It's time to change everything

As the number of cases increase and the age of patients broadens, orthopaedic applications demand a high performance bearing surface that can deliver proven clinical performance in hip and knee arthroplasty.1-8

Choose OXINIUM Oxidized Zirconium, a step change for implant technology, combining the durability of metal, the wear properties of a ceramic and corrosion resistance better than both.9-15

References
Challenging what is possible in surgical technologies

FITBONE™
Intramedullary Limb-Lengthening System

M6-C™
Artificial Cervical Disc

PhysioStim™
Bone Healing Therapy Device

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Booth #2517
Welcome Back!

Welcome to the AAOS 2021 Annual Meeting for the much-anticipated reunion of the orthopaedic community. For the first time in nearly two years, we are together again to experience orthopaedic excellence with four powerful days of education, innovation, and collaboration.

The AAOS Annual Meeting has always played a pivotal role in connecting our industry to what is new and next in musculoskeletal health care, and this year is no different.

You will have the unmatched opportunity to:

- Refresh your approach and strengthen your skills with Instructional Course Lectures
- Learn from world renowned experts across all areas of orthopaedics
- Uncover evidence-based innovations and new solutions for your patients in the Exhibit Hall
- Engage with knowledgeable staff and experience new product demos in the Resource Center
- Attend daily engaging presentations in the NEW! Engagement Theater in Academy Hall
- Hear from AAOS leadership, honor colleagues and hear remarks from Coach Roy Williams during the Your Academy meeting

I appreciate your commitment to providing the highest quality of musculoskeletal care and taking the time out to be here to review, evaluate, and apply the latest scientific research and innovative solutions to your practice and transform the way you care for your patients.

Joseph A. Bosco III, MD, FAAOS
AAOS 2020 President

PS It’s a busy few days; I encourage you to download the My Academy app to plan your customized experience with ease!
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Find expert faculty with ease using the My Academy app!
GENERAL INFORMATION
Daniel K. Guy, MD, FAAOS  
President  
Lagrange, Georgia

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First Vice-President  
New Orleans, Louisiana

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Board of Councilors  
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Chair-Elect  
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New York, New York

Alfonso Mejia, MD, MPH, FAAOS  
Secretary  
Board of Councilors  
Chicago, Illinois

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Chair  
Board of Specialty Societies  
New York, New York

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Board of Specialty Societies  
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Armando F. Vidal, MD, FAAOS  
Secretary  
Board of Specialty Societies  
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Lay Member  
Fayetteville, Georgia

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Member-at-Large  
Stamford, Connecticut

Alexander Vaccaro, MD, MBA, PhD, FAAOS  
Member-at-Large  
Philadelphia, Pennsylvania

Michael L. Parks, MD, FAAOS  
Treasurer-Elect (ex-officio)  
New York, New York

Thomas E. Arend, Jr., Esq., CAE (Ex-Officio)  
Rosemont, Illinois
YOUR ACADEMY 2021

Hear from Your Academy Leadership

Joseph A. Bosco III, MD, FAAOS
2020 Presidential Address
"Testing Our Mettle"

Daniel K. Guy, MD, FAAOS
2021 Presidential Address
"You Bet It Matters"

Felix H. Savoie III, MD, FAAOS
2021 First Vice-President Address
"The Value of AAOS Membership"

THURSDAY, 9:30–11:45 AM
BALLROOM 20B

Additional Program Highlights:

• Presidential Guest Speaker
  Roy Williams
  Former Championship-winning Coach
  UNC Men's Basketball

• Recognition of Industry Donors

• Introduction of International and Specialty Society Presidents

• Celebration of honorable colleagues
  - Diversity Award
  - Humanitarian Award
  - William W. Tipton, Jr, MD Leadership Award
  - Kappa Delta & OREF Awards
Award Presentations at the Annual Meeting

Join the American Academy of Orthopaedic Surgeons as we recognize the 2020 and 2021 Kappa Delta and OREF Clinical Research Award Winners

Thursday, September 2 • 10:40 AM • Sails Pavilion

The 2021 Kappa Delta and OREF Clinical Research Award Winners

OREF Clinical Research Award:
Epidemiology, Mechanisms, and Prevention of Sports Injury
Barry Paul Boden, MD, FAAOS
Co-Authors: Francis T. Sheehan Gavelli, PhD

Kappa Delta Young Investigator Award:
Extracellular Matrix in Cartilage Function, Regenerative Medicine and Disease: New Insights from Regulatory Proteoglycans and Collagens
Lin Han, PhD

Kappa Delta Ann Doner Vaughn Award:
Bone Regenerative Engineering: A Thirty Year Experience
Cato T. Laurencin, MD, PhD, FAAOS
Co-Authors: Yusuf Khan, PhD
Lakshmi Nair, PhD

Kappa Delta Elizabeth Winston Lanier Award:
Functional Tissue Engineering of Articular Cartilage for Biological Joint Resurfacing
Farshid Guilak, PhD
Co-Authors: Brad Estes, PhD
Franklin Moutos, PhD

The 2020 Kappa Delta and OREF Clinical Research Award Winners

OREF Clinical Research Award:
Long-term Outcomes of ACL Reconstruction Surgery
Braden C. Fleming, PhD
Co-Authors: Paul D. Fadale, MD, FAAOS Michael J. Hulstyn, MD, FAAOS
Robert M. Shalvoy, MD, FAAOS
Glenn A. Tung, MD
Gary J. Badger, MS

Kappa Delta Young Investigator Award:
Cell and Molecular Mechanisms of Tendon Development, Regeneration, and Scar Formation
Alice Huang, PhD
Co-Authors: Leesa Galatz, MD, FAAOS
Ronen Schweitzer, PhD

Kappa Delta Ann Doner Vaughn Award:
Finding Answers to the “Unsolved Fracture”: A 10 Year Journey - The Rationale, Design, and Execution of the Fixation Alternatives in the Treatment of Hip Fractures
Marc Swiontkowski, MD, FAAOS
Co-Authors: Mohit Bhandari, MD, FRCSC, PhD
FAITH Steering Committee

Kappa Delta Elizabeth Winston Lanier Award:
The Discovery, Development, Characterization, and FDA Clearance of the Alpha-Defensin Test for Periprosthetic Joint Infection
Carl Deirmengian, MD, FAAOS
Co-Authors: Keith Kardos, PhD

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ENGAGE IN EXCELLENCE AT THE AAOS RESOURCE CENTER

The Resource Center is a gem within Academy Hall that is a showplace of the latest Academy offerings. It has everything you need to continue on your path to excellence.

NEW PROGRAMS AND DEMOS, INCLUDING THE COMPREHENSIVE RESIDENT CURRICULUM AND FRACTURE & TRAUMA REGISTRY | HOT OFF THE PRESS BOOKS, PUBLICATIONS, AND REGISTRY ANNUAL REPORTS | PRODUCT DEMOS THAT EDUCATE AND DRIVE PRACTICE PROFITABILITY | INSIDE SCOOP & HOW TO BE A GUEST ON AAOS PODCASTS | USEFUL CODING TIPS | LEARN HOW THE BIOLOGICS DASHBOARD CAN GUIDE & IMPROVE PATIENT CARE | DISCOUNTS | LEARN WITH AAOS’ ONLINE LEARNING PLATFORM AND EARN CME | ENGAGE IN CONVERSATIONS WITH AAOS STAFF TO MAKE THE MOST OF YOUR MEMBERSHIP | AND MORE...

Visit the AAOS Resource Center in Academy Hall, Sails Pavilion

Tuesday: 7:00 am – 6:00 pm
Wednesday – Friday: 7:00 am – 5:00 pm

AAOS.org/resourcecenter

#KnowledgeROCKs | #LearnWithAAOS | #ILoveMyOrthoRegistry | #fAAOS | #AAOS2021

*DID WE MENTION AAOS SWAG?*
fAAOS Lapel Pins, Notebooks, Buttons, Laptop Camera Covers, Jump Drives of Registry Data Reports... and more!

while supplies last
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DID WE MENTION AAOS SWAG?* fAAOS Lapel Pins, Notebooks, Buttons, Laptop Camera Covers, Jump Drives of Registry Data Reports… and more!

while supplies last

My Academy App

Build Your Education, Exhibits, and Networking Agenda

– Purchase Instructional Course Lectures
– Add the education programs you must attend
– Select Exhibit Hall activities and exhibitors you wish to visit
– Connect with faculty and attendees across all specialties

Superior program filtering allows you to focus on specific content areas or preferred learning formats

3D Maps provide point to point navigation through Academy Hall, Exhibit Hall, and meeting rooms

Sponsored by: Smith Nephew

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## TUESDAY, AUGUST 31

<table>
<thead>
<tr>
<th>Education</th>
<th>San Diego Convention Center</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthopaedic Video Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 6:00 PM</td>
</tr>
<tr>
<td>Poster Session 1 – P0001-P0500, P1001-P1013</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 6:00 PM</td>
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<tr>
<td>Career Development</td>
<td>Room 28E - See Page 40</td>
<td>8:00 AM – 5:30 PM</td>
</tr>
<tr>
<td>Instructional Courses</td>
<td>See pages 52-201</td>
<td></td>
</tr>
<tr>
<td>Symposia &amp; Paper Presentations</td>
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</tr>
<tr>
<td>Allied Health Course - CAST1</td>
<td>Room 30C</td>
<td>8:15 AM – 5:00 PM</td>
</tr>
<tr>
<td>Poster Tours</td>
<td>Academy Hall, Sails Pavilion, See page 45</td>
<td>9:00 AM – 5:30 PM</td>
</tr>
<tr>
<td>Engagement Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>9:00 AM – 6:00 PM</td>
</tr>
<tr>
<td>Influencer Series: Dr. Matthew T. Provencher</td>
<td>Ballroom 6D</td>
<td>10:30 – 11:30 AM</td>
</tr>
<tr>
<td>Industry Lunch &amp; Learn Sessions**</td>
<td>Room 1, Room 5, See page 366</td>
<td>12:40 – 1:25 PM</td>
</tr>
<tr>
<td>Flash Five®: What’s Coming Down the Pike</td>
<td>Ballroom 6D</td>
<td>1:30 – 2:30 PM</td>
</tr>
<tr>
<td>The Way I See It…®: Traditional Thinking Challenged</td>
<td>Ballroom 6D</td>
<td>4:00 – 5:00 PM</td>
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</tbody>
</table>

**Exhibitor Sessions not sponsored by AAOS.

## WEDNESDAY, SEPTEMBER 1

<table>
<thead>
<tr>
<th>Education</th>
<th>San Diego Convention Center</th>
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<tr>
<td>Orthopaedic Video Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Poster Session 1 – P0001-P0500, P1001-P1013</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Showdowns®: Irreparable Rotator Cuff Tears</td>
<td>Ballroom 6D</td>
<td>8:00 – 9:00 AM</td>
</tr>
<tr>
<td>Poster Tours</td>
<td>Academy Hall, Sails Pavilion, See page 45</td>
<td>8:30 AM – 5:00 PM</td>
</tr>
<tr>
<td>Career Development</td>
<td>Room 28E - See Page 40</td>
<td>8:00 AM – 4:30 PM</td>
</tr>
<tr>
<td>Instructional Courses</td>
<td>See pages 52-201</td>
<td></td>
</tr>
<tr>
<td>Symposia &amp; Paper Presentations</td>
<td>See pages 52-201</td>
<td></td>
</tr>
</tbody>
</table>

Registration, Lobby D & Academy Hall, Sails Pavilion: 7:00 AM – 5:00 PM

Exhibit Halls A-H: 9:00 AM – 5:00 PM

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## WEDNESDAY, SEPTEMBER 1 (continued)

<table>
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<tr>
<th>Education</th>
<th>San Diego Convention Center</th>
<th>Time</th>
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<tr>
<td>Allied Health Course – CAST2</td>
<td>Room 30C</td>
<td>8:15 AM – 5:00 PM</td>
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<tr>
<td>Engagement Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>8:30 AM – 5:00 PM</td>
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<tr>
<td>The Way I See It…®: Narcotic-Less Surgery</td>
<td>Ballroom 6D</td>
<td>11:00 AM – 12:00 PM</td>
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<tr>
<td>Influencer Series: Dr. Amy L. Ladd</td>
<td>Room 32</td>
<td>1:30 – 2:30 PM</td>
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<table>
<thead>
<tr>
<th>Exhibit Hall</th>
<th>San Diego Convention Center</th>
<th>Time</th>
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<tr>
<td>Exhibits</td>
<td>Halls A-H</td>
<td>9:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Innovation Theater</td>
<td>Hall F, Booth 4353, See page 360</td>
<td>9:30 AM – 3:50 PM</td>
</tr>
<tr>
<td>Ask an Expert Sessions</td>
<td>Hall H, See page 363</td>
<td>9:30 AM – 4:45 PM</td>
</tr>
<tr>
<td>TechTalks</td>
<td>Hall H, See page 364</td>
<td>9:30 AM – 4:45 PM</td>
</tr>
<tr>
<td>Dedicated Exhibit Time*</td>
<td>Halls A-H</td>
<td>10:00 – 11:00 AM</td>
</tr>
<tr>
<td>Industry Lunch &amp; Learn Sessions**</td>
<td>Ask an Expert Theater, Hall H, TechTalks</td>
<td>12:40 – 1:25 PM</td>
</tr>
<tr>
<td>Complimentary Beverage Break</td>
<td>Hall A, Booth 455, Hall G, Booth 5151, Hall H, Booth 5509</td>
<td>3:00 – 3:30 PM</td>
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</table>

<table>
<thead>
<tr>
<th>General</th>
<th>Hilton Bayfront San Diego</th>
<th>Time</th>
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<tbody>
<tr>
<td>Resident Peer-to-Peer Mentoring Program</td>
<td>Sapphire E</td>
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<table>
<thead>
<tr>
<th>Specialty Society Sessions</th>
<th>San Diego Convention Center</th>
<th>Time</th>
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<tbody>
<tr>
<td>Hip/Knee/AAHKS</td>
<td>Ballroom 20A</td>
<td>8:00 AM – 5:00 PM</td>
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<tr>
<td>SOMOS</td>
<td>Room 32</td>
<td>8:00 AM – 12:30 PM</td>
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<tr>
<td>OTA</td>
<td>Ballroom 6A</td>
<td>1:30 – 5:00 PM</td>
</tr>
<tr>
<td>POSNA1</td>
<td>Ballroom 6D</td>
<td>1:30 – 3:00 PM</td>
</tr>
<tr>
<td>POSNA2</td>
<td>Ballroom 6D</td>
<td>3:30 – 5:00 PM</td>
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</tbody>
</table>

*No educational activities are scheduled.
**Exhibitor Sessions not sponsored by AAOS.

## THURSDAY, SEPTEMBER 2

<table>
<thead>
<tr>
<th>Education</th>
<th>San Diego Convention Center</th>
<th>Time</th>
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<tbody>
<tr>
<td>Orthopaedic Video Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Poster Session 2 – P0501-P1013</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Flash Five®: What’s Coming Down the Pike?</td>
<td>Ballroom 6D</td>
<td>8:00 – 9:00 AM</td>
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</tbody>
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Registration, Lobby D & Academy Hall, Sails Pavilion: 7:00 AM – 5:00 PM
Exhibit Halls A-H: 9:00 AM – 5:00 PM
### Education

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
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<tbody>
<tr>
<td>Instructional Courses</td>
<td>See pages 52-201</td>
</tr>
<tr>
<td>Symposia &amp; Paper Presentations</td>
<td>See pages 52-201</td>
</tr>
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### Poster Tours

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:30 AM – 5:00 PM</td>
<td>Academy Hall, Sails Pavilion, See page 45</td>
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### Engagement Theater

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:30 AM – 4:30 PM</td>
<td>Academy Hall, Sails Pavilion</td>
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### Career Development

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>8:30 AM – 12:00 PM</td>
<td>Room 28E - See Page 40</td>
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</tbody>
</table>

### Showdowns®: Controversies in Total Knee Arthroplasty

<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>1:30 – 2:30 PM</td>
<td>Ballroom 6D</td>
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</table>

### The Way I See It…®: Healthcare 2021

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>3:30 – 4:30 PM</td>
<td>Ballroom 6D</td>
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</table>

### Exhibit Hall

<table>
<thead>
<tr>
<th>Event</th>
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<tr>
<td>Exhibits</td>
<td>Halls A-H</td>
</tr>
<tr>
<td>Innovation Theater</td>
<td>Hall F, Booth 4353, See page 360</td>
</tr>
<tr>
<td>Ask an Expert Sessions</td>
<td>Hall H, See page 363</td>
</tr>
<tr>
<td>Dedicated Exhibit Time*</td>
<td>Halls A-H</td>
</tr>
<tr>
<td>TechTalks</td>
<td>Hall H, See page 364</td>
</tr>
<tr>
<td>Industry Lunch &amp; Learn Sessions**</td>
<td>Ask an Expert Theater, Hall H, TechTalks Theater, Hall H, Room 1, Room 5, Room 6C and Room 6F, See page 366</td>
</tr>
<tr>
<td>Complimentary Beverage Break</td>
<td>Hall A Booth 455, Hall G, Booth 5151, Hall H, Booth 5509</td>
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### General

<table>
<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>Speed Mentoring for Residents #390</td>
<td>Room 8</td>
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<tr>
<td>Your Academy 2021</td>
<td>Ballroom 20B</td>
</tr>
<tr>
<td>Award Presentations &amp; Presidential Guest Speaker: Roy Williams</td>
<td>Ballroom 20B</td>
</tr>
<tr>
<td>Forum for Young Orthopaedic Surgeons</td>
<td>Room 8</td>
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<tr>
<td>The Resident Bowl</td>
<td>Room 30C</td>
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### Specialty Society Sessions

<table>
<thead>
<tr>
<th>Event</th>
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<tbody>
<tr>
<td>AOSSM1</td>
<td>Ballroom 6A</td>
</tr>
<tr>
<td>AOSSM2</td>
<td>Ballroom 6A</td>
</tr>
<tr>
<td>Spine Specialty Societies</td>
<td>Ballroom 6E</td>
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</tbody>
</table>

*No educational activities are scheduled.*

**Exhibitor Sessions not sponsored by AAOS.
### FRIDAY, SEPTEMBER 3

#### Education

<table>
<thead>
<tr>
<th>Event</th>
<th>San Diego Convention Center</th>
<th>Time</th>
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<tbody>
<tr>
<td>Orthopaedic Video Theater</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Poster Session 2 – P0501-P1013</td>
<td>Academy Hall, Sails Pavilion</td>
<td>7:00 AM – 5:00 PM</td>
</tr>
<tr>
<td>Poster Award Ceremony and Breakfast</td>
<td>Poster Tour Stage, Academy Hall, Sails Pavilion</td>
<td>7:00 AM</td>
</tr>
<tr>
<td>Instructional Courses</td>
<td>See pages 52-201</td>
<td>8:00 – 10:00 AM</td>
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<td></td>
<td></td>
<td>11:00 AM – 12:30 PM</td>
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<td></td>
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<td>1:30 – 3:00 PM</td>
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<td>3:30 – 5:00 PM</td>
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<tr>
<td>Symposia &amp; Paper Presentations</td>
<td>See pages 52-201</td>
<td>8:00 – 10:00 AM</td>
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<tr>
<td></td>
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<td>3:30 – 5:00 PM</td>
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<tr>
<td>Poster Tours</td>
<td>Academy Hall, Sails Pavilion, See page 45</td>
<td>8:30 AM – 4:00 PM</td>
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<td>Engagement Theater</td>
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</tr>
<tr>
<td>Influencer Series: Dr. Mark D. Miller</td>
<td>Ballroom 6D</td>
<td>11:00 AM – 12:00 PM</td>
</tr>
<tr>
<td>The Way I See It…®: Navigation and Robotics</td>
<td>Ballroom 6E</td>
<td>1:30 – 2:30 PM</td>
</tr>
</tbody>
</table>

#### Exhibit Hall

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>San Diego Convention Center</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exibits</td>
<td>Halls A-H</td>
<td>9:00 AM – 1:30 PM</td>
</tr>
<tr>
<td>Innovation Theater</td>
<td>Hall F, Booth 4353, See page 360</td>
<td>9:30 AM – 12:20 PM</td>
</tr>
<tr>
<td>Ask an Expert Sessions</td>
<td>Hall H, See page 363</td>
<td>9:30 – 11:15 AM</td>
</tr>
<tr>
<td>TechTalks</td>
<td>Hall H, See page 364</td>
<td>9:30 – 11:15 AM</td>
</tr>
<tr>
<td>Complimentary Beverage Break</td>
<td>Hall A, Booth 455, Hall G, Booth 5151, Hall H, Booth 5509</td>
<td>10:00 – 11:00 AM</td>
</tr>
<tr>
<td>Dedicated Exhibit Time*</td>
<td>Halls A-H</td>
<td>10:00 – 11:00 AM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12:30 – 1:30 PM</td>
</tr>
<tr>
<td>Industry Lunch &amp; Learn Sessions**</td>
<td>Ask an Expert Theater, Hall H, TechTalks Theater, Hall H, Room 1 and Room 5. See page 366</td>
<td>12:40 – 1:25 PM</td>
</tr>
</tbody>
</table>

#### General

<table>
<thead>
<tr>
<th>General</th>
<th>San Diego Convention Center</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Resident Education Forum</td>
<td>Room 17B</td>
<td>10:00 – 11:30 AM</td>
</tr>
</tbody>
</table>

#### Specialty Society Sessions

<table>
<thead>
<tr>
<th>Specialty Society Sessions</th>
<th>San Diego Convention Center</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAHS</td>
<td>Ballroom 6A</td>
<td>8:00 AM – 12:30 PM</td>
</tr>
<tr>
<td>AANA/ASES</td>
<td>Ballroom 20B</td>
<td>8:00 AM – 12:30 PM</td>
</tr>
</tbody>
</table>

*No educational activities are scheduled.

**Exhibitor Sessions not sponsored by AAOS.
ENGAGE IN INNOVATION EXCELLENCE

Discover innovative solutions that enhance your practice.

Exhibit Hall Hours
Wednesday 9:00 AM – 5:00 PM
Thursday 9:00 AM – 5:00 PM
Friday 9:00 AM – 1:30 PM NEW!

Dedicated Exhibit Time
Wednesday 10:00 – 11:00 AM
12:30 – 1:30 PM
3:00 – 3:30 PM
Thursday 9:30 – 11:00 AM NEW!
12:30 – 1:30 PM
3:00 – 3:30 PM
Friday 10:00 – 11:00 AM
12:30 – 1:30 PM
The American Academy of Orthopaedic Surgeons wishes to thank the following companies for their promotional support of the AAOS 2021 Annual Meeting.
Accreditation
The American Academy of Orthopaedic Surgeons is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education (CME) for physicians.

CME Credit
U.S. Physicians: The AAOS designates this live activity for a maximum of 28.5 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

International Physicians: The AMA has determined that physicians not licensed in the United States but who participate in this CME activity are eligible for AMA PRA Category 1 Credits™.

Allied Health Professionals: The AAOS is not accredited to offer credit for nurses and other Allied Health Professionals. To determine if activities offering AMA PRA Category 1 Credits™ are acceptable for your licensing or certification needs please contact the relevant organizations directly.

IMPORTANT: Please check-in as soon as you arrive.

The AAOS CME transcript system will not allow you to claim CME credit for any educational activities you participated in before you officially check-in to the meeting. For instance, you arrive at the meeting on Tuesday but do not check-in until Wednesday, you will not be able to claim CME credits for your Tuesday attendance. Also, only after checking-in will you be able to print your CME Certificate of Attendance.

Check-In OR Register at the Meeting on:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Max Daily Credits</th>
<th>Max Meeting Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT and ICD-10 Coding Fundamentals for</td>
<td>up to 9</td>
<td>28.5</td>
</tr>
<tr>
<td>Starting Your Practice #290</td>
<td></td>
<td></td>
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<tr>
<td>Flash Five®</td>
<td>up to 6.5</td>
<td>19.5</td>
</tr>
<tr>
<td>Forum for Young Orthopaedic Surgeons</td>
<td>up to 6</td>
<td>13</td>
</tr>
<tr>
<td>with the ABOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influencer Series</td>
<td>up to 7</td>
<td>7</td>
</tr>
<tr>
<td>Instructional Courses</td>
<td></td>
<td></td>
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<tr>
<td>Orthopaedic Video Theater</td>
<td></td>
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<tr>
<td>Papers</td>
<td></td>
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</tr>
<tr>
<td>Posters (only when the presenter is</td>
<td></td>
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</tr>
<tr>
<td>required to be present and during the</td>
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<tr>
<td>poster tours)</td>
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<tr>
<td>Showdowns®</td>
<td></td>
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<tr>
<td>Specialty Society Sessions</td>
<td></td>
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<tr>
<td>Symposia</td>
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<tr>
<td>The Way I See It…®</td>
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<tr>
<td>Ask an Expert</td>
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<tr>
<td>Engagement Theater</td>
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<tr>
<td>Industry Exhibits</td>
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<td></td>
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<tr>
<td>Practice Management Course for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents and Fellows-in-Training #291</td>
<td></td>
<td></td>
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<tr>
<td>Speed Mentoring Program for Residents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TechTalks</td>
<td></td>
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</tr>
</tbody>
</table>

CME Certificate of Attendance Kiosks
While you are at the meeting, print your CME Certificate of Attendance for the AAOS and participating Specialty Societies.

Specialty Society Sessions CME
Listed below are the Specialty Societies designations of AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

American Association for Hand Surgery - 3.5 credits
American Orthopaedic Society of Sports Medicine (A O SSM1) - 1.5 credits
American Orthopaedic Society of Sports Medicine (A O SSM2) - 1.5 credits
Arthroscopy Association of North America / American Shoulder and Elbow Surgeons - 3.5 credits
Orthopaedic Trauma Association – 3 credits
Pediatric Orthopaedic Society of North America (POSNA1) - 1.5 hours
Pediatric Orthopaedic Society of North America (POSNA2) - 1.5 hours
Society of Military Orthopaedic Surgeons - 3.5 credits
The Hip Society/The Knee Society/American Association of Hip and Knee Surgeons - 6.5 credits
FDA Statement
Some drugs or medical devices demonstrated at the Annual Meeting have been cleared by the FDA for specific purposes only or have not been cleared by the FDA. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice. Academy policy provides that “off label” uses of a drug or medical device may be described in the Academy’s CME activities so long as the “off label” use of the drug or medical device is also specifically disclosed (i.e. it must be disclosed that the FDA has not cleared the drug or device for the described purpose). Any drug or medical device is being used “off label” if the described use is not set forth on the product’s current label.

Reproduction
The Academy reserves any and all of its rights to materials presented at the Annual Meeting, including Posters. Reproductions of any kind, by any person or entity, without prior written permission from the Academy, are strictly prohibited. Prohibited reproductions include, but are not limited to, audiotapes, videotapes, and/or still photography. Persons violating this policy may have their badge confiscated and be escorted from the meeting. No unapproved surveys, handouts, or literature may be distributed at the meeting.

Presentation of Fraudulent Research
The Central Program Committee makes every attempt to ensure that the research activities and findings presented in the scientific program are genuine and valid. It should be understood, however, that it is not possible to vet each and every study that is presented during the Annual Meeting. The abstracts of presentations submitted for grading are rated by qualified and expert graders. In some instances, the paper presentation or poster may not reflect its related abstract submitted six months earlier. The Central Program Committee considers these instances to be errors in the presenters’ judgment when they occur. Presentation of fraudulent research violates the AAOS Mandatory Standards of Professionalism on Research and Academic Responsibilities. If you feel you have witnessed a knowingly fraudulent presentation, please address your concern to a member of the Central Program Committee or Academy staff. The Central Program Committee will review the matter and determine the response, if any is needed. AAOS reserves the right to bar the submission of future abstracts from the speaker(s) and/or to publish a retraction of the abstract in AAOS Now or other AAOS publications or communications. Any AAOS member may also file a grievance against another AAOS member under the AAOS Professional Compliance Program. Based upon the recommendation of the Committee on Professionalism and the Judiciary Committee, the AAOS Board of Directors may determine to issue a letter of concern, or to reprimand, censure, suspend, or expel the AAOS Fellow or Member who presented the fraudulent research. For more information on the Professional Compliance Program, visit aaos.org/profcomp or email professionalcompliance@aaos.org.

2021 Annual Meeting Objectives
Global Objectives
• Develop and refine a perspective on the broad range of orthopaedic knowledge, care and surgical practice.
• Expand and integrate an understanding of the scientific and clinical tenets of orthopaedic surgery to better prevent and treat musculoskeletal disease.
• Develop an understanding of economic and practice management challenges that can lead to strategies that protect continued access to care for patients and viability of the profession.
• Provide a forum for the presentation of basic and clinical research with current as well as future potential applications in the management of patients with musculoskeletal disease or injury.
• Offer complementing formats to facilitate career-long education that meets the expectations and requirements of patients, colleagues and Maintenance of Certification.
• To provide a forum for the presentation of basic and clinical research with current as well as potential future applications in the management of patients with musculoskeletal disease or injury.

Instructional Objectives
• To facilitate a personalized educational experience through a comprehensive offering of instructional courses, symposia, and scientific presentations.
• Support a forum for discussion of current issues in orthopaedics including patient safety, advocacy, practice management, technology, and culturally competent care.
• To provide a forum for discussion of current issues in orthopaedics including patient safety, advocacy, practice management, technology, and culturally competent care.

Learner Objectives
• Synthesize a basis for the practice of delivering evidence based, cost effective orthopaedic care, both patient centered and population based.
• Integrate current basic science, translational research, and state-of-the art procedures and technology into clinical practice.
• Become more informed and involved in advocacy issues related to orthopaedics.
• To provide a forum for resident education on current clinical practice, relevant basic science, practice management, and advocacy issues in preparation for careers as competent and ethical orthopaedic surgeons.
Attending Policies

**ADA Request**
AAOS will consider the requests of persons with disabilities for reasonable modifications of policies, practices and procedures or for auxiliary aids and services where necessary to provide access to AAOS facilities, events, services and products. AAOS encourages that such requests be made as soon as possible to enhance AAOS’ ability to accommodate the requests. For on-site requests, please visit the Academy Headquarters Office, Room 15A.

**Anti-Discrimination and Anti-Harassment**
AAOS prohibits harassment or discrimination in any form by or against an employee, exhibitor, vendor or attendee. The AAOS Anti-Discrimination and Anti-Harassment Policies and Procedures is available by contacting AAOS at meeting@aaos.org or at www.aaos.org/antiharassmentpolicy.

**Disclaimer**
The material presented at the Annual Meeting has been made available by the American Academy of Orthopaedic Surgeons for educational purposes only. This material is not intended to represent the only, nor necessarily best, method or procedure appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement, or opinion of the faculty which may be helpful to others who face similar situations. Medical providers should use their own, independent medical judgment, in addition to open discussion with patients, when developing patient care recommendations and treatment plans. Medical care should always be based on a medical provider’s expertise that is individually tailored to a patient’s circumstances, preferences and rights. The AAOS disclaims any and all liability for injury or other damages resulting to any individual attending a session and for all claims which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by a physician or any other person.

**Event Cancellation**
AAOS may elect to cancel the Annual Meeting due to circumstances beyond our control, such as disaster, severe weather, civil commotion or government laws or regulations. In the event of such cancellation, all Annual Meeting registrants will be notified by email at the address provided in the AAOS database; and registration fees will be refunded in full. Other costs incurred by the registrant, such as airline or hotel penalties, are the responsibility of the registrant.

**Family Badge and Children at the Meeting**
AAOS members receive one complimentary family badge that may be used by a spouse, significant other, or immediate family member (not an active medical professional). All Family Badge recipients must be accompanied by the registered AAOS member and present an ID to receive a family badge.

Family Badge attendees 16 years and older have access to the following:
- Academy Hall
- Industry Exhibits
- Your Academy/Guest Speaker

Family Badge attendees 16 years and older have access to the following:
- Academy Hall
- Industry Exhibits
- Your Academy/Guest Speaker

Please note: Family Badge attendees will not have access to any educational sessions or events.

**FDA Statement**
Some drugs or medical devices demonstrated at the Annual Meeting have been cleared by the FDA for specific purposes only or have not been cleared by the FDA. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice. AAOS policy provides that “off label” uses of a drug or medical device may be described in AAOS’s CME activities so long as the “off label” use of the drug or medical device is also specifically disclosed (i.e. it must be disclosed that the FDA has not cleared the drug or device for the described purpose). Any drug or medical device is being used “off label” if the described use is not set forth on the product’s current label.

**Use of Geographic Location**
AAOS mobile apps use geographic data to enhance user experience by providing direction and messaging for key events.

**Image Capture**
By attending and participating in events and activities held during the Annual Meeting, attendees grant AAOS (and its employees and agents) permission to capture, retain, and utilize the attendees’ image, likeness, voice, and actions, whether captured live or recorded, in any format or medium. Any such images, voices or likeness captured during the Annual Meeting may be used for display, exhibition, publication, or reproduction in any medium or context for any purpose, including, but not limited to, commercial or promotional purposes, without further notice, authorization, or compensation.

**Non-Smoking Policy**
Smoking is not permitted in public areas such as restaurants, hotel lobbies and the convention center.

**Privacy Policy – Use of Personal Information**
Annual Meeting registration lists, including the medical registrant’s name, postal mailing address, and phone number, are available for sale to exhibitors in advance of and after the Annual Meeting.

Personal Information, including the medical registrant’s name, postal mailing address, phone number, email address, hospital affiliation and practice focus, is available to Annual Meeting exhibitors and service providers through a lead retrieval system. While registering for Annual Meeting, medical registrants may choose to opt out of the distribution of their email addresses through the lead retrieval system.

AAOS, its third-party vendors or service providers may collect, store and use Personal Information to provide AAOS products and services or to improve the user experience at AAOS events and with AAOS products and services. For additional information, please refer to the entire AAOS Privacy Policy by visiting www.aaos.org/privacy.

**Private Meeting**
The AAOS Annual Meeting is a private meeting. The AAOS reserves the right to control meeting space and may, at its sole discretion, remove persons from the meeting who are not registered, who do not meet attendance requirements or who cause disruptions.
Attendee Policies (continued)

Refund Policy
The Academy does not issue refunds on-site during the meeting. All requests for refunds (registration, courses, track packages, and/or Specialty Society Sessions) must have been received via email to the Live Events department at meeting@aaos.org on or before July 23, 2021. The Exhibitor refund policy is available in the Exhibit Prospectus or contact AAOS at exhibits@aaos.org.

Reproduction Policy
AAOS reserves any and all its rights, including intellectual property rights, to materials presented at the Annual Meeting, including Posters. Reproductions of any kind or format, by any person or entity, without prior written permission of AAOS, are strictly prohibited. Persons violating this policy may be escorted from the meeting.

Selling and Marketing Activities
• Selling and/or marketing activities are reserved exclusively for registered exhibitors and can only be conducted from an exhibit booth space or other areas as approved by AAOS.
• Annual Meeting attendees that plan to sell and/or market products and services at the Annual Meeting can only do so from an exhibit booth in the Industry Exhibit Hall.
• At the sole discretion of AAOS, attendees found in violation of this requirement may be escorted from the meeting and may have all meeting privileges revoked without refund of fees paid.
• No unapproved surveys, handouts, or literature may be distributed at the Annual Meeting.

Safety

Emergency Numbers
San Diego Convention Center (SDCC): (619)525-5911
From a SDCC house phone: 5911
For emergencies, outside of the convention center:
City Police Emergency: 911
City Police Non-Emergency:(619)531-2000
Poison Control: (800)222-1222 (Nationwide)

Nearest Hospitals
Scripps Mercy Hospital - 4.0 miles
4077 Fifth Ave (619)294-8111
Alvarado Hospital Medical Center – 12.7 miles
6655 Alvarado Rd (619)287-3270

First Aid at the Convention Center
Ballroom 20 Lobby
This station is fully equipped and staffed by licensed medical professionals and will include automated external defibrillators for reviving heart attack victims.
• Hours of Operation:
  Tuesday - Friday ......................... 7:00 AM – 6:00 PM

For Your Safety - When you are outside you should:
• Get directions before leaving the hotel or restaurant.
• Take taxis or shuttles you recognize.
• Walk with another person. Single targets are the most likely victims of crime.
• Do not wear your badges or carry conference bags. Both identify out-of-towners.
• Avoid dark, isolated areas, such as closed plazas and apparent shortcuts back to the hotel.

Drug Stores
CVS, 400 5th Ave, (619)744-9967
• Hours of Operation
  Monday – Sunday ............................ 7:00 AM – 10:00 PM
• Pharmacy Hours:
  Monday – Friday ............................ 9:00 AM – 9:00 PM
  Saturday ........................................... 9:00 AM – 6:00 PM
  Sunday ........................................... 10:00 AM – 6:00 PM

CVS, 645 Market St, (619)234-5952
• Hours of Operation:
  Monday – Sunday ............................ 7:00 AM – 10:00 PM
• Pharmacy Hours:
  Monday – Friday ............................ 9:00 AM – 9:00 PM
  Saturday ........................................... 9:00 AM – 6:00 PM
  Sunday ........................................... 10:00 AM – 6:00 PM

© 2021 American Academy of Orthopaedic Surgeons
AAOS Registry Program
AAOS Resource Center, Academy Hall, Sails Pavilion
AAOS Registry Program’s mission is to improve orthopaedic care through the collection, analysis, and reporting of actionable data. We seek to encompass all the musculoskeletal and anatomical areas for orthopaedics through comprehensive data and technology resulting in optimal patient outcomes. Our registries include: Fracture & Trauma Registry, American Joint Replacement Registry, Musculoskeletal Tumor Registry, and Shoulder & Elbow Registry. Additionally, the American Spine Registry is a collaboration with American Association of Neurological Surgeons.

AAOS Resource Center
Academy Hall, Sails Pavilion
The AAOS Resource Center is a showplace of the latest offerings anchored in Academy Hall that has something for everybody, no matter what career stage.

• Making its debut, a comprehensive, all-encompassing Resident Orthopaedic Core Knowledge program
• Registry Program’s new Fracture & Trauma Registry and data reports from American Joint Replacement Registry and Shoulder & Elbow Registry
• Podcast Booth where leaders will be recording live shows
• Educational Product Offerings – CME educational books, journals, online learning products, coding resources, and practice exams to access and purchase at a discount
• Quality Programs and latest news about biologics including member dashboards

AAOS OrthoPac
Hall E, Booth 4035
Learn more about AAOS’ legislative and regulatory activities and the Orthopaedic PAC.

• Hours of Operation:
  Wednesday – Thursday ........................................ 9:00 AM – 5:00 PM
  Friday .......................................................... 9:00 AM – 1:30 PM

Airline Information
American Airlines .................................................. (800)433-7300
Delta ............................................................. (800)221-1212
United Airlines .................................................... (800)864-8331
Corp Trav .......................................................... (630)656-6605

Airport Shuttle
The airport shuttle is an economical way to get to your hotel from the airport with rates ranging $14-$30 one-way. Book online at www.san.org/to-from/Shuttles.

Badges are required for entry to all areas and are distributed with a paid registration.

• Member and Customer Services including help with My Academy app and member value survey
• Orthopaedic Video Theater – learn new techniques or get refreshers on hundreds of topics
• Hours of Operation:
  Tuesday ..................................................... 7:00 AM – 6:00 PM
  Wednesday – Friday .................................... 7:00 AM – 5:00 PM

ADA Needs
Wheelchairs and mobility scooters are available through the following company: Scootaround, (888)441-7575 or www.scootaround.com

Affiliate Displays
Academy Hall, Sails Pavilion
• American Board of Orthopaedic Surgery – ABOS
  Booth is staffed during the following hours:
  Tuesday ..................................................... 7:00 AM – 6:00 PM
  Wednesday – Friday .................................... 7:00 AM – 5:00 PM

Business & Package Center – FedEx Office
Lobby D, (619)525-5450
Offers packaging, shipping, printing, copying, equipment rental, office supplies and other services.

• Hours of Operation:
  Tuesday ..................................................... 7:00 AM – 6:00 PM
  Wednesday – Friday .................................... 7:00 AM – 5:00 PM

Career Center
Academy Hall, Sails Pavilion
Provides an opportunity for employers and candidates of orthopaedic surgery positions to meet in person.

• Hours of Operation:
  Tuesday ..................................................... 7:00 AM – 6:00 PM
  Wednesday – Friday .................................... 7:00 AM – 5:00 PM
Cash Station/ATM
ATMs are located in the convention center lobby areas. The following banks are in proximity to the convention center:

- **U.S. Bank**, 801 Market St, (619)744-2140
- **Union Bank**, 1101 Market St, (619)702-2768

  - **Hours of Operation:**
    - Monday – Friday ..................................... 9:00 AM – 5:00 PM
  - **Pacific Premier Bank**, 501 W Broadway #550, (619)241-4260
  - **Hours of Operation:**
    - Monday – Friday ..................................... 9:00 AM – 4:00 PM

Certificate of Attendance Kiosks
Academy Hall, Sails Pavilion, Lobby A, Lobby G
Print your CME Certificate of Attendance for the Annual Meeting and participating Specialty Societies.

Coat and Luggage Check
Lobby A
For identification, please leave a business card in your pocket.

  - **Hours of Operation:**
    - Tuesday ................................................. 6:30 AM – 6:30 PM
    - Wednesday – Friday ................................ 6:30 AM – 5:30 PM

Exhibits
Halls A-H

  - **Hours of Operation:**
    - Wednesday – Thursday .............................. 9:00 AM – 5:00 PM
    - **NEW!** Friday ........................................... 9:00 AM – 1:30 PM

Admission
Admission to the Exhibit Hall is by badge only. Individuals under the age of 16 are not permitted in the exhibit halls.

Dedicated Exhibit Time
Explore the Exhibit Hall without missing any education sessions. The following dedicated times have been set aside for attendees to view and discuss the latest technologies in orthopaedic surgery and attend product demonstration.

  - **Wednesday**
    - 10:00 – 11:00 AM, 12:30 – 1:30 PM, 3:00 – 3:30 PM
  - **Thursday**
    - **NEW!** 9:30 – 11:00 AM, 12:30 – 1:30 PM, 3:00 – 3:30 PM
  - **Friday**
    - 10:00 – 11:00 AM, 12:30 – 1:30 PM

Food Service
There are ample food and beverage concession areas located throughout the convention center for convenient walk up service.

Forum for Young Orthopaedic Surgeons with the American Board of Orthopaedic Surgery (ABOS)
Thursday, 11:00 AM - 12:30 PM, Room 8
Meet with Executive Medical Director of the ABOS, David F. Martin, MD, FAAOS, during this unique forum and learn critical information about Board requirements and procedures.

Hotel Reservations – 2022 Annual Meeting
All attendees can make “EARLY” hotel reservations for the 2022 Annual Meeting in Chicago. Stop by the Housing Help Desk in Lobby D and make your reservation today!

Housing Help Desk
Lobby D
Visit the Housing Help Desk if you experience any problems with your reservation or room.

  - **Hours of Operation:**
    - Monday .................................................. 2:00 – 6:00 PM
    - Tuesday .................................................. 7:00 AM – 6:00 PM
    - Wednesday – Friday ................................. 7:00 AM – 5:00 PM

Instructional Course Lecture Ticket Exchange
Attendee Registration, Lobby D
Individual tickets purchased in advance may be exchanged for the same type ticket (for example an ICL for an ICL) at the Ticket Sales counter. There are no exchanges available for the Education Specialty Tracks. The registrant must pay the difference between the advance purchase price and the on-site purchase price to exchange a ticket.

International Business Office
Room 15B
Academy Staff are available to assist you with inquiries. For membership inquiries, please visit the membership desk in the Resource Center, Academy Hall, Sails Pavilion.

  - **Hours of Operation:**
    - Tuesday .................................................. 7:00 AM – 6:00 PM
    - Wednesday – Friday ................................. 7:00 AM – 5:00 PM

International Groups Department
Attendee Registration, Lobby D
Hotel and registration assistance for international guests who used this service.

International Surgeons Lounge
Room 15B
We invite surgeons visiting the U.S. to come and relax, meet with other international colleagues, and browse information on AAOS international activities. Refreshments (coffee, tea, and water) are provided.

  - **Hours of Operation:**
    - Tuesday .................................................. 7:00 AM – 6:00 PM
    - Wednesday – Friday ................................. 7:00 AM – 5:00 PM

Lactation Room
We offer a lounge within the women’s restrooms of Lobbies A and E.

  - **Hours of Operation:**
    - Tuesday .................................................. 7:00 AM – 6:00 PM
    - Wednesday – Friday ................................. 7:00 AM – 5:00 PM
Lost & Found
Academy Headquarters Office, Room 15A
• Hours of Operation:
  Monday .................................................. 7:00 AM – 6:00 PM
  Tuesday ................................................. 6:30 AM – 6:30 PM
  Wednesday – Friday ................................ 6:30 AM – 5:30 PM

My Academy App
Plan your personalized meeting experience with ease using the My Academy App
• NEW! Build your education, exhibits, and networking agenda
• Add the education programs you won’t want to miss
• Select Exhibit Hall activities and exhibitors you wish to visit
• Connect with faculty and attendees across all specialties
• Access program handouts and submit your evaluations all in one place
• NEW! Superior program filtering allows you to focus on specific content areas or preferred learning formats.
• NEW! 3D Maps provide point to point navigation through Academy Hall, Exhibit Hall, and meeting rooms.

The My Academy App is available for free download from the App Store or Google Play

Sponsored by:

Smith+Nephew

Allied Health Program
CAST 1 & 2, Room 30C
AAOS and the National Association of Orthopaedic Technologists (NAOT) have collaborated to develop this program. To attend any of these courses, you need to register for the AAOS Annual Meeting and purchase a ticket for each course. The Annual Meeting on-site registration fee is $500.

Tickets for the CAST courses are $230. A complete listing of the courses can be found on page 202.

Offices
Academy Headquarters Office ................................... Room 15A
Exhibits Office ............................................. Lobby E
International Business Office ................................ Room 15B
Magazine Office ........................................... Room 24B
Media Briefing ................................................. Room 23A
Press Office .................................................. Room 22
Speaker Ready Rooms ..................................... Room 11

Room 26

Parking
The San Diego Convention Center offers a 1,950-vehicle underground parking garage below the building, including 31 ADA compliant parking stalls with elevator access to the center.

The entrance is on Harbor Drive and there are no in-and-out privileges. No overnight or RV parking is permitted. The rate is $20.00 per day. For additional information, please contact ACE Parking at (619)237-0399.

Prayer Room
Room 18
AAOS provides this dedicated room for the purpose of meditation and quiet prayer.
• Hours of Operation:
  Tuesday ................................................. 7:00 AM – 6:00 PM
  Wednesday – Friday ................................ 7:00 AM – 5:00 PM

Redemption Centers
Booths 149, 4658, and 5347
Visit the Redemption Centers to pick up a complimentary tote bag and AAOS T-shirt. Enter drawings to win gift cards and more! Check your registration packet for special coupons, redeemable exclusively at AAOS Redemption Centers.
• Hours of Operation:
  Wednesday – Thursday ................................ 9:00 AM – 5:00 PM
  Friday ................................................... 9:00 AM – 1:30 PM

Registration
Lobby D
• Hours of Operation:
  Monday .................................................. 2:00 – 6:00 PM
  Tuesday ................................................. 7:00 AM – 6:00 PM
  Wednesday – Friday ................................ 7:00 AM – 5:00 PM

Fees:
Members in good standing: AAOS Fellow, Candidate, Resident, Emeritus, Associate, PA, International, International Resident ......................................................... $250
Annual Meeting Official Speaker ........................................ No Fee
Annual Meeting Official Co-Author ................................... $250
Non-Member Physician ............................................. $1,565
Non-Physician .................................................. $1,565
International Non-Member Medical Attendee ................ $1,075
U.S. Non-Member Fellow-in-training .......................... $250
U.S. Non-Member Resident-in-training ........................ $250
U.S. Allied Health ................................................ $500
Must work in an orthopaedic practice or institution and provide hands on patient care. For example: RN, LPN, NP, PA, PA-C, ATC, CTO, CST, OTC, DPT, PT.
U.S. Orthopaedic Practice Staff .................................. $500
Must work in an orthopaedic practice or institution and provide patient services. This category includes: practice administrator, office manager, office assistant, medical records and insurance billing and coding staff.
U.S. Career Center approved participant ........................ $500
Limited to hiring employers who also have an active Career Center listing.
Exhibitor Research & Development Personnel ........... $1,565
Ribbons
If you did not receive your participant/volunteer ribbon(s) in advance, please stop by the Ribbon Counter located in Registration, Lobby D or one of our Speaker Ready Rooms 11 or 26. Committee members and Board of Councilors receive their ribbons from their liaisons.

Ride Share at the Convention Center
Uber and Lyft drop-off and pick-up areas are located outside of Lobby A.

Shuttle Bus
Shuttle bus service to and from the convention center is available to guests staying at official AAOS hotels beyond the downtown area. For a schedule, see the My Academy App.

- Hours of Operation:
  Tuesday ..................................................6:30 AM - 6:30 PM
  Wednesday - Friday .................................6:30 AM – 5:30 PM
  (No Service between 10:00 AM –3:00 PM)
Items left on the shuttles will be turned in to the Academy Headquarters Office, Room 15A.

Social Media
Follow AAOS on our member- and patient-facing social media channels. We share education, research, and updates from the Academy, as well as consumer-friendly news and resources you can share with your patients.

Speaker Ready Rooms 11 & 26
- Hours of Operation:
  Monday ..................................................2:00 – 6:00 PM (Room 11 only)
  Tuesday ..................................................6:30 AM – 6:00 PM
  Wednesday – Friday .................................6:30 AM – 5:00 PM

Specialty Society Sessions
Wednesday - Friday, San Diego Convention Center
Refer to the listing on page 24.

Taxi Service at the Convention Center
The taxi drop-off and pick-up areas are located outside Lobby A.

The Joint Commission
Hall B1, Booth 1114
For 70 years, the name Joint Commission has been synonymous with quality and safety. We offer Advanced Certification for Total Hip and Knee Replacement and Advanced Certification in Spine Surgery in collaboration with the American Academy of Orthopaedic Surgeons. These certifications provide a framework for consistency and improving patient outcomes through clinically proven evidence-based standards.

Wi-Fi
Wireless Internet access – at no charge – is available throughout the convention center lobbies, meeting rooms, Academy Hall, Ask an Expert, Innovation Theater, TechTalks, and the Exhibit Hall food service areas.

Academy Executive Leadership Team
Chief Executive Officer ................Thomas E. Arend, Jr, Esq, CAE
Chief Operating Officer ................................. Dino Damalas, MBA
Chief Commercial Officer ................................. Anna Salt Troise, MBA
Chief Human Resources Officer ....................... Laura Abrahams
Chief Quality and Registries Officer ........ Nathan Glusenkamp, MA

Senior Leadership Team
Chief Information Officer ................................. Jack King, MBA
Chief Marketing & Communications Officer ........ Tony Priore, MS
Managing Director, Clinical Quality & Value ...... Jayson Murray, MA
Vice President, Live Events ................................. Susan McSorley
Director, Finance ........................................ Tina Slager, CPA, MBA
Director, Governance and Affiliate Relations ... Donna Malert, CAE
Vice President, Government Relations .......... Graham Newson, MA
Director, Learning & Practice .......................... Brian Moore
Director, Registries Operations .... Reagan Bayer, MBA, PMP, CSM
Director, Strategic Planning and Performance Management ............................. Todd Applebaum, MBA
General Counsel ........................................ Melissa Young, JD
Participate in Education Sessions from Specialty Societies

Connect with professionals who share your specialty interest. Exchange experiences and ideas while learning about the latest developments to ensure superior patient care with special programming presented by organizations that are members of the Board of Specialty Societies (BOS). Those organizations include:

- **American Association for Hand Surgery**
  - Ballroom 6A
  - Friday, 8:00 AM – 12:30 PM
  - 3.5 AMA PRA Category 1 Credits™

- **American Orthopaedic Society for Sports Medicine**
  - Ballroom 6A
  - AOSSM1: Thursday, 1:30 – 3:00 PM
  - 1.5 AMA PRA Category 1 Credits™
  - AOSSM2: Thursday, 3:30 – 5:00 PM
  - 1.5 AMA PRA Category 1 Credits™

- **Arthroscopy Association of North America/American Shoulder and Elbow Surgeons**
  - Ballroom 20B
  - Friday, 8:00 AM – 12:30 PM
  - 3.5 AMA PRA Category 1 Credits™

- **Orthopaedic Trauma Association**
  - Ballroom 6A
  - Wednesday, 1:30 – 5:00 PM
  - 3 AMA PRA Category 1 Credits™

- **Pediatric Orthopaedic Society of North America**
  - Ballroom 6D
  - POSNA1: Wednesday, 1:30 – 3:00 PM
  - 1.5 AMA PRA Category 1 Credits™
  - POSNA2: Wednesday, 3:30 – 5:00 PM
  - 1.5 AMA PRA Category 1 Credits™

- **Society of Military Orthopaedic Surgeons**
  - Room 32
  - Wednesday, 8:00 AM – 12:30 PM
  - 3.5 AMA PRA Category 1 Credits™

- **Spine Specialty Societies**
  - • American Spinal Injury Association
  - • Cervical Spine Research Society
  - • North American Spine Society
  - • Scoliosis Research Society
  - Ballroom 6E
  - Thursday, 1:30 – 5:00 PM
  - CME credit is included in the overall AAOS Annual Meeting AMA PRA Category 1 Credits™.

- **The Hip Society/The Knee Society/American Association of Hip and Knee Surgeons**
  - Ballroom 20A
  - Wednesday, 8:00 AM – 5:00 PM
  - 6.5 AMA PRA Category 1 Credits™
Resources to Help You Gain an Advantage in Today’s Job Market

Whether you are a recent graduate or seeking a change, the On-site Career Center at the Annual Meeting offers an opportunity to get in front of hiring professionals and prospective employers. Plus, obtain valuable guidance to hone your skills and gain an advantage in today’s orthopaedic job market.

What to Expect

• More than 150 participating employers – find positions for all career stages

• On-site interviews (private interview booths) – take the next step toward your new job

• FREE One-on-one CV consultations – advice to help you gain an advantage in your job search

• Professional interview practice with InterviewStream – this tool allows you to record your interview with real-world questions and receive feedback to improve your skills

Get Listed in the Job Seeker Booklet - Create or Update Your Listing

Academy Members with an active job seeker listing with AAOS may participate in the On-site Career Center. Create your listing or update your availability at the Annual Meeting to be listed in our daily Job Seeker Booklet which is provided to employers. Stop by the On-site Career Center to get started.

Register Today for the Virtual Career Fair

Wednesday, September 29, 7:00 - 9:00 pm CT
www.aaos.org/careercenter

Secure your spot for the opportunity to network with representatives from numerous healthcare organizations and make important career connections.
The American Academy of Orthopaedic Surgeons gratefully acknowledges the following companies for their financial support of AAOS programs and projects throughout 2020.

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<tr>
<th>Diamond Level</th>
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<th>Gold Level</th>
<th>Supporter Level</th>
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For information on Corporate Sponsorship Opportunities visit aaos.org/corporateengagement
The only national political action committee (PAC) in Washington, D.C., dedicated solely to representing orthopaedic surgeons before Congress.

For more than 20 years, the Orthopaedic PAC has helped advance the legislative agenda of the AAOS by providing opportunities to shape healthcare policy impacting musculoskeletal care.

The Orthopaedic PAC is nonpartisan and represents every orthopaedic surgeon, regardless of practice type or location. It supports candidates for federal office who align with our principles and will effectively advocate for the profession.

OrthoPAC and Advocacy at the Annual Meeting

- To learn more about the Orthopaedic PAC and AAOS’ advocacy efforts, visit booth number 4035 in Exhibit Hall. Current members are also welcomed to refresh and relax in the donor lounge.

- Finally, don’t miss the OrthoPAC Donor Appreciation Luncheon on September 1 at 11:30 AM in Room 16 AB. All 2020-2021 donors are invited to hear from special guest speaker Ronald Brownstein!

Learn more at aaos.org/advocacy/PAC
We Recognize These Organizations Who Meet the Requirements for Advanced Total Hip & Knee Replacement Certification

| Abbott Northwestern Hospital | Long Island Jewish Medical Center | Scranton Hospital Company, LLC |
| Adena Regional Medical Center | McKay Dee Hospital | Sky Ridge Medical Center |
| AdventHealth Zephyrhills | Medical University of South Carolina Medical Center | South Shore University Hospital |
| Atlantic Coast Surgical Suites, LLC | Memorial Hermann - Texas Medical Center | Sparks Family Hospital, Inc. |
| Baptist Health System, Inc. | Memorial Hermann Memorial City Medical Center | St. Anthony’s Memorial Hospital |
| Baylor University Medical Center (BUMC) | Memorial Hospital Jacksonville | St. Charles Hospital |
| Beaufort County Memorial Hospital | Memorial Hospital of South Bend, Inc. | St. Francis Health, LLC |
| Beloit Health System | Mercy General Hospital | St. Helena Hospital |
| Broward Health North | Mercy Medical Center | St. Joseph Mercy Hospital |
| Cabell Huntington Hospital, Inc. | MidState Medical Center | St. Jude Medical Center |
| Carilion Medical Center | Midwest Orthopedic Specialty Hospital | St. Luke’s- Roosevelt Hospital Center |
| Catholic Health Initiatives | Monongahela Valley Hospital | St. Mary Medical Center |
| CHI Health Mercy Council Bluffs | Montefiore Health System | St. Mary’s Regional Medical Center |
| CHI St. Vincent Hospital Hot Springs | Morristown Medical Center | Steward Holy Family Hospital, Inc. |
| Chippewa and Johnston-Willis Hospital | MultiCare Valley Hospital | Steward Saint Anne’s Hospital |
| CHRISTUS Good Shepherd Medical Center | Muvé - West Chester Ambulatory Surgical Center, LLC | Steward Trumbull Regional Medical Center, Inc. |
| CHRISTUS Trinity Mother Frances Hospital | Muvé - Lakeway Ambulatory Surgical Center, LLC | Stormont-Vail HealthCare, Inc. |
| Columbus Orthopaedic Outpatient Center, LLC | Muvé - Warminster Ambulatory Surgical Center, LLC | Sutter Bay Hospitals |
| Coral Gables Hospital | New England Baptist Hospital | SVMC Holdings, Inc. |
| Davie Medical Center | North Central Surgical Center, LLP | Texas Orthopedic Hospital |
| DLP Conemaugh Memorial Medical Center LLC | North Kansas City Hospital | The Good Samaritan Hospital of Cincinnati, Ohio |
| Doctors Hospital at Renaissance | North Shore University Hospital | The Lawrence Memorial Hospital |
| Duncan Regional Hospital, Inc. | Northpointe Surgical Suites, LLC | The Miriam Hospital |
| Elkhart General Hospital, Inc. | Northwest Arkansas Hospitals, LLC | The Queen’s Medical Center |
| Elmhurst Hospital Center | Ogden Regional Medical Center | The Unity Hospital of Rochester |
| Essentia Health St. Joseph’s Medical Center | Ohio Specialty Surgical Suites, LLC | The University of Tennessee Medical Center |
| Fayetteville Arkansas Hospital Company, LLC | Orlando Health, Inc. | TidalHealth Peninsula Regional, Inc. |
| Frisco Medical Center, LLP | Pasadena Hospital Association | Truman Medical Center, Incorporated |
| Goleta Valley Cottage Hospital | Penn Medicine Princeton Medical Center | United Regional Health Care System |
| Granbury Hospital Corporation | Phoenixville Hospital, LLC | Universal Health Services of Rancho Springs, Inc. |
| Greater Baltimore Medical Center | Presidio Surgery Center, LLC | University Hospitals Cleveland Medical Center |
| Hackensack Meridian Health | Prism Health-Upstate | UPMC Williamsport |
| Hackensack University Medical Center | Reading Hospital | Vadnais Heights Surgery Center, LLC |
| Highland Hospital of Rochester | Red Cedar Surgery Center, LLC | Wellmont Health System |
| Hugh Chatham Memorial Hospital | Reston Hospital Center | WellStar Kennestone Hospital |
| Huntington Hospital | Riverside University Health System - Medical Center | West End Surgical, LLC |
| Indian River Memorial Hospital, Inc. | Rochester General Hospital | West Virginia University Hospitals, Inc. |
| Indiana University Health Ball Memorial Hospital, Inc. | Saint Francis Hospital and Medical Center | White Fence Surgical Suites, LLC |
| Indiana University Health Bloomington, Inc. | Saint Luke’s East Hospital | Williamette Ambulatory Surgery Center, PC |
| Indiana University Health, Inc. | San Antonio Regional Hospital | Williamette Valley Medical Center |
| Jersey Shore University Medical Center | Santa Barbara Cottage Hospital | Wyoming County Community Hospital |
| Johns Hopkins Bayview Medical Center | | Yale New Haven Hospital |
| Kishwaukee Community Hospital | | |
We want to hear from you!

Our new membership satisfaction survey is only 5 questions and will take you minutes to complete.

Be Heard.  We want to hear from you!

I have an opinion.
I have a suggestion.
I have a recommendation.
I have an idea.

AAOS
American Academy of Orthopaedic Surgeons

Scan this, enter your member ID and tell us your thoughts!
Or access the survey by visiting aaos.org/BeHeard
#BeHeard
ENGAGE IN EXCELLENCE IN CHICAGO

“MAKE NO LITTLE PLANS”

Make plans now to attend the AAOS 2022 Annual Meeting. Secure your discounted hotel rate at the housing booth in Lobby D.

onPeak.com/aaos

— Daniel Burnham
World Renowned Chicago Architect

2022 Annual Meeting
March 22 – 26, Chicago, Illinois
ENGAGE IN EXCELLENCE

CALL FOR ABSTRACTS
AAOS 2022

Share your research and expertise with the orthopaedic community.

Submit your research at aaos.org/abstracts

Important Deadline Dates:

September 7, 2021
Abstract applications for Paper, Poster, TechTalks, and Orthopaedic Video Theater Presentations

October 1, 2021
Applications for Instructional Course Lectures and Symposia

2022 Annual Meeting
March 22 – 26, Chicago, Illinois
AAOS Fellows — You Deserve to be Recognized!

Let your peers, colleagues and patients know that you are a proud Fellow of the American Academy of Orthopaedic Surgeons.

The FAAOS designation distinguishes orthopaedic surgeons from other healthcare specialists as the leaders of the musculoskeletal health team.

Learn more at [aaos.org/FAAOS2021](http://aaos.org/FAAOS2021) and pick up your exclusive FAAOS lapel pin at the AAOS Membership Booth, Sails Pavilion.

Proudly display your FAAOS designation today!
The Most Comprehensive Resident Learning Environment Is Coming Soon!

The all-new AAOS Resident Orthopaedic Core Knowledge (ROCK) is the only advanced learning tool that establishes a core knowledge baseline for orthopaedic residency training programs.

ROCK will engage your residents with extensive content across all anatomical and specialty areas, supporting a deep, structured, and well-rounded orthopaedic residency education.

This all-in-one platform will minimize the time you spend on course development with a ready-made course of study. You can also tailor the curriculum to your program’s requirements by easily integrating your existing resources.

Learn more at AAOS.org/ROCKdemo

Get a sneak peek in the Resource Center in Academy Hall, Sails Pavilion!
Revisit the AAOS 2021 Annual Meeting Anytime, Anywhere

Access Cutting-Edge Orthopaedic Insights
Watch the sessions you couldn’t attend or revisit your favorites. Access over 500 hours of educational meeting content with AAOS 2021 Annual Meeting OnDemand.

- Access content within 48 hours of presentations
- Easily sync across all your devices
- Add a hard drive for an additional $99
- Download PDF handouts and MP3 audio files
- Test online and earn up to 100 CME credits

Order today and get extended special meeting pricing!

$399 AAOS MEMBERS
$199 RESIDENT MEMBERS
$599 NON-MEMBERS

In Person: Academy Hall, Sails Pavilion
Online: AAOS.OnDemand.org/SanDiego
By Phone: 800-501-2303 (U.S. Only) or 818-844-3299
Monday – Friday 6 a.m. – 5 p.m. PT
EDUCATION

Learn while you engage with colleagues and experts in stimulating education events

Choose from four dynamic and diverse leaning styles that allow you to create your ideal experience.

1. Lecture-Based

Instructional Courses Master in-depth experience-based orthopaedic techniques from world-renowned surgeons.

Paper Presentations Explore new and exciting research and advances in orthopaedics.

TechTalks Attend presentations of the latest technology and applications beneficial to surgeons and staff teams. Non-CME session, located in Exhibit Hall.

NEW! Engagement Theater Experience this new theater featuring daily engaging presentations on a variety of topics ranging from advocacy and research updates to mentoring.

Career Development Courses Advance or refine your career with curriculum including: Leadership, Teaching and Communication, Research and Education, Mentoring and Marketing.

Technical Skills Courses Focus on positioning, approach and step-by-step technical tips through edited videos; includes live discussion on the pearls.

Poster Tours Attend guided presentations of the top-rated posters. Recognized experts create a memorable experience by highlighting pearls and answering your questions.

Use the My Academy App to Submit Your Evaluations and Enter to Win a $100 American Express Gift Card!

The contribution of your evaluation is critical and used to deliver high-quality education across all practice areas. For each Instructional Course Lecture and Symposium evaluation you complete, you’ll be automatically entered in a daily drawing for a $100 American Express gift card. Winners will be notified via email.
2. Panels

**Innovation Theater** Watch live demonstrations of innovative products, services, and solutions showcased by medical and technology professionals. *Non-CME session, located in Exhibit Hall.*

**Symposia** Inspire your thinking as a panel of surgeons shares leading-edge research shaping changes in practice.

**The Way I See It...®** Listen to the faculty's candid opinions on contemporary, top-of-mind issues.

**Flash Five®: What’s Coming Down the Pike**
Collect critical takeaways on hot topics during a series of 5-minute presentations.

3. Self-Directed

**Orthopaedic Video Theater** Select and watch high quality, peer-reviewed surgical technique videos, including 2020 and 2021 award winners!

**Posters** Learn from visual presentations about the latest medical, clinical, and scientific research.

**ePosters** Access interactive video presentations of research during and after the meeting at aaos.org/annual.

4. Collaborative

**Case Presentation Courses** Engage in table discussions of complex cases with peers and experts, review case data, and hear the final solution.

**NEW! Orthopaedic Influencer** Learn what it takes to become an influencer as residents interview those that have the power to positively cause change through knowledge, position, and authority.

**Ask an Expert** Present your patient case challenges and receive expert diagnosis and recommendations. *Non-CME session, located in Exhibit Hall.*

**Showdowns®** Take the driver’s seat as you watch surgeons debate topics and techniques; then YOU determine who wins the debate.
EXCLUSIVE LEARNING

Three innovative AAOS programs give you a front row seat to hot topics, expert insights, and candid opinions.

The Way I See It…®

Keep current with expert insight and practical guidance. Hear the faculty’s candid opinions on these top-of-mind issues.

**Tuesday, 4:00–5:00 PM**
Ballroom 6D

Traditional Thinking Challenged—Is the Evidence Strong Enough to Change Practice (TWISI1)

*Moderator: Michael D. McKee, MD, FAAOS, FRCSC*

*Topics and Speakers:*
- Is it Really Safe to Treat Pilon Fractures Early?
  Michael T. Archdeacon, MD, FAAOS
- Is There Really No Advantage to Vacuum Assisted Closure in Open Fracture Management?
  Michael J. Gardner, MD, FAAOS
- Why Does Practice Not Always Follow the Evidence?
  Edward J. Harvey, MD, MSc, FRCSC
- Are We Fixing the Right Number of Clavicle Fractures?
  Michael D. McKee, MD, FRCSC, FAAOS
- Are Any Local Adjuncts Used to Stimulate Fracture Repair Ready for Prime Time?
  J. Tracy Watson, MD, FAAOS

**Wednesday, 11:00 AM–12:00 PM**
Ballroom 6D

Narcotic-less Surgery (TWISI2)

*Moderator: Charles, M. Davis, MD, PhD, FAAOS*

*Topics and Speakers:*
- Opioid-free Shoulder Arthroplasty
  Nady Hamid, MD, FAAOS
- Peri-operative Pain Management in Trauma Patients (non-pharmacologic techniques of pain control)
  Joseph R. Hsu, MD, FAAOS
- Virtual Reality for Peri-operative Pain Management
  Milton T. M. Little, MD, FAAOS

**Thursday, 3:30–4:30 PM**
Ballroom 6D

Healthcare 2021: How Orthopaedic Leaders are Preparing for the Future (TWISI3)

*Moderator: Eric C. Makhni, MD, MBA, FAAOS*

*Topics and Speakers:*
- Redesigning the Patient Experience from the Ground Up: The Dell Medical Experience
  Kevin J. Bozic, MD, MBA, FAAOS
- Medicare for All—And Other Potential Government Options
  Kevin Counihan
- Privademic is the Way of the Future
  Edward M. Delsole, MD
- Staying Competitive in a Crowded Market: The Strategy for Hospital for Special Surgery
  Bryan T. Kelly, MD, FAAOS
- Five Predictions for US Healthcare in the Near Future: A Payer and Provider Prospective
  Ken Yamaguchi, MD, FAAOS

**Friday, 1:30–2:30 PM**
Ballroom 6E

Navigation and Robotics: Lessons Learned, Relevance Today, and What Does the Future Hold (TWISI4)

*Moderator: Jess H. Lonner, MD, FAAOS*

*Topics and Speakers:*
- Robotics: Past, Present and Future
  William L. Bargar, MD, FAAOS
- The View from a Late Adopter and Convert
  Steven F. Schutzer, MD, FAAOS
- Navigation: Past, Present and Future
  S. David, Stulberg, MD, FAAOS

Content that pertains to these two pages on My Academy App!
**Showdowns®**

Watch as surgeons debate topics and techniques; then YOU determine who wins via the Audience Response System on the My Academy app.

**Wednesday, 8:00–9:00 AM**
**Ballroom 6D**
Irreparable Rotator Cuff Tears: American versus European Treatment Options—What’s the Difference? (SD1)

**Moderator:** Gonzalo Samitier Solis, MD

Proximal Humerus Fractures Fixed
Emilio Calvo, MBA, MD, PhD

Muscle Transfer
Jean Kany, Sr, MD

Superior Capsular Reconstruction
John M. Tokish, MD, FAAOS

Replacement
Thomas W. Wright Jr, MD, FAAOS

**Thursday, 1:30–2:30 PM**
**Ballroom 6D**
Controversies in Total Knee Arthroplasty—What is Best for Your Patients? (SD2)

**Moderator:** Jay R. Lieberman, MD, FAAOS

Cementless TKA: Cement is Rarely Needed Now
**Affirmative:** R. Michael Meneghini, MD, FAAOS
**Negative:** Steven J. MacDonald, MD

Patella Resurfacing: Not Worth the Time
**Affirmative:** Robert L. Barrack, MD, FAAOS
**Negative:** Matthew P. Abdel, MD, FAAOS

Robotic TKA: Does It Really Make a Difference?
**Affirmative:** Michael A. Mont, MD, FAAOS
**Negative:** Daniel J. Berry, MD, FAAOS

**Flash Five®: What’s Coming Down the Pike**

Hear critical takeaways on these hot topics during focused 5-minute presentations. Choose the day/time option that works best for your schedule!

**Tuesday, 1:30–2:30 PM**
**Ballroom 6D**
**Moderator:** Claudette M. Lajam, MD, FAAOS

**OR**

**Thursday, 8:00–9:00 AM**
**Ballroom 6D**
**Moderator:** Amy L. Ladd, MD, FAAOS

**Cartilage Defects**
Robert H. Brophy, MD, FAAOS

**Pain Management in Hip and Knee Arthroplasty**
Henry D. Clarke, MD, FAAOS

**Biologics**
Jason L. Dragoo, MD, FAAOS

**Carpometacarpal Arthritis**
Duretti Fufa, MD, FAAOS

**Periprosthetic Fractures of the Distal Femur**
Mark A. Lee, MD, FAAOS

**Flail Chest Management**
Michael D. McKee, MD, FRCSC, FAAOS

**Opioids**
Robert R. Slater Jr., MD, FACS, FAAOS

**New Developments for Glenoid Bone Deficiency**
Robert Z. Tashjian, MD, FAAOS

**3D Printing**
Douglas B. Unis, MD, FAAOS
SYMPOSIA

Inspire your thinking as a panel of surgeons shares leading-edge research shaping changes in practice.

PRESIDENT SYMPOSIUM O
Elimination of the Inpatient Only List: What We Don’t Know Will Hurt Us and Our Patients

Friday, 8:00–10:00 AM
Ballroom 20A
Moderator: Joseph Bosco III MD, FAAOS

In 2020, CMS eliminated Inpatient Only designation for musculoskeletal procedures. This symposium addresses impact at the level of the surgeon, the institution, and the patient, and offers strategies to mitigate negative effects.

SYMPOSIUM Q
AAOS 2021 Annual Meeting Highlights

Friday, 11:00 AM–12:30 PM
Room 32
Moderators: Amy L. Ladd, MD, FAAOS and Claudette M. Lajam, MD, FAAOS

Hear a synopsis of the best papers and posters from each of the eleven classifications representative of Annual Meeting education. Watch as Program Committee members present the best three to five studies presented at the AAOS 2021 Annual Meeting.

CAREER DEVELOPMENT COURSES

Strengthen your professional skills and competencies with Career Development Courses. From relevant best practices to emerging trends these 1-hour courses provide an unparalleled career-advancing experience. All courses take place in Room 28E.

TUESDAY

8:00–9:00 AM
Managing Residents in 2021

9:30–10:30 AM
Optimizing Your Chances for Presentations and for Publications

11:00 AM–12:00 PM
Strategic Diversity, Equity, and Inclusion Leadership in Orthopaedics: Modernized Frameworks and Practices

1:30–2:30 PM
Entrepreneurship for the Orthopaedic Surgeon

Tuesday, 3:00–4:00 PM
Navigating the Challenges of Mentoring in Today's Environment

4:30–5:30 PM
Rocket Fuel for the Young Academic Orthopaedic Surgeon — The National Institutes of Health K Award

WEDNESDAY

8:00–9:00 AM
Physician Heal Thyself: Understanding the Biologic Basis of Stress

11:00 AM–12:00 PM
Harassment is Everyone’s Issue: Optimizing Your Work Environment

THURSDAY

8:00–9:00 AM
Leadership at Every Level: Principles and Practice

Thursday, 1:30–2:30 PM
Career Transitions

3:30–4:30 PM
Social Media and Orthopaedics: Establishing Your Online Reputation
Orthopaedic Video Theater Award Ceremonies

OVT offers dynamic videos from diverse perspectives, including globally renowned experts, and user-submitted videos — adding increased variety to your learning.

2020 OVT Award Ceremony
Wednesday, 5:00 PM
Academy Hall, Sails Pavilion

2021 OVT Award Ceremony
Friday, 4:00 PM
Academy Hall, Sails Pavilion

Poster Awards Ceremony

Watch as Central Program Committee Chair, Claudette M. Lajam, MD, FAAOS, presents the winners of the best in class poster for each classification, and the best in show for the best poster of the AAOS 2021 Annual Meeting.

2021 Poster Awards Ceremony
Friday, 7:00 AM
Academy Hall, Sails Pavilion

RECOGNIZING EXCELLENCE

Recognize the honorable work of your colleagues as AAOS awards the top Orthopaedic Video Theater and Posters of the Annual Meeting.
ACADEMY HALL
LOCATED IN THE SAILS PAVILLION

From Membership, Education, and Career Planning to Quality Research and Registries, the solutions, actions and resources that are part of your AAOS Membership are gathered all in one convenient place.

Hours: Tuesday 7:00 AM – 6:00 PM • Wednesday – Friday 7:00 AM – 5:00 PM

AAOS Resource Center
Access everything you need to move forward on your path to excellence at the Resource Center.

AAOS is committed to helping every member grow, succeed and thrive in the orthopaedic surgery profession. Engage with knowledgeable staff, realize member benefits, update your profile and experience new product demos and learn how we support your needs all year long. Stop by to explore:

• The all new Resident Orthopaedic Core Knowledge
• AAOS Registry Program
• Biologics Initiative
• Discounts on educational books
• Online Learning and Self Assessment Exams
• Code-X and Coding Solutions
• Member Advantage Program
• ... And so much more!

Career Center
Take advantage of our expanded career services for members in the Career Center.

Access on-site resources to help you gain an advantage in the job market including one-on-one CV consultations, job search tools, interview practice and more.

On Demand
Revisit the sessions you attended or catch what you missed with Annual Meeting OnDemand.

Get access to 500+ hours of instructional courses, symposia and other influential sessions presented by top-rated faculty. Visit the OnDemand booth in Academy Hall to claim your special attendee on-site discount.
Learn at Your Own Pace with Interactive Self-directed Opportunities

**Posters**
Walk through more than 1,000 visual presentations of the latest medical, clinical, or scientific research.

See how researchers are pushing boundaries, explore multicenter or multidisciplinary studies, or review a follow up to a previous study. Presenter and co-authors are invited to present daily between 11:30 AM and 12:30 PM.

Posters are displayed by classification and offered in two sessions to offer even more cutting-edge content.

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<th>Classification</th>
<th>Session 1 Tuesday – Wednesday</th>
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<td>Trauma</td>
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**Orthopaedic Video Theater**
Select and watch high-quality, peer-reviewed surgical technique videos, including 2020 and 2021 award winners in the OVT.

OVT offers dynamic videos from diverse perspectives, including globally renowned experts, and user-submitted videos — adding increased variety to your learning.

View 2020 & 2021 Award-Winning Presentations at the following stations:

- **Adult Reconstruction Hip & Knee**
  - Station 1

- **Foot & Ankle and Hand & Wrist**
  - Station 2

- **Oncology, Pediatrics, and Trauma**
  - Station 3

- **Shoulder and Elbow**
  - Station 4

- **Spine, and Sports Medicine**
  - Station 5

- **Honorable Mentions**
  - Station 6
NEW! ENGAGEMENT THEATER

Experience this new theater featuring daily engaging presentations on a variety of topics ranging from leadership, mentoring, quality and practice management. Integrate daily presentations into your meeting experience. Visit the Engagement Theater in Academy Hall, Sails Pavilion.

TUESDAY
9:00—9:30 AM
eSports Players: The New Athletes with Orthopaedic Diagnoses
John C. Hagedorn, MD, FAAOS

10:00—10:30 AM
AAOS Registry Program 2021 Update
Nathan Glusenkamp

11:00—11:30 AM
Prepare for Alternative Payment Models (APMs) and Take Better Care of Your Patients: A Novel System for Hip and Knee Osteoarthritis (OA)
William A. Jiranek, MD, FAAOS, FACS

1:00—1:30 PM
Navigating Power in Health Care Organizations
Daniel B. Murrey, MD, FAAOS

2:00—2:30 PM
Women in Orthopaedics Worldwide (WOW)
Dawn LaPorte, MD, FAAOS
Camila B. R. De Mattos, MD

4:00—4:30 PM
AAOS and Value-based Healthcare: At the Table or on the Menu?
Robert H. Quinn, MD, FAAOS

Wednesday, 10:30—11:00 AM
Volunteer Engagement - Navigating the Committee Appointment Program
Felix H. Savoie, MD, FAAOS

11:30 AM—12:00 PM
Mentorship in Orthopaedics: How to Succeed as a Mentor and a Mentee
Julie B. Samora, MD, MPH, PhD, FAAOS

1:30 PM—2:00 PM
Biologics and Regenerative Medicine
Jason L. Dragoo, MD, FAAOS

2:30 PM—3:00 PM
Osseointegration Amputation Surgery: What You Need to Know
Jonathan A. Forsberg, MD, PhD, FAAOS

3:30 PM—4:00 PM
Code-X Demo
David J. Kennedy
Madelaine Reese

4:30 PM—5:00 PM
The Biologics Dashboard
S. Raymond Golish, MD, MBA, PhD, FAAOS

THURSDAY
8:30—9:00 AM
Advanced Certification in Spine Surgery
Dave Eickemeyer, MBA

9:30—10:00 AM
Diversity in Orthopaedics: As Seen in AAOS Now
Marlene DeMaio, MD, FAAOS

11:00—11:30 AM
Condition-based Bundled Payments
Karl M. Koenig, MD, MS, FAAOS

4:00—4:30 PM
AAOS Leadership Institute: Pathways to Leadership
Joseph A. Bosco III, MD, FAAOS

FRIDAY
11:00 AM—12:00 PM
Meet the ABOS
David F. Martin, MD, FAAOS

1:30—2:00 PM
Leadership Outside the Operating Room
Thomas C. Barber, MD, FAAOS

2:30—3:00 PM
Political Action Committee (PAC): Let’s Work Together
Douglas W. Lundy, MD, MBA, FAAOS

3:30—4:00 PM
AAOS Leadership Institute: Tales from the Trenches
Joseph A. Bosco III, MD, FAAOS
Engagement Theater

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Dawn LaPorte, MD, FAAOS
Camila B. R. De Mattos, MD

4:00 – 4:30 PM

AAOS and Value-based Healthcare: At the Table or on the Menu?
Robert H. Quinn, MD, FAAOS

Wednesday

8:30 – 9:00 AM

FAAOS: What You Need to Know
Jennifer M. Weiss, MD, FAAOS

9:30 – 10:00 AM

Advanced Total Hip and Total Knee Certification
Dave Eickemeyer, MBA

Wednesday, 10:30 – 11:00 AM

Volunteer Engagement - Navigating the Committee Appointment Program
Felix H. Savoie, MD, FAAOS

11:30 AM – 12:00 PM

Mentorship in Orthopaedics: How to Succeed as a Mentor and a Mentee
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Marlene DeMaio, MD, FAAOS

11:00 – 11:30 AM

Condition-based Bundled Payments
Karl M. Koenig, MD, MS, FAAOS

Thursday, 12:00 – 12:30 PM

Code-X Demo
David J. Kennedy
Madelaine Reese

1:30 – 2:30 PM

Award Recipients: Life is a Mission — What is Yours? 2021 Diversity Award Winner
Lisa Lattanza, MD, FAAOS

2020 Diversity Award Winner
James A. Hill, MD, FAAOS

2021 Humanitarian Award Winner
David Atkin, MD, FAAOS

2020 Humanitarian Award Winner
Steven Meyer, MD, FAAOS

2021 Tipton Award Winner
Joseph Zuckerman, MD, FAAOS

2020 Tipton Award Winner
Scott Scutchfield, MD, FAAOS

4:00 – 4:30 PM

AAOS Leadership Institute: Pathways to Leadership
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Friday

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Joseph A. Bosco III, MD, FAAOS

POSTER TOURS

Hear highlights and key takeaways during expert-led tours of selected posters in the Poster Tour Theater in Academy Hall, Sails Pavilion.

TUESDAY

9:00 – 10:00 AM

Spine
Sergio Mendoza-Lattes, MD, FAAOS

10:30 – 11:30 AM

Adult Reconstruction Hip
Hari Bezwada, MD, FAAOS

3:00 – 4:00 PM

Practice Management
Jeffrey S. Morgan, MD, MBA, FAAOS

4:30 – 5:30 PM

Adult Reconstruction Knee
Daniel J. Del Gaizo, MD, FAAOS

WEDNESDAY

8:30 – 9:30 AM

Musculoskeletal Oncology
Valerae O. Lewis, MD, FAAOS

11:30 AM – 12:30 PM

Shoulder and Elbow
Vani J. Sabesan, MD, FAAOS

1:30 – 2:30 PM

Adult Reconstruction Hip & Knee Poster Walking Tour en Español
Carlos Higuera, MD

4:00 – 5:00 PM

Pediatrics
Zachery S. Stinson, MD, FAAOS

THURSDAY

8:30 – 9:30 AM

Hand and Wrist
TBD

11:30 AM – 12:30 PM

Adult Reconstruction Knee
James A. Keeney, MD, FAAOS

3:00 – 4:00 PM

Global Poster Session on Spine
Sandeep N. Gidvani, MD, FAAOS

FRIDAY

8:30 – 9:30 AM

Foot and Ankle
Timothy Charlton, MD, FAAOS

11:30 AM – 12:30 PM

Adult Reconstruction Knee
James A. Keeney, MD, FAAOS

1:30 – 2:30 PM

Global Poster Session on Spine
Sandeep N. Gidvani, MD, FAAOS

3:00 – 4:00 PM

Trauma
Andrew R. Evans, MD, FAAOS
ENGAGE IN RESIDENT EXCELLENCE & FUN

Nowhere else can you interact with expert faculty, experience remarkable technology advances, and participate in resident focused activities developed exclusively for you.

WEDNESDAY

8:00 – 10:00 AM
Essential Coding and Reimbursement for Starting Practice #290
Ballroom 6E
Begin your practice with knowledge and power! Margaret Maely BSN, MS will address the basic elements of CPT, ICD-10-CM and diagnosis coding.

11:00 AM – 12:00 PM
Resident Peer-to-Peer Mentoring Program
Room 8
Are you a new fellow or a recently matched resident? Or, a resident interested in pursuing fellowship? This one-of-a-kind event fosters mentoring skills of resident trainees while junior residents experience an environment of mentoring and guidance to successfully navigate the fellowship application process!

12:30 – 5:00 PM
Practice Management for Residents and Fellows-in-Training #291
Ballroom 6E
Review essential elements of practice management and strengthen the foundation in preparation for practice.

Sponsored by: Stryker

THURSDAY

8:00 – 9:30 AM
Speed Mentoring for Residents #390
Room 8
Learn how to navigate the transition from residency to practicing physician from the pro’s. This free session will focus on guidance of the practical and the intangibles you need to start your next phase of our career in a successful manner.
Sponsored by: Zimmer Biomet

11:00 AM – 12:30 PM
Forum for Young Orthopaedic Surgeons with the American Board of Orthopaedic Surgery (ABOS)
Room 8
Meet with Executive Medical Director of the ABOS, David F. Martin, MD, FAAOS, during this unique forum and learn critical information about Board requirements and procedures.

3:30 – 5:00 PM
The Resident Bowl
Room 30C
Step up your game at the sixth annual AAOS Resident Bowl. Residents are invited to compete on teams in a game-style setting, answering orthopaedic and non-orthopaedic trivia for grand and runner-up prizes.
All are welcome to be in the audience and cheer for their colleagues.
Sponsored by: DePuy Synthes

FRIDAY

10:00 – 11:30 AM
The Resident Education Forum
Room 17B
Residents, Delegates, and Program Directors please join us to accomplish a number of leadership and educational objectives.
On behalf of the AAOS, Residents, Delegates, and Program Directors from across the country will team up to discuss and determine best and unique education practices sparked by the pandemic.
Walk-ins welcome.
Influencers Series

Get up close and personal and learn what it takes to become an influencer as Residents interview those that have the power to positively change through knowledge, position, and authority in orthopaedics.

**TUESDAY**

10:30 – 11:30 AM  
*Ballroom 6D*  
Matthew T. Provencher, MD, MBA, CAPT MC USNR (Ret.), FAAOS  
Interviewer: Molly Day, MD, ATC  
Moderator: William N. Levine, MD, FAAOS

**WEDNESDAY**

1:30 – 2:30 PM  
*Room 32*  
Amy L. Ladd, MD, FAAOS  
Interviewer: Abidemi Adenikinju, MD  
Moderator: Joaquin Sanchez-Sotelo, MD, FAAOS

**FRIDAY**

11:00 AM – 12:00 PM  
*Ballroom 6D*  
Mark D. Miller, MD, FAAOS  
Interviewer: Ayoosh Pareek, MD  
Moderator: Marlene DeMaio, MD, FAAOS

The Path to a Successful Residency Starts with ROCK

The AAOS Resident Orthopaedic Core Knowledge (ROCK) program is a comprehensive resident curriculum that sets the baseline for orthopaedic knowledge.

This robust program is filled with content that has been vetted by 22 orthopaedic experts in 11 subspecialties. ROCK adapts to different learning styles, optimizing your learning experience and instilling the confidence that comes with a deep understanding of the content.

ROCK facilitates peak knowledge and optimizes learner outcomes and understanding. You’ll gain the insights and confidence you need to ensure a successful future as a board-certified surgeon who delivers the best patient care.

Currently in a beta testing phase, AAOS will unlock the ROCK to all residents during the first quarter of 2022. And because AAOS is committed to delivering the highest quality education to the next generation of orthopaedic surgeons, residents will never pay for access to ROCK.

Get a sneak peek of the ROCK in the Resource Center located in Academy Hall, Sails Pavillion.
Committee Members

The Central Program, Central Instructional Courses, Education Track, Exhibits, and Orthopaedic Video Theater Committees gratefully acknowledge the efforts of all the committee members who volunteered their time and expertise to organize an excellent educational experience for all attendees.

2021 Central Program Course Committee
Claudette M. Lajam, MD, FAAOS, Chair
Julie E. Adams, MD, FAAOS
Charles M. Davis III, MD, PhD, FAAOS
Leesa M. Galatz, MD, FAAOS
Amy L. Ladd, MD, FAAOS
Rafael J. Sierra, MD, FAAOS

2021 Central Instructional Course Committee
Eric J. Strauss, MD, FAAOS, Chair
Brian J. Galinat, MD, MBA, FAAOS
Carolyn Hettrich, MD, MPH, FAAOS
Harpal S. Khanuja, MD, FAAOS
Jay R. Lieberman, MD, FAAOS

2021 Program Committees
Adult Reconstruction Hip
Paul J. Duwelius, MD, FAAOS, Chair
Bryce C. Allen, MD, FAAOS
Hari Bezwada, MD, FAAOS
David F. Dalury, MD, FAAOS
Michele D’Apuzzo, MD, FAAOS
John T. Dearborn, MD, FAAOS
Karen S. Duane, MD, FAAOS
Joseph S. Gondusky, MD, FAAOS
Alexander C. Gordon, MD, FAAOS
William G. Hamilton, MD, FAAOS
Brian R. Hamlion, MD, FAAOS
Curtis W. Hartman, MD, FAAOS
Andrew S. Holmes, MD, FAAOS
Jason M. Jennings, MD, FAAOS
Gregg R. Klein, MD, FAAOS
Ryan C. Koonce, MD, FAAOS
Chad A. Krueger, MD, FAAOS
William J. Long, MD, FAAOS
Conjeevaram Maheshwer, MD, FAAOS
David W. Manning, MD, FAAOS
Oliver Marin-Pena, MD
Dean K. Matsuda, MD, FAAOS
Menachem M. Muller, MD, PhD, FAAOS
Nader A. Nassif, MD, FAAOS
John F. Nettour, MD, FAAOS
Nicolas O. Noiseux, MD, FRCSC, MS, FAAOS
Patrick O’Toole, MD
James J. Purtill, MD, FAAOS
Alexander P. Sah, MD, FAAOS
Arjun Saxena, MD, MBA, FAAOS
Benjamin M. Stronach, MD, FAAOS
Edwin P. Su, MD, FAAOS
Marc E. Umlas, MD, FACS, FAAOS
Jonathan M. Vigdorchik, MD, FAAOS
Mark W. Zawadsky, MD, FAAOS
James M. Zurbach, MD, FAAOS

Adult Reconstruction Knee
Sumon Nandi, MD, MBA, FAAOS, FACS, Chair
Oluwaseun T. Akinbo, MD, FAAOS
Michael P. Ast, MD, AAOS
George F. Chimento, MD, FAAOS
Stephen R. Davenport, MD, FAAOS
Michael R. Dayton, MD, FAAOS
Douglas A. Dennis, MD, FAAOS
Claudio Diaz, MD
Orry Erez, MD, FAAOS
Aidin Eslam Pour, MD, FAAOS
Victor H. Hernandez, MD, MS, FAAOS
James A. Keeney, MD, FAAOS
Brian A. Klatt, MD, FAAOS
Young-Min Kwon, MD, PhD, FAAOS
Jason E. Lang, MD, FAAOS
Yogesh Mittal, MD, FAAOS
Douglas R. Turgeon, MD, FAAOS
Brian R. Waterman, MD, FAAOS
Alan Zhang, MD, FAAOS

Trauma
James C. Krieg, MD, FAAOS, Chair
Michael J. Beltran, MD, FAAOS
Lisa K. Cannada, MD, FAAOS
Matthew R. Craig, MD, FAAOS
Miguel S. Daccarett, MD, FAAOS
Derek J. Donegan, MD, MBA, FAAOS
Robert L. Garrison II, MD, FAAOS
John T. Gorczyca, MD, FAAOS
Stuart T. Guthrie, MD, FAAOS
Kyle T. Judd, MD, FAAOS
Utku Kandemir, MD, FAAOS
Charles M. LeCroy, MD, FAAOS
Carol Lin, MD, MA, FAAOS
Paul E. Matuszewski, MD, FAAOS
John A. Scolaro, MD, FAAOS
Justin C. Siebler, MD, FAAOS
Peter A. Siska, MD, FAAOS
Jan P. Szatkowski, MD, FAAOS
David C. Templeman, MD, FAAOS
Boris A. Zelle, MD, FAAOS

2020 Instructional Course Committee

Adult Reconstruction Hip
Mengnai Li, MD, PhD, FAAOS
Thomas G. Myers, MD, FAAOS
Vivek M. Shah, MD, FAAOS

Adult Reconstruction Knee
Mark W. Pagnano, MD, FAAOS, Chair
Michael H. Huo, MD, FAAOS
William M. Mihalko, MD, PhD, FAAOS

Foot and Ankle
Christopher E. Gross, MD, FAAOS, Chair
Carroll P. Jones, MD, FAAOS
Geoffrey I. Phillips, MD FAAOS
Ashish Shah, MD, FAAOS

Hand and Wrist
John R. Fowler, MD, FAAOS, Chair
Nileshkuma Chaudhari, MD, FAAOS
John J. Faillace, MD, FAAOS
Diane E. Sedgwick Payne, MD, MPT, FAAOS

Pediatrics
Meghan N. Imrie, MD, FAAOS, Chair
Shital N. Parikh, MD, FAAOS

Practice Management
Ira H. Kirschenbaum, MD, FAAOS, Chair
Oladapo M. Babatunde, MD, FAAOS
Thomas B. Fleeter, MD, FAAOS
Michael Marks, MD, MBA, FAAOS

Shoulder and Elbow
John G. Costouros, FACS, MD, FAAOS, Chair
Jonathan D. Barlow, MD, MS, FAAOS
Timothy P. Codd, MD, FAAOS

Michael S. Khazzam, MD, FAAOS
Andrew S. Neviaser, MD, FAAOS
Joshua B. Sykes, MD, FAAOS

Spine
Kristen E. Radcliff, MD, FAAOS, Chair
Safdar N. Khan, MD, FAAOS
Brian J. Neuman, MD, FAAOS
Haitao Zhou, MD, FAAOS

Sports Medicine
Xinning Li, MD, FAAOS, Chair
Michael E. Angeline, MD, FAAOS
Joshua S. Hornstein, MD, FAAOS

Trauma
Gregory J. Della Rocca, MD, PhD, FAAOS, Chair
Utku Kandemir, MD, FAAOS
Edward Perez, MD, FAAOS
Clay A. Spitler, MD, FAAOS
Seth R. Yarboro, MD, FAAOS

Tumor
Robert J. Steffner, MD, FAAOS, Chair
Adam S. Levin, MD, FAAOS
Susan M. McDowell, MD, FAAOS
Robert J. Steffner, MD, FAAOS
Matthew T. Wallace, MD, FAAOS
Lee M. Zuckerman, MD, FAAOS
The Academy would like to thank the Annual Meeting Committee for their hard work and contributions to the 2021 Annual Meeting.
Tuesday Educational Programs

**CAREER DEVELOPMENT**

8:00 AM - 9:00 AM  
Room 28E

◆ CD1 Managing Residents in 2021  
Moderator: Kenneth A. Egol, MD, FAAOS  
R. Dale Blasier, MD, FAAOS  
George S. Dyer, MD, FAAOS

This course provides the learner with an assessment of barriers to the implementation of modern teaching strategies in orthopaedic residencies and discusses the historical and current models for training in the United States. Presenters discuss metrics for evaluation and present methods to improve resident assessment. This course also helps you design a plan as part of the educational process to foster success and target areas to deal with underperformance on a case-by-case basis. One size does not fit all!

**SYMPOSIUM A**

8:00 AM - 10:00 AM  
Ballroom 20A

Tips and Tricks to Save You During Revision Total Hip Arthroplasties: Video-Based Demonstrations  
Moderator: Matthew P. Abdel, MD, FAAOS

This symposium will provide the latest information on managing failed THAs that require complex exposures, management of bone loss, and advanced techniques to treat complications.

I. Putting it All Together: Case-Based Examples  
Matthew P. Abdel, MD, FAAOS

II. Extended Trochanteric Osteotomy: How Do I Get in there Safely?  
Daniel J. Berry, MD, FAAOS

III. Acetabular Component Removal: It is an Art!  
James A. Browne, MD, FAAOS

IV. Now it’s Infected: My Articulating Spacer Construct  
James I. Huddleston, MD, FAAOS

V. Hemispherical Cups and Augments: How to Make them Work  
David G. Lewallen, MD, FAAOS

VI. Periprosthetic Femur Fractures: Revision Total Hip Arthroplasty Pearls  
David J. Mayman, MD, FAAOS

VII. Modular Fluted Tapered Stems: Making Femoral Revisions Easy  
R. Michael Meneghini, MD, FAAOS

VIII. Instability Requiring Revision: Deciding what Construct to Use, and How to Perform that Construct Successfully  
Douglas E. Padgett, MD, FAAOS

IX. Cup-Cage for Massive Bone Loss or Pelvic Discontinuity: An Off-the-Shelf Solution  
Wayne G. Paprosky, MD, FAAOS

X. Femoral Component Removal: Technical Pearls Going from the Top  
Scott M. Sporer, MD, FAAOS

XI. Custom Triflange for Massive Bone Loss or Pelvic Discontinuity: Take the Guess Work Out  
Bryan D. Springer, MD, FAAOS

**SYMPOSIUM B**

8:00 AM - 10:00 AM  
Ballroom 6B

Augmentation of Fracture Repair: Is Anything Ready for Prime Time?  
Moderator: Emil H. Schemitsch, MD, FAAOS

A primary goal of the symposium will be to achieve consensus opinions on many current issues and controversies regarding the augmentation of fracture repair and non-union management. The recent evidence that has challenged traditional thinking regarding management of fracture healing problems will be evaluated.

I. Is there any Role for Bone Morphogenetic Proteins and Osteoinductive Proteins in 2021?  
Brett D. Crist, MD, FAAOS

II. An Evidence-Based Approach to Management of the Nonunion with No Bone Defect!  
Michael J. Gardner, MD, FAAOS

III. Reamer / Irrigator / Aspirator Bone Graft: Always Use, or is there still a Role for the Iliac Crest Bone Graft?  
Anna N. Miller, MD, FAAOS

IV. Cell-Based Therapies for Fracture Repair: Is the Evidence Strong Enough for Routine Use?  
Aaron Nauth, MD

V. Universal Use of Antibiotic Powder in Open Wounds: Do the Benefits Outweigh the Risks?  
William T. Obremskey, MD, MPH, FAAOS

VI. What Role does Allograft Play in Fracture Management in 2021?  
Emil H. Schemitsch, MD, FAAOS

VII. An Evidence-Based Approach to Management of the Nonunion with a Bone Defect!  
J. Tracy Watson, MD, FAAOS

**INSTRUCTIONAL COURSE LECTURE**

8:00 AM - 10:00 AM  
101 Intraoperative and Postoperative Complications in Total Hip Arthroplasty: How Do I Make it Right?  
Moderator: Jay R. Lieberman, MD, FAAOS

This course provides surgeons with strategies to prevent and manage common complications that occur intraoperatively and postoperatively including periprosthetic fracture, wound drainage, infection, dislocation, and trunionosis.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
TUESDAY EDUCATIONAL PROGRAMS

102  Management of Periprosthetic Joint Infection: What has Happened Over the Last Few Years?
Moderator: Javad Parvizi, MD, FAAOS
Thorsten Gehrke, MD
Carlos A. Higuera Rueda, MD, FAAOS
Carlo Romano, MD

This course provides attendees with the most recent developments related to prevention, diagnosis, and treatment of periprosthetic joint infection (PJI).

103  Biologics in Rotator Cuff Repair: Magic or Mischief?
Moderator: John M. Tokish, MD, FAAOS
Jeffrey S. Abrams, MD, FAAOS
Walter S. Choate, MD, FAAOS
Jason L. Dragoo, MD, FAAOS

This course offers a thorough presentation of the use of biologics in the setting of a rotator cuff tear and its impact on patient outcomes.

104  Midfoot Trauma: Let’s Get it Right the First Time
Moderator: Michael P. Clare, MD, FAAOS
Robert B. Anderson, MD, FAAOS
Geoffrey I. Phillips, MD, FAAOS
Andrew K. Sands, MD, FAAOS

This ICL will focus on pathoanatomy, treatment principles and techniques in the management of midfoot trauma, including high level athletes, complex injuries, and late reconstruction.

105  From the Sideline to the Hot Zone: Can Orthopaedic Surgeons be First Responders?
Moderator: Craig S. Roberts, MD, MBA, FAAOS
Brandi Hartley, MD, FAAOS
Alfonso Mejia, MD, MPH, FAAOS
Andrew N. Pollak, MD, FAAOS

Orthopaedic surgeons can competently serve as “first responders” outside the hospital as good Samaritans, team physicians, and tactical emergency medical support physicians.

106  Scaphoid Nonunions: Current Best Practices and Treatment
Moderator: Julie E. Adams, MD, FAAOS
Ruby Grewal, MD
Steve K. Lee, MD, FAAOS
Nicholas Pulos, MD

This ICL focuses upon the vexing problem of scaphoid nonunions and their treatment. Authors from a variety of practice locations and types will share their strategies for treatment and discuss current evidence and best practices, tips and tricks and technical pearls.

107  Sports Specialization and the Skeletally Immature Athlete: Current Concepts
Moderator: Nirav K. Pandya, MD, FAAOS
Jennifer Beck, MD, FAAOS
Brian T. Feeley, MD, FAAOS
Andrew T. Pennock, MD, FAAOS

Single sport specialization has had dramatic impact on the health of skeletally immature athletes, and understanding its effect is critical for the clinician.

108  Taking Charge of Change in 2021: Leading Your Organization through the Evolving Value-Based Payment Landscape
Moderator: Richard C. Mather, MD, MBA, FAAOS
Kevin J. Bozic, MD, MBA, FAAOS
Daniel B. Murrey, MD, FAAOS
Hugh S. West, MD, FAAOS

Organizational innovation is imperative in the current and evolving payment landscape. This course seeks to share lessons learned from diverse practices to guide yours to success.

109  Urban Legends vs. Evidence-Based Medicine in Total Shoulder Arthroplasty
Moderator: Richard J. Friedman, MD, FAAOS
Lawrence V. Gulotta, MD, FAAOS
Howard D. Routman, DO, FAAOS
Thomas W. Throckmorton, MD, FAAOS

Discuss current pre-, intra- and postoperative practices in total shoulder arthroplasty to determine what is best practice based on evidence-based medicine.

The following symbols appear next to educational sessions and indicate one or more of the following:

U.S. Food and Drug Administration has not cleared the drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an off label use). For full information, refer to page 17.

For those who have not registered or purchased these tickets in advance, available tickets may be purchased when registering on-site.

An Audience Response System will be featured in several courses in symposia.

Case Presentations - Features a participant's round table with an expert faculty facilitator and an iPad for showing images and data from faculty selected cases. The moderator will present the case to the participants and the facilitator leads individual table discussion.

The case is then discussed by all course participants’ with individual tables showing their conclusions. The moderator will present the final solution using evidence-based data including teaching points with references to support the selected treatment. Four to five cases will be discussed during the highly interactive two hour session.

Technical Skills - Focused on positioning, approach, and step-by-step technical tips in an edited video followed by discussion on the pearls. The courses will feature four to five cases.

The Board of Specialty Societies logo next to an educational session indicates the session is co-branded with AAOS and that society.
110  **Elbow Arthroscopy in Overhead Athletes: Technical Tricks**  
*Moderator:* Felix H. Savoie III, MD, FAAOS  
Jeffrey R. Dugas, MD, FAAOS  
Eric C. Makhni, MD, MBA, FAAOS  
George A. Paletta, MD, FAAOS  

Elbow arthroscopy is a critical tool for treating pathologies associated with overhead athletes. This ICL will review helpful technical pearls for success.

111  **Own Your Patient’s Bone Health: Know How to Treat Prior to Spine Surgery**  
*Moderators:* Paul A. Anderson, MD, FAAOS and  
John R. Dimar, MD, FAAOS  
Joseph M. Lane, MD, FAAOS  
Ronald A. Lehman, MD, FAAOS  

Metabolic bone disease causes major morbidity in the aging skeleton requiring orthopaedists to have improved knowledge of the physiology, diagnosis, and currently available treatment regimes.

112  **What to Do When it is Anterior Cruciate Ligament Number Two**  
*Moderator:* Bryson P. Lesniak, MD, FAAOS  
Michael G. Baraga, MD, FAAOS  
Asheesh Bedi, MD, FAAOS  
Alan Getgood, MD, FRCS (Ortho)  

Anterior cruciate ligament (ACL) revision is an increasingly common procedure. This course aids the surgeon in recognizing causes of primary ACL failure and how to address them.

*Moderator:* Austin T. Fragomen, MD, FAAOS  
Michael D. Gilmore, MD, FAAOS  
Volker Musahl, MD, FAAOS  
Anil S. Ranawat, MD, FAAOS  
S. Robert Rozbruch, MD, FAAOS  

This is a collaboration between LLRS and AOSSM. This congress brings Limb Deformity and Sports osteotomy experts together to discuss approaches to osteotomy.

181  **Management of Most Common Foot and Ankle Pathologies**  
*Moderator:* Ashish Shah, MD, FAAOS  
Jason S. Ahuero, MD, FAAOS  
Judith F. Baumhauer, MD, MPH, FAAOS  
Stephen F. Conti, MD, FAAOS  
John E. Femina, MD, FAAOS  
Naren G. Gurbani, MD, FAAOS  
Daniel Guss, MD, MBA, FAAOS  
Kenneth Hunt, MD, FAAOS  
Jeffrey E. Johnson, MD, FAAOS  
Mark S. Myerson, MD, FAAOS  
Vinod K. Panchbhavi, MD, FAAOS  
Keith L. Wapner, MD, FAAOS  

Course presenters discuss the fundamentals of conservative and surgical management of most common foot and ankle pathologies like acute achilles rupture, plantar fasciitis, equinus contracture [gastrocnemius tightness], sesamoiditis, and metatarsalgia. They also help participants to understand the different controversies in treatment of these common pathologies by active discussion with the faculty.

182  **Challenges in the Management of Neuromuscular Hip Disorders in Children and Young Adults**  
*Moderator:* Keith D. Baldwin, MD, FAAOS  
Oussama Abousamra, MD  
Corinna C. Franklin, MD, FAAOS  
Michael T. Healy, MD, FAAOS  
Martin J. Herman, MD, FAAOS  
Jennifer C. Laine, MD, FAAOS  
Jonathan G. Schoenecker, MD, FAAOS  
Wade Schrader, MD  
Julianne P. Sees, DO, FAAOS  
Valentin Antoci, MD, PhD, FAAOS  
Walter H. Truong, MD, FAAOS  

This course examines the various controversies in neuromuscular hip displacement and reconstruction in children and young adults.

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PAPER PRESENTATIONS

8:00 AM - 10:00 AM
Ballroom 6A

**ADULT RECONSTRUCTION KNEE I**

Moderators: Claudio Diaz, MD and Julius K. Oni, MD, FAAOS

**PAPER 001**

**Tuesday**

8:00 AM  PAPER 001

There is No Difference in Reinfection Rates but Significantly Higher Reoperation Rates Associated with Premolded Cement Spacers than Primary Component Spacers in Treatment of Prosthetic Joint Infection of the Knee with Two-Stage Exchange

**Jenna A. Bernstein, MD**
Jessica Baylor Baylor, BS
Mackenzie A. Roof, BS
Brielle Antonelli, BS
Antonia F. Chen, MD, MBA, FAAOS
William J. Long, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS

Premolded cement spacers and component spacers are equally effective in clearing TKA infection with similar rates of reinfection after second stage revision.

**PAPER 002**

8:05 AM  PAPER 002

One-Stage Durable Functional Prosthetic Spacers are an Option for Treating Periprosthetic Joint Infection after Total Knee Arthroplasty

**Liam Bosch, MD**
Nicole A. Segovia, BS
Prema Arora, MS
James I. Huddleston, MD, FAAOS
Stuart B. Goodman, MD, PhD
Derek F. Amanatullah, MD, PhD, FAAOS

Functional prosthetic spacers for PJI using primary TKA components and high-dose antibiotic cement are equivalent to two-stage revision for infection control, survival, and functional outcomes.

**PAPER 003**

8:10 AM  PAPER 003

Interim Spacer Exchange for Treatment of Periprosthetic Joint Infection: Almost Half the Patients Fail Subsequently

**Elie Kozaily, MD**
Timothy Tan, MD
Steven J. Yacovelli
Hiba K. Anis, MD
Carlos A. Higuera Rueda, MD, FAAOS
Nicolas S. Piuuzzi, MD
Javad Parvizi, MD, FAAOS

A study investigating the rate and risk factors associated with failure of two-stage exchange in patients who required an interim spacer exchange.

**PAPER 004**

8:20 AM  PAPER 004

Recurrent Failures after Two-Stage Exchanges are Secondary to New Organisms Not Previously Covered by Antibiotics

**Fortune J. Egbulefu, MD**
Jaewon Yang, MD
Antonia F. Chen, MD, MBA, FAAOS
Scott M. Sporer, MD, FAAOS
John Segreti
Matthew Austin, MD, FAAOS
Craig J. Della Valle, MD, FAAOS

Recurrent periprosthetic joint infection after two-stage exchange is most likely due to a different organism rather than persistent infections that were not adequately treated.

**PAPER 005**

8:25 AM  PAPER 005

Results of Two-Stage Revision for Chronic Periprosthetic Joint Infection with Minimum 5-Year Follow Up: A Multicenter Study

**Beau J. Kildow, MD**
Curtis W. Hartman, MD, FAAOS
Timothy S. Brown, MD, FAAOS
Bryan D. Springer, MD, FAAOS
Thomas K. Fehring, MD, FAAOS
Kevin L. Garvin, MD, FAAOS

Two-stage exchange arthroplasty for chronic PJI results in high infection eradication at 87.6% with minimum 5-year follow up.

**PAPER 006**

8:30 AM  PAPER 006

Predictors of Reinfection in Prosthetic Joint Infections following Two-Stage Reimplantation

**Curtis W. Hartman, MD, FAAOS**
Eric Daubach, BA
Brian Richard, MD
Elizabeth Lyden, MS
Hani Haider, PhD
Beau J. Kildow, MD
Beau S. Konigsberg, MD, FAAOS
Kevin L. Garvin, MD, FAAOS

Elevated CRP levels and MSSA infection were strongly associated with failure of a two-stage reimplantation.

**PAPER 007**

8:40 AM  PAPER 007

◆ Results of Debridement Antibiotics and Implant Retention for Periprosthetic Joint Infection with the Use of Intraosseous Antibiotics

**Beau J. Kildow, MD**
Shaun P. Patel, MD
Jesse E. Otero, MD, FAAOS
Keith Fehring, MD
Brian M. Curtin, MD, FAAOS
Bryan D. Springer, MD, FAAOS
Thomas K. Fehring, MD, FAAOS

The addition of IO vancomycin at the time of DAIR yielded improved results compared to standard protocol for acute infections.
8:45 AM  PAPER 008
Success Rates of Debridement, Antibiotics, and Implant Retention in 230 Infected Total Knee Arthroplasties: Implications for Classification of Periprosthetic Joint Infection
Mark Zhu
Katy Kim
Alana Cavadino, MSc, PhD
Jacob Munro, MD
Simon Young, MD, FRACS
DAIR has a high failure rate in all PJIs occurring more than a year post primary TKA.

8:50 AM  PAPER 009
Is there Harm in Debridement, Antibiotics, and Implant Retention vs. Two-Stage Revision in the Treatment of Periprosthetic Knee Infection? Experiences within a Large US Healthcare System
Stephen J. Huffaker, MD, PhD
Heather A. Prentice, PhD
Matthew P. Kelly, MD, FAAOS
Adrian D. Hinman, MD, FAAOS
DAIR may be a reasonable, safe, and successful consideration in knee PJI management of some patients but must be weighed against an overall higher septic reoperation risk versus two-stage revision alone.

9:00 AM  PAPER 010
Chronic Antibiotic Suppression after Irrigation and Debridement with Modular Component Exchange Rarely Results in Antibiotic Resistance
Sumon Nandi, MD, MBA, FAAOS
James Doub
Aaron J. Johnson, MD
Vincent Y. Ng, MD, FAAOS
Farshad Adib, MD
Antibiotic resistance and adverse drug reactions are rare with chronic antibiotic suppression following total joint arthroplasty irrigation and debridement.

9:05 AM  PAPER 011
Emergence of Antibiotic Resistance during Two-Stage Revision for Periprosthetic Joint Infection
Leanne Ludwick
Emanuele Chisari, MD
Jasmine Wang, BS
Samuel Clarkson, MD
Lacee K. Collins, BS
Javad Parviz, MD, FAAOS
The emergence of antibiotic resistance across two-stage revisions needs to be analyzed to ensure that antibiotic stewardship is not sacrificed.

9:10 AM  PAPER 012
Early Prosthetic Joint Infections following Total Knee Arthroplasty are More Resistant and Polymicrobial than Late Prosthetic Joint Infections: Antibiotic Sensitivities to Guide Empiric Antibiotic Choice
Katy Kim
Mark Zhu
Jacob Munro, MD
Simon Young, MD, FRACS
Empirc antibiotics are guided by the likely organisms. Early PJIs are more resistant and polymicrobial than late PJIs. Hence, a wider empirical antibiotic coverage is appropriate in early PJIs.

9:20 AM  PAPER 013
Septic Revision Total Knee Arthroplasty is Associated with Significantly Higher Mortality than Aseptic Revisions: A Single-Center Study (1,254 Patients)
Benjamin Bloch, MBBS, FRCS (Ortho)
Hosam Matar, MD, MSc
Susan Snape, MBCHB, PhD
Peter J. James, FRCS
rTKA performed for infection is associated with significantly higher postoperative mortality at all time points compared with aseptic revision surgery.

9:25 AM  PAPER 014
Synchronous Periprosthetic Joint Infections: Very High Mortality, Reinfection, and Reoperation at One Year
Elizabeth Gauden, MD
Mark W. Pagnano, MD, FAAOS
Kevin I. Perry, MD, FAAOS
Gina Suh, MD
Daniel J. Berry, MD, FAAOS
Matthew P. Abdel, MD, FAAOS
Patients with synchronous PJIs had very high rates of mortality and unplanned reoperation, with a diagnosis of rheumatoid arthritis increasing the risk of mortality by 8-fold.

9:30 AM  PAPER 015
Clinical and Functional Outcomes of Patients Who Undergo Knee Fusion vs. Amputation for Prosthetic Joint Infection
Alexandra Stavakis, MD
Matthew Dipane, BA
Edward J. McPherson, MD, FAAOS
The study retrospectively reviews the clinical and functional outcomes of patients who undergo knee endofusion versus amputation for persistent or recurrent infection.

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9:40 AM  PAPER 016
Adverse Factors Associated with Failed Treatment for Infected Primary Total Knee Arthroplasty in the FROCE-TJR Regisry
David C. Ayers, MD, FAAOS
Mohamed A. Yousef, MD, PhD
Hua Zheng, PhD
Patricia Franklin, MD, MBA

Smoking, extensor mechanism disruption, polymicrobial infection, soft tissue defect requiring flap reconstruction, and three or more surgical revisions are associated with failed treatment for infected TKA.

9:45 AM  PAPER 017
Are Intraoperative Cultures Necessary if the Aspiration Culture is Positive? A Periprosthetic Joint Infection Concordance Study
K. Keely Boyle, MD
Milan Kapadia
Michael Henry, MD
Andy Miller, MD
Alberto V. Carli, MD, MSc

The majority of aspiration and tissue cultures in culture positive PJI are concordant, but this concordance varies based on bacterial species. One in six had discordance comparing aspiration to tissue culture.

9:50 AM  PAPER 018
Concomitant Hip and Knee Periprosthetic Joint Infection in Periprosthetic Fracture: Diagnostic Utility of Serum and Synovial Fluid Markers
Young-Min Kwon, MD, PhD, FAAOS
Janna Van Den Kieboom, MD
Venkatsaiakhil Tirumala, BS, MS
Liang Xiong, MD, PhD
Ruben V. Oganesyan, MD
Christian Klemt, PhD

The diagnostic utility of the serum and synovial markers for diagnosing PJI was lower in the setting of concomitant periprosthetic fracture compared to PJI alone.

Discussion

9:40 AM  PAPER 019
Is Outpatient Shoulder Arthroplasty Safe in Patients Over 65 Years of Age? A Comparison of Readmissions and Complications in Inpatient and Outpatient Settings
James M. Gregory, MD, FAAOS
Taylor J. Willenbring, BS
Marijke J. Devos, MD
Adam Kozemchak, MS
Ryan J. Warth, MD

Outpatient TSA is safe for appropriately selected patients 65 years or older, and reevaluation of TSA as an inpatient-only procedure should be considered.

8:00 AM - 10:00 AM
Ballroom 6D
Shoulder and Elbow I
Moderators: Matthew D. Budge, MD, FAAOS and Joseph W. Galvin, DO, FAAOS

8:00 AM  PAPER 019
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James M. Gregory, MD, FAAOS
Taylor J. Willenbring, BS
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Outpatient TSA is safe for appropriately selected patients 65 years or older, and reevaluation of TSA as an inpatient-only procedure should be considered.

8:05 AM  PAPER 020
Is Total Shoulder Arthroplasty or Reverse Total Shoulder Arthroplasty Candidacy in an Ambulatory Surgery Center Dictated by Safety or Insurance?
Anthony J. Marois, MD
Caleb A. Jones, MD
David Bernholt, MD
Frederick M. Azar, MD, FAAOS
Thomas W. Throckmorton, MD, FAAOS
Tyler J. Brolin, MD, FAAOS

The decision to proceed with shoulder arthroplasty in an inpatient setting is multifactorial in nature. Safety and insurance payer source both play significant roles in decision making.

8:10 AM  PAPER 021
Dexamethasone Improves Postoperative Pain and Nausea after Total Shoulder Arthroplasty: A Prospective, Randomized Controlled Trial
Elizabeth A. Klag, MD
Noah A. Kuhlmann, BS, MS
Joseph S. Tramer, MD
Sreten Franovic, BS, MS
Stephanie J. Muh, MD, FAAOS

Preoperative administration of intravenous dexamethasone leads to improved pain control and decreased nausea and vomiting in patients undergoing shoulder arthroplasty.

Discussion
Tuesday Educational Programs

8:20 AM  PAPER 023
Comparing Patient-Reported Outcome Measures and Physical Exam for Internal Rotation in Patients Undergoing Reverse Shoulder Arthroplasty: Does Surgery Alter Patient's Perception of Function?
Edward J. Southard, MD
Gabriella Ode, MD
Damir Pamic, BS
Peter Simon, PhD
Kaitlyn N. Christmas, BS, CCRP
William E. Lee, PhD
Philippe Collin, MMED
Mark A. Frankle, MD, FAAOS

Assessment of internal rotation in patients undergoing RSA requires both physical exam findings and patient-reported outcome data to accurately define internal rotation.

8:25 AM  PAPER 024
Reverse Total Shoulder Arthroplasty for Patients with Minimal Preoperative Pain: A Matched Cohort Analysis
Teja S. Polisetty, BS
Andrew R. Malarkey, DO
Ryan Colley
Gagan Grewal, MD, MS
Jonathan C. Levy, MD, FAAOS

RSA patients with minimal preoperative pain achieve significant improvements in function and motion similar to those who choose to have RSA for both pain and function, but are less satisfied.

8:35 AM  PAPER 025
Anatomic vs. Reverse Shoulder Arthroplasty – Are Nerve Injury Rates Different? A Retrospective Cohort Study
Manan S. Patel, BA
William B. Wilent, PhD
Michael Gutman, BA
Joseph A. Abboud, MD, FAAOS

In this study, we present no nerve injuries in the largest series of primary total shoulder arthroplasties performed under continuous intraoperative nerve monitoring.

8:40 AM  PAPER 026
Predictors of Scapular Fracture following Reverse Total Shoulder Arthroplasty: Analysis of 739 Consecutive Cohort
Vahid Entezari, MD
Lauren E. Grobaty, BA
Jonathan Guevara, MD
Jared M. Mahylis, MD, FAAOS
Bong-Jae Jun, PhD
Alparslan Turan, MD
Carl S. Winalski, MD
Eric T. Ricchetti, MD, FAAOS
Joseph P. Iannotti, MD, PhD

Scapular fractures occur in 7% of patients following rTSA; one-third were missed initially while lower BMI, history of osteoporosis and hypothyroidism significantly increased the odds of this fracture.

8:45 AM  PAPER 027
The Impact of Subscapularis Integrity on Functional Outcome in Reverse Shoulder Replacement Utilizing a 135° Stem
Carl Cirino, MD
Paul J. Cagle, MD, FAAOS
Reuben Gobezie, MD, FAAOS
Evan S. Lederman, MD, FAAOS
Patrick J. Denard, MD, FAAOS
Bradford O. Parsons, MD, FAAOS

Our study demonstrates a healing rate of 57% following repair in RSA with a 135° angle. No difference in standardized outcome measures was found regardless of subscapularis healing status.

8:55 AM  PAPER 028
Two-Stage Revision Surgery for Periprosthetic Shoulder Infection: Clinical Results at a Minimum of Five Years Follow Up
Prashant S. Meshram, MS (ORTH), MBBS
Jorge L. Rojas, MD
Jacob Joseph, BA
Umasuthan Srikumaran, MD, MBA, FAAOS
Stephen C. Weber, MD, FAAOS
Edward G. McFarland, MD, FAAOS

For patients undergoing reverse shoulder arthroplasty, reaming the glenoid flat to address glenoid bone loss has excellent survival and maintained clinical results at a minimum of 5-year follow up.

9:00 AM  PAPER 029
Comparison of Clinical Outcomes Using Inlay vs. Onlay Humeral Trays in Reverse Shoulder Arthroplasty for Patients with Osteoarthritis with Glenoid Bone Loss without Cuff Tear
Prashant S. Meshram, MS (ORTH), MBBS
Jacob Joseph, BA
Jorge L. Rojas, MD
Umasuthan Srikumaran, MD, MBA, FAAOS
Stephen C. Weber, MD, FAAOS
Edward G. McFarland, MD, FAAOS

The improvement in function and range of motion and complication rates were similar between patients who had a lateralized glensphere RSA prosthesis with either an inlay or an onlay humeral design.

Discussion
9:10 AM  PAPER 031  
**Patient Satisfaction and Outcomes of Reverse Shoulder Arthroplasty: A Minimum of 10 Years Follow Up**  
Mihir M. Sheth, MD  
Brett L. Heldt, BS  
Jennifer H. Spell  
Emily A. Vidal, BS  
Mitzi S. Laughlin, PhD, ATC  
Brent J. Morris, MD, FAACS  
Hussein A. Elkousy, MD, FAACS  
Thomas B. Edwards, MD, FAACS

The study included patients with at least 10 years follow up after reverse shoulder arthroplasty, and evaluated the indications, revisions, pain, single assessment numeric evaluation, and satisfaction.

9:15 AM  PAPER 032  
**Off-Label Use of Reverse Arthroplasty: The American Academy of Orthopaedic Surgeons Shoulder and Elbow Registry**  
John E. Kuhn, MD, FAACS  
Stephen C. Weber, MD, FAACS  
Patrick St Pierre, MD, FAACS  
Stephen F. Brockmeier, MD, FAACS  
Grant E. Garrigues, MD, FAACS  
Ronald A. Navarro, MD, FAACS  
Joaquin Sanchez-Sotelo, MD, FAACS  
Gerald R. Williams, MD, FAACS

AAOS Shoulder Elbow Registry demonstrates rTSA used for On-Label use or rotator cuff tears arthropathy is decreasing over time. Off-Label for different diagnoses is increasing.

9:20 AM  PAPER 033  
**Conversion to Reverse Total Shoulder Arthroplasty with and without Humeral Stem Retention: Long-Term Results**  
Marios Loucas, MD  
Rafael Loucas, MD  
Philipp Kriechling, MD  
Samy Bouaicha, MD  
Karl Wieser, MD

Modularity of a shoulder arthroplasty system (SAS) has substantial advantages if conversion to reverse shoulder arthroplasty becomes necessary and should be considered as prerequisite for stemmed SAS.

9:30 AM  PAPER 034  
**Reverse Total Shoulder Arthroplasty in Patients with Type B2, B3, and Type C Glenoids: A Matched Pair Analysis**  
Rafael Loucas, MD  
Philipp Kriechling, MD  
Marios Loucas, MD  
Rany El Nashar  
Christian Gerber, MD  
Karl Wieser, MD

Reverse total shoulder arthroplasty seems to be a valuable treatment option for patients with primary (dysplasia) or secondary (wear) posterior glenoid deficiency.

9:35 AM  PAPER 035  
**Early Clinical and Radiographic Outcomes of an Augmented Baseplate in Reverse Shoulder Arthroplasty for Glenohumeral Arthritis with Glenoid Deficiency**  
Jacob Kirsch, MD  
Manan S. Patel, BA  
Akash Singh, BS  
Mark D. Lazarus, MD, FAACS  
Gerald R. Williams, MD, FAACS  
Surena Namdari, MD, MSc, FAACS

Primary RSA with an augmented baseplate results in excellent clinical outcomes and significant deformity correction in patients with advanced glenoid deficiency.

9:40 AM  PAPER 036  
**Postoperative Glucocorticoid Use in Shoulder Arthroplasty: Early Results of a Randomized-Control Trial**  
Alexander M. Dawes, BS  
Corey Spencer, BS  
Kevin X. Farley, BA  
Charles A. Daly, MD  
Michael B. Gottschalk, MD, FAACS  
Eric R. Wagner, MD

The purpose of this RCT is determine the effect a postoperative methylprednisolone taper (MPT) course has on pain and opioid consumption following primary total shoulder arthroplasty.

9:50 AM  PAPER PRESENTATIONS  
**8:00 AM - 10:00 AM**  
**Ballroom 6E**  
**Spine I**  
Moderator: Stuart H. Hershman, MD, FAACS

8:00 AM  PAPER 037  
**Low Bone Density Increases the Risk of Proximal Junctional Kyphosis in Thoracolumbar Fusion**  
Aaron J. Buckland, FRACS, MBBS  
Eaman Balouch, MD, PhD  
Jack R. Zhong, BA  
Nicholas A. O’Malley, BS  
Carolyn Stickley, BS  
Carlos Leon  
Constance Maglaras, PhD  
Brooke K. O’Connell

Poor bone mineral density is an independent risk factor for development of severe PJK. We propose a T-score cutoff value of -1.55 to be used by surgeons in assessing risk of postoperative PJK development.
Tuesday Educational Programs

8:05 AM  PAPER 038
When Not to Operate in Spinal Deformity: Identifying Subsets of Patients with Clinical Deterioration, Major Complications, and Highly Cost Inefficient Surgery/ Is there a Threshold for Saying No?

Peter G. Passias, MD, FAAOS
Katherine E. Pierce, BS
Sara Naessig, BS
Waleed Ahmad, MS
Renaud Lafage, MS
Virginie Lafage, PhD
D. Kojo Hamilton
Gregory M. Mundis, MD, FAAOS
Han Jo Kim, MD, FAAOS
Richard A. Hostin, MD, FAAOS
Alan H. Daniels, MD, FAAOS
Robert A. Hart, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Christopher I. Shaffrey, MD, FAAOS
Frank J. Schwab, MD
Christopher Ames, MD
Justin S. Smith, MD
Robert S. Bess, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
International Spine Study Group

Due to the complexity and invasiveness of deformity correction across all regions of the spine, high costs and major postoperative complications are often associated.

8:10 AM  PAPER 039
The Posterior Cranial Vertical Line: A Novel Global Sagittal Alignment Parameter that Correlates to Proximal Junctional Kyphosis Development following Adult Spinal Deformity Surgery

Paul Park, MD
Cole R. Morrissette, BA, MA
Nathan J. Lee, MD
Meghan Cerpa, MPH
Ronald A. Lehman, MD, FAAOS
Lawrence G. Lenke, MD, FAAOS

Our study proposes the posterior cranial vertical line (PCVL) as a novel radiographic marker for global sagittal balance and explores how the PCVL relates to postop proximal junctional kyphosis.

Discussion

8:20 AM  PAPER 040
Osteoporosis Increases the Likelihood of Revision Surgery following a Long Spinal Fusion for Adult Spinal Deformity

Anmol Gupta, MD, MBA
Thomas D. Cha, MD, FAAOS
Joseph H. Schwab, MD, FAAOS
Harold Fogel, MD
Daniel Tobert, MD
Afshin Razi, MD, FAAOS
Andrew C. Hecht, MD, FAAOS
Christopher M. Bono, MD, FAAOS
Stuart H. Hershman, MD, FAAOS

Osteoporotic ASD patients are statistically more likely to require revision surgery. However, the incidence of such was not found to be temporally different in comparison to non-osteoporotic patients.

8:25 AM  PAPER 041
The Impact of Paraspinal Muscle Size as an Independent Risk Factor for the Incidence of Proximal Junctional Kyphosis

Avani Vaishnav, MBBS
Kosuke Sato, MD
Hikari Urakawa, MD
Jonathan C. Elysee
Renaud Lafage, MS
Han Jo Kim, MD, FAAOS
Frank J. Schwab, MD
Virginie Lafage, PhD
Sheeraz Qureshi, MD, FAAOS

Paraspinal muscle size of upper instrumented vertebra level was assessed in adult spinal deformity. Small paraspinal muscle contributed to incidence of proximal junctional kyphosis as a risk factor.

8:30 AM  PAPER 042
How Much Lumbar Lordosis Does a Patient Need to Reach their Age-Adjusted Alignment Target? A Formulated Approach Predicting Successful Surgical Outcomes

Michael H. McCarthy, MD, MPH
Renaud Lafage, MS
Justin S. Smith, MD
Robert S. Bess, MD, FAAOS
Themistocles S. Protopsaltis, MD, FAAOS
Christopher Ames, MD
Eric O. Klineberg, MD, FAAOS
Han Jo Kim, MD, FAAOS
Christopher I. Shaffrey, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Gregory M. Mundis, MD, FAAOS
Munish C. Gupta, MD, FAAOS
Frank J. Schwab, MD
Virginie Lafage, PhD
HSS ISSG Spine
International Spine Study Group

Constructed with multilinear regression, the formula LL = PI + 0.3TK - 0.5Age + 10 permits to reach age-adjusted alignment goal and reduce postoperative complications in ASD surgery.

Discussion

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
8:40 AM  PAPER 043
Intraoperative vs. Postoperative Radiographic Coronal Balance for Adult Spinal Deformity Surgery
Alex Ha, MD
Alexander Tuchman, MD
Justin Mathew, MD
Nathan J. Lee, MD
Meghan Cerpa, MPH
Andrew J. Luzzi, MD
Ronald A. Lehman, MD, FAAS
Lawrence G. Lenke, MD, FAAS

A novel intraoperative coronal balance measurement correlates well with postoperative coronal balance and can guide additional intraoperative corrective interventions.

8:45 AM  PAPER 044
Depressive Disorder is Associated with Longer In-Hospital Lengths of Stay, Complications, and Costs of Care following Spine Fusion for the Treatment of Adult Spinal Deformity: A Match-Controlled Study
Rushabh Vakharia, MD
Chester J. Donnally, MD
Bilal Mahmood, MD
Miriam Weisberg, MD
Nicholas U. Ahn, MD
Ahmed Saleh, MD
Alexander Vaccaro, MD, MBA, FAAS
Afshin Razi, MD, FAAS

This retrospective study analyzes the effects of depressive disorders on patients undergoing spine fusion for the treatment of adult spinal deformity.

8:50 AM  PAPER 045
Correlation of Operative Time to Complications after Spinal Deformity Surgery
Tina Raman, MD
Michael Dinizo, MD
Nicholas Shepard, MD

We found that increasing operative time was a significant predictor of medical complications within 90 days of adult spinal deformity surgery.

9:00 AM  PAPER 046
Cervical Radiographic Parameters and Patient-Reported Outcomes following Harrington Instrumentation: A Minimum 35-Year Follow Up
Addisu Mesfin, MD, FAAS
Adan M. Omar, MD
Jarren A. Section, MD
Noorullah Majsoodi, BS
Aron Sulovari, BA

An increase in positive sagittal malalignment of the cervical spine was correlated with worse patient-reported outcomes in the setting of preexisting Harrington instrumentation for AIS.

9:05 AM  PAPER 047
Low Pelvic Incidence Patients are at High Risk of Over Correction following Adult Spinal Deformity Surgery
Themistocles S. Protopsaltis, MD, FAAOS
Alexandra Soroceanu, MD
Gregory M. Mundis, MD, FAAOS
Justin S. Smith, MD
Michael P. Kelly, MD, FAAOS
Alan H. Daniels, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
Christopher Ames, MD
Robert A. Hart, MD, FAAOS
Robert S. Bess, MD, FAAOS
Christopher I. Shaffrey, MD, FAAOS

Low pelvic incidence patients are susceptible to over correction of lumbar lordosis with a resulting higher rate of PJK. Care should be taken to optimize lordosis and the lordosis apex below L4.

9:10 AM  PAPER 048
A Clinical Care Pathway to Reduce Length of Stay after Adult Spinal Deformity Surgery
Han Jo Kim, MD, FAAOS
Michael Steinhaus, MD
Renaud Lafage, MS
Jonathan C. Elysee
Ananth Punyala, BS, MS
Sachin P. Shah, BA
Ellen M. Soffin, MD, PhD
Chad M. Craig, MD

A clinical care pathway applied on 20 adult spinal deformity patients undergoing ≥5 level fusions to the pelvis led to a decrease in LOS from 7.4 days to 4.5 days when compared to historical cohort.

9:20 AM  PAPER 049
Power-Assisted Pedicle Screw Technique Protects against Risk of Surgeon Overuse Injury: A Real-Time Electromyography Study
David L. Skaggs, MD, FAAS
Amy A. Claeson, PhD
Frank J. Schwab, MD
Anup Gandhi, PhD

Power-assisted pedicle screw technique is protective, use of manual technique risks overuse injury to the surgeon, notably to the forearm extensors, biceps, upper trapezius, and neck extensors.
9:25 AM  PAPER 050
Force of Ligamentous Failure is Lower in Patients with Adult Spinal Deformity Requiring Revision Surgery
Bahar Shahidi, DPT, PhD
Bradley J. Anderson, BS
Tina L. Iannacone, MPH
Courtney A. Moltzen, MS
Gregory M. Mundis, MD, FAAOS

Posterior spinal ligamentous strength at the proximal junction in individuals who experience failure is less than 50% that of those undergoing primary surgery. Ligament is important for stability.

9:30 AM  PAPER 051
Efficacy, Safety, and Cost Effectiveness of Intraoperative Tranexamic Acid in Adult Spinal Surgery: A Retrospective Analysis of 289 Cases
Aidan P. Sweeney, MS
Samuel Broida, BS
Bryan Grommersch
Joel A. Zaldumbide, BS
Hardeep Singh, MD
Keith W. Michael, MD

When compared to low-dose, high-dose TXA protocols are more effective at reducing perioperative transfusion requirements in adult spinal surgery while also being more cost-effective for the patient.

Discussion

9:40 AM  PAPER 052
Radiation Exposure with Use of Intraoperative CT Guidance in Spinal Deformity Surgery
Gonzalo E. Sumarriva, MD
Bhumit R. Desai, MD
Alaa E. Mohammed, MPH
Paul Celestre, MD, FAAOS

The balance between technical accuracy and its clinical implications when using third-generation navigation systems are important for patient radiation safety and should always be considered.

9:45 AM  PAPER 053
Artificial Intelligence Clustering of Adult Spinal Deformity Morphology Predicts Surgical Characteristics, Alignment, and Outcomes
Alan H. Daniels, MD, FAAOS
Wesley M. Durand, BS
Renaud Lafage, MS
D. Kojo Hamilton
Peter G. Passias, MD, FAAOS
Han Jo Kim, MD, FAAOS
Themistocles S. Protopsaltis, MD, FAAOS
Virginie Lafage, PhD
Justin S. Smith, MD
Christopher I. Shaffrey, MD, FAAOS
Munish C. Gupta, MD, FAAOS
Michael P. Kelly, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
Frank J. Schwab, MD
Jeffrey Gum, MD, FAAOS
Gregory M. Mundis, MD, FAAOS
Robert K. Eastlack, MD, FAAOS
Khaled M. Kebaish, MD, FAAOS
Alexandra Soroceana, MD
Richard A. Hostin, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Robert S. Bess, MD, FAAOS
Christopher Ames, MD
Robert A. Hart, MD, FAAOS
International Spine Study Group

This study used artificial intelligence to cluster lateral radiographs of ASD patients into morphologically similar groups.
Critical Analysis of Anterior/Posterior Staged vs. Same Day Surgery in Patients Undergoing Identical Corrective Surgery for Adult Spinal Deformity

Peter G. Passias, MD, FAAOS
Waleed Ahmad, MS
Sara Naessig, BS
Katherine E. Pierce, BS
Renaud Lafage, MS
Virginie Lafage, PhD
Breton G. Line, BS
Gregory M. Mundis, MD, FAAOS
Robert K. Eastlack, MD, FAAOS
Pierce D. Nunley, MD, FAAOS
D. Kojo Hamilton
Robert A. Hart, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Christopher I. Shaffrey, MD, FAAOS
Frank J. Schwab, MD
Christopher Ames, MD
Justin S. Smith, MD
Robert S. Bess, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
International Spine Study Group

In the closest matched cohort of ASD patients known to date, A/P staged procedures were found to result in significant radiographic improvement and GAP proportionality at 2Y.

Discussion

Open Subpectoral Biceps Tenodesis versus Arthroscopic Repair for Superior-Labrum Anterior to Posterior Tears in Patients under 30

Christopher Colasanti, MD
Eoghan Hurley, MBCHB
Nathan A. Lorentz
Kirk A. Campbell, MD, FAAOS
Michael J. Alaia, MD, FAAOS
Laith M. Jazrawi, MD, FAAOS
Bogdan A. Matache, MD, FRCSC
Eric J. Strauss, MD, FAAOS

In patients with a SLAP tear, biceps tenodesis has been shown to be reliable alternative to arthroscopic repair, with a low rate of revision surgery and excellent patient-reported outcomes.

Discussion

Long-term outcomes after arthroscopic repair of type II superior labrum anterior and posterior lesions in young military patients are less favorable than previously reported, and alternative surgical solutions such as biceps tenodesis may be considered.

Positive Lipstick Sign Does Not Appear to Compromise Clinical Outcomes when the Biceps is Left Alone in Shoulder Arthroscopy

Justin W. Griffin, MD, FAAOS
Wihan Du Plessis
Matthew H. Adsit, BS, MS
Kevin F. Bonner, MD, FAAOS

Favorable outcomes can be achieved in patients with a positive lipstick sign when the biceps is left alone and the primary shoulder pathology is addressed.

Discussion

Two-Year Clinical Outcomes and Survivorship after Biceps Tenodesis

Adam B. Yanke, MD, PhD, FAAOS
Hailey Huddleston, BS
Enrico Forlenza, MD
Nabil Mehta, MD
Devin E. Laux
Kevin C. Parvaresh, MD
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS

Our 2-year postoperative findings support the use of BT for treating biceps pathology.

Increased Load to Failure in Biceps Tenodesis with All-Suture Suture Anchor Compared to Interference Screw: A Cadaveric Biomechanical Study

Brittany Ammerman
Dallas M. Smuin, MD
Christopher M. Stauch, BS
Emily Vannatta, BS
Robert A. Gallo, MD, MHA, FAAOS
Gregory S. Lewis, PhD
Aman Dhawan, MD, FAAOS

A single all suture anchor provides similar biomechanics, including greater ultimate strength and more displacement, as an interference screw in open subpectoral biceps tenodesis.
8:30 AM  PAPER 060
Open vs. Arthroscopic Distal Clavicle Excision: Open Approach is Associated with Higher Postoperative Complication Rate
Enrico Forlenza, MD
Avinesh Agarwalla, MD
Opheie Lavoie-Gagne
Brian C. Werner, MD, FAAOS
Adam B. Yanke, MD, PhD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS
Retrospective study aimed at comparing the incidence of postoperative complications in patients undergoing open and arthroscopic distal clavicle excision, and to identify independent predictors.

Discussion

8:40 AM  PAPER 061
Nationwide Analysis on the Effects of Depressive Disorders in Patients Undergoing Shoulder Arthroscopy: A Matched-Control Analysis
Ajit Vakharia, MD
Marsalis Brown, MD
Naveen Jasty
Charles Su, MD, PhD
James E. Voos, MD, FAAOS
Robert J. Gillespie, MD, FAAOS
This analysis of over 59,000 patients demonstrated DD patients undergoing shoulder arthroscopy have higher rates of medical complications, readmissions, and costs of care.

8:45 AM  PAPER 062
Patient-Reported Outcomes Measurement Information System Upper Extremity Underperforms Psychometrically relative to American Shoulder and Elbow Surgeons Score in Patients undergoing Primary Rotator Cuff Repair
Ophele Lavoie-Gagne
Hailey Hudleston, BS
Michael Fu, MD, MS
Nabil Mehta, MD
Benedict U. Nwachukwu, MD, MBA
Adam B. Yanke, MD, PhD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS
Retrospective study aiming to evaluate the psychometric properties of PROMIS UE-CAT relative to the ASES score in patients undergoing primary rotator cuff repair (RCR).

8:50 AM  PAPER 063
Identifying Risk Factors for Failure of Rotator Cuff Repair using Claims Data
Claudia Thomas, MD
Sam Akhavan, MD, FAAOS
Patrick J. DeMeo, MD, FAAOS
A large insurance claims database was utilized to examine modifiable preoperative, intraoperative, and postoperative risk factors that are associated with re-tear after rotator cuff repair.

Discussion

9:00 AM  PAPER 064
Preoperative Opioid Use is a Risk Factor for Revision Surgery, Complications, and Increased Resource Utilization following Arthroscopic Rotator Cuff Repair
Kevin X. Farley, BA
Jacob M. Wilson, MD
Corey Spencer, BS
John W. Xerogeanes, MD, FAAOS
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD
Preoperative opioid use is a risk factor for complications and revision surgery following RCR. We also observed a dose-dependent response between opioid use and postoperative complication.

9:05 AM  PAPER 065
Preoperative Opioid Use Adversely Affects Patient-Reported Outcomes Measurement Information System Results Following Rotator Cuff Repair
Fabien Meta, MD
Alexander Ziedas, BS
Caleb M. Gulledge, BS
Lafi S. Khalil, MD
Stephanie J. Muh, MD, FAAOS
Vasilios Moutzouros, MD, FAAOS
Eric C. Makhni, MD, MBA, FAAOS
Preoperative opioid use in rotator cuff patients prior to arthroscopic repair leads to lower PROMIS Pain Interference, Physical Function, and Depression outcome scores in the postoperative period.

9:10 AM  PAPER 066
Suprascapular vs. Interscalene Nerve Block in Arthroscopic Shoulder Surgery
Brian M. Godshaw, MD
Misty Suri, MD, FAAOS
Mohammed A. Khalid, MD
Arjun Verma, BA, BS
Michael S. Warren, MD
Colin J. Carroll, BS
Deryk G. Jones, MD, FAAOS
This study shows that the suprascapular nerve block with intra-articular local anesthesia provides clinically equivalent analgesia and comparable postoperative opioid consumption when compared to IS.
9:20 AM  PAPER 067
Health Literacy in Shoulder Arthroscopy: A Quantitative Assessment of the Understandability and Readability of Online Patient Education Material
Olivia O'Reilly, MD
Mary K. Skalitzky, BA
Alan G. Shamrock, MD
Kyle K. Kesler, MD
Trevor Gulbrandsen, MD
Burke Gao, MD
Matthew J. Bollier, MD, FAAOS

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure

Evaluation of publicly available online shoulder arthroscopy patient education materials using validated readability scales.

9:25 AM  PAPER 068
Operative vs. Nonsurgical Treatment of Severely Shortened or Comminuted Clavicle Fractures in Older Adolescent Athletes: Results from a Prospective, Multicenter, Level 2 Cohort Study
David D. Spence, MD, FAAOS
Philip L. Wilson, MD, FAAOS
Donald S. Bae, MD, FAAOS
Michael T. Busch, MD, FAAOS
Eric W. Edmonds, MD, FAAOS
Henry B. Ellis, MD, FAAOS
Katelyn A. Hergott, MPH
Mininder S. Kocher, MD, MPH, FAAOS
G. Y. Li, MD, FAAOS
Elizabeth S. Liotta, MBBS
Jeffrey J. Nepple, MD, FAAOS
Nirav K. Pandya, MD, FAAOS
Andrew T. Pennock, MD, FAAOS
Crystal A. Perkins, MD
Coleen S. Sabatini, MD, MPH, FAAOS
David N. Williams, PhD
Samuel C. Willimon, MD, FAAOS
Benton E. Heyworth, MD, FAAOS
FACTS (Function after Adolescent Clavicle Trauma and Surgery)

Despite several studies suggesting the contrary in adult populations, comparably excellent outcomes of severe clavicle fractures in adolescent athletes may be achieved with non-operative treatment.

9:30 AM  PAPER 069
Application of Machine Learning Algorithms in the Prediction of Prolonged Postoperative Opioid Use in Patients Undergoing Elective Shoulder Arthroscopy
Yining Lu, MD
Ophelie Lavoie-Gagne
Aditya V. Karhade, MD, MBA
Enrico Forlenza, MD
Joseph H. Schwab, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Gregory P. Nicholson, MD, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS

Retrospective review aimed to develop a machine learning algorithm that can reliably and effectively predict sustained opioid use in patients following elective shoulder arthroscopy.

9:40 AM  PAPER 070
Defining the Time Required to Achieve Clinically Significant Outcome Improvement after Total Shoulder Arthroplasty
Justin Drager, MD
Evan M. Polce, BS
Michael Fu, MD, MS
Hailey Huddleston, BS
Brady T. Williams, MD
Grant E. Garrigues, MD, FAAOS
Brian Forsythe, MD, FAAOS
Gregory P. Nicholson, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Midwest Orthopaedics at Rush

Patients undergoing rTSA had lower rates of achieving SCB and PASS at both 6 months and 2 years compared to patients undergoing TSA.

9:45 AM  PAPER 071
Development of a Machine Learning Algorithm to Predict Extended Opioid Utilization following Total Shoulder Arthroplasty
Yining Lu, MD
Ophelie Lavoie-Gagne
Enrico Forlenza, MD
Gregory P. Nicholson, MD, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS

Retrospective review aimed at developing and validating a machine learning algorithm that can effectively identify patients at risk of extended opioid utilization following TSA.

9:50 AM  PAPER 072
Preoperative Opioid Use Predicts Postoperative Opioid Use and Inferior Clinically Significant Outcomes after Total Shoulder Arthroplasty
Yining Lu, MD
Matthew R. Cohn, MD
James D. Baker, BA
Grant E. Garrigues, MD, FAAOS
Gregory P. Nicholson, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Brian Forsythe, MD, FAAOS

Retrospective study aiming to evaluate the influence of preoperative opioid use on achievement of midterm clinically significant outcomes (CSO) following total shoulder arthroplasty (TSA).

Discussion
Tuesday Educational Programs

September 14, 2021
9:30 AM - 12:30 PM

**CAREER DEVELOPMENT**

**9:30 AM - 10:30 AM**
Room 28E

**CD2 Optimizing Your Chances for Presentations and for Publications**
Moderator: Fares S. Haddad, FRCS
Charles R. Clark, MD, FAAOS
Seth S. Leopold, MD, FAAOS
Guido Marra, MD, FAAOS

Understand the abstract submission and review process to increase the likelihood of acceptance. Learn how to write an abstract that is focused, concise, and clear so that your message is heard by reviewers. This course offers a good understanding of the peer review process and its importance in scientific journals, provides key information on best practices and how to optimize papers for publication, and gives insight into how to review papers including a section on identifying research fraud.

**INSTRUCTIONAL COURSE LECTURE**

**10:30 AM - 12:30 PM**

**121 Outpatient Arthroplasty: Same Day, Home Safe**
Moderator: Michael P. Bolognesi, MD, FAAOS
Harpal S. Khanjua, MD, FAAOS
Claudette M. Lajam, MD, FAAOS
R. Michael Meneghini, MD, FAAOS

Understanding and addressing safely the reasons that surgeons and patients believe they ‘need’ a hospital admission is the cornerstone to outpatient arthroplasty. Course faculty review the surgical techniques and perioperative factors.

**122 Dual Mobility Total Hip Arthroplasty: A Durable Game Changer or the Next Cause for Concern?**
Moderator: Gwo-Chin Lee, MD, FAAOS
Paul M. Courtney, MD, FAAOS
Atul F. Kamath, MD, FAAOS
Sebastien Lustig, MD

This ICL will focus on the benefits and unique complications associated with dual mobility bearings in primary and revision THA.

**123 The Complex Primary Total Knee Arthroplasty Made Simple**
Moderator: Steven J. MacDonald, MD
Daniel J. Berry, MD, FAAOS
Jay R. Lieberman, MD, FAAOS
Bryan D. Springer, MD, FAAOS

This course is designed to provide the adult reconstructive knee surgeon with strategies to manage the complex cases that present requiring total knee arthroplasty. The challenges addressed are common, and are problems surgeons need to address routinely and on the spot; therefore knowing and understanding the array of effective strategies in advance of the problem is essential. This course helps prepare the surgeon to address these problems by providing recommendations from leading surgeons on how to deal with these common, but complex, clinical scenarios and consensus opinion from the panel on the best way to solve problems.

**124 Total Ankle Arthroplasty: Understanding the Technological Revolution in Managing End Stage Ankle Arthritis**
Moderator: Steven L. Haddad, MD, FAAOS
Gregory C. Berlet, MD, FAAOS
Scott Ellis, MD, FAAOS
Andy Goldberg, MD, FRCS (Ortho)

This new course takes the participant through the world of total ankle arthroplasty. No piece of metal is left unturned, as the surgeon begins the journey with a fact-based discussion on the merits and detractions of arthroplasty vs. arthrodesis.

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*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
125 The Treatment of Periprosthetic Fractures in 2021: A Comprehensive Evidence-Based Approach!
Moderator: Emil H. Schemitsch, MD, FAAOS
Aaron Nauth, MD
Adam A. Sassoon, MD, FAAOS
Andrew H. Schmidt, MD, FAAOS
A primary goal of the symposium will be to achieve consensus opinions on many current issues and controversies regarding the treatment of peri-prosthetic fractures. The symposium will allow registrants to optimize surgical decision making and fixation and manage complications following these difficult injuries.

126 Management of Limb Length Discrepancy in Pediatrics
Moderator: Raymond W. Liu, MD, FAAOS
Elizabeth W. Hubbard, MD, FAAOS
Christopher A. Iobst, MD, FAAOS
David A. Podeszwa, MD, FAAOS
This overview of treatment options for pediatric limb length discrepancy will discuss conservative management, epiphyseodesis, external fixation and internal lengthening.

127 It’s a Brave New World: Alternative Payment Models and Value Creation in Total Joint Replacement
Moderator: Ryan M. Nunley, MD, FAAOS
As healthcare reform continues to evolve, there will need to be an emphasis on generating value, improving quality, and decreasing cost. As fee for service loses its grip on total joint replacement (TJR) reimbursement, value-based purchasing will become more common place.

128 New Approaches to the Diagnosis and Management of Periprosthetic Joint Infection of the Shoulder
Moderator: Eric T. Ricchetti, MD, FAAOS
Grant E. Garrigues, MD, FAAOS
Jason Hsu, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
The current approaches to diagnosis and management of periprosthetic shoulder infections are reviewed with diagnostic and reconstructive challenges.

129 Update on the Management of Metastatic Spine Disease
Moderator: Addisu Mesfin, MD, FAAOS
Matthew W. Colman, MD, FAAOS
Hamid Hassanzadeh, MD, FAAOS
Amit Jain, MD
Rates of metastatic spine disease are increasing globally due to increased life expectancy. Evidence based surgical management of metastatic spine disease is provided.

183 The Failed Reverse Shoulder Arthroplasty: Step-by-Step Approach to Revision; How the Experts Think: A Case-Based Instructional Course Lecture
Moderator: Joseph A. Abboud, MD, FAAOS
Pascal Boileau, MD
Bassem T. Elhassan, MD, FAAOS
Mark A. Frankle, MD, FAAOS
Mark D. Lazarus, MD, FAAOS
Jonathan C. Levy, MD, FAAOS
Anand M. Murthi, MD, FAAOS
Howard D. Routman, DO, FAAOS
Joaquin Sanchez-Sotelo, MD, FAAOS
Gerald R. Williams, MD, FAAOS
This is a case-based instructional course designed to allow the attendee to learn from world-renowned experts about the thought processes they implement when performing revision reverse shoulder arthroplasty.

184 Lumbar Interbody Fusion: Approaches, Devices, Biologics, and More
Moderator: Norah A. Foster, MD
Tuan L. Bui, MD, FAAOS
Daniel DeRosa, MD
Melissa M. Erickson, MD, FAAOS
Paul M. Huddleston, MD, FAAOS
Thomas J. Kesan, MD, FAAOS
Tyson Maugle, DO
Emily C. Nguyen, MD
William J. Richardson, MD, FAAOS
Anthony W. Roccisano, DO, FAAOS
Elizabeth M. Yu, MD, FAAOS
Technology provides the spine surgeon with multiple options for surgical approach, interbody device and biologic. Surgeon preference, outcome data and cost considerations will be discussed.

10:30 AM - 12:30 PM
Ballroom 20A
Adult Reconstruction Hip I
Moderator: John T. Dearborn, MD, FAAOS and Harold W. Rees, MD, FAAOS
10:30 AM PAPER 073
Mid-Term Outcomes Among High Body Mass Index Patients in Total Hip Arthroplasty
Oliver Sax, DO, MS
Scott Douglas, MD
Ethan Remily, DO
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Margaret Kelemen
Qais Naziri, MD, MBA
Ronald E. Delanois, MD, FAAOS
This study aimed to report mid-term (five-year) complications in non-obese, obese, and morbidly obese patients undergoing total hip arthroplasty.
TUESDAY EDUCATIONAL PROGRAMS

10:35 AM  PAPER 074  
Twenty-Year Follow Up of Pelvic Tilt in Supine, Standing, and Sitting Positions Before and After Total Hip Arthroplasty  
Hidetoshi Hamada, MD  
Masaki Takao, MD  
Wataru Ando, MD  
Tetsuro Tani  
Makoto Iwasa  
Hideaki Enami, MD  
Satoshi Kamihata, MD  
Nobuhiro Sugano, MD

Continuous backward change over 20 years in supine was significantly less than standing position. Vertebral fracture associated with pelvic backward tilt from supine to standing 20 years after THA.

10:40 AM  PAPER 075  
Prevalence of Risk Factors for Adverse Spinopelvic Mobility in Total Hip Arthroplasty  
Jonathan M. Vigdorchik, MD, FAAOS  
Abhinav Sharma, MS  
Chameka S. Madurawe, BS  
Jim Pierrepoint, PhD  
Douglas A. Dennis, MD, FAAOS  
Andrew J. Shimmin, MD

There was a positive correlation between number of risk factors present and risk of adverse spinopelvic mobility.

10:50 AM  PAPER 076  
Careful Patient Selection Together with an Optimal Implant Positioning Does Not Eliminate the Risk of Elevated Serum Cobalt and Chrome Levels following Metal-on-Metal Hip Resurfacing  
Alexander P. Oxblom, MD  
Håkan B. Hedlund, PhD  
Raed Itayem, MD, PhD  
Li Fellander-Tsai, MD  
Mathias Vidgren, MD  
Ola Rolfsen, MD, PhD  
Harald Brismar, MD, PhD

Careful patient selection combined with optimal cup positioning reduces but does not eliminate the risk of having "unsafe" sCo and/or sCr concentrations following MoM-HR at mean 8 years follow up.

10:55 AM  PAPER 077  
Understanding the Main Predictors of Length of Stay after Total Hip Arthroplasty: Patient-Related or Procedure-Related Risk Factors?  
Kelsey L. Girbino, BS  
Carlos A. Higuera Rueda, MD, FAAOS  
Alison K. Klika, MS  
Wael K. Barsoum, MD, FAAOS  
Nicolas S. Piuzzi, MD

Although patient-related risk factors provide substantial predictive value for LOS following THA, procedure-related risk factors remain the main drivers of predicting LOS.

11:00 AM  PAPER 078  
Creation and Validation of Crosswalks between the Western Ontario and McMaster Universities Osteoarthritis Index and Hip Disability and Osteoarthritis Outcome Score, Joint Replacement  
Curtis Mensah, MS  
Ilan Fleisher, BS  
Madison C. Thompson, BA  
Amethia D. Joseph, MHA  
Alexander S. McLawhorn, MD, MBA  
Douglas E. Padgett, MD, FAAOS  
Stephen Lyman, PhD

We report creating crosswalks between the WOMAC and HOOS,JR to be used in meta-analysis, and comparing current and historic PROMs in joint replacement registries.

11:10 AM  PAPER 079  
Do Total Hip Arthroplasty Patients Fare Better Under Publicly or Privately-Owned Hospitals? A Comparison of 90-Day Outcomes  
Wayne A. Wilkie, DO  
Scott Douglas, MD  
Ethan Remily, DO  
Nequesha Mohamed, MD  
Sahir Pervaiz, MD, MS  
Oliver Sax, DO, MS  
James Nace, DO, PT  
Ronald E. Delanois, MD, FAAOS

Hospital and patient demographics, length of stay and discharge, 90-day cost, and complication rates in government non-federal, for-profit private, and non-profit private hospitals performing THA.

11:15 AM  PAPER 080  
Before or After? An Assessment of 1-Year Complications in Spinal Fusion and Total Hip Arthroplasty  
Nequesha Mohamed, MD  
Ethan Remily, DO  
Wayne A. Wilkie, DO  
Scott Douglas, MD  
Sahir Pervaiz, MD, MS  
Oliver Sax, DO, MS  
Qais Naziri, MD, MBA  
Johannes F. Plate, MD, PhD  
Ronald E. Delanois, MD, FAAOS

Direct comparisons of pre-total hip arthroplasty (THA) fusion and post-THA fusion are lacking. This study matches pre-THA and post-THA fusion patients assessing 1-year postoperative complications.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
11:20 AM

**PAPER 081**

No Dislocation Panacea: Mid-Term Outcomes of Dual Mobility Bearing Primary Total Hip Arthroplasty

*Benjamin Kelley, MD*

*Michael Orden, MD*

*Matthew Dipane, BA*

*Adam A. Sassoon, MD, FAAOS*

*Edward J. McPherson, MD, FAAOS*

Outcomes following primary dual mobility total hip arthroplasty, a consecutive series.

*Discussion*

11:30 AM

**PAPER 082**

New Polyethylenes in Total Hip Replacement: A 20-Year Follow-Up Study

*Eduardo Garcia-Rey, MD*

*Ana Cruz Pardos, MD*

*Eduardo Garcia-Cimbrelo, MD*

The significant reduction in femoral head penetration obtained with the highly-cross-linked polyethylene versus nitrogen-sterilized polyethylene in cementless total hip replacement resulted in less osteolysis and revision rates after 20 years with the former.

11:35 AM

**PAPER 083**

Conversion to Total Hip Arthroplasty: A Matched Analysis on Outcomes with Primary Arthroplasty

*Scott Douglas, MD*

*Ethan Remily, DO*

*Wayne A. Wilkie, DO*

*Nequesha Mohamed, MD*

*Sahir Pervaiz, MD, MS*

*Oliver Sax, DO, MS*

*Aaron J. Johnson, MD*

*Ronald E. Delanois, MD, FAAOS*

This study examined 1) cost of care; 2) readmissions; and 3) complication rates in conversion total hip arthroplasty against propensity matched primary total hip arthroplasties.

11:40 AM

**PAPER 084**

Postoperative Opioid Consumption in Hip Arthroplasty: A State-by-State Analysis

*Ethan Remily, DO*

*Nequesha Mohamed, MD*

*Wayne A. Wilkie, DO*

*Scott Douglas, MD*

*Sahir Pervaiz, MD, MS*

*Oliver Sax, DO, MS*

*Taj-Jamal Andrews, MBA, MD*

*James Nace, DO, PT*

*Ronald E. Delanois, MD, FAAOS*

The current study analyzed 1) demographics, 2) 90-day morphine milliequivalent consumption, and 3) 90-day episode of care costs for total hip arthroplasties in each state.

*Discussion*

11:50 AM

**PAPER 085**

Dose of Preoperative Opioids Affects Outcomes after Total Hip Arthroplasty

*Robert A. Burnett, MD*

*Elizabeth B. Terhune, MD*

*Charles P. Hannon, MD, MBA*

*Craig J. Delia Valle, MD, FAAOS*

Patients using preoperative opioids prior to THA were matched to opioid naive patients. Opioids users showed a dose dependent increase in ED visits, readmissions, and postoperative complications.

11:55 AM

**PAPER 086**

Comparing Rheumatoid Arthritis, Lupus Arthritis, Psoriatic Arthritis, and Ankylosing Spondylitis to Osteoarthritis when Performing Total Hip Arthroplasty

*Scott Douglas, MD*

*Oliver Sax, DO, MS*

*Sahir Pervaiz, MD, MS*

*Ethan Remily, DO*

*Ali Reisat, MD, MBA*

*James Nace, DO, PT*

*Nequesha Mohamed, MD*

*Ronald E. Delanois, MD, FAAOS*

This study examines outcomes after total hip arthroplasty in patients with several types of arthritis.

12:00 PM

**PAPER 087**

Where Do We Stand Today on Racial and Ethnic Health Inequities? Analysis of Primary Total Hip Arthroplasty from a 2011–2017 National Database

*Olohirere T. Ezomo*

*Mohamad J. Halawi, MD, FAAOS*

*Daniel C. Sun, MD*

*Christian Gronbeck, BA*

*Melvyn A. Harrington, MD, FAAOS*

Health disparities persist among minority groups with respect to disease burden, THA utilization, LOS, and complications. Blacks and Hispanics/Latinos appear to be the most impacted.

*Discussion*

12:10 PM

**PAPER 088**

Does Higher Patient Activation Create Greater Value in Total Hip and Total Knee Arthroplasty?

*Thomas M. Hanson, MD*

*Paul M. Werth, MA, MS*

*David S. Jevsevar, MD, MBA, FAAOS*

Higher preoperative activation as measured by the PAM-13 is an independent predictor of quality and value in total hip arthroplasty; using a standardized value equation considering outcomes and costs.

*Discussion*
12:15 PM  PAPER 089
Postoperative Opioid Consumption among High Body Mass Index Patients in Hip Arthroplasty
Ethan Remily, DO
Scott Douglas, MD
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Oliver Sax, DO, MS
Taj-Jamal Andrews, MBA, MD
Qais Naziri, MD, MBA
Ronald E. Delanois, MD, FAAOS
This study investigated length of stay, opioid consumption, costs, readmissions, revisions, and complications in matched non-obese, obese, and morbidly obese patients undergoing hip arthroplasty.

12:20 PM  PAPER 090
Unexpected Wear of a Moderately Crosslinked Polyethylene in Total Hip Arthroplasty
Ramakanth R. Yakkanti, MD
Justin Ocksrider, MD
Anand Patel, MD
Matthew Kolevar, MD
Rebecca Moore, MS
Clare M. Rimnac, PhD
Timothy M. Wright, PhD
Elexis Baral, BS
Raymond P. Robinson, MD, FAAOS
This study evaluates a moderately cross linked polyethylene, with an unexpectedly high early wear rate in primary total hip arthroplasty.

10:35 AM  PAPER 094
Development of Antibiotic Eluting 3D Printed Methacrylate Beads
Stephen Silva, MD
Ryan Hoffman, MD
Qingwu Kong, MD
Solomon Samuel
James S. Raphael, MD, FAAOS
Advances in 3D printing technologies have allowed for the novel creation of drug eluting methacrylate beads which have successfully demonstrated antimicrobial properties.

10:30 AM - 12:30 PM
Ballroom 6A
Trauma I
Moderators: Lisa K. Cannada, MD, FAAOS and Boris A. Zelle, MD, FAAOS

10:30 AM  PAPER 091
Aerobic Synovial Cultures Provide Greatest Diagnostic Value for Adult Septic Arthritis: A Retrospective Review of 596 Patients
Brian Wahlig
Joshua J. Sun
Alejandro Diaz De Leon, BS
Michael H. Huo, MD, FAAOS
Brigham K. Au, MD, FAAOS
Through the analysis of 3,689 cultures in patients with septic arthritis, it was determined that anaerobic, fungal, and acid-fast synovial cultures are not useful in otherwise healthy patients.

10:55 AM  PAPER 095
A Novel Composite of Phase-Change Material and Bone Cement to Improve Antibiotic Cement Spacers for Management of Bone Defects
Joshua A. Parry, MD
Joseph C. Chavarria, MD
Lori R. Chambers, MD
David Rojas, MD
Jason Nadeau, MS
Todd H. Baldini
Cyril Mauffrey, MD, MRCS
Yang Lu, MD
The reduction of bone cement polymerization temperatures may reduce soft-tissue thermal necrosis, which could benefit bone defect reconstruction.

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11:00 AM  PAPER 096
Take it or Leave it?  The Fate of the Retained Antibiotic Cement Spacer
Michael A. Moverman, MD
Na Cao, MD
Edward Rodriguez, MD, FAAOS
Philip Hanna, MD
Paul T. Appleton, MD, FAAOS
John J. Wixted, MD, FAAOS
Andrew J. Marcantonio, DO, FAAOS
Donald P. Willier, BS
Michael J. Weaver, MD, FAAOS
Michael McTague, MPH
Raymond M. Smith, MD
Scott P. Ryan, MD, FAAOS
Greater Boston Orthopaedic Research Consortium
Retained antibiotic cement spacers placed for segmental bone defects due to open fractures, nonunion, and infection do not break, form bridging bone across the spacer, and often clear infection.

11:10 AM  PAPER 097
◆ Biomimetic Hematoma: Novel Carrier Delivers Extremely Low Dose rhBMP-2 for Highly Effective Healing of Large Bone Defects
Vaida Glatt, PhD
Anna Woloszyk
Kevin Tetsworth, MD
This novel biomimetic hematoma mimics the properties of innate healing fracture hematoma, while consistently and efficiently enhancing the healing of large bone defects at very low doses of rhBMP-2.

11:15 AM  PAPER 098
High-Cycle Fatigue Life of Cortical Bone is Radiation Dose-Dependent
Jason Ina, MD
Ajit Vakharia, MD
Ozan Akkus
Clare M. Rimnac, PhD
Cortical bone allograft cycle-fatigue life has a dose-dependent response to radiation sterilization. Decreasing the radiation-sterilization dose can lead to a meaningful increase in cycle-fatigue life.

11:20 AM  PAPER 099
The Role of Cultures in Diaphyseal Tibia Nonunions: A Multicenter Study
Malcolm DeBaun, MD
Cara Lai, BS
Michael J. Chen, MD
Joseph R. Hsu, MD, FAAOS
Michael J. Gardner, MD, FAAOS
This is a retrospective multicenter investigation that shows patients with tibia nonunions have high rates of positive cultures at the time of nonunion repair.

11:30 AM  PAPER 100
Accuracy of Surgical Cultures in Aseptic Nonunion Surgeries is Questionable
Olivia Rice, MD
Ainsley K. Bloomer, MD
Louis Lewandowski, MD, FAAOS
Susan M. Odum, PhD
William T. Obremskey, MD, MPH, FAAOS
Elsa B. Rodriguez, MD
Joseph R. Hsu, MD, FAAOS
Gisele Bailey
Amber N. Stanley, BS
Katheryn M. Peterson, BS
Matt Morris, BA
Meghan Wally, MSPH
Christine Churchill, BA
Michael J. Bosse, MD, FAAOS
Laurence Kempton, MD, FAAOS
Kevin D. Phelps, MD
Rachel Seymour, PhD
Stephen H. Sims, MD, FAAOS
Madhav A. Karunakar, MD, FAAOS
EMIT Collaborative
Negative labs and absent clinical signs significantly reduce the plausibility of deep infection. In this setting, the accuracy of microbial culture results diminishes, challenging their utility.

11:35 AM  PAPER 101
The Fracture-Associated Microbiome and Persistent Nonunion: Next Generation Sequencing Reveals New Findings
Karan Goswami, MD
NGS Non-Union
Gerard Chang, MD
Timothy Tan, MD
Brianna Fram, MD
Taylor Paziuk, BS
Samuel Clarkson, MD
Emanuele Chisari, MD
Andrea C. Hudgins, CCRP
Roman Natoli, MD, PhD
James C. Krieg, MD, FAAOS
Javad Parvizi, MD, FAAOS
A study investigating the role of NGS in the diagnosis of nonunion compared to culture.

11:40 AM  PAPER 102
Preoperative Serum Inflammatory Markers do not Diagnose Culture-positive Tibia Nonunions
Malcolm DeBaun, MD
Michael J. Chen, MD
Cara Lai, BS
Lawrence H. Goodnough, MD
Joseph R. Hsu, MD, FAAOS
Michael J. Gardner, MD, FAAOS
Preoperative serum inflammatory markers are not predictive of positive cultures after tibia nonunion repair.

Discussion
**Tuesday Educational Programs**

**11:50 AM**
**PAPER 103**
**A Prescribing Protocol Decreases the Rate of Chronic Opioid Use in Orthopaedic Trauma Patients**

*Andrew Fithian, MD*
*Gustavo Chavez*
*Sean T. Campbell, MD*
*Julius A. Bishop, MD, FAAOS*
*Michael J. Gardner, MD, FAAOS*

A simple and straightforward opioid prescribing protocol can reduce the risk of chronic opioid use in orthopaedic trauma patients.

**11:55 AM**
**PAPER 104**
**Decreasing Opioids and Increasing Multimodal Pain Prescription in Opioid Naïve Trauma Patients: The Power of a Standardized Protocol**

*Alessandra Dunham, MD*
*Zachary Enunam*
*Kent Stevens, MD*
*Travis Rieder, PhD*
*Casey J. Humbyrd, MD, FAAOS*
*Babar Shafiq, MD, FAAOS*

A standardized multimodal pain treatment protocol for opioid naïve orthopaedic trauma patients reduces opioid, increases multimodal, and reduces variability prescription across a diverse set of injuries.

**12:00 PM**
**PAPER 105**
**Decreasing Postoperative Opioid Prescriptions following Orthopaedic Trauma Surgery: The “Lopioid” Protocol**

*Kenneth A. Egol, MD, FAAOS*
*Emma Landes, BA*
*Philipp Leucht, MD, FAAOS*
*Nirmal C. Tejwani, MD, FAAOS*
*Abhishek Ganta, MD, FAAOS*

The Lopioid protocol was effective in decreasing the amount of Schedule II narcotics prescribed at discharge and the number of opioid refills following orthopaedic surgery for fractures.

**12:10 PM**
**PAPER 106**
**Vitamin D3 Supplementation Does Not Improve Fracture Healing: An Exploratory Phase II Randomized Controlled Trial**

*Gerard Slobogean, MD, MPH, FAAOS*
*Sofia Bzovsky, MSc*
*Nathan N. O’Hara, MHA*
*Zachary D. Hannon, BS*
*Lucas S. Marchand, MD*
*Jonathan D. Adachi*
*Lehana Thabane, PhD*
*Sheila Sprague, PhD*
*Vita-Shock Investigators*

This study was designed to identify potential evidence to support the effectiveness of vitamin D3 supplementation to improve acute fracture healing.

**12:15 PM**
**PAPER 107**
**Determine the Incidence of Infections in Patients with Compartment Syndrome of the Upper and Lower Extremities**

*Nelson J. Merchan, MD*
*Bailey Ingalls, BS*
*Jayden R. Garcia, BS*
*Carl M. Harper, MD, FAAOS*
*Tamara D. Rozental, MD, FAAOS*
*Arriyan S. Dowlatshahi, MD*

The aim of this study is to determine what factors are associated to developing infection after fasciotomy for compartment syndromes.

**12:20 PM**
**PAPER 108**
**Risk Factors for 30-Day Postoperative Complications in Traumatic Compartment Syndrome Patients**

*Frank A. Segreto, BS*
*Tai L. Li, BS*
*Ryan Kong, BS*
*Andriy Kobryn, BA*
*Omar Hariri, MD*
*Scott Pascall, MD*
*Dillon Sedaghatpour, MD*
*Nishant Sunjea, MD*

Thirty-day overall complication rate following decompression in traumatic compartment syndrome patients is higher than that in nontraumatic or chronic exertional compartment syndrome patients.

**12:25 PM**
**PAPER 109**
**Regional Gene Therapy for Bone Healing Using 3D Printed Scaffolds**

*Hyunwoo P. Kang, MD*
*Hansel Ihn, MD*
*Adam E. Jakus, PhD*
*Diani Robertson, MD*
*Ram Alluri, MD*
*Xiao Chen, BA*
*Donald B. Longjohn, MD, FAAOS*
*Daniel A. Oakes, MD, FAAOS*
*Jay R. Lieberman, MD, FAAOS*

A 3D-printed osteoconductive hydroxyapatite-composite scaffold was found to be an effective carrier for bone marrow cells transduced to overexpress BMP-2.

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PAPER PRESENTATIONS

10:30 AM - 12:30 PM
Ballroom 6B

Adult Reconstruction Knee II
Moderator: Douglas A. Dennis, MD, FAAOS

10:30 AM  PAPER 110
Effects of Perioperative Intravenous Dexamethasone on the Severity of Persistent Postsurgical Pain after Total Knee Arthroplasty: A Prospective, Randomized, Double-Blind, Placebo-Controlled Trial
Nitchanant Kitcharanant, MD
Warakorn Jingjit
Perioperative intravenous Dexamethasone could significantly decrease persistent postsurgical pain when comparing to placebo at 12 weeks following total knee arthroplasty.

10:35 AM  PAPER 111
Factor Xa Inhibitors vs. Aspirin for Venous Thromboembolism Prophylaxis: Comparing 90-Day Complications and Readmissions in Patients Undergoing Total Joint Arthroplasty
Emanuele Chisari, MD
Duncan S. Van Nest, BA
Samuel Clarkson, MD
Gregg R. Klein, MD, FAAOS
Javad Parvizi, MD, FAAOS
A study comparing short-term outcomes and readmissions in patients discharged on factor Xa inhibitors versus aspirin following TJA.

10:40 AM  PAPER 112
A Randomized, Double-Blinded, Placebo-Controlled Trial Comparing a Multimodal Pain Protocol with and without Schedule II Narcotics following Total Knee Arthroplasty
Benjamin K. Wilke, MD
Porter Young, MD
Christopher A. Roberts, MD
Michael Heckman, MS
Glenn G. Shi, MD, FAAOS
Cameron Ledford, MD, FAAOS
Steven R. Clendenen, MD
Non-narcotic multimodal regimens demonstrated equivalent postoperative pain scores following TKA compared to oxycodone in a placebo-controlled trial.

10:50 AM  PAPER 113
Reduction of Opioid Discharge Dosage after Total Knee Arthroplasty Did Not Increase the Risk of Manipulation Under Anesthesia: An Institutional Experience
Brian Chalmers, MD
Amethia D. Joseph, MHA
Juliana Lebowitz, BA, MS
Yu-Fen Chiu, MS
Peter W. Grimaldi, PA-C
Douglas E. Padgett, MD, FAAOS
Mathias P. Bostrom, MD, FAAOS
Alejandro Gonzalez Della Valle, MD, FAAOS
An institutional effort to reduce the amount of opioid medication prescribed at discharge following TKA did not result in an increased likelihood of manipulation under anesthesia.

10:55 AM  PAPER 114
Previous Knee Arthroscopy Timing Affects Revision Risk following Total Knee Arthroplasty
Safa C. Fassihi, MD
Alex Gu, MD
Lauren E. Wessel, MD
Michael P. Ast, MD, FAAOS
Peter K. Sculco, MD
Ryan M. Nunley, MD, FAAOS
Knee arthroscopy within 9 months of total knee arthroplasty is associated with significantly increased risk for revision surgery and periprosthetic joint infection at two years postoperatively.

11:00 AM  PAPER 115
Prior Knee Arthroscopy Increases the Failure Rate of Subsequent Unicompartmental Knee Arthroplasty
Safa C. Fassihi, MD
Alex Gu, MD
Lauren E. Wessel, MD
Savyasachi C. Thakkar, MD
Peter K. Sculco, MD
Michael P. Ast, MD, FAAOS
Knee arthroscopy <2 years prior to unicompartmental knee arthroplasty (UKA) is associated with an increased rate of UKA conversion to TKA and a higher rate of UKA failure due to aseptic loosening.

11:10 AM  PAPER 116
The Effect of Patient Age on the long term Relative Revision Rates of Cemented and Cementless Unicompartmental Knee Replacements: An Analysis from the National Joint Registry for England, Wales, Northern Ireland, and the Isle of Man
Hasan Mohammad, MBCHB, MSc
Gulraj Matharu, MBCHB
Barbara Marks, BS
Stephen J. Mellon, PhD
Andrew Judge, PhD
David W. Murray, FRCS (Ortho)
Cementless fixation offers reduced long-term revision rates compared to cemented fixation across all age groups.
**Tuesday Educational Programs**

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| 11:15 AM | PAPER 117 | Bilateral Total Knee Arthroplasty May Not be Safe Even in the Healthiest of Patients | Jared A. Warren, ATC, DO  
Ahmed Siddiqi, DO, MBA  
Viktor Erik Krebs, MD, FAOAS  
Robert M. Molloy, MD  
Carlos A. Higuera Rueda, MD, FAOAS  
Nicolas S. Piuzzi, MD |
|          |       | BTKA may not be a safe option for even healthy individuals compared to unilateral TKA. |                                                                       |
| 11:20 AM | PAPER 118 | Failure to Optimize Prior to Total Knee Arthroplasty: Which Modifiable Risk Factor is the Most Dangerous? | Nicholas Johnson, MD  
Susan M. Odum, PhD  
Joseph Statz, MD  
Jesse E. Otero, MD, FAOAS |
|          |       | Among the risk factors analyzed, hypoalbuminemia appears to be the strongest risk factor for all complications post TKA. |                                                                       |
| 11:30 AM | PAPER 119 | Patients with a Diagnosis of Hepatitis C are at Higher Risk of Revisions after Total Hip and Knee Replacement | Emanuele Chisari, MD  
Christopher A. Gardner, BS  
Matthew Sherman, BS  
Javad Parvizi, MD, FAOAS |
|          |       | A study examining whether Hepatitis C diagnosis is an independent risk factor for periprosthetic joint infection following TJA. |                                                                       |
| 11:35 AM | PAPER 120 | Effect of Depression and Anxiety on 90-Day Readmission Rates after Total Hip and Knee Arthroplasty | Paul Knapp, DO  
James T. Layson, DO  
Waleed Mohammad, MD  
Natalie M. Pizzimenti, MS  
David C. Markel, MD, FAOAS |
|          |       | Patients with depression, anxiety, or both undergoing TKA were at a statistically significant risk of readmission within 90-days compared to patients without these diagnoses. |                                                                       |
| 11:40 AM | PAPER 121 | Mid-Term Outcomes among High Body Mass Index Patients in Total Knee Arthroplasty | Oliver Sax, DO, MS  
Ethan Remily, DO  
Scott Douglas, MD  
Nequesha Mohamed, MD  
Sahir Pervaiz, MD, MS  
Wayne A. Wilkie, DO  
Qais Naziri, MD, MBA  
Ronald E. Delanois, MD, FAOAS |
|          |       | This study aimed to report mid-term readmission, revision, and complication rates among non-obese, obese, and morbidly obese patients after undergoing total knee arthroplasty. |                                                                       |
| 11:50 AM | PAPER 122 | Comparative Analysis of Total Knee Arthroplasty Outcomes between Arthroplasty and Non-Arthroplasty Fellowship Trained Surgeons | Vivek Singh, MD  
Trevor Simcox, MD  
Vinay Aggarwal, MD  
Ran Schwarzkopf, MD, FAOAS  
William J. Long, MD, FAOAS |
|          |       | This is a comparative analysis of total knee arthroplasty outcomes between arthroplasty and non-arthroplasty fellowship trained surgeons. |                                                                       |
| 11:55 AM | PAPER 123 | Neuraxial versus General Anesthesia in Contemporary Primary Total Knee Arthroplasties | Aaron Owen  
Adam Amundson, MD  
Christopher Duncan, MD  
Hugh M. Smith, MD, PhD  
Rebecca Johnson, MD  
Michael J. Taunton, MD, FAOAS  
Mark W. Pagnano, MD, FAOAS  
Daniel J. Berry, MD, FAOAS  
Matthew P. Abdel, MD, FAOAS |
|          |       | Neuraxial anesthesia in primary TKAs was associated with significantly fewer OMEs used, reduced length of stay, and fewer readmissions when an inverse probability of treatment weighted model was used. |                                                                       |

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PAPER PRESENTATIONS

12:00 PM  PAPER 124
The Use of Tourniquet Does Not Negatively Influence Outcomes in Total Knee Arthroplasty: A Randomized Controlled Trial
*Ran Schwarzkopf, MD, FAAOS*
Stephen Zak, BA
David Yeroushalmi, BS
Daniel Waren, MSPH
William J. Long, MD, FAAOS
Morteza Meftah, MD
Erik A. Schnaser, MD, FAAOS

Utilization of a tourniquet during TKA does not negatively impact postoperative pain scores or opioid consumption when compared to patients who underwent TKA without a tourniquet.

Discussion

12:10 PM  PAPER 125
Do We Need to Wait Three Months after Corticosteroid Injections to Reduce the Risk of Infection after Total Knee Arthroplasty? *Sarah Bhattacharjee*
Sara S. Wallace, MD, MPH
Hue H. Luu, MD, FAAOS
Lewis L. Shi, MD, FAAOS
Michael J. Lee, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS

TKA within 4 weeks of a corticosteroid injection may be associated with a higher risk of postoperative infection; however, delaying surgery more than 4 weeks may not provide additional risk reduction.

12:15 PM  PAPER 126
Perioperative Continuation of Biologic Medications Increases Odds of Periprosthetic Joint Infection in Patients with Inflammatory Arthropathy
*Victor Carlson, MD*
Lucas Anderson, MD, FAAOS
Brenna Blackburn, MPH, PhD
Chao-Chin Lu, PhD
Jeremy Gililland, MD, FAAOS

Patients with inflammatory arthropathy who continue biologic medications perioperatively have 3.46 higher odds of developing prosthetic joint infection after total joint arthroplasty.

12:20 PM  PAPER 127
Discordant Metal Allergy Tests and Inferior Patient Outcomes after Primary and Revision Total Knee Arthroplasty
*Daniel Bracey, MD, PhD*
Vishal Hegde, MD
Roseann M. Johnson, BA
Lindsay T. Kleeman-Forsthuber, MD
Jason M. Jennings, MD, FAAOS
Douglas A. Dennis, MD, FAAOS

This study compares different metal allergy test results and clinical outcomes after primary and revision TKA for patients with and without metal hypersensitivity.

Discussion

10:30 AM - 12:30 PM
Ballroom 6E
Hand and Wrist I
Moderator: Mark S Rekant, MD, FAAOS

10:30 AM  PAPER 128
A Randomized Trial Comparing Plaster Immobilization vs. Volar Plating in the Management of Distal Radius Fractures in Patients over 75 Years
*Ahmad Faraz, MBBS*
Muhammad Tahir
Katherine Watson, MBCHB, MSc
Ghulam Mahboob, FCPS
Nadeem Ahmed
Faridullah Khan, MD

There is no significant difference in the patient-reported outcomes of wrist movement, grip strength, and validated patient-reported outcome questionnaires at one year between those managed with cast and immobilization and those managed with anterior locking plates.

10:35 AM  PAPER 129
To Cast or Not to Cast Distal Radius Fractures in the Elderly? A Randomized Control Trial
*Muhammad Tahir*
Ghulam Mahboob, FCPS
Shoaib Khan
Ahmad Faraz, MBBS

The results of the trial have shown that plating and casting are equally effective in achieving satisfactory patient satisfaction, patient-reported and clinical outcomes at intermediate and final follow up.

10:40 AM  PAPER 130
Risk Factors for Distal Radius Osteotomy Nonunions
*Desraj Clark, MD*
Benjamin W. Hoyt, MD
Andres Piscoya, MD
Christopher Daniels, MD
Scott M. Tintle, MD, FAAOS

This case-control study identifies length of distraction at osteotomy site, graft selection, and prior internal fixation as risk factors for corrective distal radius osteotomy nonunion.

Discussion

10:50 AM  PAPER 131
Does Prophylactic Carpal Tunnel Release Improve Patient-Reported Outcomes after Distal Radius Fracture Stabilization?
*Jonathan F. Dalton, MD*
Sumail S. Bhogal, MD
Timothy J. Luchetti, MD
Robert J. Goitz, MD, FAAOS
Robert A. Kaufmann, MD, FAAOS
John R. Fowler, MD, FAAOS

Prophylactic carpal tunnel release concomitantly with distal radius fracture fixation is safe, but true “prophylactic” approach to release does not lead to improved patient-reported outcomes.
10:55 AM  PAPER 132
A Comparison of Sugar-Tong and Volar-Dorsal Splints for Provisional Immobilization of Distal Radius Fractures in the Adult Population
Frank A. Scott
Andy E. Lalka, BS, MPH
Trevor Jackson, MD
Derek Wilson
Ethan K. Maulsby, MD
Loss of reduction rates was similar between volar-dorsal and sugar-tong splint groups after immediate immobilization of distal radius fractures.

11:00 AM  PAPER 133
Computed Tomography Alters Distal Radius Fracture Management Despite Successful Closed Reduction
Trevor Tompane, MD
Nicholas Pulos, MD
Kevin M. Kuhn, MD, FAAOS
Dominic T. Gomez-Leonardelli, MD, FAAOS
CT scan significantly alters definitive management of distal radius fractures by orthopaedic hand and trauma surgeons, even after successful closed manipulation to within radiographic tolerances.

11:10 AM  PAPER 134
Prolonged Operative Time Associated with Adverse Outcomes after Open Reduction and Internal Fixation of Intra-Articular and Extra-Articular Distal Radial Fractures: An Analysis of 17,482 Cases
Ahmed Emara, MD
Daniel Grits
Mitchell K. Ng, MD
Kevin L. Zhai, BA
Chukwuweike U. Gwam, MD
Erin E. Ohliger, MD
Joseph F. Styron, MD, PhD
Prolonged operative time and not fracture pattern is associated with higher odds of adverse outcomes after ORIF of distal radial fractures.

11:15 AM  PAPER 135
Smoking is Independently Associated with Wound Complications, Unplanned Reoperation, and Unplanned 30-Day Readmission with Distal Upper Extremity Fractures
Charles A. Johnson, MD
Walker M. Heffron
Dane Daley, MD
In an analysis of the NSQIP database, smoking use is independently associated with acute surgical complications and unplanned reoperation with distal upper extremity fractures.

11:20 AM  PAPER 136
The Effect of Nonsteroidal Anti-inflammatory Drugs on Carpal and Hand Fracture Healing
Cameron Roth, MD
Ellen M. Goldberg, BS, MPH
Megan Conti Mica, MD, FAAOS
This study addresses postoperative NSAIDs use and its effect on fracture healing of the carpus and hand.

11:30 AM  PAPER 137
Pronator Quadratus Repair Does Not Affect Reoperation Rates following Volar Locking Plate Fixation of Distal Radius Fractures
Maximilian Meyer, MD
Kyra Benavent, BS
Stein Jasper Janssen, MD
Cassandra Chruscielski, BS
Philip E. Blazar, MD, FAAOS
Brandon E. Earp, MD, FAAOS
We conducted a retrospective review to examine the impact of pronator quadratus repair on outcomes of patients who undergo surgical fixation of a distal radius fracture.

11:35 AM  PAPER 138
Gender Disparity Trends in Authorship of Academic Hand Surgery Research
Raylin F. Xu, BA
Nathan H. Varady, BS
Antonia F. Chen, MD, MBA, FAAOS
Brandon E. Earp, MD, FAAOS
While much work remains, gender disparities in hand surgery research have significantly improved from 2005-2019; however, even among prolific female authors, commensurate academic rank has not ensued.

11:40 AM  PAPER 139
Understanding the Trends and Variability in Procedural Volume of Orthopaedic Hand Surgery Fellows – An Analysis of Accreditation Council for Graduate Medical Education Case Log Data from 2011 to 2018
Azeem T. Malik, MBBS
Adam M. Gordon, BS
Safdar N. Khan, MD, FAAOS
Hisham Awan, MD, FAAOS
Kanu S. Goyal, MD, FAAOS
There has been a significant increase in the average number of cases performed by graduating hand surgery fellows over time.
11:50 AM  
PAPER 140
Jack Haglin, BS
Jaymeson Arthur, MD
Jeffrey Hassebrock, MD
David Deckey, MD
Adam Schwartz, MD, FAAOS
Kevin J. Renfree, MD, FAAOS
Medicare reimbursement for orthopaedic hand procedures has steadily decreased from 2000 to 2020.

11:55 AM  
PAPER 141
Medicare Reimbursement Trends in Hand and Upper Extremity Surgery
Sandra Miskiel, MD
Samantha N. Weiss, BS
Andre J. Pagliaro, MD
Andre J. Pagliaro, MD
Average physician reimbursement for hand and upper extremity surgical care decreased by 21.9% from 2000 to 2020. Continued decline in reimbursement may limit access to quality care.

12:00 PM  
PAPER 142
The Impact of Intraoperative Nursing Care on Perioperative Complications during Wide Awake Local Anesthesia Hand Surgery
Lili Schindelar, MD
Clay Townsend, BS
Asif M. Ilyas, MD, FAAOS
Jonas L. Matzon, MD, FAAOS
There was no difference in perioperative complications between the surgery centers that utilized 3 versus 2 intraoperative nurses during wide awake local anesthesia hand surgery.

12:10 PM  
PAPER 143
Clinic-Based Hand Surgery Procedure Room: A Performance Improvement Analysis of Resource Savings and Patient Satisfaction
Patrick Mescher, MD
Desraj Clark, MD
Marvin Dingle, MD
Sean Wade, MD
George P. Nanos, MD, FAAOS
Scott M. Tintle, MD, FAAOS
Use of a procedure room in a military treatment facility led to cost savings and time savings to both patients and the hospital system while maintaining safety and satisfaction.

12:15 PM  
PAPER 144
Utilization of MRI in Diagnosis and Treatment of Tennis Elbow in the United States
Nathaniel Fogel, MD
Thompson Zhuang, BA
Lauren M. Shapiro, MD
Robin N. Kamal, MD, FAAOS
Marc J. Richard, MD, FAAOS
David S. Ruch, MD, FAAOS
Patients who obtained MRI for lateral epicondylitis within 90 days of diagnosis are more likely to undergo surgical intervention and result in higher cost compared to patients without acute MRI.

12:20 PM  
PAPER 145
Variability in Hand Surgery Training among Plastic and Orthopaedic Surgery Residents
Edward Testa, MD
Sebastian Orman, MD
Michael Bergen, MD
Lauren V. Ready, MPH
Neill Li, MD
Joseph A. Gil, MD
Orthopaedic residents performed significantly more hand trauma cases than plastic surgery residents, but fewer overall cases, nerve repairs and amputations, with similar volumes of nerve decompressions.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
Risk of Malignant or Sarcomatous Transformation of Giant Cell Tumors of Bone is Eight Times Lower with Megavoltage Radiation Therapy Compared with Orthovoltage Therapy

Farah Musharbash, MD
Alexander Edelstein, MD
Jad El Abiad, MD
Adam S. Levin, MD, FAAOS
Sara R. Alcorn, MD, MPH
Carol D. Morris, MD, MS

Radiation therapy for benign giant cell tumors may have a role for inoperable or refractory disease. Malignant transformation rates using modern techniques is 8 times lower than historical methods.

Post-Radiation Impact on Protective Function of Spinal Meninges in Mice

Takaki Shimizu, MD
Satoru Demura, MD
Satoshi Kato, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Hiroyuki Tsuchiya, MD

Disruption of barrier function against tumor was observed in post-irradiated dura mater in mice. Careful consideration should be given to this phenomenon when treating spinal tumors.

Functional Differences between the Levels of Resected Vertebrae after Total En Bloc Spondylectomy of the Lumbar Spine: A Prospective Cohort Study

Yuki Kurokawa, MS, PT
Satoshi Kato, MD
Satoru Demura, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Makoto Handa
Ryohei Annen
Yuki Kurokawa, MS, PT
Hiroyuki Tsuchiya, MD

Patients who underwent TES at L1 and L3 demonstrated rapid recovery than those with TES at L2, L4, and L5. Almost all patients of all levels of resection reported recovery of ambulation within 6 months.

Histologic Markers Predictive of Wound Healing Complications in Soft Tissue Sarcoma Treated with Preoperative Radiation

Benjamin J. Miller, MD, MS, FAAOS
Jacob Gylten
Stephanie Chen
Jane E. Persons, PhD
Qiang An, MBBS, MPH
Munir Tanas, MD

We analyzed skin histology to investigate underlying processes in the development of wound healing complications in patients undergoing preoperative radiation and soft tissue sarcoma resection.

Mid- to Long-Term Clinical Outcome of Tumor-Devitalized Autografts in Limb-Sparing Surgery for Bone and Soft Tissue Tumors: A Nationwide Multicenter Study

Akihiko Takeuchi, MD
Hirofuki Tsuchiya, MD
Norio Yamamoto, MD
Nakitaka Setsu, MD, PhD
Gokita Tabu, MD
Yasunori Tome, MD, PhD
Yusuke Minami
Hiroyuki Kawashima, MD, PhD
Suguru Fukushima, MD, PhD
Tomoki Nakamura, MD, PhD
Satoshi Tsukushi, MD
Teruya Kawamoto, MD, PhD
Teruki Kidani, ACNP-BC, ATC
Hirosi Kobayashi, MD, PhD
Munehsisa Kito, PhD
Tomonori Torigoe, MD, PhD
Takeshi Morii, MD, PhD
Toru Akiyama
Akihito Nagano, MD, PhD
Makoto Emori, MD
Yoshikazu Tanawa, PhD
Hisaki Aiba, MD
Takafumi Ueda, MD, PhD
Japanese Musculoskeletal Oncology Group (JMOG)

This retrospective multicenter study showed the durability and long-lasting favorable limb-function of tumor-devitalized (freezing, pasteurization, and irradiation) autograft in limb-sparing surgery.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off-label use). For full information refer to page 17.
11:10 AM PAPER 152
Wound Vac Temporizing until Final Negative Margins are Achieved Reduces Myxofibrosarcoma Local Recurrence after Marginal Excision vs. Conventional Single Stage Excision/Reconstruction
Duncan Ramsey, MD, MPH
Mitchell Fourman, MD
Anser Daud, BS
Erik T. Newman, MD
Yen-Lin Chen, MD
Thomas F. DeLaney, MD
John Mullen, MD
Kevin A. Raskin, MD, FAAOS
Santiago A. Lozano Calderon, MD, PhD, FAAOS
Temporizing the wound bed with a wound vac following myxofibrosarcoma excision yields a significant reduction in local recurrence vs. conventional single stage excision/reconstruction.

11:15 AM PAPER 153
Despite Education Orthopaedic Surgeons Still Perform Unplanned Resections
Ana C. Belzarena Genovese, MD
David Joyce, MD, FAAOS
Orthopaedic surgeons, despite years of education efforts, continue to perform soft tissue sarcomas unplanned resections.

11:20 AM PAPER 154
What is the Likelihood of Non-Pulmonary Metastasis Occurring in the Absence of Lung Metastasis in Bone and Soft Tissue Sarcoma? A Nested Case Control from a Sarcoma Referral Center
Benjamin J. Miller, MD, MS, FAAOS
Obada H. Hasan, MBBS
Momin Nasir, BS
Qiang An, MBBS, MPH
Whether imaging of the lung alone is enough to identify the presence of overall metastasis (visceral, nodal, and osseous) in extremity sarcoma is a challenging question to current practices.

11:30 AM PAPER 155
Sarcopenia and Muscle Attenuation by Computed Tomography Predict Mortality following Surgery for Extremity Bone Metastases
Peter K. Twining, BA
Olivier Q. Groot, BS
Michiel E. Bongers, MD
Colleen G. Buckless, BS, MS
Neal Kapoor, MS
Joseph H. Schwab, MD, FAAOS
Martin Torriani, MD, MSc
Miriam A. Bredella, MD
In patients undergoing surgery for extremity bone metastases, muscle area, sarcopenia, and muscle attenuation assessed by CT are predictors of 90-day and 1-year mortality.

11:35 AM PAPER 156
Can Intraoperative Use of Indocyanine Green Dye Angiography Predict Rates of Wound Complications in Patients Undergoing Soft Tissue Resection?
Joanne Zhou, MD
Ann E. Richey, BA
Cara Lai, BS
Nicole A. Segovia, BS
Subhro K. Sen, MD
David G. Mohler, MD, FAAOS
Robert J. Steffner, MD, FAAOS
Indocyanine green angiography, incision length, and hemoglobin levels postoperatively may identify skin areas at risk of developing wound complications after extremity soft tissue sarcoma resection.

11:40 AM PAPER 157
Fate of Grafted Cartilage in Osteoarticular Frozen Autografts for Reconstruction after Resection of Malignant Bone Tumor involving an Epiphysis
Katsuhiko Hayashi, MD
Norio Yamamoto, MD
Akihiko Takeuchi, MD
Shinji Miwa, MD
Kentaro Igarashi, MD, PhD
Yoshiiro Araki, MD
Hirota Yonezawa, MMED
Sei Morinaga, MMED
Hiroyuki Tsuchiya, MD
Grafted cartilage of frozen osteoarticular autografts developed osteoarthritis over time. Intraepiphyseal resection preserving partial healthy cartilage resulted in excellent survival.

11:50 AM PAPER 158
Targeting the Metastasis Initiating Cell in Undifferentiated Pleomorphic Sarcoma
Benjamin Alman, MD, FAAOS
Tang Yuning Jackie
This study reveals clonal dynamics during each step of tumor progression. Surprisingly, we found that metastasis is formed by a small subpopulation of cells, which can be therapeutically targeted.
11:55 AM  PAPER 159
Leveraging Evolutionary Fitness Bottlenecks as Therapeutic Vulnerabilities in Doxorubicin-Resistant Osteosarcoma
Etienne Flamant, BS
Anika Agarwal, BS
Anna L. Slingerland, BS
Ella F. Gunady
Abby Milwicz
Cameron T. Bozdog
Maya Sheth
Kathryn Ware
Mark M. Cullen, BS
David L. Corcoran, MS, PhD
Joseph A. Prinz
Nicolas Devos, PhD
Will Eward, DVM, MD
So Young Kim, PhD
Jason Somarelli
Duke University’s Comparative Oncology Group

Single cell lineage tracing was used in a doxorubicin-resistant osteosarcoma model to identify important gene regulatory networks that could be targeted to overcome drug resistance.

12:00 PM  PAPER 160
Identifying Modifiable and Non-Modifiable Risk Factors of Readmission and Short-Term Mortality in Osteosarcoma
Alexander L. Lazarides, MD
Daniel R. Rowland, MSc
Mark M. Cullen, BS
Marcelo Cerullo, MD, MPH
Dan Blazer, MD
Julia D. Visgauss, MD
Brian E. Brigman, MD, PhD, FAAOS
Will Eward, DVM, MD

Consideration of patient, tumor, and treatment characteristics may help predict risk of readmission in osteosarcoma.

12:10 PM  PAPER 161
Silver-Coated Megaprostheses in the Mitigation of Prosthetic Joint Infections in Limb Salvage Surgery – A Cost-Effectiveness Analysis
Dipak B. Ramkumar, MD
Sean Kelly, MD
Niveditta Ramkumar, MPH
Marcel G. Brown, BA
Kevin A. Raskin, MD, FAAOS
Santiago A. Lozano Calderon, MD, PhD, FAAOS

The use of silver-coated megaprostheses in reconstruction after wide resection of lower extremity osteosarcomas is cost-effective at mitigation of postoperative prosthetic joint infection.

12:15 PM  PAPER 162
Patients with Metastatic Disease are at Highest Risk for Anxiety and Depression in an Orthopaedic Oncology Patient Population
Cara A. Cipriano, MD, FAAOS
Jeffrey T. Tarrasch
Patrick H. England, BA
Douglas J. McDonald, MD, MS, FAAOS

The prevalence of anxiety and depression was greater in patients undergoing palliative surgery for metastatic disease than those undergoing primary sarcoma resection or non-oncologic joint replacement.

12:20 PM  PAPER 163
The Incidence, Risk Factors, and Microbial Profile of Infected Endoprosthetic Reconstructions
Rishi Trikha, MD
Danielle Greig, MD
Troy Sekimura, BS
Jeffrey J. Eckardt, MD
Nicholas M. Bernthal, MD, FAAOS

This study reviews the incidence, risk factors, and microbial profile of infected endoprosthetic reconstructions.

Discussion

CAREER DEVELOPMENT
11:00 AM - 12:00 PM
Room 28E

CD3 Strategic Diversity, Equity, and Inclusion Leadership in Orthopaedics: Modernized Frameworks and Practices
Moderator: Erica Taylor, MD, FAAOS
Michael D. Maloney, MD, FAAOS
Linda Suleiman, MD
Alison P. Toth, MD, FAAOS

This course explores modern approaches to strategic diversity leadership and the longitudinal frameworks for professional development, with sharing of best practices to create sustainable change.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
TUESDAY EDUCATIONAL PROGRAMS

FLASH FIVE®

1:30 PM - 2:30 PM
Ballroom 6D

◆FF1 Flash Five®: What's Coming Down the Pike
Moderator: Claudette M. Lajam, MD, FAAOS
Robert H. Brophy, MD, FAAOS
Henry D. Clarke, MD, FAAOS
Jason L. Dragoo, MD, FAAOS
Duretti Fufa, MD, FAAOS
Mark Glazebrook, MD
Mark A. Lee, MD, FAAOS
Michael D. McKee, MD, FAAOS
Robert R. Slater, MD, FAAOS
Robert Z. Tashjian, MD, FAAOS
Douglas B. Unis, MD, FAAOS

Experience a burst of knowledge given in five minutes on topics benefiting orthopaedic surgeons. Fast and focused...each expert takes on a hot topic and provides the most critical points and takeaways.

SYMPOSIUM D

1:30 PM - 3:30 PM
Ballroom 20B

The Hottest Controversies in Primary Total Knee Arthroplasty in 2021!
Moderator: Daniel J. Berry, MD, FAAOS

This symposium covers the hottest current controversies in primary TKA including: implant fixation, alignment, balancing, articular surface configuration, and new technologies including robotics.

I. Gap Balancing can Improve the Total Knee Arthroplasty Balance in Flexion and Extension
   Matthew P. Abdel, MD, FAAOS

II. Rotating Platform: High Incongruity, Low Wear, Long-Term Results?
    Douglas A. Dennis, MD, FAAOS

III. Robotic is Better than Anything Else
     Fares S. Haddad, FRCS

IV. Ultra Congruent: Taking the Worry Out of Balancing the Knee?
    Aaron A. Hofmann, MD, FAAOS

V. Why would You Leave Cement?
   You can’t Beat it. 2. Conventional Instruments and a “Good Brain” are still the Best, Most Efficient, and Least Costly.
    Steven J. MacDonald, MD

VI. Aim for Classic Mechanical: Nothing has Beaten it so Far
    Arthur L. Malkani, MD, FAAOS

VII. Medial Pivot: More Predictable, Physiologic Kinematics?
     William J. Maloney, MD, FAAOS

VIII. Uncemented is Ready for Prime Time (Really, this Time)
     R. Michael Meneghini, MD, FAAOS

IX. Navigation Provides Perfect Alignment without the Robot Cost
   Denis Nam, MD, MSc, FAAOS

X. Cruciate Retaining: The Best Results in Registries – Why do Anything Else?
   Sumon Nandi, MD, MBA, FAAOS

    Mark W. Pagnano, MD, FAAOS

XII. Measured Resection has Never been Beaten and is More Straightforward
   Christopher L. Peters, MD, FAAOS

CAREER DEVELOPMENT

1:30 PM - 2:30 PM
Room 28E

◆CD4 Entrepreneurship for the Orthopaedic Surgeon
Moderator: Vinod Dasa, MD, FAAOS
Ashvin K. Dewan, MD
Michael T. Havig, MD, FAAOS
Morteza Meftah, MD

The landscape of physician entrepreneurship is an evolving and complex landscape. Physicians must understand these basic concepts to maximize their innovation.

INSTRUCTIONAL COURSE LECTURE

1:30 PM - 3:30 PM
Room 2

◆141 Difficult Revision Total Hip Arthroplasties Through an Anterior Approach: Extensile Expansions of Anterior Approach for Revisions, Complex Deformities, Conversions, and Periprosthetic Fractures

Moderator: Joseph T. Moskal, MD, FAAOS
Theodore T. Manson, MD, FAAOS
J. Bohannon Mason, MD, FAAOS
John L. Masonis, MD, FAAOS

Designed for the surgeon already using the direct anterior approach for routine primary and simple revision hip arthroplasties, this course teaches how to expand the approach both proximally and distally for hip reconstructions with complex deformities, as well as perform femoral and acetabular revisions through a direct anterior approach. Cementless and cemented stem removal, extended trochanteric osteotomy, treatment of periprosthetic fractures, intra-pelvic extension of the approach as well as managing pelvic discontinuity also are covered. At the conclusion of the course, participants have the cognitive skills for extension of the surgical approach and the conceptual framework for incorporation of revision direct anterior hip replacement into their practice.
What's Trending in Ankle Fractures: Is it Hot or Not?

Moderator: Aniethab Aiyer, MD, FAAOS
Jesse F. Doty, MD, FAAOS
Christopher E. Gross, MD, FAAOS
Jonathan R. Kaplan, MD, FAAOS

Management of ankle fractures has evolved over the last few decades, with more studies further delineating the influence of both soft tissue and osseous considerations. With better understanding of the role of ligamentous and bony constraints, there is greater ability to restore functional anatomy, offset development of arthritis and improve quality of life. Therefore, this symposium aims to provide a comprehensive review of the current treatment options for these deformities while discussing the evolution in options for management and technology to aide in the surgeon care for these problems.

Optimizing Outcomes by Optimizing Bone Health

Moderator: Julie E. Adams, MD, FAAOS
Lisa K. Cannada, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS
Lori S. Fitton, ACNP-BC, PhD

This ICL explores both specific problems and general solutions to the challenge of poor bone quality in the setting of orthopedic care. We will discuss specific treatment challenges and experienced speakers will share their tips and pearls for optimal outcomes in the setting of fragility fractures and elective procedures. A holistic view will be considered of the problem of bone health and the role of the orthopedic surgeon and mid level provider in considering osteoporosis, evaluating patients, and building teams to optimize our patients’ health.

Wide Awake Hand Surgery: Strategies to Implement it in Your Practice

Moderator: Asif M. Ilyas, MD, FAAOS
Ryan Garcia, MD, FAAOS
Kristofer S. Matullo, MD, FAAOS
Jonas L. Matzon, MD, FAAOS

“Wide Awake Hand Surgery” has many advantages including improved economics, convenience, safety profile, patient satisfaction, and outcomes. The faculty will discuss benefits and implementation strategies.

Employment Contracts: The Good, the Bad, and the Ugly

Moderator: Jack M. Bert, MD, FAAOS
David M. Glaser, JD
Louis F. McIntyre, MD, FAAOS
Nicholas A. Sgaglione, MD, FAAOS

Employment contracts are fraught with complications and an employment contract “checklist” is important to develop and understand when negotiating a hospital or private practice agreement.

The Basic Shoulder Arthroplasty: Simple Shoulder Replacement

Moderator: Gordon I. Groh, MD, FAAOS
Mark A. Frankle, MD, FAAOS
Jonathan C. Levy, MD, FAAOS
Gerald R. Williams, MD, FAAOS

This course explores the challenges of shoulder arthroplasty for the community surgeon. Current modern preoperative planning and intraoperative techniques are discussed.

The Art of the Historically Common but Sometimes Forgotten Shoulder Procedures

Moderator: John G. Horneff, MD, FAAOS
Joseph A. Abboud, MD, FAAOS
Samer S. Hasan, MD, PhD
Anand M. Murthi, MD, FAAOS

This ICL focuses on shoulder procedures that have become more uncommon due to advancement in technique but remain an important part of a surgeon’s repertoire.

Biologics in Spine Fusion

Moderator: Charla R. Fischer, MD, FAAOS
Philipp Leucht, MD, FAAOS
Elizabeth Lord, MD
Addisu Mesfin, MD, FAAOS

The use of bone graft and bone graft substitutes in spine surgery is common, yet the science behind each bone graft substitute is mostly based on case series reviews. The goal of this course is to review the most common bone grafts in spine surgery, as well as understand how BMP functions on a cellular level.

Secrets of Success in the Management of Lower Extremity Nonunions

Moderator: John K. Sontich, MD, FAAOS
Randall E. Marcus, MD, FAAOS
Charalampos Zalavras, MD, FAAOS

The balance of stability and biology of lower extremity nonunion treatment are evaluated to promote speedy healing, early weight-bearing, and reduced hardware failure.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Managing Pediatric Emergencies: A Case-Based Discussion

Moderators: Todd A. Milbrandt, MD, FAAOS and Derek M. Kelly, MD, FAAOS
Michelle S. Caird, MD, FAAOS
Eric W. Edmonds, MD, FAAOS
Nicholas D. Fletcher, MD, FAAOS
Henry J. Iwinski, MD, FAAOS
Derek M. Kelly, MD, FAAOS
A. Noelle Larson, MD, FAAOS
Reid B. Nichols, MD, FAAOS
Brandon A. Ramo, MD, FAAOS
Vishwas R. Talwalkar, MD, FAAOS

Room 31

This program is a case based session on how to manage pediatric orthopaedic emergencies. These cases will illustrate the work-up and surgical treatment of these conditions.

Four Common Shoulder Problems in Overhead Sports: An Interactive, Round Table, Case-Based, Problem-Solving Session

Moderator: Michael T. Freehill, MD, FAAOS
Asheesh Bedi, MD, FAAOS
Stephen F. Brockmeier, MD, FAAOS
Michael G. Ciccotti, MD, FAAOS
Stephen E. Lemos, MD, PhD

Room 33

This ICL round table will be an interactive session, which is case based and dealing with 4 very common problems seen with overhead sporting activities.

Low Patient Grit Correlates with Worse Postoperative Functional Outcomes following Rotator Cuff Repair

Kurt Stoll, MD
Robert A. Creighton, MD, FAAOS
Ganesh V. Kamath, MD, FAAOS

This study shows that a patient’s level of Grit positively correlates with postoperative functional outcomes following rotator cuff repair.

Adherence Patterns and Dose Response of Physical Therapy for Rotator Cuff Pathology

David Burns, MD
Philip Bayer, MSc
Helen Razmjou, PhD
Robin R. Richards, MD, FRCSC
Cari Whyne, PhD

Tracking 42 patients undergoing rotator cuff physical therapy with smart watches and AI revealed low rates of exercise adherence and a clinically significant dose-response to cumulative exercise.

Isolated Bioinductive Repair of Partial-Thickness Rotator Cuff Tears Using a Resorbable Bovine Collagen Implant: Two-Year Radiologic and Clinical Outcomes from a Prospective Multicenter Study

Brandon D. Bushnell, MD, MBA, FAAOS
Theodore F. Schlegel, MD, FAAOS
Jeffrey S. Abrams, MD, FAAOS
Richard L. Anglo, MD, PhD, FAAOS
Mark H. Getelman, MD, FAAOS
Charles P. Ho, MD, PhD

Final results from a 2-year prospective multi-center study of a bioinductive resorbable bovine collagen implant for treatment of partial-thickness rotator cuff tears.

In patients experiencing stiffness after rotator cuff surgery, the repair is less likely to fail at six months. The protective effect of stiffness appears to persist up to nine years postoperatively.

Outcomes following Arthroscopic Primary Rotator Cuff Repair using Margin Convergence vs. Superior Capsular Reconstruction: Should Technically Repairable Massive Rotator Cuff Tears be Repaired Primarily?

Michael C. Ciccotti, MD
Marilee P. Horan, MPH
Bryant P. Elrick, MS
Peter J. Millett, MD, MSc, FAAOS

Both massive rotator cuff tears repaired with margin convergence and superior capsule reconstruction SCR provided significant improvements in PROs. Tears should be repaired, even if MC techniques are needed.
2:00 PM  PAPER 169
Long-Term Functional and Structural Outcome of Rotator Cuff Repair in Patients Less than 61 Years Old
Andrew Green, MD, FAAOS
Kelsey E. Jaynes, BS
Jacob K. Adkins, BA
Janine Molino, MS, PhD
Stacey E. Gallacher, MD, FAAOS
Peter Evangelista, MD

Long-term follow up after rotator cuff repair in younger patients demonstrates durable patient-reported outcomes and substantial structural deterioration.

Discussion

2:10 PM  PAPER 170
Healing and Functional Results of Dermal Allograft Augmentation of Complex and Revision Rotator Cuff Repairs
Surena Namdari, MD, MSc, FAAOS
Thema A. Nicholson, MSc
Tyler J. Brolin, MD, FAAOS
Jeffrey Lu
Joseph A. Abboud, MD, FAAOS
Mark D. Lazarus, MD, FAAOS

Double row arthroscopic repair and dermal allograft augmentation of complex and revision rotator cuff tears led to substantial improvements in functional outcomes.

2:15 PM  PAPER 171
Deep Sedation with the SuperNO2VA Mask Is Associated with Decreased Anesthesia Time Compared to General Anesthesia for Shoulder Surgery with Regional Anesthesia
Joseph, I King III, MD, FAAOS
José R. Soberón, MD
Matt Gunst, MD
Penny S. Reynolds, PhD
Felipe Urdaneta, MD

Deep sedation using the SuperNO2VA Mask is feasible in all types of shoulder surgery and is associated with decreased anesthesia time, IV fluid administration, and vasopressor use.

Discussion

2:20 PM  PAPER 172
Prospective Evaluation of Arthroscopic Rotator Cuff Repairs at >15 Years Follow Up
Sridhar Pinnamaneni, MD
Evan Vellios, MD
Laurence U. Okeke, BA
Samuel A. Taylor, MD, FAAOS
Joshua S. Dines, MD, FAAOS
David M. Dines, MD, FAAOS
Scott A. Rodeo, MD, FAAOS
Russell F. Warren, MD, FAAOS
Lawrence V. Gulotta, MD, FAAOS

At long-term (>15 year) follow up, patient-reported outcomes of all-arthroscopic rotator cuff repairs appear to show significant improvement from baseline preoperative function and remain durable.

Discussion

2:30 PM  PAPER 173
The Effect of Tranexamic Acid for Visualization on Pump Pressure and Visualization during Arthroscopic Rotator Cuff Repair: A Blinded, Randomized Controlled Trial
Thema A. Nicholson, MSc
Jacob Kirsch, MD
Ryan Churchill, MD
Joseph A. Abboud, MD, FAAOS
Mark D. Lazarus, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS

Use of IV TXA demonstrated no measurable improvement in surgeon ability to maintain a lower pump pressure during arthroscopic rotator cuff repair. There is no substantial benefit to routine TXA use.

2:35 PM  PAPER 174
Opioids against Opioids. Buprenorphine Transdermal Patches in Arthroscopic Rotator Cuff Repair: Randomized Controlled Trial
Agustin Bertona, MD
Maria Bruchmann, MD
Luciano A. Rossi, MD
Ignacio Tanoira, MD
Maximiliano Ranaletta, MD

This study focused on opioids against opioids: buprenorphine transdermal patches in arthroscopic rotator cuff repair randomized controlled trial.

2:40 PM  PAPER 175
Anteroposterior Tear Size, Age, Hospital, and Case Number Important Predictors in Repair Integrity: An Analysis in 1,962 Consecutive Arthroscopic Rotator Cuff Repairs
Julian Duong
Patrick H. Lam, MD, PhD
George A. Murrell, MD

This study formulates a predictive model based upon the relationship between preoperative and intraoperative factors and re-tear rate following rotator cuff repair, including interaction effects.

Discussion

2:50 PM  PAPER 176
Subacromial Balloon Spacer vs. Partial Repair for Massive Rotator Cuff Tears: A Prospective, Randomized, Multicenter Trial
Joseph A. Abboud, MD, FAAOS
Nikhil N. Verma, MD, FAAOS
Umasuthan Srikumaran, MD, MBA, FAAOS
Colleen Roden, MSc
Heather L. Neill, RN
Edwin J. Rogusky, MD, FAAOS
Peter Lapner, MD

Use of one manufacturer's balloon spacer was non-inferior when compared to partial rotator cuff repair for the treatment of massive rotator cuff tears at 24-month follow up.
2:55 PM  PAPER 177
Real World Survey Burden of Common Patient-Reported Outcome Measures Utilized in Shoulder Surgery
Jonathan T. Bravman, MD, FAAOS
Darby A. Houck
Ian L. Verbeck, BS
Eric C. McCarty, MD, FAAOS
Rachel M. Frank, MD, FAAOS
Michelle Wolcott, MD, FAAOS
Adam J. Seidl, MD, FAAOS
The results of this study are noteworthy as they may suggest that patients who intend to complete the survey – potentially as a result of doing well after shoulder surgery – are going to complete it.

3:00 PM  PAPER 178
The Relationship of Staged, Bilateral Arthroscopic Primary Rotator Cuff Repair Timing and Postoperative Complications
Jourdan M. Cancienne, MD
Patrick J. Denard, MD, FAAOS
Stephen F. Brockmeier, MD, FAAOS
Brian C. Werner, MD, FAAOS
Medicare aged patients with staged bilateral RCR who have the second repair within 3 months have higher rates of revision surgery, stiffness requiring LOA/MUA, VTE, and emergency room visits.

3:10 PM  PAPER 179
Does Concomitant Cervical Pathology Affect Rotator Cuff Surgery? Postoperative Functional Outcomes after Arthroscopic Rotator Cuff Repair in Patients with Only Rotator Cuff Tears vs. those with Concomitant Cervical Radiculopathy
Merrill Lee, MBBS, MRCS
Vikaesh Moorthy
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Denny T. Lie, FRCS
Patients with rotator cuff tears and concomitant cervical radiculopathy achieve similar postoperative functional outcomes to those with only rotator cuff tears, after arthroscopic rotator cuff repair.

3:15 PM  PAPER 180
Effect of Preoperative and Postoperative Doses of Acetaminophen on Pain Management in Patients Undergoing Rotator Cuff Repair: A Prospective Randomized Study
Joseph A. Abboud, MD, FAAOS
Arjun Singh, BS
Jacob Kirsch, MD
Manan S. Patel, BA
Thomas Harper, MD
Mark D. Lazarus, MD, FAAOS
John G. Horneff, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
Armen C. Voskeridjian, MD
Perioperative acetaminophen significantly decreased opioid consumption and resulted in improved overall pain control following primary rotator cuff repair.

3:20 PM  PAPER 181
Efficacy of Brachial Plexus Blockade with Liposomal Bupivacaine and Bupivacaine Compared to Ropivacaine Combined with Dexamethasone for Arthroscopic Rotator Cuff Repair
Ryan W. Simovitch, MD, FAAOS
Chris Pociask, PA-C
John D. Matz
Lawrence P. Deziel, MD
Thomas M. Hernandez, MD
Liposomal bupivacaine interscalene nerve block for arthroscopic rotator cuff repair yields favorable results with a reduction in postop opioid use and improvement of patients perception of anesthesia.

3:30 PM - 3:30 PM  PAPER PRESENTATIONS
Ballroom 6B
Sports Medicine II
Moderators: Michael J. Alaia, MD, FAAOS and Gregory B. Maletis, MD, FAAOS

1:30 PM  PAPER 182
Higher Return to Pre-Injury Activity Levels following Anterior Cruciate Ligament (ACL) Reconstruction with Bone-Patellar Tendon-Bone vs. Hamstring Tendon Autograft: Results from the New Zealand ACL Registry
Richard Rahardja, MBCHB
Mark Zhu
Hamish Love, FRACS
Mark Clatworthy, MD
Andrew P. Monk, FRCS, PhD
Simon Young, MD, FRACS
The use of a bone-patellar tendon-bone autograft in primary ACL reconstruction increased the odds of a return to pre-injury activity levels when compared to the hamstring tendon autograft.

1:35 PM  PAPER 183
Perioperative Complications and Early Clinical Outcomes following Anterior Cruciate Ligament Reconstruction with Soft Tissue Quadriceps Tendon Autograft in Adolescent Athletes
Benton E. Heyworth, MD, FAAOS
Naveen Jasty
Danielle Cook, BS
Elizabeth S. Liotta, MBBS
Quad tendon ACLR shows a relatively high overall early postoperative complication and subsequent surgery rate in adolescents.
1:40 PM  PAPER 184
Anatomic Double-Bundle Anterior Cruciate Ligament (ACL) Reconstruction Not Superior to Anatomic Single-Bundle ACL Reconstruction at 10-Year Follow Up: A Randomized Clinical Trial
Sadesh Balasingam, MD
Ioannis Karikis
Mattias Ahlden, MD
Lars Rostgard-Christensen, MD
Ninni Sernert, RPT
Juri Kartus, MD
This long-term randomized clinical trial justifies the decision to discontinue use of the double-bundle technique.

Discussion

1:50 PM  PAPER 185
Allograft Anterior Cruciate Ligament Reconstruction in Patients aged 40 and Older: Patient Reported Outcomes and a Patient Acceptable Symptom State
Stephen M. Sylvia, MD
Gabriel S. Perrone, MD
Jonathan A. Stone, MD
Benjamin Miltenberg, BS
Teron Nezwek, MD
Yilun Zhang, BS
Samuel W. Golenbock, MSc
John C. Richmond, MD, FAAOS
Matthew J. Salzler, MD, FAAOS
The largest single center sample of patient reported outcomes in patients 40 and older who underwent ACL reconstruction shows a higher failure rate than previous data and a new PASS score for IKDC.

1:55 PM  PAPER 186
Long-Term Clinical Outcomes of Anterior Cruciate Ligament Reconstruction With and Without Anterolateral Ligament Reconstruction: A Matched-Pair Analysis with a Minimum Follow Up of 97 Months
Adnan Saithna, FRCS (Ortho)
Ibrahim Haidar
Thomas Fradin, MD
Johnny Rayes, MD
NgbiloCédric, MD
Thais D. Vieira, MD
Bertrand Sonnery-Cottet, MD
Combined ACL and ALL reconstruction is associated with significantly lower graft rupture rates than isolated ACL reconstruction at long-term follow up (minimum 97 months).

2:00 PM  PAPER 187
Outcomes following Isolated Acute Anterior Cruciate Ligament Reconstruction are Inferior in Patients with an Associated Anterolateral Ligament Injury
Marcel Sobrado, MD
Pedro N. Giglio, MD
Marcelo B. Bonadio, MD
Paulo V. Helito
Tales Guimaraes, MD
José R. Pécora, MD
Riccardo G. Gobbi, MD
Camilo Partezani Helito, PhD
Combined ACL and ALL injuries are associated with significantly less favorable outcomes than isolated ACL injuries at a minimum follow up of two years following ACL reconstruction.

Discussion

2:10 PM  PAPER 188
Role of Age on Success of Arthroscopic Primary Repair of Proximal Anterior Cruciate Ligament Tears
Harmen D. Vermeijden, MD
Jelle P. Van Der List, MD
Gregory S. DiFelice, MD, FAAOS
The failure rate of primary repair of proximal ACL tears is high in patients aged 21 or younger (37.0%), and this should be taken into account when discussing repair in this patient group.

2:15 PM  PAPER 189
Bridge-Enhanced Anterior Cruciate Ligament (ACL) Repair has Earlier Resolution of Symptoms and Return of Function Compared to ACL Reconstruction
Samuel Barnett, MD
Martha M. Murray, MD, FAAOS
Gary J. Badger, MS
Ryan Sanborn, BA
Ala Kiapour, PhD
Benedikt Proffen, MD
Nicholas J. Sant, BS
Braden C. Fleming, PhD
Lyle J. Micheli, MD, FAAOS
Yi-Meng Yen, MD, PhD, FAAOS
Dennis E. Kramer, MD, FAAOS
The BEAR Trial Team
This is a follow-on report of the first-in-human randomized trial of the BEAR technique, now reporting results at various earlier time points in the first 2 years after surgery.
### PAPER 190
**2:20 PM**
**Poster Tibial Tunnel Position in Single Bundle Anterior Cruciate Ligament Reconstruction Induces Abnormal Kinematics**  
*Shinichiro Nakamura, MD, PhD*  
*Yoshihisa Tanaka*  
*Shinichi Kuriyama, MD, PhD*  
*Kohei Nishitani, MD, PhD*  
*Mutsumi Watanabe, MD*  
*Shuichi Matsuda, MD*

Posterior tibial tunnel position in single bundle ACL reconstruction should be avoided due to residual rotational instability during high demand activities.

**Discussion**

### PAPER 193
**2:40 PM**
**Bone-Patellar Tendon-Bone Allografts: Effects of Donor Age on Biomechanics Properties**  
*Connor M. Delman, MD*  
*Trevor J. Shelton, MD*  
*Sean McNary, PhD*  
*John R. Taylor, MD, MPH*  
*Richard A. Marder, MD, FAAOS*

Surgeons should be aware that using patellar tendon allografts from younger adults may have a lower failure rate as compared to grafts from older patients.

**Discussion**

### PAPER 191
**2:30 PM**
**The Effect of Lateral Extra-Articular Tenodesis on Medial and Lateral Menisci Loading in Response to Simulated Tests of the Pivot Shift and Anterior Laxity**  
*Niv Marom, MD*  
*Hamidreza Jahandar, MS*  
*Zaid Zayyad*  
*Thomas Fraychineaud*  
*Herve Ouanezar, MD*  
*Thomas L. Wickiewicz, MD, FAAOS*  
*Carl W. Imhauser, PhD*  
*Andrew D. Pearle, MD, FAAOS*  
*Danyal Nawabi, MD, FRCS (Orth)*

LET augmentation to ACLR may increase lateral lateral meniscal load in flexion, which may affect outcomes in cases of concomitant lateral meniscal pathology.

### PAPER 192
**2:35 PM**
**Bone Bruising Severity after Anterior Cruciate Ligament Rupture Predicts Elevation of Chemokine MCP-1 Associated with Osteoarthritis**  
*Lukas Keil, MD*  
*Douglas Onuscheck, MD*  
*Lincoln F. Pratson, MD*  
*Ganesh V. Kamath, MD, FAAOS*  
*Robert A. Creighton, MD, FAAOS*  
*Daniel Nissman, MD, MPH*  
*Brian G. Pietrosimone, PhD, ATC*  
*Jeffrey T. Spang, MD, FAAOS*

Severity of bone bruising following ACL rupture correlates with elevated synovial fluid levels of chemokine MCP-1 associated with osteoarthritis acutely post injury and 12 months post-reconstruction.

### PAPER 194
**2:50 PM**
**Does Medial Collateral Ligament Grade II Lesions Influence the Outcome of Anterior Cruciate Ligament Reconstruction? A Prospective Study with a Minimum 14 Years of Follow Up**  
*Stefano Zaffagnini, MD*  
*Gian Andrea Lucidi*  
*Piero Agostinone, MD*  
*Giacomo Dal Fabbro*  
*Luca Macchiara, MD*  
*Alberto Grassi, MD*

This study conducted at a minimum highlight that the outcomes of isolated ACL and combined ACL and MCL grade II lesions are similar; therefore no additional procedure are needed.

### PAPER 195
**2:55 PM**
**Intraoperative and Early (90-Day) Postoperative Complications and Associated Variables with Multiligamentous Knee Reconstruction**  
*Derek Axibal, MD*  
*Nicholas C. Yeatts, BS*  
*Alexander Hysong, MD*  
*David Trofa, MD*  
*Claude T. Moorman, MD, FAAOS*  
*Dana P. Piasecki, MD, FAAOS*  
*James E. Fleischli, MD, FAAOS*  
*Bryan M. Saltzman, MD*

There is a low, yet not insignificant, intraoperative complication rate and high early (90 day) postoperative complication rate with multiligamentous knee surgery.

### PAPER 196
**3:00 PM**
**Peroneal Nerve Palsy is Predictive of Posterolateral Corner Injury Location and Anterior Cruciate Ligament Tear in Patients with Traumatic Ligamentous Knee Injuries: A Retrospective Analysis**  
*Anthony Essilfie, MD*  
*Erin Fitzgerald, MD*  
*David A. Bloom, BA*  
*Michael G. Doran, MD*  
*Eoghan Hurley, MBCHB*  
*Kirk A. Campbell, MD, FAAOS*  
*Laith M. Jazrawi, MD, FAAOS*  
*Michael J. Alaia, MD, FAAOS*

The results of this study suggest that CPN palsy following traumatic knee injury is pathognomonic for combination ACL and PLC injury.

**Discussion**
Early Use of Blood Flow Restriction Training with Low-Intensity Exercises following Anterior Cruciate Ligament Reconstruction Improves Quadriceps Strength and Postoperative Pain: A Randomized Controlled Trial

Nathan P. Fackler, MS
Andrew J. Curley, MD
Alexandra Galel, BS
Caroline Fryar, MD
Jennifer N. Lewis, ATC, DPT
David Wang
Edward S. Chang, MD

Blood flow restriction training used in conjunction with low-weight exercises during the acute postoperative period may accelerate rehabilitation following anterior cruciate ligament reconstruction.

Outcomes following Medial Patellofemoral Ligament Reconstruction with Allograft

Danielle H. Markus, BA
Eoghan Hurley, MBCHB
Edward Shontz, BS
Kirk A. Campbell, MD, FAAOS
Laith M. Jazrawi, MD, FAAOS
Eric J. Strauss, MD, FAAOS

There was a low rate of recurrent instability following MPFLR with allograft, with excellent patient-reported outcomes and a low complication rate.

Isolated Medial Patellofemoral Ligament Reconstruction vs. Tibial Tubercle Osteotomy plus Medial Retinacular Plication for Recurrent Patellar Instability: A Matched, Cohort Analysis Comparing Two Techniques

Benton E. Heyworth, MD, FAAOS
Evan Zheng, BA
Zaamin Hussain, MD, MEd
Benjamin Wilson, MD
Kianna D. Nunally, BA
Mininder S. Kocher, MD, MPH, FAAOS
Yi-Meng Yen, MD, PhD, FAAOS
Lyle J. Micheli, MD, FAAOS
Dennis E. Kramer, MD, FAAOS

Tibial tubercle osteotomy with medial retinacular plication shows equivalent or superior results to the medial patellofemoral ligament reconstruction for operative stabilization of PFI.

What Predicts Successful Long-Term Outcome following Periacetabular Osteotomy in Hips with Dysplasia or Acetabular Retroversioin: 30 Years of Experience in 808 Patients

Christiane S. Leibold, MD
Malin K. Meier, MD
Moritz Tannast, MD
Klaus Siebenrock, MD
Simon D Steppacher, MD

Hip dysplasia and acetabular retroversion can both be corrected successfully by PAO. Preexisting joint degeneration is the most important predictive factor for successful surgery.

Do Patient-Reported Outcomes Correlate to Femoral Head Coverage after Periacetabular Osteotomy? Prospective Cohort Study

Mazen M. Ibrahim, MD, PhD
Kevin Smit, MD
George A. Grammatopoulos, MRCS
Stephane Poitras, PhD, PT
Paul E. Beaule, MD, FAAOS

Our study demonstrated postoperative femoral head coverage and acetabular orientation are significant predictors of PROMs.

Physical and Mental Demand During Total Hip Arthroplasty

Michael A. Mont, MD, FAAOS
Alexandra Valentino, BS
Laura Scholl, MS
Emily Hampp, PhD
Hytham Salem, MD
Ryan Smith, MD
Zackary O. Byrd, MD

Robotic-assisted THA reduces the mental demand of acetabular reaming compared to manual THA. In addition, robotics may reduce surgeon energy expenditure compared to manual THA.
1:50 PM  
**PAPER 203**  
The Effects of Robotic-Assisted Surgery on Revision, Readmission, and Complication Rates in Primary Total Hip Arthroplasty  
**Ethan Remily, DO**  
Scott Douglas, MD  
Nnequesha Mohamed, MD  
Wayne A. Wilkie, DO  
Oliver Sax, DO, MS  
Sahir Pervaiz, MD, MS  
Bernard E. Shalit  
Qais Naziri, MD, MBA  
Ronald E. Delanois, MD, FAAOS  
This study examined length of stay, costs, readmissions, revisions, and complication rates in robot-assisted patients against matched non-robot-assisted patients who underwent total hip arthroplasty.

1:55 PM  
**PAPER 204**  
More Predictable Return of Motor Function with Mepivacaine vs. Bupivacaine Spinal Anesthetic in Total Hip and Total Knee Arthroplasty: A Double-Blinded, Randomized Clinical Trial  
**Cody Wyles, MD**  
Mark W. Pagnano, MD, FAAOS  
Robert T. Trousdale, MD, FAAOS  
Rafael J. Sierra, MD, FAAOS  
Michael J. Taunton, MD, FAAOS  
Kevin I. Perry, MD, FAAOS  
Hugh M. Smith, MD, PhD  
Christopher Duncan, MD  
Matthew P. Abdel, MD, FAAOS  
In patients undergoing primary THA and TKA, spinal anesthesia with mepivacaine allowed more consistent return of lower-extremity motor function compared with low-dose bupivacaine.

2:00 PM  
**PAPER 205**  
Effectiveness of Periarticular Injection after Bipolar Hemiarthroplasty for Displaced Femoral Neck Fracture in Elderly Patients: A Double-Blinded Randomized Controlled Study  
**Ong-Art Phruetthiphat, MD**  
307/3 Lawanprasert  
Saradej Khuang sirikul, MD  
Thanainit Chotanaphuti, MD  
For reduction of morphine use, intraoperative periarticular injection can be used as an alternative pain management after bipolar hemiarthroplasty for displaced femoral neck fracture in elderly.

2:10 PM  
**PAPER 206**  
The Impact of Opioid Legislation on Narcotic Filling in Total Hip Arthroplasty: National Time and State-Level Trends  
**Daniel J. Cunningham, MD**  
Sean P. Ryan, MD  
Brian D. Lewis, MD, FAAOS  
State-specific opioid-limiting legislation has been associated with decreased 90-day cumulative opioid filling in primary total hip arthroplasty. However, initial opioid volume remains unchanged.

2:15 PM  
**PAPER 207**  
Does Activity Level after Primary Total Hip Arthroplasty Affect Aseptic Survival?  
**David A. Crawford, MD, FAAOS**  
Michael J. Morris, MD, FAAOS  
Adolph V. Lombardi, MD, FAAOS  
Keith R. Berend, MD, FAAOS  
Higher activity level after primary THA did not increase the risk for mid-term aseptic or all cause failure.

2:20 PM  
**PAPER 208**  
A Simple Hip-Spine Classification for Total Hip Replacement: Validation and Large Multicenter Series  
**Jonathan M. Vigdorchik, MD, FAAOS**  
Abhinav Sharma, MS  
Aaron J. Buckland, FRACS, MBBS  
Ameer M. Elbuluk, MD  
Nima Eftekhary, MD  
David J. Mayman, MD, FAAOS  
Kaitlin M. Carroll, BS  
Seth A. Jerabek, MD  
The data from this study suggest that patients with spinal stiffness and/or deformity can remain candidates for THA provided that they are appropriately managed preoperatively and intraoperatively.

2:30 PM  
**PAPER 209**  
Aspirin is a Good Prophylaxis Option for Venous Thromboembolism in Patients with Femoral Neck Fracture Undergoing Arthroplasty  
**Emanuele Chisari, MD**  
Roshan P. Shah, MD, JD  
Matthew Levitsky, MD  
Nicolas S. Piu zzi, MD  
Carlos A. Higuera Rueda, MD, FAAOS  
Daniel C. Santana  
Syona Satwah, BS  
Timothy Tan, MD  
Javad Parvizi, MD, FAAOS  
This is a study investigating the role of aspirin as a venous VTE prophylaxis for patients with femoral neck fracture undergoing total hip arthroplasty hemiarthroplasty.

2:35 PM  
**PAPER 210**  
Further Defining the Anterior Approach Total Hip Arthroplasty Learning Curve: Effects of a Co-Surgeon and a Comprehensive Classification of Complications  
**Nathan Redlich, MD**  
Brittany M. Becker, ATC, BS  
Jake D. Bauwens, MD  
Joseph M. Schwab, MD, FAAOS  
Our study is unique to the AATHA literature by use of a co-surgeon, use of the Hip Society’s standardized complications, and estimation of the learning curve with a mathematical model.
Tuesday Educational Programs

2:40 PM  PAPER 211
Perioperative Medical Optimization of Symptomatic Benign Prostatic Hypertrophy is a Cost-Effective Infection Prevention Strategy in Total Knee and Hip Arthroplasty
Michael A. Moverman, MD
Matthew Bruha, MD
Nicholas R. Pagani, MD
Richard N. Puzzitiello, MD
Mariano Menendez, MD
C. Lowry Barnes, MD, FAAOS

While perioperative medical management of symptomatic BPH is a cost-effective infection control intervention for total joint arthroplasty, surgical optimization is not financially justified.

Discussion

2:50 PM  PAPER 212
Cemented versus cementless femoral stem fixation in primary total hip arthroplasty and risk of cause-specific revision in a US cohort
Matthew P. Kelly, MD, FAAOS
Priscilla H. Chan, MS
Heather A. Prentice, PhD
Liz Paxton, PhD, MA
Adrian D. Hinman, MD, FAAOS
Monti Khatod, MD, FAAOS

In a US cohort, we observed a higher risk of revision due to infection and aseptic loosening but lower periprosthetic fracture revision risk with cemented compared to cementless stem elective total hip arthroplasty.

2:55 PM  PAPER 213
Development of a Risk Calculator for Intensive Care Unit Admission after Hip and Knee Arthroplasty
Matthew Grosso, MD
Kamolsak Sukhonthamarn, MD
Gabrielle Allred
Matthew Sherman, BS
Atul F. Kamath, MD, FAAOS
Javad Parvizi, MD, FAAOS
Camilo Restrepo, MD

A study to develop risk calculators to determine the risk of ICU admission following primary and revision, hip and knee arthroplasty.

3:00 PM  PAPER 214
Previous Hip Arthroscopy in Patients Undergoing Total Hip Arthroplasty Increases the Risk of Medical Complications, Implant-Related Complications, and Subsequent Revision Surgery
Nicholas Lemme, MD
Daniel Yang, BS
Ashwin Veeramani
Alan H. Daniels, MD, FAAOS
Eric M. Cohen, MD

Previous hip arthroscopy increases the risk for both medical and surgical complications, as well as the need for revision surgery.

Discussion

3:10 PM  PAPER 215
The Effect of Femoral Offset and Abnormal Spinopelvic Motion on the Risk of Dislocation following Total Hip Arthroplasty
Nathanael D. Heckmann, MD
Richard B. Han, BA, MD
Brian C. Chung, BS
Jay R. Lieberman, MD, FAAOS

The purpose of this study is to investigate the prevalence of under-restored femoral offset and abnormal spinopelvic motion in a consecutive series of THA patients treated for recurrent instability.

3:15 PM  PAPER 216
Complications in Over 1,000 Joint Arthroplasty Procedures Done in Ambulatory Surgery Centers
James S. Chambers, MD

Compared to previously published in-hospital arthroplasty data, procedures performed at ASCs have similar rates of complications.

3:20 PM  PAPER 217
Cementless Fixation, Total Hip Arthroplasty, and Increased Age are Risk Factors for Revision after Arthroplasty for Femoral Neck Fracture: Results from the American Joint Replacement Registry
James I. Huddleston III, MD, FAAOS
Ayushmita De
Heena Jaffri, MPH
John W. Barrington, MD, FAAOS
Paul J. Duwelius, MD, FAAOS
Bryan D. Springer, MD, FAAOS

This study is to find which procedure, HA or THA, is effective in treating FNF.

Discussion

PAPER PRESENTATIONS

1:30 PM - 3:30 PM
Room 32
Foot and Ankle I
Moderator: David R. Richardson, MD, FAAOS

1:30 PM  PAPER 218
Comparison of PROMIS Outcomes of Arthrodesis and Synthetic Cartilage Implant in the Treatment of Hallux Rigidus
Muhammad Y. Mutawakkil, MD
Rehaem Beli, BS, MS
Haley Smith, MD
Daniel J. Johnson, MD
Mitesh P. Mehta, BA
Anish R. Kadakia, MD, FAAOS

At a minimum of one-year postoperatively, arthrodesis shows better PROMIS function and pain scores as well as patient satisfaction in the treatment of hallux rigidus.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
1:35 PM  PAPER 219
Revision First Metatarsophalangeal Joint Fusion for Nonunion, Implant Failures, and Failed Hallux Valgus Correction; Does the Indication Matter?
Dan Prat, MD
Brandon A. Haghverdian, MD
Eric Pridgen, MD, PhD
Wonyong Lee, MD
Keith L. Wapner, MD, FAAOS
Wonyong Lee, MD
Kathryn O’Connor, MD, FAAOS
Daniel C. Farber, MD, FAAOS

The clinical and patient-reported outcomes of revision 1st MTP joint surgery with fusion were similar between the different indications for revision, but were inferior compared to primary MTP fusion.

1:40 PM  PAPER 220
Results of Hallux Metatarsophalangeal Joint Arthrodesis With and Without Calcaneal Autograft
Fred Finney, MD
Anthony Barcel, MD
Todd A. Irwin, MD, FAAOS
W H. Davis, MD, FAAOS
Bruce E. Cohen, MD, FAAOS
John K. Ellington, MD, MS
Carroll P. Jones, MD, FAAOS

In this relatively large retrospective comparison, the use of calcaneal graft was noted to be safe, however there was no difference in union rate when using calcaneus autograft for hallux MTP fusion.

1:50 PM  PAPER 221
Influence of Topography on 3D Printed Titanium Foot and Ankle Implants
Bijan Abar, BS
Nicholas Allen
Cambre Kelly, PhD
Helena Barber, BA
Ken Gall, PhD
Samuel B. Adams, MD, FAAOS

Tensile testing and in vitro testing indicate that printing artificial roughness diminished mechanical properties such as tensile strength and ductility without clear benefit to cell growth.

1:55 PM  PAPER 222
Short-Term Clinical Outcomes and Evaluation of Adjacent Joint after an Alumina Ceramic Total Talar Prosthesis
Masatake Matsuoka, PhD
Tomohiro Onodera, MD, PhD
Koji Iwasaki, MD, PhD
Shinji Matsubara, MD, PhD
Ryo Su Hishimura, PhD
Eiji Kondo, MD
Norimasa Iwasaki

We should pay attention to patients with collapsed talus because higher collapse rate of talus might influence the occurrence of bone marrow edema in adjacent joint after total talar prosthesis.

2:00 PM  PAPER 223
Retrospective Radiographic Evaluation of Fusion Using Recombinant Human Platelet-Derived Growth Factor-BB and Beta-Tricalcium Phosphophate (rhPDGF-BB/b-TC)
Christopher D. Kreulen, MD, FAAOS
Trevor J. Shelton, MD
Alvin Shieh, MD
Eric Chang
Amy Steele, MD, BS
Eric Giza, MD, FAAOS

Using rhPDGF-BB/beta-TCP can aide in fusion without causing increased morbidity of autogenous bone graft harvesting.

2:10 PM  PAPER 224
High Rate of Talar Collapse in Scandinavian Total Ankle Replacement
Daniel J. Scott, MD, MBA
David Vier, MD
Samuel Ford, MD
Shannon Alejandro, MD
David E. Jaffe, MD, FAAOS
James W. Brodsky, MD, FAAOS

We found a 10% rate of STAR talar sided failures at mean 7-year follow up.

2:15 PM  PAPER 225
Long-Term Revision Rates and Functional Outcomes of Total Ankle Arthroplasty and Ankle Arthrodesis
Kevin M. Goodson, MD
Kevin Huang, BA, MS
Evan Loewy, MD
Arthur K. Walling, MD, FAAOS

This study presents largest and longest-term follow up comparing the Scandinavian Total Ankle Replacement (STAR) prosthesis to ankle arthrodesis published in the United States to date.

2:20 PM  PAPER 226
Correlation of Patient-Reported Outcomes with Physical Function after Total Ankle Arthroplasty
Daniel J. Scott, MD, MBA
Justin M. Kane, MD
Samuel Ford, MD
Yahya Daoud, MSc
Scott Coleman, MBA, MS
James W. Brodsky, MD, FAAOS

For patients undergoing TAA, as by measured gait and PROs, walking speed and ankle push-off power correlated most with improvement in SF-36 and AOFAS scores, while pain and ROM did not.
This study reviews patient perceptions of podiatrists compared to foot and ankle orthopaedic surgeons and the preferences they have for a particular type of provider.

Orthopaedists are becoming more subspecialized but why? We found ankle fractures treated by foot and ankle or trauma fellowship-trained surgeons have decreased risk of surgical complications.

This is a study to determine if it is more cost effective for an orthopaedic surgeon or podiatrist to operatively manage ankle fractures.

Payments from industry did not affect reported outcomes.

In hindfoot fusions, the rate of fusion did not vary between autograft and allograft use but decreased in patients given a combination; moreover, time to fusion decreased with the use of allograft.
3:20 PM  PAPER 235
Randomized Trial of Dilute Betadine Soak and Scrub for Orthopaedic Foot and Ankle Surgery
Daniel D. Bohl, MD, MPH
Nasima Mehraban, MD
David Rossi
Connor Wakefield, BS
Johnny L. Lin, MD, FAAOS
Simon Lee, MD, FAAOS
Kamran S. Hamid, MD, MPH, FAAOS
The purpose of this study is to determine whether the addition of a dilute butadiene soak and scrub to the standard preparation decreases positive bacterial culture rates from the hallux nailfold.

Discussion

PAPER PRESENTATIONS
1:30 PM - 3:30 PM
Ballroom 6A
Global Perspectives
The best papers from countries outside of the United States are presented in one session. Come hear experts discuss important topics from outside the US. This paper session is presented in English.

CAREER DEVELOPMENT
3:00 PM - 4:00 PM
Room 28E
◆CD5 Navigating the Challenges of Mentoring in Today’s Environment
Moderator: Selina Poon, MD, FAAOS
Lattisha L. Bilbrew, MD
Seth S. Leopold, MD, FAAOS
William N. Levine, MD, FAAOS
Claudia L. Thomas, MD, FAAOS
Jennifer M. Weiss, MD, FAAOS
Learn about the nuts and bolts on how to create, build, and continue to have meaningful mentoring relationships with surgeons of all gender and ethnicity in today’s environment.

THE WAY I SEE IT…® (TWISI)
4:00 PM - 5:00 PM
Ballroom 6D
◆TWIS11 Traditional Thinking Challenged: Is the Evidence from Recent Fracture Trials Strong Enough to Change Practice?
Moderator: Emil H. Schemitsch, MD, FAAOS
Michael T. Archdeacon, MD, FAAOS
Michael J. Gardner, MD, FAAOS
Edward J. Harvey, MD, MSc
Michael D. McKee, MD, FAAOS
J. Tracy Watson, MD, FAAOS
There continues to be a significant burden of disease associated with the management of common fractures. Despite a plethora of trials focused on the management of many common fractures, the treatment of many of these injuries remains controversial and at odds with trial evidence. A primary goal of this session is to evaluate the evidence and achieve consensus opinions on many current issues and controversies regarding fracture management.

SYMPOSIUM E
4:00 PM - 6:00 PM
Ballroom 6B
Patient-Reported Outcomes are Everywhere! How Do I Actually Use them in My Clinical Practice?
Moderator: Karl M. Koenig, MD, MS, FAAOS
Learn the latest ways of incorporating patient-reported outcome collection into your practice and how to utilize them in daily clinical care.

I. Patient-Reported Outcome History, Evolution, and New Predictive Decision Tools
   Judith F. Baumhauer, MD, MPH, FAAOS
II. Use of Patient-Reported Outcomes in Predictive Analytics
   Kevin J. Bozic, MD, MBA, FAAOS
III. Patient-Reported Outcome Measure Selection: What Should I Use and Why?
    David S. Jevsevar, MD, MBA, FAAOS
IV. Building Patient-Reported Outcome Collections and Follow-Up Systems for Your Practice
   Karl M. Koenig, MD, MS, FAAOS
V. Role of Patient-Reported Outcomes in Shared Decision Making: The New York University Experience
   Joshua C. Rozell, MD
INSTRUCTIONAL COURSE LECTURE

4:00 PM - 6:00 PM

161 The Popular Conversion Total Hip Arthroplasty: Video-Based Tips to Attack These Tough Cases
Moderator: Matthew P. Abdel, MD, FAAOS
Fares S. Haddad, FRCS
Douglas E. Padgett, MD, FAAOS
Michael J. Taunton, MD, FAAOS

This video-based instructional course lecture provides technical tips and tricks related to conversion total hip arthroplasties (THAs) for congenital and posttraumatic etiologies, including how to manage in situ hardware.

162 Advanced Technology in Total Knee Arthroplasty
Moderator: David J. Mayman, MD, FAAOS
Wolfgang Fitz, MD
Patrick A. Meere, MD, FAAOS
Jonathan M. Vignorich, MD, FAAOS

This course provides an introduction to the state-of-the-art technology in total knee replacement: what is out there and how to use it safely.

163 Chronic Achilles Ruptures: From Bracing to Complex Reconstruction
Moderator: Daniel C. Farber, MD, FAAOS
Samuel B. Adams, MD, FAAOS
Scott Ellis, MD, FAAOS
Andrea Veljkovic, MD, FRCSC

Chronic achilles ruptures are a reconstructive challenge. Faculty reviews clinical scenarios and provides multiple treatment options and the pros/cons of reconstruction techniques.

Moderator: Afshin Razi, MD, FAAOS
Kenneth B. Chapman, MD
Timothy T. Davis, MD
Eric Lee, MD, MA

This course offers a concise review of interventional pain management and treatment of common adult spinal disorders seen in general orthopaedic offices. The faculty, three pain management experts, discuss the best practices for understanding and selecting appropriate interventional procedures for spinal disorders, as well as risks and benefits of each. This course provides evidence-based guidelines for pain management options to aid in counseling patients.

165 Wrist Injuries in the Athlete: Treatment Considerations and Technical Tricks
Moderator: Eric R. Wagner, MD
Michael B. Gottschalk, MD, FAAOS
Sanjeev Kakar, MD, FAAOS
Eric R. Wagner, MD

Attendees will be comfortable evaluating and treating athletes of all levels with wrist pathologies, while adding new techniques to their armamentarium.

166 Arthroscopic Surgery in Pediatric Patients: What’s New?
Moderator: Maria J. Tuca, MD
Javier Besomi, MD
Cristian Olmedo, MD

A complete evidence-based practice, principles, surgical techniques, pearls and pitfalls, review and new advancements in pediatric arthroscopic surgery lecture is presented.

167 Leadership in Orthopaedics: How to be your Own Chief Officer whether Leading in the Operating Room or Orchestrating from the Podium
Moderator: Mary K. Mulcahey, MD, FAAOS
Asheesh Bedi, MD, FAAOS
Matthew T. Provencher, MD, FAAOS
Karen M. Sutton, MD, FAAOS

The course will discuss how to be the “Captain” in the OR and a visionary of education while bringing your diversity to the table.

168 From A to P: Technical Pearls to Master Shoulder Instability Surgery
Moderator: William N. Levine, MD, FAAOS
George S. Athwal, MD
Eric C. Makrhi, MD, MBA, FAAOS
Felix H. Savoie III, MD, FAAOS

This technique-based course focuses entirely on technical pearls and skills for mastering shoulder instability surgery, for both open and arthroscopic cases.

169 Navigation Options for Spinal Surgeons: State of the Art 2021
Moderator: Sumeet Garg, MD, FAAOS
Jeffrey Gum, MD, FAAOS
Christopher J. Kleck, MD, FAAOS
A. Noelle Larson, MD, FAAOS

This course is an overview of modern spinal navigation technologies for instrumentation: 3D fluoroscopy with computer navigation, robotic navigation, and patient specific navigation with 3D printing.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
170 Joint Preservation Techniques for the Knee in 2021: The Utility of Biologics, Osteotomies, and Cartilage Restoration Procedures

Moderator: Rachel M. Frank, MD, FAAOS
Seth Sherman, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Armando F. Vidal, MD, FAAOS

This course provides a comprehensive overview of joint preservation techniques for the knee, including biologic and reconstructive approaches, with an emphasis on evidence-based treatment guidelines for young, high-demand patients.

171 Shoulder Arthritis in the “Aging” Athlete: Management Strategies in 2021 from Biologics to Arthroscopy to Arthroplasty

Moderator: Stephen F. Brockmeier, MD, FAAOS
Seth C. Gamradt, MD, FAAOS
Lawrence V. Gulotta, MD, FAAOS
Frank Petrigliano, MD, FAAOS

In an aging but still active population, incidence of degenerative shoulder conditions continue to rise. Management options including biologics, arthroscopy, and arthroplasty are outlined.

172 Lower Extremity Periprosthetic Fractures: Perspectives of Trauma vs. Joint Surgeons

Moderator: Gavin Pereira, MD, FAAOS
Derek F. Amanatullah, MD, PhD, FAAOS
Philip R. Wolinsky, MD, FAAOS

This course is intended to show how Trauma and Arthroplasty surgeons think when faced with Periprosthetic fractures of the hip and knee.

188 All in a Day’s Work: How to Address the Array of Knee Problems Our Patients Present

Moderator: Adolph V. Lombardi, MD, FAAOS
C. Lowry Barnes, MD, FAAOS
Keith R. Berend, MD, FAAOS
Michael E. Berend, MD, FAAOS
Michael P. Bolognesi, MD, FAAOS
John J. Callaghan, MD, FAAOS
Craig J. Della Valle, MD, FAAOS
Mark W. Pagnano, MD, FAAOS
Christopher L. Peters, MD, FAAOS
Bryan D. Springer, MD, FAAOS
Robert T. Trousdale, MD, FAAOS

Patients present with a wide range of knee problems that require tailored solutions to restore function and provide durability and pain relief.

4.05 PM A Comparison of Medicare and Private Payer Patient Outcomes in Outpatient Arthroplasty

Moderator: John J. Callaghan, MD, FAAOS
Benjamin M. Stronach, MD, FAAOS
Trevor R. Pickering, MD, FAAOS
Louis F. McIntyre, MD, FAAOS
Robert K. Mehrle, MD, FAAOS
Harpa S. Khanuja, MD, FAAOS

Site of service migration of TJA is a significant paradigm shift in orthopaedics. This study compares the results of private pay to Medicare patients done in the ASC compared to a hospital.
The Same Day Discharges following Primary Total Joint Arthroplasty: A Single Surgeon, Propensity-Score-Matched Cohort Analysis

Young-Min Kwon, MD, PhD, FAAOS
Venkatsiaakhil Tirumala, BS, MS
Christian Klemt, PhD
Ruben V. Oganesan, MD
Liang Xiong, MD, PhD
Ingwon Yeo, MD
Manuel T. Sobol
Christopher T. Zoppo
Jonathan J. Jordanides, BS

This study shows that patients that had same-day discharge had similar postoperative outcomes, including patient-reported outcome measures, compared to patients that had a standard inpatient protocol.

Discussion

Hospital Discharge within a Day after Total Knee Arthroplasty Does Not Affect 1-Year Complications Compared with Rapid Discharge

Aaron Chen
Safa C. Fassihi, MD
Alex Gu, MD
Michael A. Malahias, MD
Shawn S. Richardson, MD
Leonard T. Builer, MD
Seth Stake, MD
Michael P. Ast, MD, FAAOS
Peter K. Sculco, MD

At one year postoperatively, there were no significant differences in complication or revision rates between patients who underwent outpatient TKA and those who underwent rapid or traditional discharge.

Frequency and Timing of Complications and Catastrophic Events Following Same Day Discharge Compared to Inpatient Total Knee Arthroplasty in an Unselected Population

Nithin C. Reddy, MD, FAAOS
Heather A. Prentice, PhD
Liz Paxton, PhD, MA
Adrian D. Himman, MD, FAAOS
Ronald A. Navarro, MD, FAAOS

Same-day discharge was not inferior to inpatient stay after TKA when evaluating risk of complications or catastrophic events, including cardiac complications, VTE, ED visit, unplanned readmission, and mortality.

Reasons and Risk Factors for 30-day Readmission after Outpatient Total Knee Arthroplasty: A Review of 3,015 Cases

Tony S. Shen, MD
Patawat Bovonratwet, MD
Michael P. Ast, MD, FAAOS
David J. Mayman, MD, FAAOS
Steven B. Haas, MD, FAAOS
Edwin P. Su, MD, FAAOS

Overall, the rate of 30-day readmission after outpatient TKA was low. Patients who are at high risk for 30-day readmission after outpatient TKA had reduced readmissions after overnight admission.

Discussion

Same Day Discharge Total Knee Arthroplasty Increases Risk of Complications on More than Half of Patients

William Cumbie, DO
Jared A. Warren, ATC, DO
Bryan Demyan, DO
Michael R. Bloomfield, MD, FAAOS
Carlos A. Higuera Rueda, MD, FAAOS
John McLaughlin, DO

Almost half of of patients in this study had an elevated risk of complications with a SDD.

Is Outpatient Total Joint Arthroplasty Associated with Increased Risk of New Persistent Opioid Use?

Nathan Varady, BS
Eric L. Smith, MD, FAAOS
Samuel Clarkson, MD
Ruijia Niu, MPH
David M. Freccero, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS

Total amount of surgical opioids prescribed was similar between inpatient and outpatient TJA; however, outpatient TJA patients were significantly less likely to become persistent users.

Preoperative Narcotic Use and Patient Allergies Predict Failure of Same Day Discharge after Total Joint Arthroplasty

Elizabeth Lieberman, MD
Erik Hansen, MD
Ryan M. Nunley, MD, FAAOS
John C. Clohisy, MD, FAAOS
Charles M. Lawrie, MD

In a retrospective study of 2,615 patients undergoing total joint arthroplasty, we found preoperative narcotic use and >2 reported allergies predicted failure of planned same day discharge.

Discussion

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
5:00 PM  PAPER 245
Outcomes of Total Knee Arthroplasty in Medicare Patients at an Ambulatory Surgery Center
Jamil S. Kendall, MD
Ryland P. Kagan, MD
Sarah E. Roberts, RN
Megan C. Rushkin, MPH
Thomas Huff, MD, FAAOS

This study shows promising preliminary results for outcomes of total knee arthroplasty in Medicare patients at an ambulatory surgery center.

5:05 PM  PAPER 246
Equal Complication and Readmission Rates in Outpatient Total Hip Arthroplasty and Total Knee Arthroplasty in the Ambulatory Surgery Center and Hospital Setting
R. Michael Meneghini, MD, FAAOS
Elizabeth M. Krilich, BS
Mary Ziema-Davis

Study data support that THA and TKA can be safely and successfully performed in either an ASC or hospital setting, with equivalent complication and readmission rates.

5:10 PM  PAPER 247
Similar 90-Day Outcomes among Inpatient and Outpatient Arthroplasties: A Single-Surgeon Matched Cohort Analysis
Joseph Serino, MD
Jaewon Yang, MD
Adam S. Olsen, MD
Elizabeth B. Terhune, MD
Anne Debenedetti, BA
Craig J. Delia Valle, MD, FAAOS

Compared to a matched inpatient cohort, those who underwent arthroplasty at an ambulatory surgery center had significantly fewer ED visits and similar outcomes for all other complications evaluated.

Discussion

5:20 PM  PAPER 248
Effects of Preoperative Carbohydrate-Rich Drinks on Immediate Postoperative Outcome in Total Knee Arthroplasty
Jonathan H. Shaw, MD
Allen A. Kadado, MD
Kamil J. Bober, MD
Ayooluwa Ayoola, BS
Noel O. Akiyoyamen
Wayne T. North, MD
Michael A. Charters, MD, FAAOS

Carbohydrate loading through the enhanced recovery after surgery protocol following total knee arthroplasty demonstrated decrease incidence of postoperative bolus, but no significance in nausea.

Discussion

5:25 PM  PAPER 249
Efficacy of Virtual versus Outpatient Physical Therapy in Same-Day and Non-Hospital-Based Total Knee Arthroplasty Patients Enrolled in a Comprehensive Patient Engagement Program
Eric M. Heinrich, MD, FAAOS
Mikayla E. McGrath, BS
Hallie R. Lucas, RN
Donna McNeil, RN
Sarah M. Ulcoq, OTR/L
David A. Dodgin, MD, FAAOS

Implementation of a comprehensive patient engagement program allows for utilization of Virtual PT as an effective alternative to OPT in same-day and non-hospital-based TKA patients.

5:30 PM  PAPER 250
Shorter Early Ambulation following Total Knee Arthroplasty is Associated with Increased Venous Thromboembolism Rates
Nipun Sodhi, MD
Peter A. Gold, MD
Luke Garbarino, MD
Hiba K. Anis, MD
Jamie Heimroth, MD
Max Willinger, MD
Zachary A. Aberman, MD
Jonathan Danoff, MD, FAAOS
Sreevathsa Boraiah, MD
Jonathan L. Schaffer, MD, FAAOS
Carlos A. Higuera Rueda, MD, FAAOS
Robert M. Molloy, MD
Stanley E. Asnis, MD, FAAOS
Vijay J. Rasquinha, MD
Michael A. Mont, MD, FAAOS
Northwell Health Arthroplasty

Early postoperative ambulation can potentially improve pain and decrease VTE risk. This study utilized an institutional database to determine the association between ambulation and VTE following TKA.

Discussion

5:40 PM  PAPER 251
Decreasing Post-Anesthesia Care Unit Length of Stay in Joint Replacement Surgery through Alternative Management of Anesthesia
Michael A. Mont, MD, FAAOS
Joseph Marino, MD
Andrew R. Bohm, PhD
Arielle Deane
Virghinya Ridwan
Giles R. Scuderi, MD, FAAOS

Discharges from the PACU can be safely and more expeditiously performed without motor blockade assessment and intraoperative assessment of discharge criteria.
Tuesday Educational Programs

5:45 PM  PAPER 252
Identifying Preoperative Predictors of Successful Outpatient Arthroplasty
James Murrell, MBCHB
Nikhil A. Khadabadi, MBBS, MRCS
Thomas S. Moores, BSc, MBChB
Fahad S. Hossain, FRCS (Ortho), MBBS
Outpatient arthroplasty may successfully be implemented in patients below 65 years of age undergoing partial knee replacement surgery regardless of patient and hospital related factors.

5:50 PM  PAPER 253
Fewer Adverse Events after Unicompartmental Knee Arthroplasty when Performed as Outpatient Procedure
Edward S. Hur, MD
Joseph Serino, MD
Daniel D. Bohl, MD, MPH
Craig J. Della Valle, MD, FAAGS
COL. (ret) Tad L. Gerlinger, MD, FAAOS
The association of short-term adverse events following outpatient and inpatient unicompartmental knee arthroplasty trended over time using a national database.

4:00 PM - 6:00 PM
Ballroom 6E
Practice Management/Rehabilitation I
Moderators: R S. Barton, MD, FAAGS and Robert A. Butler, MD, FAAGS

4:00 PM  PAPER 254
The Effect of Recommending Surgery and Other Interventions on Orthopaedic Outpatient Press Ganey Satisfaction Scores
Jesse N. Steadman, BS
Andrew R. Stephens
Andrew R. Tyser, MD, FAAGS
Nikolas H. Kazmers, MD, MS
Our study demonstrates that patients who are offered surgery or any interventions are more likely to be satisfied with their encounter than patients who are not offered surgery or any interventions.

4:05 PM  PAPER 255
Discrepancy in Work-Family Dynamics Between Female and Male Orthopaedic Surgeons
Courtney D. Bell, MD
Meghan E. Bishop, MD
Alvin C. Ong, MD, FAAGS
Zachary D. Post, MD, FAAGS
Alexandra Stavrakis, MD
Danielle Y. Ponzio, MD
Evaluation of the work-family dynamics of female and male orthopaedic surgeons.

4:10 PM  PAPER 256
Increased Prevalence of Cancer and Breast Cancer in Female Orthopaedic Surgeons
Lauren M. Shapiro, MD
Loretta Chou, MD, FAAGS
Brianna Johnson, MD
Andrea Finlay, PhD
The increased prevalence of cancer and breast cancer found among female orthopaedic surgeons is a concerning public health issue within our specialty that warrants further investigation.

4:20 PM  PAPER 257
The Projected Cost Analysis for the Management of Intra- and Postoperative Complications between Direct Anterior and Posterior Approach in Primary Total Hip Arthroplasty
Mohamed E. Awad, MD, MBA
Brendan J. Farley, MD
Ahmad I. Hasan, MSc
Hussein F. Darwiche, MD
Khaled J. Saleh, MD, MPH, FAAGS
Our study showed that DAA pose a higher economic burden of $529,731.57 difference more cost in managing the associated intra- and postoperative complications as compared to PA.

4:25 PM  PAPER 258
Target Price Adjustment for Hip Fractures Is Not Sufficient In the Bundled Payments for Care Improvement Initiative
Hope E. Skibicki, DO
Michael Yayac, BA
Chad A. Krueger, MD, FAAGS
Paul M. Courtney, MD, FAAGS
This is a comparison of the episode-of-care costs of hip fracture patients to elective THA patients based upon CMS target price methodology.

4:30 PM  PAPER 259
Basic Metabolic Panels are Not Cost Effective in the Postoperative Setting after Primary Total Joint Arthroplasty
Kevin L. Mekkawy, DO
Yash Chaudhry, BA, DO
Sandesh Rao, MD
Syed A. Hasan, MD
Julius K. Oni, MD, FAAGS
Harpal S. Khanuja, MD, FAAGS
Robert S. Sterling, MD, FAAGS
BMPs are routinely obtained following TJA. We aimed to identify the incidence of intervention secondary to abnormal BMPs and the presence of any patient factors indicative of the need for intervention.

Discussion

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
PAPER 260
4:40 PM
Confidence Differences in Surgical Skills among Male versus Female Orthopaedic Surgery Residency Applicants
Jona Kerluku, BS
Lauren E. Wessel, MD
Dakota Adamec
Daphne Ling, MPH, PhD
Joseph Nguyen, MPH
Duretti Fufa, MD, FAAOS
Karen M. Sutton, MD, FAAOS

The primary goal of this study was to identify whether confidence differences exist between male and female orthopaedic surgery applicants in the context of completing a surgical simulation task.

PAPER 261
4:45 PM
Perceptions of Discrimination and Occupational Opportunity among 274 Black Orthopaedic Surgeons in the United States
Gabriella Ode, MD
Eric W. Carson, MD, FAAOS
Scott E. Porter, MD, MBA, FAAOS
Jaysson T. Brooks, MD

The majority of black orthopaedic surgeons reported experiencing racial microaggressions in practice. Critical analysis of the efficacy of current diversity and inclusion measures is needed.

PAPER 262
4:50 PM
Surprise Bills for Patients Undergoing Revision Total Joint Arthroplasty in the United States
Ahab Chopra
Nathan Varady, BS
Troy B. Amen, BA
David M. Freccero, MD, FAAOS
Eric L. Smith, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS

In this study of 42,103 patients undergoing revision TJA, nearly 1 in 5 patients being treated by in-network surgeons at in-network hospitals received surprise out-of-network bills during their stay.

PAPER 263
5:00 PM
Investigating the Bias in Orthopaedic Patient-Reported Outcome Measures by Mode of Administration: A Meta-Analysis
Jon Hammarslett, MD
Jonathan R. Acosta, MD
Steven Regal, MD
Sam Akhavan, MD, FAAOS
Peter Tang, MD, FAAOS
Alan W. Reynolds, MD

This meta-analysis demonstrated differences in PROMs up to 15% based on the mode of questionnaire administration in the field of orthopaedics.

PAPER 264
5:05 PM
The Projected Cost-Analysis for the Utilization of Perioperative Services, Pain Management, and Narcotics Consumption between Direct Anterior and Posterior Approach in Primary Total Hip Arthroplasty
Mohamed E. Awad, MD, MBA
Brendan J. Farley, MD
Ahmad I. Hasan, MSc
Hussein F. Danwiche, MD
Khaled J. Saleh, MD, MPH, FAAOS

Direct anterior THA has higher reimbursement costs as compared to posterior approach with no difference in pain reduction and narcotic consumption at 6 weeks postoperatively.

PAPER 265
5:10 PM
Public Perceptions and Disparities in Access to Telehealth Orthopaedic Services in the COVID-19 Era
Richard Puzzitiello, MD
Michael A. Moverman, MD
Nicholas R. Pagani, MD
Andrew Jawa, MD, FAAOS
Scott P. Ryan, MD, FAAOS
Matthew J. Salzler, MD, FAAOS
Mariano Menendez, MD

The majority of the general public appears receptive to telehealth for orthopaedic care, more so for routine established visits in which the physical examination plays a less prominent role.

PAPER 266
5:20 PM
Preoperative Opioid Usage Correlates with Revision Surgeries and Hospital Readmission in the Most Common Orthopaedic Surgical Procedures Performed in the United States
Cameron Roth, MD
David J. Cook, BA, BS
Jasha B. Sommer-Simpson, MS
Kenneth S. Chakour, MD
Sara S. Wallace, MD, MPH
Hue H. Luu, MD, FAAOS

On a large population scale, preoperative opioid use for 6 months is associated with increased risk for 1-year revision and 90-day readmission after the most commonly performed orthopaedic procedures.

PAPER 267
5:25 PM
The Effect of Preoperative Opioid Education on Postoperative Opioid Consumption after Outpatient Orthopaedic Surgery: Prospective Randomized Trial
Asif M. Ilyas, MD, FAAOS
Clay Townsend, BS

Preoperative counseling significantly reduced the number of prescription opioid pills and total morphine equivalents consumed by patients following outpatient orthopaedic surgery.
5:30 PM  PAPER 268
Is the New Outpatient Prospective Payment System Classification for Outpatient Total Knee Arthroplasty Appropriate?
Edwin G. Theosmy, DO
Michael Yayac, BA
Chad A. Krueger, MD, FAAOS
Paul M. Courtney, MD, FAAOS
A study examining if cuts in reimbursement is justified by comparing the difference in true facility costs between inpatient and outpatient TKAs.

5:40 PM  PAPER 269
Surgical Tray Optimization and Efficiency: The Impact of a Novel Sealed Sterile Container and Instrument Tray Technology
Michael A. Mont, MD, FAAOS
Kevin Marchand, BS
Kelly B. Taylor
Joseph Ehiorobo, MD
Hytham Salem, MD
Robert C. Marchand, MD, FAAOS
Reduced turnover time could potentially increase case load and decrease the need for extra instrumentation or the need for loaner trays. This simple means of increasing efficiency could be used as a model for surgeons wishing to streamline surgical trays and reduce costs.

5:45 PM  PAPER 270
Routine Hemoglobin A1c Screening Prior to Total Joint Arthroplasty: A Cost-Effectiveness Analysis
Thompson Zhuang, BA
Lauren M. Shapiro, MD
Derek F. Amanatullah, MD, PhD, FAAOS
William J. Maloney, MD, FAAOS
Robin N. Kamal, MD, FAAOS
Routine hemoglobin A1c screening in patients undergoing total joint arthroplasty can reduce rates of periprosthetic joint infection at a net cost savings.

5:50 PM  PAPER 271
Transfer Effectiveness of Surgical Education with Immersive Virtual Reality: A Randomized Controlled Trial
Ryan Lohre, MD
Aaron J. Bois, MD, MSc, FRCS
George S. Athwal, MD
Peter Lapner, MD
J. Whitcomb Pollock, MD
Danny Goel, MD, MBA
Immersive virtual reality was superior to video instruction for complex skill and knowledge acquisition in this randomized controlled trial.

4:00 PM - 6:00 PM
Ballroom 6A
Spine II
Moderator: Jason L. Pittman, MD, PhD

4:00 PM  PAPER 272
The Relationship of Depression and Surgical Outcomes among Cervical and Lumbar Patients
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS
This study evaluated the relationship baseline depression has with postoperative patient-reported outcome measure improvement for patients undergoing cervical and lumbar spine surgery.

4:05 PM  PAPER 273
Not So Sweet: Determining Hemoglobin A1C Cutoffs in Diabetic Patients Prior to Posterior Spinal Fusion
Aaron J. Buckland, FRACS, MBBS
Nicholas A. O’Malley, BS
Charme Mehta, BS
Carolyn Stickley, BS
Carlos Leon
Eaman Balouch, MD, PhD
Jack R. Zhong, BA
Constance Maglaras, PhD
Above HbA1C 6.65% and 7.95% patients with DM are at increased risk of wound complications and SSI, respectively. Diabetic preoperative optimization should aim to achieve an HbA1C below 6.65%.

4:10 PM  PAPER 274
Influence of Depression on Achieving Minimal Clinically Important Difference following Lumbar Decompression
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Kern Singh, MD, FAAOS
This study evaluates the association of preoperative mental health with the rate of achieving minimal clinically important difference in patient-reported outcomes following lumbar decompression.
**4:20 PM**  
**PAPER 275**  
Preoperative Optimization of Modifiable Frailty Factors Reduces Risk of Hospital Acquired Conditions in Elective Surgical Spine Patients  
*Peter G. Passias, MD, FAAOS*  
Katherine E. Pierce, BS  
Sara Naessig, BS  
Waleed Ahmad, MS  
Lara Passfall, BS  
Oscar Krol, BA  
Bhaveen H. Kapadia, MD  
Shaileen Vira, MD  
Bassel Diebo, MD

In order to optimize hospital resources and treatment outcomes, physicians and patients should be aware of modifiable factors that contribute to patient frailty and can impact acquiring HACs.

**4:25 PM**  
**PAPER 276**  
A Cross-Sectional Analysis of 1,347 Complications for Cervical Disc Replacements  
*Avani Vaishnav, MBBS*  
Sohrab Virk, MD  
Sheeraz Qureshi, MD, FAAOS

Our study defines complications outlined in the MAUDE database related to CDR implants. These complications have not always been highlighted in previously published IDE trials.

**4:30 PM**  
**PAPER 277**  
Timing of Total Hip Arthroplasty Affects Lumbar Spinal Fusion Outcomes  
*Emily Mills, MD*  
Gabriel J. Bouz, MD  
Blake G. Formanek, BA  
Nathanael D. Heckmann, MD  
Raymond J. Hah, MD, FAAOS

Patients who undergo THA after LSF are more likely to have lumbar related complications than those who do not undergo THA or who undergo THA prior to LSF.

**4:40 PM**  
**PAPER 278**  
Impact of Body Mass Index on Opioid Consumption in Lumbar Spine Fusion Surgery  
*Taryn E. Leroy, MD*  
Andrew Moon, MD  
Marissa A. Gedman, BA, MS  
Jessica P. Ardlen, MD, FAAOS  
Ashley Rogerson, MD

Obesity is associated with longer operative times, hospital length of stay, and a significantly increased amount of opioid consumption after lumbar fusion surgery.

**4:45 PM**  
**PAPER 279**  
Surgical Lumbar Degenerative Patients with Postoperative Depression Report Worse Postoperative Satisfaction  
*Rafa Rahman*  
Bo Zhang, MD  
Nicholas S. Andrade, BS  
Alvaro Ibaseta, MD, MS  
Richard L. Skolasky, ScD  
Brian J. Neuman, MD, FAAOS

Following lumbar degenerative surgery, patients with postoperative depression, irrespective of preoperative depression status, have significantly higher odds of dissatisfaction.

**4:50 PM**  
**PAPER 280**  
Outcomes following Cervical Disc Replacement vs. Anterior Cervical Discectomy and Fusion in Patients with Myelopathy  
*Ryan Lee, MBA*  
Avani Vaishnav, MBBS  
Hikari Urakawa, MD  
Kosuke Sato, MD  
Chirag B. Chaudhary, MS  
Russel C. Huang, MD, FAAOS  
Todd J. Albert, MD, FAAOS  
Sheeraz Qureshi, MD, FAAOS

Patients with myelopathy see similar improvements following CDR as those undergoing ACDF, with greater rates of MCID achievement in SF-12 MCS seen in CDR.

**5:00 PM**  
**PAPER 281**  
The Use of Table-Mounted Retraction Does Not Lead to Higher Incidence of Postoperative Dysphagia after Anterior Cervical Spine Surgery  
*Athan G. Zavras, BA*  
Ali Piracha  
Zakariah K. Siyaji, BS  
Talha S. Qadri, BA  
Arash J. Sayari, MD  
Nicholas Shepard, MD  
Matthew W. Colman, MD, FAAOS

This study found that table-mounted retraction in anterior cervical spine surgery increases operative efficiency without leading to higher incidence of dysphagia compared to self-retaining retractors.
5:05 PM  PAPER 282
Economic Burden of Nonsurgical Treatment of Adult Spinal Deformity
Peter G. Passias, MD, FAAOS
Waleed Ahmad, MS
Sara Naessig, BS
Katherine E. Pierce, BS
Renaud Lafage, MS
Virginie Lafage, PhD
Eric O. Klineberg, MD, FAAOS
Khaled M. Kebaish, MD, FAAOS
Jeffrey Gum, MD, FAAOS
Michael P. Kelly, MD, FAAOS
Breton G. Line, BS
Robert A. Hart, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Justin S. Smith, MD
Christopher Ames, MD
Christopher I. Shaffrey, MD, FAAOS
Frank J. Schwab, MD
Richard A. Hostin, MD, FAAOS
Robert S. Bess, MD, FAAOS
International Spine Study Group

Adult spinal deformity patients undergoing operative treatment at baseline had greater sagittal deformity and greater improvement in health-related quality of life compared to nonsurgical patients.

5:10 PM  PAPER 283
Preoperative Hyponatremia is an Independent Risk Factor for Postoperative Complications and Extended Length of Stay following Posterior Lumbar Arthrodesis
Kevin Wang, BA
Andrew Harris, MD
Khaled M. Kebaish, MD, FAAOS

Preoperative hyponatremia is an independent risk factor for prolonged hospital stay following posterior lumbar fusion as well as for major postoperative complications like cardiac arrest and death.

Discussion

5:20 PM  PAPER 284
Outcomes following Cervical Disc Replacement in Patients with Predominantly Neck Pain Complaints vs. Radiculopathic Arm Pain
Ryan Lee, MBA
Avani Vaishnav, MBBS
Philip Louie, MD
Hikari Urakawa, MD
Kosuke Sato, MD
Chirag B. Chaudhary, MS
Russel C. Huang, MD, FAAOS
Todd J. Albert, MD, FAAOS
Sheeraz Qureshi, MD, FAAOS

The results of our study suggest CDR can be a viable surgical option even in patients presenting with predominantly neck pain complaints.

5:25 PM  PAPER 285
Liposomal Bupivacaine Does Not Decrease Postoperative Opioid Use or Length of Hospital Stay in Patients Undergoing Anterior Cervical Discectomy and Fusion
Eric V. Neufeld, MD
Terence Ng
Benjamin Schaffler, BS
Cesar R. Iturriaga, DO
Alan Job, MD
Austen Katz, MD
Rohit Verma, MD, FAAOS

Retrospective study of 82 patients who underwent ACDF demonstrated that preoperative liposomal bupivacaine administration did not reduce postoperative opioid use or decrease length of hospital stay.

5:30 PM  PAPER 286
Does Lumbar Spinal Surgery Affect Healthy Life Expectancy? An Analysis of 444 Consecutive Patients Over 80 Years
Masahiro Kanayama, MD
Tomoyuki Hashimoto, PhD
Fumihiro Oha, MD
Yukitoshi Shimamura, MD
Takeru Tsujimoto
Masaru Tanaka, MD
Yuichi Hasegawa, MD
Norimasa Iwasaki

A retrospective review of 444 patients over 80 years showed that lumbar spinal surgery did not extend life expectancy but maintained walking ability 0.7 years before death.

Discussion

5:40 PM  PAPER 287
The Modic-Endplate-Complex Phenotype in Cervical Spine Patients: Association with Symptoms and Outcomes
Arash J. Sayari, MD
James D. Baker, BA
Garrett Harada, MD
Youping Tao, MD
Philip Louie, MD
Bryce A. Basques, MD
Fabio Galbusera, MSc
Frank Niemeyer
Hans-Joachim Wilke
Howard S. An, MD, FAAOS
Dino Samartzis, PhD
Midwest Spine Group

This study evaluates cervical Modic changes, endplate abnormalities, and their impact on patient presentation and postoperative outcomes after anterior cervical fusion and discectomy.
5:45 PM  PAPER 288
Preoperative Cross-Sectional Area of Psoas Muscle Impacts Postoperative Functional Outcomes of Posterior Lumbar Spinal Surgery
Avani Vaishnav, MBBS
Hikari Urakawa, MD
Kosuke Sato, MD
Ryan Lee, MBA
Chirag B. Chaudhary, MS
Jung K. Mok, BS
Yoshihiro Katsuura, MD
Sheeraz Qureshi, MD, FAAOS
The decrease of psoas cross-sectional area on preoperative MRI had a negative impact on short-term functional outcomes of posterior lumbar surgery. NTTPA was a reliable parameter, especially at L3/4.

5:50 PM  PAPER 289
◆Wearable Accelerometers Demonstrate Similar Postoperative Recovery Patterns in Lumbar Laminectomy and Cervical Laminoplasty Patients
Dhruv S. Shankar
Dennis Bienstock
Jinseong Kim, BS
Michael Gao, BS
Komal Srivastava, MS
Wesley Bronson, MD
Saad Chaudhary, MD, FAAOS
Jashvant Poeran, MD, PhD
James C. Iatridis, PhD
Andrew C. Hecht, MD, FAAOS
Mount Sinai Spine Research Group
We used wearable accelerometers to measure postoperative recovery patterns in lumbar laminectomy and cervical laminoplasty patients and compared this data to patient-reported outcome measures.

4:05 PM  PAPER 291
Current Bearing Surface Utilization for Total Hip Arthroplasty in the United States
Peter P. Hsieh, MD
Clark J. Chen, BS
Alexander Uppfill-Brown, MD, MSc
Armin Arshi, MD
Troy Sekimura, BS
Fiachra Rowan, MD
Amir Khoshbin, MD
Alexandra Stavrankis, MD
This retrospective cohort study using a national database demonstrated increased utilization of ceramic-on-polyethylene bearing surface for primary total hip arthroplasty compared to other types.

4:10 PM  PAPER 292
Aspirin and Nonsteroidal Anti-inflammatory Drugs Allergy in Primary Total Joint Arthroplasty: Does Avoiding Aspirin Thromboprophylaxis Increase the Risk of Venous Thromboembolism?
Elie Kazaily, MD
Timothy Tan, MD
Javad Parvizi, MD, FAAOS
A study investigating whether the use of non-aspirin VTE prophylaxis due to a reported aspirin or NSAIDs allergy was associated with a higher incidence of VTE.

4:15 PM  PAPER 293
Surgical Approach to Total Hip Arthroplasty Affects the Organism Profile of Periprosthetic Joint Infections
Daniel B. Buchalter, MD
Greg Teo, MD
David Kirby, MD
Vinay Aggarwal, MD
William J. Long, MD, FAAOS
The direct anterior total hip arthroplasty approach is at a unique risk for monomicrobial gram-negative periprosthetic joint infections due to the microbiome of the inguinal region.

4:20 PM  PAPER 294
Iron Deficiency Anemia is Associated with Increased Early Postoperative Surgical and Medical Complications following Total Hip Arthroplasty
Alyssa D. Althoff, MD
Sean Sequeira, BS
Nicole D. Quinlan, MD, MS
Brian C. Werner, MD, FAAOS
In a retrospective database study of 82,983 patients, those with IDA had increased postoperative complications and greater utilization of hospital resources compared to matched controls.
4:30 PM  PAPER 295
Differences in Periprosthetic Joint Infection Rates in the Direct Anterior Approach and Non-Anterior Approaches to Primary Total Hip Arthroplasty
Sai S. Allu
Dominique M. Dockery, BA
Jillian Glasser, BA
Valentim Antoci, MD, PhD, FAAOS
Christopher T. Born, MD, FAAOS
Dioscaris R. Garcia, PhD
This study is a meta-analysis evaluating the periprosthetic joint infection rates following primary total hip arthroplasty based on approach.

4:40 PM  PAPER 296
Primary Total Hip Arthroplasty Outcomes in Octogenarians
Stephen Zak, BA
Katherine A. Lygrisse, MD
Alex Tang, BS
Morteza Meftah, MD
William J. Long, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS
This study demonstrates the safety and success of elective THA in octogenarians.

4:45 PM  PAPER 297
Routine Surgical Antiseptic Agents are Ineffective at Eradication of Staphylococcus Epidermidis Biofilm Formed on Orthopaedic Implant Material In Vitro
Donald J. Davidson, MA, MBBS
Alexander D. Liddle, FRCS, MBBS
David Spratt, PhD
Antiseptic agents, povidone-Iodine 10% and chlorhexidine gluconate 4%, are an ineffective treatment for biofilm-related prosthetic joint infection and are no substitute for meticulous debridement.

4:50 PM  PAPER 298
Hepatitis C Treatment Success in Viral Eradication Prior to Elective Total Joint Arthroplasty Reduces Risk of Periprosthetic Joint Infection
Kyle Cichos, BS
Antonia F. Chen, MD, MBA, FAAOS
Erik N. Hansen, MD, FAAOS
Eric M. Jordan, BS
Kian Niknam, MS
Gerald McWinn, MS, PhD
Elie S. Ghanem, MD, FAAOS
HCV patients with positive VL at time of TJA are at an increased risk for PJI compared to those with undetectable VL, and HCV treatment type has no impact on outcomes after TJA.

5:00 PM  PAPER 299
Closed Incision Negative-Pressure Therapy for Revision Total Hip Arthroplasty: A Randomized Controlled Trial
Elizabeth B. Terhune, MD
Jaewon Yang, MD
Anne Debenedetti, BA
Craig J. Della Valle, MD, FAAOS
COL. (ret) Tad L. Gerlinger, MD, FAAOS
Brett R. Levine, MD, MS
Denis Nam, MD, MSc, FAAOS
Preliminary results of a randomized control trial did not demonstrate a decrease in the rate of wound complications with the use of closed-incision negative wound therapy following revision THA.

5:05 PM  PAPER 300
Examining the Microbiome of Personal Protective Equipment in Direct Anterior Total Hip Arthroplasty
Justin Vaida, MD
Taylor L. Shackelford, MD
Eric J. Neumann, MD
Benjamin M. Frye, MD
Adam E. Klein, MD, FAAOS
Matthew J. Dietz, MD, FAAOS
This study investigates the presence of bacteria present on personal protective equipment used in total hip arthroplasty.

5:10 PM  PAPER 301
Diagnosis of Periprosthetic Joint Infection Using Synovasure Tests
Anay R. Patel, MD
Emily A. Vidal, BS
Revanth Poondla
Mitzi S. Laughlin, PhD, ATC
Aslan Amirian, MD
Ugonna N. Ihekweazu, MD
Robin N. Goytia, MD, FAAOS
Vasilios Mathews, MD, FAAOS
Gregory W. Stocks, MD, FAAOS
The purpose of this study was to investigate the diagnostic accuracy of the Synovasure Alpha Defensin Test for periprosthetic joint infection compared against the 2018 MSIS PJI criteria.

5:20 PM  PAPER 302
Bacteremia in Patients undergoing Debridement, Antibiotics, and Implant Retention Leads to Increased Reinfection Rates and 90-Day Costs
Daniel Bracey, MD, PhD
Samuel Rosas, MD, MBA
Vishal Hegde, MD
Johannes F. Plate, MD, PhD
Douglas A. Dennis, MD, FAAOS
Jason M. Jennings, MD, FAAOS
The purpose of this study was to evaluate reinfection rates following DAIR in patients with and without bacteremia.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
5:25 PM  PAPER 303
Extended Oral Antibiotics Prevent Periprosthetic Joint Infection in High-Risk Cases: 3,862 Patients with 1-Year Follow Up
R. Michael Meneghini, MD, FAAOS
Michael M. Kheir, MD
Julian Dilley, MD
Mary Ziemia-Davis

Extended antibiotic prophylaxis led to a statistically significant and clinically meaningful reduction in 1-year infection rates of patients at high risk for infection.

5:30 PM  PAPER 304
Increased Risk of Early Prosthetic Joint Infection in Total Hip Arthroplasty with the Use of Alternatives to Cefazolin Even with the Addition of Expanded Gram Negative Prophylaxis
Dionisio Ortiz, MD, FAAOS
Vinay Aggarwal, MD
Greg Teo, MD
Katherine A. Lygrisse, MD
William J. Long, MD, FAAOS

There is increased PJI risk in THA patients receiving alternatives to cefazolin even with expanded gram negative antibiotic prophylaxis.

Discussion

5:40 PM  PAPER 305
Topical Vancomycin for the Prevention of Prosthetic Joint Infection in Hip and Knee Arthroplasty: A Systematic Review and Meta-Analysis
Murray Wong, MD
Sarup Sridharan, MD
Erin Davison, MD
Richard Ng, MD
Nicholas M. Desy, MD, FAAOS

A meta-analysis of 6,575 patients shows topical vancomycin reduces the rate of prosthetic joint infection after primary and aseptic revision hip and knee arthroplasty without increasing complications.

5:45 PM  PAPER 306
The Prevalence and Outcomes of Unexpected Positive Intraoperative Cultures in Presumed Aseptic Revision Hip Arthroplasty
Brent Lanting, MD
Michael Neufeld, MD
Matthew G. Teeter, PhD
Michael Shehata, ChB, MD
James L. Howard, FRCSC, MD
Steven J. MacDonald, MD
Edward Vaseghz, MD, MSc

The prevalence of UPC in presumed aseptic revision THA was 9.2%. The infection-free survival is encouraging. Patients with a single UPC and no signs of infection do not require antibiotic treatment.

5:50 PM  PAPER 307
The Impact of Urinary Tract Infections on Periprosthetic Joint Infections and Medical Complications following Primary Total Joint Arthroplasty: A Matched Cohort Analysis
David Sacolick, MD
Amil R. Agarwal, BA
Caitlin M. Ward, BA
Alex Gu, MD
Safa C. Fasshi, MD
Gregory Golladay, MD, FAAOS
Savyasachi C. Thakkar, MD

Following primary TJA, patients with preoperative UTIs are at increased risk for 90-day medical complications but not PJI relative to matched controls.

Discussion

PAPER PRESENTATIONS

4:00 PM - 6:00 PM
Room 32

4:00 PM  PAPER 308
Is Thoracic Spinal Motion Preserved after Anterior Vertebral Body Tethering?
Abdul F. Buyuk, MD
Smitha E. Mathew, MBBS
Todd A. Milbrandt, MD, FAAOS
A. Noelle Larson, MD, FAAOS

Patients who underwent AVBT surgery showed significant thoracic motion at one year following the surgery. Preserving the thoracic motion in patients with scoliosis may have potential advantages.

4:05 PM  PAPER 309
Pediatric Back Pain: A Scoring System to Guide Use of Magnetic Resonance Imaging
Michael T. Nolte, MD
Garrett Harada, MD
Ryan Craig Leduc, MD
Arash J. Sayari, MD
Bryce A. Basques, MD
Vincent Federico, MD
Dino Samartzis, PhD
Monica Kogan, MD, FAAOS
Howard S. An, MD, FAAOS

This study presents a predictive model to help determine when ordering magnetic resonance imaging (MRI) may result in a change in clinical management for pediatric patients with back pain.
4:10 PM  PAPER 310  
Predicted Life Expectancy in Patients with Cerebral Palsy and Neuromuscular Scoliosis Undergoing Spinal Fusion: An Exploratory Analysis from a Single Institution Over 15 Years  
Arun Hariharan, MD, MS  
Carlos D. Pargas, MB  
Margaret Ann Baldwin, MD  
Joseph L. Petfield, MD, FAAOS  
Kenneth J. Rogers, PhD  
Suken A. Shah, MD, FAAOS  
Julieanne P. Sees, DO, FAAOS  
Michael W. Shradar, MD, FAAOS  
Freeman Miller, MD, FAAOS  
This study demonstrates that patients with cerebral palsy have a mean survival of 10.5 years after undergoing spinal fusion surgery.  
Discussion

4:20 PM  PAPER 311  
Pediatric Venous Thromboembolism: Different Rates of Incidence, Anatomic Locations, and Risk Factors between Orthopaedic and Non-Orthopaedic Related Patients  
Benjamin J. Shore, MD, MPH, FAAOS  
Aneesh V. Samineni, BA  
Ryan Sanborn, BA  
Jodie Shea  
Danielle Cook, BS  
Collin J. May, MD, FAAOS  
Benton E. Heyworth, MD, FAAOS  
Pediatric orthopaedic-related VTEs have a significantly lower incidence rate as well as different primary risk factors and anatomic locations than those of non-orthopaedic-related VTEs.  
Discussion

4:25 PM  PAPER 312  
Surgically Related Pediatric Venous Thromboembolism in Orthopaedic vs. Non-Orthopaedic Cohorts  
Benjamin J. Shore, MD, MPH, FAAOS  
Aneesh V. Samineni, BA  
Ryan Sanborn, BA  
Jodie Shea  
Danielle Cook, BS  
Collin J. May, MD, FAAOS  
Benton E. Heyworth, MD, FAAOS  
Pediatric orthopaedic surgery-related VTEs have a higher incidence rate as well as different risk factors, anatomic locations, and prophylaxis than those of non-orthopaedic surgery-related VTEs.  
Discussion

4:30 PM  PAPER 313  
◆ Preventing Cast Saw Burns with a Modified Cast Saw Blade  
Alejandro S. Cazzulino, MD  
Musa Zaid, MD  
Jiali Lei, MS  
Cole Cuthbert, MS, BA  
Sunaira Santhiveeran, MS, BS  
Alan B. Dang, MD, FAAOS  
Alexis Dang, MD, FAAOS  
The application of a simple aluminum heatsink to the surface of an oscillating cast saw blade can significantly reduce the temperature of the blade and possibly prevent cast saw burns.  
Discussion

4:40 PM  PAPER 314  
Surgical Treatment of Patellar Instability in Adolescent Dancers  
Kianna D. Nunally, BA  
Lyle J. Micheli, MD, FAAOS  
Evan Zheng, BA  
Zaamin Hussain, MD, MEd  
Benjamin Wilson, MD  
Mininder S. Kocher, MD, MPH, FAAOS  
Yi-Meng Yen, MD, PhD, FAAOS  
Dennis E. Kramer, MD, FAAOS  
Benton E. Heyworth, MD, FAAOS  
This study analyzes the demographic, clinical, and radiologic features of adolescent dancers with patellar instability and compares them to a larger control group of matched, non-dancer athletes.  
Discussion

4:45 PM  PAPER 315  
◆ Novel Application of the Internal, Magnetically-Controlled, Telescopic Nail to the Extramedullary Femur in the Skeletally Immature Patient: Early Results  
Katherine Rosenwasser, MD  
Nickolas J. Nahm, MD  
Philip K. McClure, MD, FAAOS  
John E. Herzenberg, MD, FAAOS  
Shawn C. Standard, MD, FAAOS  
Limb lengthening in the young CFD patient is challenging and external fixation has somewhat fallen out of favor. We present our early results of internal extramedullary femoral lengthening.  
Discussion

4:50 PM  PAPER 316  
An Ovine Study of Locked Intramedullary Implants across the Distal Femoral Growth Plate  
Kouami Amakoutou, MD  
Alexander J. Benedick, MD  
Derrick Knapik, MD  
Lewis G. Zirkle, MD, FAAOS  
Raymond W. Liu, MD, FAAOS  
Retrograde femoral nailing can be considered a viable surgical option in skeletally immature patients for fracture care or deformity correction without significant growth-related complications.  
Discussion

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
5:00 PM  PAPER 317
Creation and Validation of a “Shorthand” Knee MRI Bone Age Assessment Tool as an Alternative for Skeletal Maturity Assessment
Andrew T. Pennock, MD, FAAOS
James D. Bomar
Hakan C. Pehlivan, MD
Pradyumna Gurusamy, MD
Eric W. Edmonds, MD, FAAOS
A new “shorthand” MRI bone age assessment tool may be a simpler alternative to skeletal assessment than using the Greulich and Pyle Atlas (in full, or shorthand) or the full MRI bone age atlas.

5:05 PM  PAPER 318
Classifying Ischial Tuberosity Avulsion Fractures by Ossification Stage and Tendon Attachment
Brendon Mitchell, MD
James D. Bomar
Dennis R. Wenger, MD, FAAOS
Andrew T. Pennock, MD, FAAOS
We propose a new classification system for these fractures that reflects ossification pattern and tendon attachment.

5:10 PM  PAPER 319
Quantitative Assessment of the Skeletally Immature Patella Vascularity: A Cadaver Study Using Contrast Enhanced Magnetic Resonance Imaging
Craig Klinger, BA
Naomi E. Gadinsky, MD
Kenneth Lin, MD
Laura J. Kleeblad, MD
Kevin G. Shea, MD, FAAOS
David L. Helfet, MD, FAAOS
Scott A. Rodeo, MD, FAAOS
Daniel W. Green, MD, FAAOS
Lionel E. Lazaro, MMED
Our findings would corroborate possible vascular-mediated etiology of DDP and BP lesions, as lower superolateral and central arterial contributions were observed, where these lesions often occur.

5:20 PM  PAPER 320
Unplanned Return to the Operating Room after Adolescent Idiopathic Scoliosis Surgery
Nishand Mehta, BA
Divya Talwar, MPH, PhD
Harms Study Group
Jack M. Flynn, MD, FAAOS
Harms Study Group
UPROR following spinal fusion for AIS has decreased significantly over time but, as expected, increases with increased follow up. A total of 45.5% of UPRORs occur within the first year following surgery.

5:25 PM  PAPER 321
Who Will Need a Second Surgery? A Study of Cases of Isolated Septic Arthritis from the CORTICES Database
Keith D. Baldwin, MD, FAAOS
Valentin Antoci, MD, PhD, FAAOS
Danielle Cook, BS
David D. Spence, MD, FAAOS
Jennifer C. Laine, MD, FAAOS
Jaclyn F. Hill, MD, FAAOS
Anthony I. Riccio, MD, FAAOS
Joshua S. Murphy, MD, FAAOS
Jonathan G. Schoenecker, MD, FAAOS
Vidyadhar V. Upasani, MD, FAAOS
G. Y. Li, MD, FAAOS
CORTICES Study Group
Higher CRP values and lower platelet values indicate more severe disease in isolated SA with a greater likelihood of repeat surgery.

5:30 PM  PAPER 322
Safety and Efficacy of Waterproof Mehta Casting for Early Onset Scoliosis
Keegan Conry, MD
Lorena Fioccari, MD
Melanie Morschler
Todd F. Ritzman, MD, FAAOS
Serial waterproof Mehta casting is safe and efficacious in EOS when compared to published literature of traditional Mehta casting.

5:40 PM  PAPER 323
Usage of Peripheral Nerve Blocks is Not Associated with Decreased Postoperative Opioid Prescription after Anterior Cruciate Ligament Reconstruction in Adolescents
John S. Vorhies, MD, FAAOS
Japsimran Kaur, BS
Nicole A. Segovia, BS
Eli Cahan, BA
Kristin C. Halvorsen
Charles M. Chan, MD, FAAOS
Here we use a multi-state administrative claims database to demonstrate an increase in postoperative opioid prescription associated with PNB after ACL reconstruction. Our results indicate that on a population level, use of PNB does not result in the same decreased need for postoperative opioids as suggested by previous research.
Reducing Pain, Opioid Consumption, and Time in the Hospital for Pediatric Scoliosis Patients after Posterior Spinal Fusion

Jonathan D. Grabau, MD
Emily Wynkoop, MD
Syed K. Mehdi, MD
Vincent W Prusick, MD
Vishwas R. Talwalkar, MD, FAAOS
Ryan D. Muchow, MD, FAAOS
Henry J. Iwinski, MD, FAAOS

A standardized multimodal pain regimen is shown to decrease postoperative mean VAS pain scores, opioid use and rate of consumption, and length of stay for AIS patients undergoing PSF.

Reducing Pediatric Opioid Consumption in a Pediatric Orthopaedic Practice

Courtney Baker, MD
A. Noelle Larson, MD, FAAOS
William J. Shaughnessy, MD, FAAOS
Anthony A. Stans, MD, FAAOS
John D. Rutledge, PA-C
Daniel S. Ubl, MPH
Elizabeth Habermann, PhD, MPH
Todd A. Milbrandt, MD, FAAOS

A tiered opioid prescribing guideline can significantly decrease prescribed narcotic doses in the pediatric population undergoing orthopaedic procedures.

Discussion

CAREER DEVELOPMENT

4:30 PM - 5:30 PM
Room 28E

CD6 Rocket Fuel for the Young Academic Orthopaedic Surgeon – The National Institutes of Health K Award

Moderator: Eric R. Henderson, MD, FAAOS
Nicholas M. Bernthal, MD, FAAOS
Matthew B. Dobbs, MD, FAAOS
Christian Lattermann, MD, FAAOS
Robert A. Magnussen, MD, FAAOS
Kurt P. Spindler, MD, FAAOS
Charles H. Washabaugh, MS, PhD
Kurt R. Weiss, MD, FAAOS

This session reviews key elements of the National Institutes of Health K Award, which provides support for young, academic surgeons emphasizing personal and longitudinal development as researchers.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**SYMPOSIUM F**

8:00 AM - 10:00 AM
Ballroom 6A

2021 Centers for Medicare & Medicaid Services Changes and Payer Trends

*Moderator: Ira H. Kirschenbaum, MD, FAAOS*

This symposium provides information on 2021 Evaluation and Management (E/M) documentation changes, Merit-Based Incentive Payment System (MIPS) revamp, evolving payer trends including outpatient joint surgery carve outs, and value-based care contracting.

I. Value Based Care-safety Net Hospitals  
   *Ira H. Kirschenbaum, MD, FAAOS*

II. Outpatient Joint Surgery  
   *Craig M. McAllister, MD, FAAOS*

III. Value based Care- Models  
   *Louis F. McIntyre, MD, FAAOS*

IV. E/M, MIPS, Compliance Rules Changes  
   *Ranjan Sachdev, MD, MBA, FAAOS*

**CAREER DEVELOPMENT**

8:00 AM - 9:00 AM
Room 28E

◆CD7 Physician Heal Thyself: Understanding the Biologic Basis of Stress and Practical Biohacking Tools to Improve Mental Health and Wellness for Orthopaedic Surgeons

*Moderator: Allen A. Deutsch, MD, FAAOS*

Krista Gregory
Anthony E. Johnson, MD, FAAOS
M. Catherine Sargent, MD, FAAOS

This ICL will introduce the neuroscience of mental health issues, identify the warning signs for suicide and teach practical tools to improve wellness and resiliency.

**SHOWDOWNS®**

8:00 AM - 9:00 AM
Ballroom 6D

◆SD1 Irreparable Rotator Cuff Tears: American vs. European Treatment Options – What’s the Difference?  

*Moderator: Gonzalo Samtier Solis, MD*

Emilio Calvo, MBA, MD
Jean Kany Sr., MD
John M. Tokish, MD, FAAOS
Thomas W. Wright, MD, FAAOS

Seek clues on irreparable rotator cuff tears management. Learn about identification, surgical options, results, complications, and rehabilitation protocol with a highly selected international panel from the United States and Europe.

**SYMPOSIUM G**

Room 28C

Racial Disparities in Orthopaedic Surgery: Patients, Residents, and Faculty

*Moderator: Eric W. Carson, MD, FAAOS*

This symposium aims to educate and equip the orthopedic community with tools to address healthcare disparities and improve orthopedic specialty recruitment for racial minorities.

I. Diversity in Orthopaedics: You Can’t Fix what You Can’t Measure  
   *Jaysson T. Brooks, MD*

II. Healthcare Disparities and Structural Racism: Interventions  
   *Eric W. Carson, MD, FAAOS*

III. Introduction and Promoting Inclusion: Staff Recruitment and Support  
   *George S. Dyer, MD, FAAOS*

IV. Promoting Inclusion: Program Recruitment  
   *Kenneth A. Egol, MD, FAAOS*

V. Promoting Inclusion: Program Recruitment  
   *MaCalus V. Hogan, MD, MBA*

VI. Diversity in Orthopaedics: Addressing Unconscious Bias in Healthcare  
   *Rivka C. Ihejirika-Lomedico, MD*

VII. Diversity in Orthopaedics: Attending Insights  
   *Kolawole Jegede, MD*

VIII. Diversity in Orthopaedics: Attending Insights  
   *Jasmin L. McGinty, MD, FAAOS*

IX. Healthcare Disparities and Structural Racism: History and Relevance  
   *Toni M. McLaurin, MD, FAAOS*

X. Healthcare Disparities and Structural Racism: Access, Policy, and Ethical Considerations  
   *Christian A. Pean, MD*

XI. Healthcare Disparities and Structural Racism: Interventions  
   *Alysia Robertson, MD*

XII. Promoting Inclusion: Staff Recruitment and Support  
    *Joseph D. Zuckerman, MD, FAAOS*
INSTRUCTIONAL COURSE LECTURE

8:00 AM - 10:00 AM

201 Getting It Right the Second Time: Pearls and Principles for Revision Surgery in the Foot and Ankle
Moderator: Michael P. Clare, MD, FAAOS
Mark J. Berkowitz, MD, MBA
Anish R. Kadakia, MD, FAAOS
Jeremy J. McCormick, MD, FAAOS
Room 9

This course presents strategies and techniques for the evaluation and treatment of the failed foot and ankle surgery, including the failed bunion, nonunion/malunion of hindfoot and ankle fusion, the unsuccessful flatfoot surgery, and the failed ankle fracture.

202 Incorporating Telemedicine in Your Orthopaedic Practice: COVID-19 and Beyond
Moderator: Jocelyn R. Wittstein, MD, FAAOS
William A. Jiranek, MD, FAAOS
Richard C. Mather, MD, MBA, FAAOS
Alexander Vaccaro, MD, MBA, PhD, FAAOS
Room 7B

This ICL reviews telemedicine examination techniques of the shoulder, hip, spine and knee and provides guidance on incorporating telemedicine to maximize efficiency and minimize cost.

203 Upper Limb Nerve Compression and Injury: How Not to Miss or Mismanage
Moderator: Julie E. Adams, MD, FAAOS
John R. Fowler, MD, FAAOS
Meredith N. Osterman, MD, FAAOS
Scott P. Steinmann, MD, FAAOS
Room 8

This ICL focuses upon peripheral nerve syndromes and injuries including the challenges associated with debated nerve compression / pain syndromes, failure of initial surgical management for commonly seen conditions, and how to diagnose and manage nerve syndromes and injuries that may go unrecognized or untreated. The speakers will discuss optimal management including operative and nonoperative care, rehabilitation, reconstructive options including nerve repair, nerve transfers, tendon transfers.

204 Management Strategies for Scapholunate Ligament Injuries: From Occult Injury to Arthritis
Moderator: Dean G. Sotereanos, MD, FAAOS
Gregory I. Bain, MD
Loukia K. Papatheodorou, MD
Mark S. Rekant, MD, FAAOS
Ballroom 6C

This instructional course lecture focuses upon strategies to recognize scapholunate (SL) ligament injuries and discusses treatment options in the acute and chronic setting, with and without arthritis.

205 Skeletal Dysplasias: New Concepts in Management from the Child to Adult
Moderator: Benjamin Alman, MD, FAAOS
John E. Herzenberg, MD, FAAOS
William G. Mackenzie, MD, FAAOS
James O. Sanders, MD, FAAOS
Room 4

Understand how new instrumentation and medical approaches are changing the surgical management in children and adults with skeletal dysplasias.

206 Update on Infection in Shoulder Arthroplasty
Moderator: Jason Hsu, MD, FAAOS
Grant E. Garrigues, MD, FAAOS
Albert Lin, MD, FAAOS
Sandra B. Nelson, MD
Room 5

This course is an update on the diagnosis and treatment of periprosthetic shoulder arthroplasty infection from the Musculoskeletal Infectin Society (MSIS).

207 From Little League Baseball and Youth Tennis to the Pros: How to Treat Common Injuries in the Overhead Athlete of All Levels of Competition
Moderator: Anthony A. Romeo, MD, FAAOS
Christopher S. Ahmad, MD, FAAOS
Michael G. Cicotti, MD, FAAOS
Brandon Erickson, MD
Room 2

This ICL will cover the diagnosis and management of common shoulder and elbow injuries in overhead athletes of all levels of play.

208 Current State of Total Disc Replacement
Moderator: Kristen E. Radcliff, MD, FAAOS
Anton Y. Jorgensen, MD, FAAOS
Vikas V. Patel, MD, BSME, FAAOS
Rick C. Sasso, MD, FAAOS
Matthew S. Young, MD
Room 1

There is strong clinical and cost data supporting use of cervical and lumbar total disc replacement for treating symptomatic disc degeneration in appropriately selected patients.

209 Surgical Considerations in Revision Anterior Cruciate Ligament Reconstruction
Moderator: Michael J. Alaia, MD, FAAOS
Cory Edgar, MD, PhD
Gregory C. Fanelli, MD, FAAOS
Volker Musahl, MD, FAAOS
Ballroom 6F

This course reviews practical information and technical points for surgeons performing revision anterior cruciate ligament (ACL) reconstructions. Case presentations highlight decision-making skills and solutions to common challenging problems.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Pathway to Successful Translational Trauma Research  
**Moderator:** Markus S. Huber-Lang, MD  
Florian T Gebhard, MD, PhD  
Melanie Haffner-Luntzer, PhD  
This course presents current knowledge of molecular danger response after trauma. A special focus will be on presenting examples of successful translational trauma research.

Rib Fracture Fixation and the Surgical Management of Flail Chest Injuries  
**Moderator:** Emil H. Schemitsch, MD, FAAOS  
Niloofar Dehghan, MD, MSc, FAAOS  
Michael D. McKee, MD, FAAOS  
Aaron Nauth, MD  
Rib fracture fixation in the setting of the flail chest or unstable chest wall injuries in trauma patients is gaining in popularity. Although it is a non-traditional area of surgical fixation, there is some preliminary evidence that stabilization of flail chest injuries may significantly decrease patient morbidity and improve outcomes. Increasingly, orthopaedic trauma surgeons are becoming involved in the surgical management and care of these patients. This ICL will examine the history, techniques, current status, and future of rib fracture fixation.

Advances in Pediatric Fracture Management: A Case-Based Review of Common Pediatric Injury and Current Trends in Management  
**Moderator:** Henry B. Ellis, MD, FAAOS  
Daniel W. Green, MD, FAAOS  
Christine A. Ho, MD, FAAOS  
Stephanie W. Mayer, MD  
Shital N. Parikh, MD, FAAOS  
Andrew T. Pennock, MD, FAAOS  
Charles A. Popkin, MD, FAAOS  
Susan A. Scherl, MD, FAAOS  
Kevin G. Shea, MD, FAAOS  
Samuel C. Willimon, MD, FAAOS  
Yi-Meng Yen, MD, PhD, FAAOS  
This course is a review of common pediatric fracture patterns discussed by a diverse panel of experts of differing generations from various geographic regions.

A Case-Based Approach for Meniscus Repair and Replacement: Reconsidering Indications, Techniques, and Biologic Augmentation  
**Moderator:** James L. Pace, MD, FAAOS  
Thomas R. Carter, MD, FAAOS  
Thomas M. DeBerardino, MD, FAAOS  
Jack Farr, MD, FAAOS  
Wayne K. Gersoff, MD, FAAOS  
Andreas H. Gomoll, MD, FAAOS  
Laith M. Jazrawi, MD, FAAOS  
Bert Mandelbaum, MD, FAAOS  
Lawrence S. Miller, MD, FAAOS  
Scott A. Rodeo, MD, FAAOS  
Tim Spalding, FRCS  
A case based approach to treating a variety of meniscus tears and meniscus deficiency with a focus on the latest techniques and biologic augmentation.

Essential Coding and Reimbursement for Starting Practice  
**Moderator:** Sarah Wiskerchen  
This presentation is a must for surgeons joining a group, signing an employment contract or venturing out on your own. It will address the basic elements of CPT and ICD-10-CM diagnosis coding as well as fee schedule development and production tracking for employed physicians. Don't miss this opportunity to begin your practice with knowledge and power!

Minimally Invasive Percutaneous Fixation with Modified Palm Tree Technique for Fractures of the Proximal Humerus: Clinical and Radiological Outcomes in a Series of 132 Patients  
**Siddharth R. Virani, MRCS, MS**  
Andrews Leonidou, MRCS, MSc  
Georgios Panagopoulos, PhD  
Ehud Atoun, MD  
Giuseppe Sforza, MD  
Ofer Levy, MD  
This is a study of minimally invasive percutaneous fixation with modified palm tree technique for fractures of the proximal humerus.
The proposed evidence-based treatment algorithm resulted in reliable outcomes, suggesting that an individualized treatment might be important for patients with proximal humerus fracture.

Demographic Factors have the Greatest Influence on Patient-Reported Functional Disability following Initial Treatment of Proximal Humerus Fractures in Adults: A Systematic Review

Existing evidence surrounding the association between patient, injury, and treatment factors, and DASH scores is limited and insufficient to draw any definitive conclusions.

Simple Decompression vs. Anterior Transposition of the Ulnar Nerve for Distal Humerus Fractures Treated with Plate Fixation: Secondary Outcomes of a Randomized Trial

Analysis of secondary outcomes from a randomized trial suggesting simple decompression and anterior transposition are equally effective treatment methods but residual impairment remains over time.

Optimal Fixation of the Capitellar Fragment in Distal Humerus Fractures

In this cadaveric biomechanical study, parallel plating provided stiffer fixation of a separate capitellar fragment in an intra-articular distal humerus fracture when compared to orthogonal plating.
**9:00 AM**
PAPER 335
Operative vs. Nonoperative Treatment of Z-Type Comminuted Clavicle Fractures in Adolescents: A Substratified Cohort Analysis

*Coleen S. Sabatini, MD, MPH, FAAOS*

Eric W. Edmunds, MD, FAAOS
Donald S. Baer, MD, FAAOS
Michael T. Busch, MD, FAAOS
Henry B. Ellis, MD, FAAOS
Mininder S. Kocher, MD, MPH, FAAOS
G. Y. Li, MD, FAAOS
Elizabeth S. Liotta, MBBS
Katelyn A. Hergott, MPH
Jeffrey J. Nepple, MD, FAAOS
Nirav K. Pandya, MD, FAAOS
Andrew T. Pennock, MD, FAAOS
Crystal A. Perkins, MD
David D. Spence, MD, FAAOS
David N. Williams, PhD
Samuel C. Willimon, MD, FAAOS
Philip L. Wilson, MD, FAAOS
Benton E. Heyworth, MD, FAAOS

FACTS (Function after Adolescent Clavicle Trauma and Surgery)

In this investigation of 2-year patient reported outcomes and complications for adolescents with Z-type midshaft clavicle fractures, surgery appears to offer no benefit over nonoperative treatment.

**9:05 AM**
PAPER 336
Can Upstream Patient Education Improve Fracture Care in a Digital World? Use of a Decision Aid for the Treatment of Displaced Diaphyseal Clavicle Fractures

*Cara Lai, BS*

Malcolm DeBaun, MD
Noelle L. Van Rysselegh, MD
Geoffrey D. Abrams, MD, FAAOS
Robin N. Kamal, MD, FAAOS
Julius A. Bishop, MD, FAAOS
Michael J. Gardner, MD, FAAOS

The development of an upstream decision aid for treatment of displaced diaphyseal clavicle fractures is shown to be comparable to consultation with an orthopaedic traumatologist.

**9:10 AM**
PAPER 337
Long-Term Functional Outcomes and Complications in Operative vs. Nonoperative Treatment for Displaced Midshaft Clavicle Fractures in Adolescents: A Retrospective Comparative Study

*Martin O. Riiser, MD*

Marius Molund, MD

This is a retrospective study of 109 adolescents with dislocated midshaft clavicular fractures, comparing plate vs. intramedullary nail as surgical options, and operative vs. nonoperative treatment.

**9:20 AM**
PAPER 338
Correlation of Radial Bow and Postreduction Angulation to the Functional Outcome in Nonoperatively Treated Diaphyseal Forearm Fractures in Children

*Rachelle Jasmine U. Ong, MD*

Angeli Apalisoc, MD

This paper aims to determine if the radial bow is a better predictor of functional outcome compared to postreduction angulation among nonoperatively treated diaphyseal forearm fractures in children.

**9:25 AM**
PAPER 339
Dorsal or Lateral Approach for Intramedullary Nailing using Kirschner Wire in Pediatric Radius Diaphyseal Fractures: Does it Really Matter?

*Tolga Onay*

Ahmet H. Akgülle, MD
Servet Igrek
Mehmet D. Kesimer, MD
Evrim Sirin
Mert O. Topkar, MD

Good functional results and similar complication rates can be obtained with both dorsal and lateral entry approaches. K-wire is an inexpensive implant option for pediatric forearm fractures.

**9:30 AM**
PAPER 340
Canal Fill of the Forearm Bones when Placing Intramedullary Nails

*Joshua M. Abzug, MD, FAAOS*

Max Hamaker, MD
Casey M. Codd, BA
Nathan N. O’Hara, MHA

This study did not identify an association between the nail to canal diameter ratio and postoperative angulation when treating pediatric forearm fractures.

**9:40 AM**
PAPER 341
Early Improvement in Pain and Function for Geriatric Proximal Humerus Fractures with Locked Plate Fixation: An Age, Comorbidity, and Fracture Morphology Matched Analysis

*Steven Samborski, MD*

Steven Karnyski, MD
Brittany Haws, MD
Gillian Soles, MD, FAAOS
Gregg T. Nicandro, MD, FAAOS
Ilya Voloshin, MD, FAAOS
John T. Gorczyca, MD, FAAOS
John P. Ketz, MD, FAAOS

An age, comorbidity, and fracture morphology matched cohort of geriatric proximal humerus fractures, treatment with locked plate fixation decreased pain and improved range of motion in early recovery.
9:45 AM  PAPER 342
Risk Factors for Loss of Reduction following Locked Plate Fixation of Geriatric Proximal Humerus Fractures
Brittany Haws, MD
Steven Samborski, MD
Steven Karnyski, MD
Gillian Soles, MD, FAAOS
Gregg T. Nicandri, MD, FAAOS
Ilya Voloshin, MD, FAAOS
John T. Gorczyca, MD, FAAOS
John P. Ketz, MD, FAAOS

Older age, calcar comminution, superior greater tuberosity position, increased screw-calcar distance are risk factors for fracture displacement after locked plate fixation of proximal humerus fracture.

9:50 AM  PAPER 343
Outcomes for Type C Proximal Humerus Fractures in the Geriatric Population: Comparison of Nonoperative Treatment, Locked Plate Fixation, and Reverse Shoulder Arthroplasty
Steven Samborski, MD
Steven Karnyski, MD
Brittany Haws, MD
Gillian Soles, MD, FAAOS
Gregg T. Nicandri, MD, FAAOS
Ilya Voloshin, MD, FAAOS
John T. Gorczyca, MD, FAAOS

Management of geriatric AO/OTA type 11C proximal humerus fractures with reverse shoulder arthroplasty is associated with better range of motion and a decreased complication rate compared to nonop and ORIF.

8:00 AM - 10:00 AM  PAPER PRESENTATIONS
8:00 AM  PAPER 344
A 10-Year Analysis of Surgical Costs for Arthroscopic Meniscectomy: Hospital Reimbursement Increased Steadily as Surgeon Payments Declined
Christopher L. Camp, MD
Bryant Song, MS
Matthew D. Laprade, BS
Ryan R. Wilbur
Aaron J. Krych, MD, FAAOS

Hospital and anesthesiologist reimbursements for outpatient APM increased significantly while surgeon reimbursements decreased between 2005 and 2014.

8:05 AM  PAPER 345
Five-Year Outcomes after Observation vs. Debridement of Unstable Chondral Lesions during Partial Meniscectomy: The Chondral Lesions and Meniscus Procedures Randomized Controlled Trial
Leslie J. Bisson, MD, FAAOS
Melissa Kluczynski, MS
William Wind, MD, FAAOS
Marc S. Fineberg, MD, FAAOS
Geoffrey A. Bernas, MD, FAAOS
Michael A. Rauh, MD, FAAOS
John M. Marzo, MD, FAAOS
Zehua Zhou, MA
Jiwei Zhao

Patient outcomes did not differ at 5 years after debridement versus observation of unstable chondral lesions in patients undergoing arthroscopic partial meniscectomy.

8:10 AM  PAPER 346
Repair or Excision? A 10-Year Analysis of Subsequent Osteoarthritis and Total Knee Arthroplasty following Meniscal Tear
Sarah Bhattacharjee
Jason Strelzow, MD, FAAOS
Douglas R. Dirschl, MD, FAAOS

Our results suggest that in meniscal tear patients aged 20-50, meniscectomy is associated with a higher risk for OA and TKA than meniscal repair, although statistical significance was not high.

8:20 AM  PAPER 347
Midterm Outcomes of Isolated Lateral Meniscus Tears in Young Patients
Nicholas C. Duethman, MD
Lucas Keyt, BS
Ryan R. Wilbur
Bryant Song, MS
Matthew D. Laprade, BS
Aaron J. Krych, MD, FAAOS

Young patients with isolated lateral meniscus tears treated with repair had a greater increase in IKDC score compared to meniscectomy. Rates of failure, reoperation, and symptomatic OA were similar.

8:25 AM  PAPER 348
Percutaneous Medial Collateral Ligament Release Improves Medial Compartment Access during Knee Arthroscopy
Thomas E. Moran, MD
Alex J. Demers, BS
Kaitlyn Shank, ATC, MEd
Brian C. Werner, MD, FAAOS
John T. Awowale, MD
Mark D. Miller, MD, FAAOS

Percutaneous MCL release during knee arthroscopy improves visualization and facilitates instrumentation by providing an almost two-times wider working space within the medial tibiofemoral joint.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
8:30 AM PAPER 349
Postoperative MRI Demonstrates a High Rate of Healing but Worsening Meniscus Extrusion following Transtibial Root Repair: A Prospective Multicenter Study
Richard Nauert, MD
Aaron J. Krych, MD, FAAOS
Corey Cook, MA
Adam Johnson, MD
Patrick A. Smith, MD, FAAOS
Michael J. Stuart, MD, FAAOS

This prospective multicenter trial demonstrated excellent meniscal healing and no progression of cartilage degeneration following transtibial root repair, however meniscus extrusion persisted.

Discussion

8:40 AM PAPER 350
Long-Term Outcomes and Survivorship of Fresh-Frozen Meniscal Allograft Transplant with Soft Tissue Fixation: Minimum 10-Year Follow-Up Study
Alberto Grassi, MD
Giuseppe Filardo, MD
Gian Andrea Lucidi
Luca Macchiarola, MD
Vito Coco, MD
Iacopo Romandini, MD
Stefano Zaffagnini, MD

Up to 10 years after surgery, 86% of fresh-frozen MATs with soft tissue fixation were still in situ, and satisfactory clinical results were present for about 70% of patients.

8:45 AM PAPER 351
Do Outcomes of Meniscal Allograft Transplantation Differ Based on Age and Sex? A Comparative Group Analysis
Rachel M. Frank, MD, FAAOS
Ron Gilat, MD
Eric Haunschild, BS
Hailey Huddleston, BS
Sumit S. Patel, MS
Derrick Knapik, MD
Justin Drager, MD
Adam B. Yanke, MD, PhD, FAAOS
Brian J. Cole, MD, MBA, FAAOS

Cohort study examining the effects of age and sex on patient-reported outcome (PRO) measures and graft survival after primary MAT.

8:50 AM PAPER 352
Clinical Outcomes of Meniscal Allograft Transplantation with Respect to Minimal Clinically Important Difference
Lisa Su, MS
Ignacio Garcia-Mansilla, MD
Benjamin Kelley, MD
Armin Arshi, MD
Peter D. Fabricant, MD, MPH
Kristofer J. Jones, MD, FAAOS

This is a systematic review and meta-analysis of clinical outcomes studies of patients undergoing MAT and compares postoperative improvement to established minimal clinically important difference thresholds.

Discussion

9:00 AM PAPER 353
Minimum 10-Year Clinical Outcomes of Lateral Collagen Meniscus Implants for the Replacement of Partial Lateral Meniscus Defects
Alberto Grassi, MD
Piero Agostinone, MD
Gian Andrea Lucidi
Giuseppe Filardo, MD
Erica Bulgheroni, MD
Erica Bulgheroni, MD
Paolo Bulgheroni, MD
Luca Macchiarola, MD
Stefano Zaffagnini, MD

Lateral CMI for partial lateral meniscus defect provided good long-term results, with a 10-year survival rate of 85% and a 14-year survival rate of 64%. At the final follow up, 58% of the patients were considered Good or Excellent according to the Lysholm score. However, a general decrease of PROMs was present from short to long-term follow up.

9:05 AM PAPER 354
Patient Satisfaction with Overall Care is Equivalent Using Telemedicine vs. Traditional Office-Based Follow Up after Arthroscopic Meniscus Surgery: A Prospective Randomized Controlled Trial
Christina Herrero, MD
David A. Bloom, BA
Charles C. Lin, MD
Laith M. Jazrawi, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Guillem Gonzalez-Lomas, MD, FAAOS
Michael J. Alaia, MD, FAAOS
Kirk A. Campbell, MD, FAAOS

This study reports that patient satisfaction with overall care using telemedicine visits was equivalent to that of in-person office visits following arthroscopic meniscus surgery.
Wednesday Educational Programs

9:10 AM  PAPER 355
Surgical Outcomes after Bucket Handle Meniscus Repairs: Analysis of a Large Contained Cohort Study
**David Y. Ding, MD, FAAOS**
Lue-Yen Tucker, BA
Amy L. Vieira, PA-C

Subsequent reoperations occur in 20% of bucket-handle meniscus repairs. Younger age and lower BMI increase the risk while concomitant ACL reconstruction reduces the risk of subsequent reoperation.

**Discussion**

9:20 AM  PAPER 356
Osteochondral Allograft Transplants for Large Oval Defects of the Medial Femoral Condyle: Comparison of Lateral vs. Medial Femoral Condyle Donors and Single vs. Double Plug Constructs
**John A. Grant, MD, PhD, FAAOS**
Timothy S. Mologne, MD
William Bugbee, MD, FAAOS
Shankar G. Kaushal, MS
Conor S. Daly-Seiler, MS
Robert W. Goulet, PhD
Michael Casden, BS

Oval contralateral LFC, oval ipsilateral MFC, and overlapping circle MFC donor OCA provide similar cartilage surface contour matches for large oval osteochondral defects of the medial femoral condyle.

9:25 AM  PAPER 357
Osteochondral Allograft Transplantation for Focal Cartilage Defects of the Knee: Clinically Significant Outcomes, Failures, and Survival at a Minimum 5-Year Follow Up
**Ron Gilat, MD**
Eric Haunschmidt, BS
Hailey Huddleston, BS
Sumit S. Patel, MS
Nolan B. Condon
Theodore S. Wolfson, MD
Kevin C. Parvaresh, MD
Adam B. Yanke, MD, PhD, FAAOS
Brian J. Cole, MD, MBA, FAAOS

Case series examining clinically significant outcomes, failures, and graft survival rates after OCA transplantation at a minimum 5-year follow up.

9:30 AM  PAPER 358
Long-Term Results of Bulk Fresh Osteochondral Allografts for Cartilage Restoration in the Knee
**Paul R. Kuzyk, MD, FRCSC, MSc**
Anser Daud, BS
Oleg Safir, MD
Allan E. Gross, MD, FRCSC

A look at the long-term results of bulk fresh osteochondral allografts for cartilage restoration in the knee, with a focus on graft survivorship, function, complications, and reoperation.

**Discussion**

9:40 AM  PAPER 359
Loose Body vs. Trochlear Biopsy Matrix-Induced Autologous Chondrocyte Implantation Magnetic Resonance Observation of Cartilage Repair Tissue Scores and International Knee Documentation Committee Reported Outcomes In Pediatric Patients
**Zachary R. Hill, MD**
Connor M. Delman, MD
Trevor J. Shelton, MD
Wyatt D. Vander Voort, MD
Brian M. Haus, MD, FAAOS

Two-year patient reported outcomes using IKDC, and 1-year cartilage grading using MOCART scoring system. No difference when comparing traditional biopsy from loose body in MACI Implantation.

9:45 AM  PAPER 360
Shorter Storage Time is Strongly Associated with Improved Graft Survivorship at 5-Years after Osteochondral Allograft Transplantation
**Gergo B. Merkely, MD**
Jakob Ackermann
Evan Farina, MD
Courtney Vanarsdale, PA-C
Christian Lattermann, MD, FAAOS
Andreas H. Gomoll, MD, FAAOS

Early transplantation of osteochondral allografts to <25 days in storage improves rates of graft survival at 5-years.

9:50 AM  PAPER 361
Does Articular Cartilage Damage Worsen from First Time to Recurrent Patellar Dislocation?-A Longitudinal MRI Study
**Kevin B. Freedman, MD, FAAOS**
Christopher J. Hadley, BS
Somnath Rao, BA
Gavin M. Ajami
Leanna Ludwick
James Liu, MD
Fotios P. Tjoumakaris, MD, FAAOS

The purpose of this study is to investigate the frequency of articular cartilage injury observed on MRI in patients undergoing patellar stabilization surgery for recurrent patellar dislocations.

**Discussion**

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WEDNESDAY EDUCATIONAL PROGRAMS

CAREER DEVELOPMENT

11:00 AM - 12:00 PM
Room 28E

◆ CD8 Harassment is Everyone’s Issue: Optimizing Your Work Environment
Moderator: Antonia F. Chen, MD, MBA, FAAOS
Marlene DeMaio, MD, FAAOS
Casey J. Humbyrd, MD, FAAOS
Karen Michael, Esq
Judybeth Tropp

It is important to define and recognize harassment in the workplace. Once harassment is identified, there are ethical and legal considerations that must be taken into account with regard to reporting and rectifying harassment. Finally, solutions are offered to prevent harassment from happening in the workplace in the first place.

THE WAY I SEE IT… ® (TWISI)

11:00 AM - 12:00 PM
Ballroom 6D

◆ TWISI2 Narcotic-Less Surgery
Moderator: Charles M. Davis, MD, PhD
Nady Hamid, MD, FAAOS
Joseph R. Hsu, MD, FAAOS
Milton T. Little, MD, FAAOS

Hear from experts, just the way they see it, on narcotic-less options – including acupuncture, cryotherapy, blocks and other cutting edge options – as they give their personal opinions on these options.

SYMPOSIUM H

11:00 AM - 12:30 PM
Ballroom 20B

How Do I Get Out of this Jam? Managing Intraoperative and Early Postoperative Problems in Shoulder Arthroplasty
Moderator: John W. Sperling, MD, MBA, FAAOS

Learn from an international panel of experts on how to manage frequent intra-operative and early post-operative problems in shoulder arthroplasty.

I. Primary Anatomic Total Shoulder Arthroplasty Intraoperative Problems: There is an Unexpected 1cm. Rotator Cuff Tear; Do I Repair and Do an Anatomic or Go to Reverse?
Joseph A. Abboud, MD, FAAOS

II. Primary Reverse Arthroplasty Intraoperative Problems: There is Significant Glenoid Deficiency; How do I Manage it?
Thomas R. Duquin, MD, FAAOS

III. Early Postoperative Problems in Shoulder Arthroplasty: There is a Postoperative Acromial Fracture; What Do I Do Now?
Mark A. Frankle, MD, FAAOS

IV. Early Postoperative Problems in Shoulder Arthroplasty: I Have a Positive Culture from a Revision Procedure; What Do I Do Now?
Joseph P. Iannotti, MD, PhD

V. Primary Reverse Arthroplasty Intraoperative Problems: I am Having Problems Closing the Subscapularis; Do I Just Leave it Unrepaired?
Stephen Roche, MD

VI. Early Postoperative Problems in Shoulder Arthroplasty: The Subscapularis Tore Out of My Anatomic Shoulder at Six Weeks; Do I Attempt a Repair or Go Right to a Reverse?
Anthony A. Romeo, MD, FAAOS

VII. Primary Anatomic Total Shoulder Arthroplasty Intraoperative Problems: I Can’t Get Enough Exposure of the Glenoid
Markus Scheibel, MD

VIII. Early Postoperative Problems in Shoulder Arthroplasty: The Reverse is Dislocated at the Six-Week Check Up; Do I Attempt a Closed Reduction or Go Right to a Revision Surgery?
Thomas W. Throckmorton, MD, FAAOS

IX. Primary Anatomic Total Shoulder Arthroplasty Intraoperative Problems: I am Having Problems Properly Balancing the Shoulder
Eric R. Wagner, MD

X. Primary Reverse Arthroplasty Intraoperative Problems: There is No Posterior Rotator Cuff; Do I Need to do a Latissimus Transfer?
Jon J. P. Warner, MD, FAAOS

INSTRUCTIONAL COURSE LECTURE

11:00 AM - 12:30 PM

◆ 221 The Synovial Joint: Structure, Function, Injury and Repair, Osteoarthritis
Moderator: Joseph A. Buckwalter, MD, FAAOS
Alan J. Grodzinsky, PhD

Room 7A

This course offers a concise review of the current understanding of the biology and biomechanics of articular cartilage and provides a basis for current understanding of osteoarthritis and cartilage repair. A basis for understanding current clinical approaches to providing biologic resurfacing of articular cartilage and restoration of synovial joint function also is covered.

◆ 222 Ankle Instability: An International Perspective
Moderator: Christopher E. Gross, MD, FAAOS
John G. Kennedy, MD
Gino Kerkhoffs
Markus Knupp, MD

Room 7B

Our understanding of ankle instability is evolving rapidly. We have started to examine ankle instability with direct arthroscopic evaluation in addition to radiographic instability parameters. This symposium will explore how the global community understands and treats the ligamentously-unstable ankle, from primary to revision cases.
Recruiting and Retaining Female Orthopaedic Surgeons: From Residents to Partners
Moderator: Mary K. Mulcahey, MD, FAAOS
Ann E. Van Heest, MD, FAAOS
Kristy L. Weber, MD, FAAOS
Room 9
The current state of women in orthopaedics, the role of implicit bias, and the value of female partners are discussed.

Biologic Joint Preservation
Moderator: Jason L. Dragoo, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
S. Raymond Golish, MD, MBA
Wellington K. Hsu, MD, FAAOS
Allston J. Stubbs, MD, MBA
Room 8
The use of biologic and joint preservation strategies are becoming an important part of our practice. Learn state-of-the-art techniques regardless of your subspecialty.

Managing Complications and Failures in Pediatric Sports Medicine
 Moderator: Nirav K. Pandya, MD, FAAOS
Jennifer Beck, MD, FAAOS
Jonathan C. Riboh, MD, FAAOS
Samuel C. Willimon, MD, FAAOS
Room 3
Understanding principles of revision surgery in the high-demand pediatric athlete are essential for the sports medicine physician.

The Management of Meniscal Pathology: From Partial Meniscectomy to Transplantation
Moderator: Laith M. Jazrawi, MD, FAAOS
Philip A. Davidson, MD, FAAOS
James N. Gladstone, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Room 2
This instructional course lecture provides a focused consolidation of expert lectures on current diagnoses and management of meniscus pathology and treatment.

Scapula Posterior Surgical Approaches: Variations on the Classic Judet
Moderator: Peter A. Cole, MD, FAAOS
Peter A. Cole, MD, FAAOS
Evgeny Dyskin, MD, PhD
Austin Heare, MD
Babar Shafiq, MD, FAAOS
Room 4
We highlight a powerful framework for surgical reduction, fixation, and various approaches for different clinical scenarios. Surgical risks, timing, and fracture applications will be stressed.

Controversies in Foot and Ankle Surgery: Finding the Right Solution for the Right Patient
Moderators: Eric W. Tan, MD, FAAOS and Thomas G. Harris, MD, FAAOS
Daniel C. Farber, MD, FAAOS
Eric Giza, MD, FAAOS
Todd A. Irwin, MD, FAAOS
Jeffrey E. Johnson, MD, FAAOS
Paul J. Juliano, MD, FAAOS
David M. Macias, MD, FAAOS
Lew C. Schon, MD, FAAOS
William B. Smith, DO, FAAOS
Paul Talusan, MD, FAAOS
Room 31
Course presenters discuss the controversies surrounding surgical management of foot and ankle injuries including hallux valgus, hallux rigidus, osteochondral lesions of the talus, and Lisfranc trauma.

How to Stay Out of Trouble in the Pediatric/Adolescent Patient
Moderator: Valerae O. Lewis, MD, FAAOS
Odion T. Binitie, MD, FAAOS
Justin E. Bird, MD, FAAOS
Amalia M. DeComas, MD, FAAOS
Kevin B. Jones, MD, FAAOS
Nicole I. Montgomery, MD, FAAOS
Room 33
Bryan S. Moon, MD, FAAOS
Michael D. Neel, MD, FAAOS
Christian M. Ogilvie, MD, FAAOS
Kevin A. Raskin, MD, FAAOS
Rosanna L. Wustrack, MD, FAAOS
Melissa N. Zimel, MD, FAAOS
The pediatric and adolescent population often presents with lytic lesions of bone. It is crucial for the general orthopaedic surgeon to know how to effectively recognize, work up, and manage these tumors. Through case presentations, the work-up, treatment options (non-operative, surgical, non-invasive, and minimally invasive techniques), and the appropriate surveillance protocol are discussed.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**PAPER PRESENTATIONS**

**11:00 AM - 12:30 PM**

**Ballroom 6A**

**Spine III**
Moderator: Evalina L. Burger, MD, FAAOS

**11:00 AM**

**PAPER 362**

Does a Dedicated Scoliosis Team and Surgical Standardization Improve Outcomes in Adolescent Idiopathic Scoliosis Surgery and is it Reproducible?

_Vishal Sarwahi, MD, FAAOS_  
Sayyida Hasan, BS  
Jesse M. Galina, BS  
Aaron M. Atlas, BS, MS  
Yungtai Lo, PhD  
Terry D. Amaral, MD, FAAOS

A standardized AIS approach including a dedicated operative team, preoperative work-up, postoperative multi-disciplinary management, and streamlined surgical steps improves outcomes and efficiency.

**11:05 AM**

**PAPER 363**

Complications following Posterior Surgical Treatment of Adolescent Idiopathic Scoliosis: 10-Year Prospective Follow-Up Study

_Arun Hariharan, MD, MS_  
_Suken A. Shah, MD, FAAOS_  
_Harms Study Group_  
_Margaret Ann Baldwin, MD_  
_Joseph L. Petfield, MD, FAAOS_  
_Baron Lonner, MD, FAAOS_  
_Firoz Miyanji, MD_  
_Peter O. Newton, MD, FAAOS_  
_Amer Samdani, MD_  
_Paul D. Sponseller, MD, FAAOS_  
_Burt Yaszay, MD, FAAOS_  
_Harms Study Group_  
_Harms Study Group_  
_Harms Study Group_

Surgery for AIS has a 12% rate of complications and 8.6% rate of reoperations over 10 years. Plus, complications can present even late into the 10-year period.

**11:10 AM**

**PAPER 364**

Using a Dedicated Spine Radiology Technologist is Associated with Reduced Fluoroscopy Time, Radiation Dose, and Surgical Time in Pediatric Spinal Deformity Surgery

_David L. Skaggs, MD, FAAOS_  
_Ali Siddiqui, MD_  
_Lindsay M. Andreas, MD, FAAOS_  
_Kyle Obana, BA_  
_Kenneth D. Illingworth, MD_  
_Vernon T. Tolo, MD, FAAOS_  
_Rajan R. Murgai, MD_  
_Michael D. Mariscal, MA_  
_Skorn Ponrartana, MD, MPH_

Use of a dedicated radiology technologist resulted in a significant reduction in total fluoroscopy time, radiation exposure, and total surgical time during pediatric spine surgery.

**Discussion**

**11:20 AM**

**PAPER 365**

Use of Bone Substitutes and Extenders in Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis is Associated with Wound Complications

_Amit Jain, MD_  
_Harms Study Group_  
_Majd Marrache, MD_  
_Rachel Bronheim, MD_  
_Dhananjay Bansal_  
_Suken A. Shah, MD, FAAOS_  
_Amer Samdani, MD_  
_Patrick J. Cahill, MD, FAAOS_  
_Baron Lonner, MD, FAAOS_  
_Michelle Marks, PT, MA_  
_Peter O. Newton, MD, FAAOS_  
_Thomas J. Errico, MD, FAAOS_  
_A. Noelle Larson, MD, FAAOS_  
_Paul D. Sponseller, MD, FAAOS_  
_Harms Study Group_

Use of bone substitutes and extenders in posterior spinal fusion for adolescent idiopathic scoliosis is associated with wound-related complications.

**11:25 AM**

**PAPER 366**

Vertebral Body Tethering Compared to the Gold Standard Spinal Fusion: Matched Analysis 2 Years Postoperatively

_Baron Lonner, MD, FAAOS_  
_Lily Eaker, BA_  
_Jonathan Markowitz, MD_

Patients who undergo VBT can expect comparable curve correction, clinical outcomes, and improved kyphosis restoration to those who undergo PSF without increased complications.
11:30 AM  PAPER 367
Review of New Neurological Injuries and Prognosis Associated with Idiopathic Scoliosis Surgeries from Scoliosis Research Society Morbidity and Mortality Database
William F. Lavelle, MD, FAAOS
Harman Chopra
Swamy Kurra, MBBS
Jinhui Shi, MD
Stephen A. Albanese, MD, FAAOS
Elizabeth A. Demers Lavelle, MD

NNIs are catastrophic complications that can be associated with IS surgeries. Our study explored the factors that can affect the prognosis of NNIs.

Discussion

11:40 AM  PAPER 368
Complications, Reoperations, and Mid-Term Outcomes following Anterior Vertebral Body Tethering vs. Posterior Spinal Fusion: A Meta-Analysis
Max Shin, BA
Gabriel R. Arguelles, BA
Patrick J. Cahill, MD, FAAOS
Jack M. Flynn, MD, FAAOS
Keith D. Baldwin, MD, FAAOS
Jason B. Anari, MD

Mid-term outcomes following anterior vertebral body tethering for the fusionless treatment of adolescent idiopathic scoliosis demonstrate high rates of complications and reoperations.

11:45 AM  PAPER 371
Effectiveness of an Adolescent Idiopathic Scoliosis Care Path
Swetha Sundar, MD
Brittany Patterson, BS, MS
Ernest Young, MD
Ryan C. Goodwin, MD, FAAOS
David P. Gurd, MD, FAAOS
Thomas E. Kuivila, MD
Robert T. Ballock, MD, FAAOS
Kevin Bailey, DO

Development of a standardized care path for the treatment of AIS resulted in improvements in both process measures and outcomes measures, thus improving the quality of patient care.

11:50 AM  PAPER 369
An Algorithm for Using Deep Learning Convolutional Neural Networks with Three Dimensional Depth Sensor Imaging in Scoliosis Detection
Terufumi Kokabu, MD
Noriaki Kawakami, MD
Koki Uno, MD, PhD
Toshiaki Kotani, MD, PhD
Tepppei Suzuki
Hiroyuki Tachi, MD
Yuichiro Abe, MD, PhD
Norimasa Iwasaki
Hideki Sudo, MD

The novel three-dimensional depth sensor imaging system with its newly innovated convolutional neural network for regression has outstanding discriminative ability for predicting the Cobb angle.

11:50 AM  PAPER 370
Comparison of Operative Implications between Adolescent and Young Adult Idiopathic Scoliosis Patients from Scoliosis Research Society Mortality and Morbidity Database
William F. Lavelle, MD, FAAOS
Swamy Kurra, MBBS

Delaying surgical treatment into adulthood can result in complex surgical procedures and more operative associated complications.

Discussion

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Is Total Hip Arthroplasty a Cost-Effective Option for Management of Displaced Femoral Neck Fractures?
Daniel Axelrod, MD
Jean-Eric Tarride, PhD
Seper Ekhtiari, MD
Gord Blackhous, MSc
Herman Johal, MD
Emil H. Schemitsch, MD, FAANS
Diane Heels-Ansdell, MSc
Mohit Bhandari, MD, FRCSC
HEALTH Investigators

To evaluate cost effectiveness of THA compared to HA, a trial-based economic analysis of the X randomized controlled trial was undertaken.

Arthroplasty vs. Internal Fixation for the Treatment of Minimally Displaced Femoral Neck Fractures: A Retrospective Cohort Study
Gerard Slobogean, MD, MPH, FAANS
Shaikh M. Afaq, MD
Nathan N. O’Hara, MHA
Emil H. Schemitsch, MD, FAANS
Sofia Bzovsky, MSc
Sheila Sprague, PhD
Rudolf W. Poolman, MD, PhD
Frede Frihagen, MD, PhD
Diane Heels-Ansdell, MSc
Mohit Bhandari, MD, FRCSC
Marc F. Swiontkowski, MD
FAITH and HEALTH Investigators

Arthroplasty for femoral neck fractures may reduce the risk of mortality and reoperation compared to internal fixation of minimally displaced fractures.

Intramedullary Nailing vs. Sliding Hip Screw Intertrochanteric Evaluation: The INSITE Trial
Emil H. Schemitsch, MD, FAANS
INSITE Investigators

This randomized controlled trial found no significant differences in outcomes between patients treated with intramedullary nail or sliding hip screw for intertrochanteric hip fractures.

Development and Validation of a Postoperative Nonunion Risk Score for Subtrochanteric Femur Fractures
Michalis Panteli, MD
Robert M. West, MSc
Ippokratis Pountos
Peter Giannoudis, MD, FACS

This study demonstrates that the risk of nonunion can be reliably estimated in patients presenting with a subtrochanteric fracture, from the early postoperative period.

Epiphyseal Medialization following Distal Femur Plating is Associated with a Higher Risk of Revision
Stephane Pelet, MD, PhD
Philippe Beauchamp-Chalifour, MD
Sarah Hébert, MD
Etienne Belzile, MD

Epiphyseal medialization following distal femur fracture plating is significantly associated with a higher risk of nonunion and revision surgery.

Retrograde Intramedullary Nailing or Locked Plating for Stabilization of Distal Femoral Fractures? A Comparative Study of 193 Patients
Anthony Howard, PhD
Richard Myatt, MBBS, MRCS
Michalis Panteli, MD
Harry Hodgson, MBBS
Florence R. Kinder
Mantaran S. Bakshi
Peter Giannoudis, MD, FACS

The functional results of patients are superior in the plating group compared the nailing group, when assessed in postoperative time frames from 1 to 10 years.

Incidence of Ipsilateral Femoral Neck and Shaft Fractures in Pediatric and Adolescent Patients
Timothy Borden, MD
Layla A. Haidar, MPH
Sree M. Vemu, BS
Garrett S. Dennis, BS
Surya Mundluru, MD
Jessica L. Traver, MD
Lindsay M. Crawford, MD, FAAOS
Shiraz A. Younas, MD, FAAOS
Alfred A. Mansour, MD, FAAOS

In 840 pediatric femoral shaft fractures, the incidence of ipsilateral femoral neck fracture was 0.5% and 1.7% in those 12-17 yo in high energy traumas. Screening CT detected 50% of these injuries.

Motorized Internal Limb Lengthening Techniques are Superior to Alternative Limb Lengthening Techniques: A Systematic Review and Meta-Analysis of the Literature
Gerard A. Sheridan, FRCS
David Falk, MD
Austin T. Fragomen, MD, FAAOS
S. Robert Rozbruch, MD, FAAOS

Motorized Internal limb lengthening is associated with fewer complications and improved times to regenerate union and full weight-bearing when compared to alternative limb lengthening methods.
Disparities in costs between femoral neck fractures and osteoarthritis treated with arthroplasty have increased since the Comprehensive Care for Joint Replacement model was implemented.

Fixation of femoral shaft fractures >24 hours from admission is associated with an increased risk of complications and this appears to be exacerbated with increasing time from injury.

Biomechanical study demonstrates improved fracture stability when pin spread is optimized in both the sagittal and coronal planes when performing CRPP for supracondylar humerus fractures.

Surgery of the hip and multiple prior ED visits in the past year are independent predictors of complications in children with sickle cell disease undergoing orthopaedic surgery.
11:30 AM  
**PAPER 389**  
Nerve Blocks for Pediatric Anterior Cruciate Ligament Reconstruction: Comparing Function, Patient-Reported Outcomes, and Efficiency  
*Theodore J. Ganley, MD, FAAOS*  
*Tomasina M. Leska, BS*  
*Joshua Bram, BS*  
*Nicolas Pascual-Leone, BA*  
*Brendan A. Williams, MD*  

Single-shot nerve blocks were associated with shorter operative times and better PROMIS physical function-mobility scores at 1 week compared to femoral nerve catheter with single-shot sciatic block.

**Discussion**

11:40 AM  
**PAPER 390**  
How Much Will My Child's Anterior Cruciate Ligament Reconstruction (ACLR) Cost? Availability and Variability of Consumer Prices for Pediatric ACLR in the United States  
*Julianna Lee*  
*Ryan H. Guzek, BS*  
*Neal S. Shah*  
*John Todd R. Lawrence, MD, PhD*  
*Theodore J. Ganley, MD, FAAOS*  
*Apurva Shah, MD, MBA*  

Healthcare costs for pediatric sports medicine procedures are difficult to obtain, even for educated consumers. Top-ranked hospitals and hospitals in the Northeast charge more than their counterparts.

**Discussion**

11:45 AM  
**PAPER 391**  
Variation in Treatment Approaches to Adolescent Midshaft Clavicle Fractures in Pediatric versus Adult Hospitals  
*Brandon E. Earp, MD, FAAOS*  
*Dafang Zhang, MD*  
*Benton E. Heyworth, MD, FAAOS*  
*Elizabeth S. Liotta, MBBS*  
*Katelyn A. Hergott, MPH*  

Adolescent patients treated at adult hospitals for displaced midshaft clavicle fractures have more than 5 times the odds of surgical treatment than those treated at a pediatric hospital.

**Discussion**

11:50 AM  
**PAPER 392**  
Subsequent Injury and Function following Tibial Spine Repair in the Pediatric Population  
*Noah J. Quinlan, MD*  
*Taylor Hobson, MD*  
*Alexander J. Mortensen, MD*  
*Temitope Adeyemi, MPH*  
*Travis G. Maak, MD, FAAOS*  
*Stephen K. Aoki, MD, FAAOS*  

Subsequent injury and function of the ipsilateral and contralateral knees following tibial spine repair in the pediatric population.

**Discussion**

12:00 PM  
**PAPER 393**  
Medial Patellofemoral Ligament Reconstruction in Adolescents with Acute First-Time Patellar Dislocation with an Associated Loose Body  
*Andrew T. Pennock, MD, FAAOS*  
*Pradyumna Gurusamy, MD*  
*Jason Pedowitz, MD*  
*Kristina Parvanta Johnson, ATC, OPA-C*  
*Alyssa N. Carroll*  
*Henry G. Chambers, MD, FAAOS*  
*Eric W. Edmonds, MD, FAAOS*  

MPFL reconstruction results in lower rates or recurrent instability and fewer subsequent surgeries compared to MPFL repair or neglect in adolescent patients with first-time patellar dislocations.

12:05 PM  
**PAPER 394**  
Predictors of Arthrofibrosis after Pediatric Anterior Cruciate Ligament Reconstruction: What is the Impact of Quadriceps Autograft?  
*Abraham Ouweleen, BA*  
*Tyler Hall, BA*  
*Craig J. Finlayson, MD, FAAOS*  
*Neeraj M. Patel, MD, MPH*  

Patellar tendon autograft, female sex, and motion deficits at 6 weeks after ACLR (<90 degrees of flexion or extension deficit ≥5 degrees) were predictive of arthrofibrosis in children and adolescents.

**Discussion**

**RESIDENT'S COURSE**

12:30 PM - 5:00 PM  
Ballroom 6E  

◆ 291 Practice Management for Residents and Fellows-in-Training  
Moderators: Claudette M. Lajam, MD, FAAOS and Marc R. Safran, MD, FAAOS  
Jonathan D. Barlow, MD, MS  
R. Dale Blasier, MD, FAAOS  
Roy Davidovitch, MD, FAAOS  
Kathleen L. DeBruhl, JD  
Carlos Guanche, MD, FAAOS  
Douglas W. Lundy, MD, MBA  
Hassan R. Mir, MD, MBA  
Evette D. Thompson  
Colin Wiens, MBA  
Anthony C. Williams

Residents and fellows, please join us for this specially developed educational event tailored just for you! You learn about billing, personal finance, running your practice, how to choose your first job, negotiating a contract, starting off your practice right, and navigating the legal and work comp aspects of orthopaedic practice. No CME is offered.
Physician Burnout and Wellness Symposium
Moderator: Alfred Atanda, MD, FAAOS

This symposium reviews the relevant literature pertaining to recognizing, mitigating, and addressing provider burnout.

I. Promoting a Culture of Physician Resiliency and Burnout Prevention
   Alfred Atanda, MD, FAAOS

II. Resilience and Grit
    Lisa K. Cannada, MD, FAAOS

III. Extrinsic Drivers of Burnout
     Cordelia W. Carter, MD, FAAOS

IV. Organizational/Departmental Strategies to Address Burnout
     Melissa A. Christino, MD, FAAOS

V. Intrinsic Drivers of Burnout
   Julie B. Samora, MD, MPH

VI. Personal Strategies to Address Burnout
     Jeffrey M. Smith, MD, CPC

INSTRUCTIONAL COURSE LECTURE

1:30 PM - 3:00 PM

241 Percutaneous Techniques in Foot Surgery
   Moderator: Alastair S. E. Younger, MD
   Jorge I. Acevedo, MD, FAAOS
   Rebecca Cerrato, MD, FAAOS
   Peter G. Mangone, MD, FAAOS
   Room 4

Percutaneous foot surgery allows the achievement of surgical goals without the risks of open incisions. Experts demonstrate how to achieve the procedural goals.

242 Global Volunteerism for Orthopaedic Surgeons
   Moderator: Coleen S. Sabatini, MD, MPH, FAAOS
   Todd S. Kim, MD, FAAOS
   Divya Singh, MD, FAAOS
   Peter G. Trafton, MD, FAAOS
   Room 7A

Learn how to be an effective global volunteer and impart your orthopaedic knowledge to strengthen and empower the global health workforce by volunteering overseas.

243 Ethical Issues in Orthopaedic Surgery:
     From Trolley Problems to Trainees
   Moderator: Charles Carroll, MD, FAAOS
   Casey J. Humbyrd, MD, FAAOS
   Rachel M. Randall, MD
   Claire Shannon, MD
   Room 7B

We examine three “hot topics” in orthopaedics through an ethical lens: diversity in orthopaedics, opioid prescribing, and patient satisfaction surveys.

244 Contemporary Questions and Controversies Regarding the Assessment and Management of Distal Radius Fractures: What is the Best Evidence in 2021?
   Moderator: Jesse B. Jupiter, MD, FAAOS
   Charles Cassidy, MD, FAAOS
   Duretti Fufa, MD, FAAOS
   Ruby Grewal, MD
   Room 3

This course offers the best evidence on treatment of fractures in the older patient, alternative treatment options, avoidance of tendon rupture, and deformity.

245 Ten Complications that I Learned from in Routine Shoulder Surgery
   Moderator: Surena Namdari, MD, MSc, FAAOS
   Jay D. Keener, MD, FAAOS
   Reza Omid, MD, FAAOS
   Robert Z. Tashjian, MD, FAAOS
   Room 8

This instructional course lecture discusses 10 common intraoperative and postoperative shoulder complications and their management in a case-based format.

246 It’s Not Always FAI
   Moderator: Dean K. Matsuda, MD, FAAOS
   J.W. Thomas Byrd, MD, FAAOS
   Dominic Carreira, MD, FAAOS
   William C. Meyers, MD
   Room 9

This timely ICL covers common conditions of groin pain beyond FAI that should not be missed by the sports medicine or hip practitioner.

285 Surgical Strategies for Cervical Spondylotic Myelopathy
   Moderator: Christopher G. Furey, MD, FAAOS
   Paul A. Anderson, MD, FAAOS
   Sanford E. Emery, MD, MBA
   Timothy A. Moore, MD, FAAOS
   Joseph D. Smucker, MD, FAAOS
   Room 31

This course is a comprehensive discussion of surgical strategies for the management of cervical spondylotic myelopathy based on pertinent case presentations.

286 Anterior Cruciate Ligament Revision Reconstruction Technical Issues: A Case-Based Approach
   Moderator: Michael J. Stuart, MD, FAAOS
   Joel L. Boyd, MD, FAAOS
   Thomas M. DeBerardino, MD, FAAOS
   Gregory C. Fanelli, MD, FAAOS
   Aaron J. Krych, MD, FAAOS
   Bruce A. Levy, MD, FAAOS
   Jeffrey A. Macalena, MD, FAAOS
   Peter B. MacDonald, MD, FAAOS
   Daniel Whelan, MD
   Room 33

This case-based course addresses the reasons for failed anterior cruciate ligament (ACL) reconstruction, the preoperative work-up and planning, technical considerations for revision ACL surgery, and the essential ancillary procedures to ensure success.

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WEDNESDAY EDUCATIONAL PROGRAMS

292 Coding and Reimbursement for Practicing Surgeons: The Present and the Future
Moderator: Sarah Wiskerchen
Room 2
This jam packed session will be laser focused on the coding and reimbursement issues most relevant presently and in 2021, such as: Medical Decision Making: From member of a trio to solo act; The play opens in 2021; The global surgical package-Breaking Up Is Hard To Do!; Modifier 59: How it really works; Modifier 25: Are you being paid or are you being audited?

1:30 PM - 2:30 PM
Room 28E
CD9 Career Transitions
Moderator: R. Dale Blasier, MD, FAAOS
Ralph B. Blasier, MD, JD
Surgeons may not recognize deterioration of their physical and cognitive function and skills with age. It is best to be aware and develop an exit strategy.

1:30 PM - 3:00 PM
Ballroom 20B
Sports Medicine IV
Moderators: Brian R. Waterman, MD, FAAOS and Richard K. Ryu, MD, FAAOS

1:30 PM
Nonoperative Management of Anterior Shoulder Instability Can Result in High Rates of Recurrent Instability and Pain at Long-Term Follow Up
Heath Melugin, MD
Kira D. Novakofski, MD, PhD
Devin P. Leland, MD
Christopher Bernard, MS
Ryan R. Wilbur
Aaron J. Krych, MD, FAAOS
Christopher L. Camp, MD
At long-term follow up of 17 years, there was a high rate of poor outcomes following nonoperative management of anterior shoulder instability.

1:35 PM
Predictors of Bone Loss in Patients with Anterior Shoulder Instability
Carolyn Hettrich, MD, MPH
Justin A. Magnuson, BA
Keith M. Baumgarten, MD, FAAOS
Robert H. Brophy, MD, FAAOS
Julie Y. Bishop, MD, FAAOS
Matthew J. Bollier, MD, FAAOS
Jonathan T. Bravman, MD, FAAOS
Charles L. Cox, MD, MPH
Brian T. Feeley, MD, FAAOS
Rachel M. Frank, MD, FAAOS
John A. Grant, MD, PhD
Grant L. Jones, MD, FAAOS
John E. Kuhn, MD, FAAOS
ChunBong B. Ma, MD, FAAOS
Robert G. Marx, MD, FAAOS
Eric C. McCarty, MD, FAAOS
Bruce S. Miller, MD, MS
Adam J. Seidl, MD, FAAOS
Matthew V. Smith, MD, FAAOS
Rick W. Wright, MD, FAAOS
Alan Zhang, MD, FAAOS
Isaac Briskin, MA
Michael Kattan, PhD
Kevin J. Cronin, MD
Brian R. Wolf, MD, FAAOS
MOON Shoulder
This MOON Shoulder study identified risk factors associated with presence and amount of bone loss in patients undergoing surgical stabilization for anterior glenohumeral instability.

1:40 PM
Incidence of and Risk Factors for Glenohumeral Osteoarthritis following Anterior Shoulder Instability: A US Population-Based Study with an Average 15-Year Follow Up
Bradley Kruckeberg, MD
Devin P. Leland, MD
Ryan R. Wilbur
Bryant Song, MS
Christopher Bernard, MS
Aaron J. Krych, MD, FAAOS
Diane L. Dahm, MD, FAAOS
Joaquin Sanchez-Sotelo, MD, FAAOS
Christopher L. Camp, MD
In patients less than 40 years old with ASI, 25% developed symptomatic OA. Multivariate analysis revealed a potential increased risk with smoking, hyperlaxity, laborers, higher BMI, and increased age.

Discussion
1:50 PM  
**PAPER 398**  
**Beach Chair vs. Lateral Decubitus Positioning for Primary Arthroscopic Anterior Shoulder Stabilization: A Consecutive Series of 641 Shoulders**  
Bobby Yow, MD  
Military Shoulder Instability  
Ashley Anderson, MD  
Zein H. Aburish, BA  
David J. Tennent, MD  
Lance E. LeClere, MD, FAaos  
John-Paul H. Rue, MD, FAAOS  
Brett D. Owens, MD, FAaos  
Michael Donohue, MD  
Kenneth L. Cameron, PhD  
Matthew A. Posner, MD, FAaos  
Jonathan F. Dickens, MD, FAaos  

Equivalent failure rates may be anticipated with arthroscopic Bankart repair performed in the beach chair or lateral decubitus position.

1:55 PM  
**PAPER 399**  
**Criteria based return to sport testing is associated with lower recurrence rates following arthroscopic Bankart repair**  
Mauricio Drummond, MD  
Adam Popchak, DPT, PhD  
Kevin W. Wilson, MD, FAaos  
Gillian E. Kane, BS  
Albert Lin, MD, FAaos  

Athletes who undergo an objective return to play criteria-based testing protocol have lower rates of recurrent instability following arthroscopic shoulder stabilization surgery than those cleared by time from surgery. Athletes who did not undergo criteria-based RTS testing following arthroscopic shoulder stabilization had 4.85 times increased likelihood of developing recurrent instability after return to sports.

2:00 PM  
**PAPER 400**  
**Progression to Glenohumeral Arthritis after Arthroscopic Anterior Stabilization in a Young and High Demand Population**  
Ashley Anderson, MD  
Bobby Yow, MD  
Sean E. Slaven, MD  
Zein H. Aburish, BA  
Kelly G. Kilcoyne, MD, FAaos  
Matthew A. Posner, MD, FAaos  
Jonathan F. Dickens, MD, FAaos  

This study shows low rates of progression to glenohumeral arthritis after undergoing arthroscopic anterior stabilization in a young and active population.

Discussion

2:10 PM  
**PAPER 401**  
**The Role of the Long Head of the Biceps Tendon in Posterior Shoulder Stabilization during Forward Flexion**  
Lawrence V. Gulotta, MD, FAAOS  
Ryan Rauck, MD  
Amirhossein Jahandar, MS  
Andreas Kontaxis, PhD  
Xiang Chen, MS  
Russell F. Warren, MD, FAAOS  
David M. Dines, MD, FAaos  
Samuel A. Taylor, MD, FAAOS  

LHBT loading resists posterior translation of the humeral head during forward flexion in external rotation.

2:15 PM  
**PAPER 402**  
**Outcomes of Posterior Labral Repair with or without Concomitant High-Grade Glenohumeral Chondral Pathology: A Retrospective Cohort with Minimum 2-Year Follow Up**  
Bradley Young, MD  
Keith T. Corpus, MD  
Greg Scarola, MS  
David Trofa, MD  
Dana P. Piasecki, MD, FAaos  
Nady Hamid, MD, FAaos  
Shadley C. Schiffern, MD, FAaos  
Bryan M. Saltzman, MD  
James E. Fleischhi, MD, FAaos  

Concomitant glenohumeral chondral pathology at the time of primary posterior labral repair does not appear to negatively influence subjective and functional outcomes at minimum 2-year follow up.

2:20 PM  
**PAPER 403**  
**Outcomes of Arthroscopic Shoulder Stabilization at the United States Naval Academy: 5-Year Follow Up**  
Michael D. Bedrin, MD  
Bobby Yow, MD  
Sean Wade, MD  
Benjamin W. Hoyt, MD  
Jonathan F. Dickens, MD, FAAOS  
John-Paul H. Rue, MD, FAaos  
Lance E. LeClere, MD, FAAOS  

Low failure rates at five-year follow up in a young and active population after undergoing arthroscopic anterior, posterior, and combined glenohumeral instability.

Discussion

2:30 PM  
**PAPER 404**  
**Arthroscopic Bankart Repair vs. Nonoperative Management for First-Time Anterior Shoulder Instability: A Cost-Effectiveness Analysis**  
Anna M. Blaeser, BS  
Eoghan Hurley, MBChB  
Kirk A. Campbell, MD, FAAOS  
Eric J. Strauss, MD, FAAOS  
Laith M. Jazrawi, MD, FAAOS  
Soterios Gyftopoulos, MD  

The purpose of this study was to examine the cost-effectiveness of arthroscopic Bankart repair (ABR) vs. nonoperative management in first-time anterior shoulder dislocation.
2:35 PM  PAPER 405
Arthroscopic Bankart Repair vs. the Open Latarjet Procedure for First-Time Shoulder Dislocations in Athletes
Eoghan Hurley, MBCHB
Martin Davey, MD, MRCS
Ross O'Doherty
Mohamed Elmugtba G. Osman
Leo Pauzenberger, MD
Hannan Mullett, FRCS (Ortho)

Both ABR and OL result in excellent clinical outcomes, with high rates of RTP, and low recurrence rates.

1:30 PM  PAPER 406
A Radiostereometry Study of Cemented Glenoid Migration Over 2 Years and Demonstration of the Rocking Horse Glenoid Phenomenon
David A. Skipsey, BS, MBCHB
Martin R. Downing, MSc
G P. Ashcroft, FRCS, FRCS (Ortho)
Kapil Kumar, FRCS (Ortho)

Radiostereometric analysis of the cemented pegged glenoid shows early initial migration mainly in a superoposterior direction likely due to eccentric loading but this stabilized with time.

1:35 PM  PAPER 407
Risk of Revision Based on Timing of Corticosteroid Injections Prior to Shoulder Arthroplasty
Monica Stadecker, MD, MBA
Safa C. Fassihi, MD
Alex Gu, MD
Matthew J. Best, MD
Michael Livesey, MD
Sabrina Jenkins, BS
Patawut Boonratwet, MD
Umasuthan Srikumaran, MD, MBA, FAAOS

There is a time-dependent relationship between the timing of corticosteroid injection and the incidence of PJL and revision surgery following shoulder arthroplasty.

1:40 PM  PAPER 408
Cost Analysis of Shoulder Arthroplasty at a Large Academic Center: Implications for Bundled Payments
Andrew Carbone, MD
Alexander J. Vervaeccke, MD
Ivan Ye
Nicole Zubizarreta, MPH
Jashvant Poeran, MD, PhD
Bradford O. Parsons, MD, FAAOS
Olivier Verborgt, MD, PhD
Paul J. Cagle, MD, FAAOS
Leesa M. Galatz, MD, FAAOS

Our results demonstrate the importance of adequate price adjustments when designing bundled payment programs and that the reimbursement differences between insurances types may impact access to care.

1:50 PM  PAPER 409
Total Shoulder Arthroplasty at U.S. News & World Report Top-Ranked Hospitals in Orthopaedics – Do Rankings Correlate with Complications and Cost?
Mathangi Sridharan
Sarah E. Hatef, MPH
Azeem T. Malik, MBBS
Jesse H. Morris, MD
Julie Y. Bishop, MD, FAAOS
Andrew S. Neviaser, MD, FAAOS
Safdar N. Khan, MD, FAAOS
Gregory L. Cvetanovich, MD

Total shoulder arthroplasties performed at US News & World Report ranked hospitals have similar complication rates and higher costs across an episode of care.

1:55 PM  PAPER 410
Midterm (≥ 5 Years) Outcomes for Biologic Resurfacing of the Glenoid are Satisfactory for Patients Aged ≤ 60 Years with Glenohumeral Osteoarthritis
Armodios M. Hatzidakis, MD, FAAOS
Benjamin W. Sears, MD, FAAOS
Jacqueline Bader, MS
Libby Mauter, MS, PT

Biologic resurfacing shoulder arthroplasty acheives satisfactory outcomes in young patients.
Wednesday Educational Programs

2:00 PM
PAPER 411
Long-Term Clinical and Radiographic Outcomes of Total Shoulder Arthroplasty in Patients Under Age 60
Robert Brochin, MD
Ryley Zastrow, BS
Akshar Patel, BS
Bradford O. Parsons, MD, FAAOS
Evon L. Flatow, MD, FAAOS
Paul J. Cagle, MD, FAAOS

In patients under age 60, TSA significantly improved long-term functionality and pain with low complication and revision rates. Respective survivorship at 10, 15, and 20 years was 97%, 88%, and 82%.

Discussion

2:10 PM
PAPER 412
Total Shoulder Arthroplasty after Prior Arthroscopic Surgery for Glenohumeral Osteoarthritis: A Case-Control Matched Cohort Study
Bryant P. Elrick, MS
Philip-Christian Nolte, MA, MD
Justin W. Arner, MD
Taylor J. Ridley, MD
Thomas Woolson, BA
Anna-Katharina Tross, MD
Kaare S. Midtgaard, MD
Peter J. Millett, MD, MSc, FAAOS

Patients with severe glenohumeral osteoarthritis that have failed prior comprehensive arthroscopic management benefit similarly from TSA when compared to patients that opted directly for TSA.

2:15 PM
PAPER 413
Arthroscopic Debridement for Management of Glenohumeral Arthritis in the Young Patient: The Impact on Subsequent Shoulder Arthroplasty
Corey J. Schiffman, MD
Anastasia Whitson, BS
Sagar S. Chawla, MD
Frederick A. Matsen, MD, FAAOS
Jason Hsu, MD, FAAOS

Prior arthroscopic debridement at a young age was not associated with inferior outcomes from anatomic total shoulder and ream and run arthroplasty.

2:20 PM
PAPER 414
Patients with Parkinson's Disease Experience Higher Rates of Prosthetic Dislocation after Elective Total Shoulder Replacement: A Matched Comparison of 90-Day Adverse Events and 5-Year Implant Survival
Harold G. Moore, BS
Joseph B. Kahan, MD, MPH
Patrick J. Burroughs, BS
Josiah J. Sherman
Kenneth W. Donohue, MD, FAAOS
Jonathan N. Grauer, MD, FAAOS

Patients with Parkinson’s disease experienced higher rates of dislocation within 90 days after elective TSA for osteoarthritis compared to matched controls, but had comparable 5-year implant survival.

Discussion

2:30 PM
PAPER 415
Risk Factors for Early Return to Care following Same-Day Discharge Primary Shoulder Arthroplasty
Matthew D. McElvany, MD, MS
Heather A. Prentice, PhD
Laura G. Barovick, RN
Jason Kang, MD
Ronald A. Navarro, MD, FAAOS
Mark T. Dillon, MD, FAAOS

Same-day discharge patients with a history of alcohol abuse, peptic ulcer disease, or valvular disease may have a higher likelihood for early return to care.

2:35 PM
PAPER 416
Effects of Obesity on the Clinical and Functional Outcomes following Total Shoulder Arthroplasty
Richard J. Friedman, MD, FAAOS
Jared J. Reid, BS
Bryce F. Kunkle, BS
Venkatraman Kothandaraman, BS
Josef K. Eichinger, MD, FAAOS

In general, obese patients had significantly more pain, lower outcome scores, and less ROM compared to non-obese patients for both aTSA and rTSA at a mean follow up of 5 years.

Discussion

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**CAREER DEVELOPMENT**  
3:30 PM - 4:30 PM  
Room 28E  
CD10 Social Media and Orthopaedics: Establishing Your Online Reputation  
Moderator: Lance M. Silverman, MD, FAAOS  
Christian Veillette, MD  
Social media is an emerging modality that can be viewed as a chance to update our approach to interacting with patients, data, and each other in important new ways. However, careful attention regarding patient privacy, liability, and HIPPA violations is required by the orthopaedist interested in utilizing this technology. With mindful use of social media, we are able to leverage our positions as trusted community leaders to create and nurture a much larger community.

**SYMPOSIUM J**  
3:30 PM - 5:00 PM  
Room 28C  
New Perspectives in Musculoskeletal Infections  
Moderator: Julio Urrutia, MD  
Musculoskeletal infections are thoroughly discussed, including epidemiology, physio-pathology, microbiology, diagnosis, and treatment. Special focus is on periprosthetic, spinal, pediatric, and postoperative knee infections. This symposium is a collaboration between AAOS and the 2020 Guest Nation of Chile.

1. Bone Reconstruction after Pediatric Septic Growth Arrest: Lower Extremities  
   Alejandro K. Baar, MD
2. Diagnosis and Management of Spinal Epidural Abscess  
   Christopher M. Bono, MD, FAAOS
3. Success and Failure in Periprosthetic Joint Infection  
   Claudio Diaz, MD
4. Postoperative Infection after Anterior Cruciate Ligament Reconstruction Surgery: A Chilean Perspective  
   David Figueroa, MD
5. Bone Reconstruction after Pediatric Septic Growth Arrest: Upper Extremities  
   John E. Herzenberg, MD, FAAOS
6. Epidemiology of Musculoskeletal Infections in Chile  
   Samuel Parra, MD
7. Periprosthetic Joint Infection: Where We have been and What is Ahead?  
   Javad Parvizi, MD, FAAOS
8. Postoperative Infection after Anterior Cruciate Ligament Reconstruction Surgery: A US Perspective  
   Nicholas A. Sgaglione, MD, FAAOS
9. How to Predict Neurological Compromise and the Need of Surgery in Patients with Pyogenic Spinal Infections  
   Julio Urrutia, MD

**INSTRUCTIONAL COURSE LECTURE**  
3:30 PM - 5:00 PM  
261 Management of Common Complications of Foot and Ankle Surgery  
Moderator: Mark S. Myerson, MD, FAAOS  
Jesse F. Doty, MD, FAAOS  
Andrew R. Hsu, MD, FAAOS  
Anish R. Kadakia, MD, FAAOS  
This course covers common errors in decision making and surgical reconstruction of the foot and ankle. Techniques for revision surgery, reconstruction, and salvage of these deformities are presented in a case-based approach with an emphasis on video techniques.

262 The Use of Adipose Tissue as a Biologic Surgical Adjunct for Orthopaedic Reconstructive Procedures  
Moderator: Joanne Halbrecht, MD, FAAOS  
John G. Kennedy, MD  
Rajiv D. Pandya, MD, FAAOS  
Adipose tissue has the potential to increase the success of reconstructive hip and knee procedures. Indications, surgical technique and outcomes will be presented.

263 Nonsurgical Management of Osteoarthritis of the Knee: What Should You be Injecting Now and in the Future?  
Moderator: John C. Richmond, MD, FAAOS  
Jack M. Bert, MD, FAAOS  
Jason L. Dragoo, MD, FAAOS  
Andrew I. Spitzer, MD, FAAOS  
Injection therapy for the treatment of osteoarthritis of the knee is very controversial. This course gives participants the best information in 2020.

264 Do You Really Need a Hand Surgeon? Understanding Common Operations about the Hand, Wrist, and Elbow that Every Orthopaedic Surgeon Can Perform  
Moderator: Mark H. Gonzalez, MD, PhD, FAAOS  
Steven I. Grindel, MD, FAAOS  
Gautam Malhotra, MD  
Alfonso Mejia, MD, MPH  
Common hand procedures that can be performed by the general orthopedic surgeon will be discussed. Surgical technique decision making and patient selection will be emphasized.

265 Tips and Tricks in the Management of Distal Radius Fractures  
Moderators: Sanjeev Kakar, MD, FAAOS and Julie E. Adams, MD, FAAOS  
Jorge L. Orbay, MD, FAAOS  
Paul Tornetta III, MD, FAAOS  
The goal of this course is to provide an overview of the management of comminuted intra-articular distal radius fractures with technical tips and tricks.
WEDNESDAY EDUCATIONAL PROGRAMS

◆ 266  Tumors and Tumor-Like Conditions of which Every Orthopaedist Should Be Aware
Moderator: R. Lor Randall, MD, FAAOS
Alan T. Blank, MD, MS
Matthew W. Colman, MD, FAAOS
Kevin A. Raskin, MD, FAAOS

This instructional course lecture is intended to educate all non-tumor orthopaedists about common bone and soft tissue tumors they will encounter in everyday practice.

◆ 267  Incorporating Artificial Intelligence in Orthopaedic Workflow
Moderator: William B. Kurtz, MD, FAAOS
Thomas G. Myers, MD, FAAOS
Ranjit Sachdev, MD, MBA, FAAOS

Focus of this ICL will be on understanding and incorporating Natural language processing, chatbots, image processing and machine learning in orthopaedic practice workflow.

◆ 268  Management of the Challenging Rotator Cuff Tear
Moderator: Brian R. Waterman, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Michael T. Freehill, MD, FAAOS
William N. Levine, MD, FAAOS

This course explores the systematic evaluation and management of challenging rotator cuff tears, including repair, augmentation, superior capsular reconstruction, balloon arthroplasty, and orthobiologic adjuncts.

◆ 269  Achieving Lumbar Fusion: An Evidence-Based Approach to Selecting Technique, Implants, and Biologics
Moderator: Arjun Sebastian, MD, FAAOS
Ian Kaye, FAORTHA
Christopher Kepler, MD
Scott Wagner, MD

This instructional course lecture provides an evidence-based approach to lumbar fusion including discussion of various lumbar fusion techniques, implants, biologics, and the management of osteoporosis.

◆ 270  MRI of the Spine: Essentials for the Orthopaedic Surgeon
Moderator: William Morrison, MD
Mary Jesse, MD
Donald Resnick, MD
Darryl B. Sneag, MD
Adam Zoga, MD, MBA

This course helps clinicians develop a systematic structured checklist approach to the accurate interpretation of spine MRI exams, emphasizing standardized nomenclature and grading schemes.

◆ 271  Evaluation and Surgical Treatment of Knee Osteochondritis Dissecans and Adolescent Cartilage Injuries
Moderator: Benton E. Heyworth, MD, FAAOS
Henry B. Ellis, MD, FAAOS
Daniel W. Green, MD, FAAOS
Jeffrey J. Nepple, MD, FAAOS

This course is a highly interactive and comprehensive review of the full spectrum of presentations that arise in adolescent knee cartilage pathology, from trauma to osteochondritis dissecans (OCD), and beyond.

◆ 272  Management of Humeral and Glenoid Bone Deficiency in Shoulder Arthroplasty
Moderator: Andrew Jawa, MD, FAAOS
Luke S. Austin, MD, FAAOS
Mark A. Frankle, MD, FAAOS
Grant E. Garrigue, MD, FAAOS
Jason Hsu, MD, FAAOS
Joseph P. Iannotti, MD, PhD
Jonathan C. Levy, MD, FAAOS
Anand M. Murthi, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
Eric T. Ricchetti, MD, FAAOS
Matthew V. Smith, MD, FAAOS
Jon J. P. Warner, MD, FAAOS

The goal of this case-based instructional course lecture is to review strategies for managing glenoid and humeral bone deficiency in shoulder arthroplasty. Additionally, this course provides treatment options and techniques for the infected shoulder arthroplasty.

PAPER PRESENTATIONS
3:30 PM - 5:00 PM
Ballroom 6B
Practice Management/Rehabilitation II

3:30 PM  PAPER 417
Let the Sunshine In: The Evolution of Payments from Industry to Orthopaedic Surgeons in the First Five Years of the Open Payments Database
Joseph Tanenbaum, MD, PhD
Collin Blackburn, MBA
Derrick Knapik, MD
Robert J. Wetzel, MD, FAAOS
Robert J. Gillespie, MD, FAAOS
James E. Voos, MD, FAAOS

This study describes the evolution of the industry-surgeon relationship from 2014 to 2018 and raises a serious methodological issue for studies of orthopaedic subspecialties using Open Payments Data.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper Number</th>
<th>Title</th>
<th>Authors</th>
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<tbody>
<tr>
<td>3:35 PM</td>
<td>PAPER 418</td>
<td>Collaborative Creation of Opioid Guidelines Can Be Easy and Highly Effective in Orthopaedics and Preserve Patient Satisfaction, but Compliance Varies by Subspecialty</td>
<td>Clayton Del Prince, MD, Kevin M. Intrieri, BA, Rian C. Bisson, Melissa Kluczynski, Leslie J. Bisson, MD, FAAOS</td>
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<tr>
<td>3:40 PM</td>
<td>PAPER 419</td>
<td>Female Representation within Orthopaedic Leadership: Where are We Now?</td>
<td>Nina D. Fisher, MD, Andrew S. Bi, MD, Kenneth A. Egol, MD, FAAOS, Mara Karamitopoulos, MD, FAAOS</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>PAPER 422</td>
<td>Does Orthopaedic Surgery have a Personality?</td>
<td>Sarah V. Stelma, MD, Mariano Menendez, MD, Nicholas R. Pagani, MD, Richard N. Puzzitiello, MD, Scott P. Ryan, MD, FAAOS</td>
</tr>
<tr>
<td>4:10 PM</td>
<td>PAPER 423</td>
<td>Does an Interactive Patient Provider Software Improve Total Joint Arthroplasty Patient Satisfaction?</td>
<td>Jared A. Warren, ATC, DO, Kelsey L. Girbino, BS, Alison K. Klika, MS, Frank M. Sabo, MD, FAAOS, Michael Kolczun, MD, Joseph W. George, MD, Nicolas S. Piuzzi, MD, Carlos A. Higuera Rueda, MD, FAAOS</td>
</tr>
<tr>
<td>4:15 PM</td>
<td>PAPER 424</td>
<td>Do Pediatric Orthopaedists Who Treat Spine Receive Increased Industry Funding?</td>
<td>Sean Z. Haimowitz, BS, Michael Fields, MD, BS, Leah Gonzalez, MD, Lynn Ann Forrester, MD, Lauren J. Sea, BA, MD, Caixia Zhao, MD, Neil Kaushal, MD, Alice Chu, MD</td>
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<tr>
<td>4:20 PM</td>
<td>PAPER 425</td>
<td>Postoperative Sleep Status after Total Knee Arthroplasty</td>
<td>Takeo Mammoto, MD, Postoperative pain worsens sleep quality after surgery. Less pain and improved sleep quality were important for postoperative recovery.</td>
</tr>
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Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
4:30 PM  PAPER 426
Work-Related Musculoskeletal Injuries in Female Adult Reconstruction Surgeons

Olivia G. Leovnicz, BS
Anna Cohen-Rosenblum, MD
Nathan Varady, BS
Antonia F. Chen, MD, MBA, FAAOS

We conducted a survey of female arthroplasty surgeons to assess occupational musculoskeletal injuries. We found that 68.8% had sustained injuries, most commonly in the forearm/wrist/hand.

4:35 PM  PAPER 427
The Content and Accessibility of Orthopaedic Residency Program Websites

Nathan C. Sherman, MBA, MD
Jacob Sorensen
Ansab Khwaja, MD
Gregory L. DeSilva, MD, FAAOS

There has been a significant improvement in the online education and recruitment content of orthopaedic residency program websites. Programs and applicants to orthopaedic surgery alike may benefit.

3:30 PM - 5:00 PM
Ballroom 20B
Shoulder and Elbow IV
Moderators: Stephanie J. Muh, MD, FAAOS and Miguel Ramirez, MD, FAAOS

3:30 PM  PAPER 428
Predictive Factor for Failure of Conservative Management in the Treatment of Calcific Tendinitis of the Shoulder

Mauricio Drummond, MD
Caroline M. Ayinon, BA
Mark W. Rodosky, MD, FAAOS
Dharmesh Vyas, MD, FAAOS
Bryson P. Lesniak, MD, FAAOS
Albert Lin, MD, FAAOS

Patients with calcific lesions >1 cm have a 2.8x increased likelihood of failing conservative treatment in the setting of calcific tendinitis of the shoulder.

3:35 PM  PAPER 429
Glenoid and Humeral Head Morphology are Associated with Redislocation following Arthroscopic Bankart Repair

Ravi S. Vaswani, MD
Christopher J. Como, BS
Mitchell Fourman, MD
Andrew S. Wilmot
Camilo G. Borrego, MD
Dharmesh Vyas, MD, FAAOS
Albert Lin, MD, FAAOS

Failure rate after Bankart repair is relatively high. Bony morphologic parameters including glenoid radius of curvature and humeral head volume may predict postoperative instability.

4:40 PM  PAPER 430
Temporal Trends and Revision Risk for Anterior Shoulder Stabilizations: A Population-Based Cohort Study of 60,547 Patients using Hospital Episode Statistics

Salma Chaudhury, MD, PhD
Richard S. Craig, MBBS, BSc
Samuel Hawley, PhD
Andrew Judge, PhD
Jennifer Lane, MD
Dominic Furniss
Jonathan Rees

This 19-year study of 60,547 anterior shoulder stabilizations provides valuable information about long-term revision risks and adverse events after arthroscopic, open soft tissue, and bony procedures.

3:50 PM  PAPER 431
Biomechanical Analysis of Latissimus Dorsi, Pectoralis Major, and Pectoralis Minor Transfers in Subscapularis-Deficient Shoulders

Samuel A. Taylor, MD, FAAOS
Cort Lawton, MD
Andreas Kontaxis, PhD
Joseph D. Lamplot, MD
David M. Dines, MD, FAAOS
Russell F. Warren, MD, FAAOS
Lawrence V. Gulotta, MD, FAAOS

Latissimus dorsi tendon transfer is biomechanically more effective compared to pectoralis major or pectoralis minor tendon transfers for a subscapularis deficient shoulder.

3:55 PM  PAPER 432
Telehealth During the COVID-19 Pandemic: Perceived Successes and Areas for Improvement from Patients and Providers in Shoulder and Elbow Surgery Clinical Practice

Tyler Henry, BS
Michael Gutman, BA
Thema A. Nicholson, MSc
Surena Namdari, MD, MSc, FAAOS

Technical difficulties associated with telehealth platforms are burdensome for both patient and provider, and significantly impact patient satisfaction.

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4:00 PM  PAPER 433  
Superior Capsule Reconstruction Improves Glenohumeral Range of Motion and Patient-Reported Outcomes But Does Not Improve Scapulohumeral Rhythm  
Albert Lin, MD, FAAOS  
Gillian E. Kane, BS  
Clarissa Levasseur, MS  
Jonathan D. Hughes, MD  
Alexandra S. Gabrielli, MD  
Adam Popchak, DPT, PhD  
James J. Irrgang, PhD  
William Anderst, PhD  
The effect of SCR on in vivo kinematics is unknown. This data will help us identify relationships between in vivo shoulder kinematics and patient reported outcomes.

Discussion

4:10 PM  PAPER 434  
Extent of Glenohumeral Bone Loss Does Not Influence the Outcome of the Latarjet Procedure  
Matthew J. Gillespie, MBCHB, MRCS  
Jamie A. Nicholson, MBCHB, MRCSEd  
Liam Yapp, MBCHB  
Christopher M. Robinson, MD  
This blinded, retrospective analysis of 161 Latarjet procedures demonstrates functional outcomes are not influenced by glenoid bone loss, Hill-Sachs lesion, or glenoid track on preoperative CT.

4:15 PM  PAPER 435  
Utility of Allograft Talus as a Source for Grafting of Concurrent Humeral and Glenoid Defects Associated with Recurrent Glenohumeral Instability: An Anthropometric Analysis  
Branum G. Griswold, MD  
Daniel Pare, BS  
Brice G. Morpeth  
Matthew T. Provancher, MD, FAAOS  
Stephen A. Parada, MD, FAAOS  
Allograft talus from an anthropometric standpoint seems to be a viable surgical option for both glenoid and humeral reconstruction.

4:20 PM  PAPER 436  
Remplissage for Anterior Shoulder Instability with Hill-Sachs Lesions: A Systematic Review and Meta-Analysis  
Eoghan Hurley, MBCHB  
James P. Toole  
Martin Davey, MD, MRCS  
Christopher Colasanti, MD  
Leo Pauzenberger, MD  
Eric J. Strauss, MD, FAAOS  
Hannan Mullett, FRCS (Ortho)  
In patients with Hill-Sachs lesions, arthroscopic Bankart repair with Remplissage resulted in lower rates of recurrent instability compared to arthroscopic Bankart repair alone.

Discussion

4:30 PM  PAPER 437  
Recurrent Instability after Arthroscopic Bankart Repair vs Open Bone Block Stabilization: Analysis of 164 Patients at Mean 3 Years Follow-up  
Joshua Wright-Chisen, MD  
Gabriella Ode, MD  
Jennifer A. Estrada, BA  
Daphne Ling, MPH, PhD  
Lawrence V. Gulotta, MD, FAAOS  
Answorth A. Allen, MD, FAAOS  
David W. Altchek, MD, FAAOS  
Frank A. Cordasco, MD, FAAOS  
Joshua S. Dines, MD, FAAOS  
At mean 3-year follow-up, 28% of patients demonstrated recurrent instability after anterior stabilization. PROs were similar for both cohorts except WOSI physical and Lifestyle.

Discussion

4:35 PM  PAPER 438  
Arthroscopic Latarjet: In Vitro Evidence to Avoid Complications with the Trans-Pec Medial Portal  
Kevin D. Plancher, MD, MPH, FAAOS  
Albert Dunn, DO, FAAOS  
Stephanie C. Pettersen, MPT, PhD  
The medial trans-pec major (East) portal may be used safely without complications for use in the arthroscopic Bankart-Bristow-Latarjet procedure.

Discussion

PAPER PRESENTATIONS

3:30 PM - 5:00 PM  
Room 32  
Foot and Ankle II

3:30 PM  PAPER 439  
The Incidence of Osteochondral Lesions after Ankle Fractures: A Systematic Review  
Jari Dahmen  
Hugo A. Martijn, MSc  
Kaj Lambers, MD  
Sjoerd Stufkens, MD  
Gino M. Kerkhoffs, MD, PhD  
This research brings insight into the incidence rate of osteochondral lesions (OCL) in ankle fractures; these lesions were found in up to 45% of the patients with ankle fractures.

3:35 PM  PAPER 440  
Predictors of Outcomes of Microfracture for Osteochondral Lesions of the Talus  
Nathaniel Mercer, BA, MS  
John F. Dankert, MD, PhD  
Yoshiharu Shimozono, MD  
Eoghan Hurley, MBCHB  
John G. Kennedy, MD  
The purpose of this study was to analyze the predictors of both clinical and magnetic resonance imaging (MRI) outcomes for small osteochondral lesion of the talus (OLT) treated with microfracture.
3:40 PM  
**PAPER 441**  
**Thirteen-Year Follow Up of Treatment of Osteochondral Lesions with Matrix-Induced Autologous Chondrocyte Implantation**  
*Christopher D. Kreulen, MD, FAAOS*  
*Trevor J. Shelton, MD*  
*Jacqueline Nguyen, MD*  
*Eric Giza, MD, FAAOS*  
*Martin Sullivan, MD*

This study shows MACI provides significant pain relief and function at 13-years postoperative with stable long-term follow up.

3:50 PM  
**PAPER 442**  
**Utility of Weightbearing Computed Tomography to Diagnose Syndesmotic Instability in Weber B Lateral Malleolar Fractures**  
*Rohan Bhimani, MD, MBA*  
*Sohail Ashkani Esfahani, MD*  
*Bart Lubberts, MD, PhD*  
*Gregory R. Waryasz, MD*  
*Daniel Guss, MD, MBA*  
*Gino M. Kerkhoffs, MD, PhD*  
*Christopher W. DiGiovanni, MD, FAAOS*

3D volumetric measurement of the distal tibiofibular interspace is the most effective way to diagnose syndesmotic instability in patients with Weber B fracture, compared to 2D syndesmosis measurement.

3:55 PM  
**PAPER 443**  
**Utility of Area and Volume Measurements on Weightbearing CT to Diagnose Lisfranc Instability**  
*Rohan Bhimani, MD, MBA*  
*Pongpanot Sornsakrin, MD*  
*Sohail Ashkani Esfahani, MD*  
*Bart Lubberts, MD, PhD*  
*Daniel Guss, MD, MBA*  
*Cesar De Cesar Netto, MD, PhD*  
*Gregory R. Waryasz, MD*  
*Gino M. Kerkhoffs, MD, PhD*  
*Christopher W. DiGiovanni, MD, FAAOS*  
*Sohail Ashkani Esfahani, MD*

Lisfranc joint 3D volume measurements in the coronal and axial planes have the highest potential for diagnosing even subtle Lisfranc instability.

4:00 PM  
**PAPER 444**  
**Hindfoot Motion after Ankle Arthrodesis: A Prospective, Multisegment Gait Analysis with Clinical Correlation**  
*Samuel Ford, MD*  
*Scott Coleman, MBA, MS*  
*Yahya Daoud, MSc*  
*Justin M. Kane, MD*  
*Shannon Alejandro, MD*  
*Daniel J. Scott, MD, MBA*  
*James W. Brodsky, MD, FAAOS*

This prospective gait analysis of ankle arthrodesis demonstrates that stiffness of the hindfoot joints is a concomitant feature of ankle arthritis and that ankle-hindfoot ROM during gait is unchanged.

4:10 PM  
**PAPER 445**  
**Suture Tape Reinforcement Device as an Independent Fixation Solution for Partial Syndesmosis Injuries**  
*Haggai Schermann, MD*  
*Takahisa Ogawa, MD, MPH*  
*William R. Taylor, BS*  
*Bart Lubberts, MD, PhD*  
*Daniel Guss, MD, MBA*  
*Gregory R. Waryasz, MD*  
*Christopher W. DiGiovanni, MD, FAAOS*

Syndesmosis fixation with a suture tape reinforcement device was tested in coronal plane, in sagittal plane, and under external rotation stress in 15 partial and complete syndesmosis instability models.

4:15 PM  
**PAPER 446**  
**Operative Management of Ankle Fractures: Does the Presence of Depression Have an Impact on Patient-Reported Outcomes?**  
*David Bernstein, MD, MBA*  
*Gabriel A. Ramirez, MS*  
*Jeff R. Houck, PhD, PT*  
*Adolph S. Flemister, MD, FAAOS*  
*Irvin Oh, MD, FAAOS*  
*John P. Ketz, MD, FAAOS*  
*Judith F. Baumhauer, MD, MPH, FAAOS*

Patients with ankle fractures treated surgically continue to improve clinically up to one year but functional and pain improvement levels off around three months. Depressive symptoms impact recovery.

4:20 PM  
**PAPER 447**  
**Syndesmosis Injury Imparts a Large Negative Effect on Patient-Reported Outcomes: A Systematic Review**  
*John J. Heifner, MD*  
*Jack E. Kilgore, BS*  
*Jennifer A. Nichols, PhD*  
*Christopher W. Reb, DO, FAAOS*

Qualitative assertions that syndesmosis disruption imparts a large negative impact on clinical outcomes is accurate. The impact extends beyond an initial painful period which demands further attention.
4:30 PM  PAPER 448

Is Telemedicine More Suited for Certain Lower Extremity Pathologies? An Analysis of Non-Urgent Follow Up in a Foot and Ankle Practice

Wesley J. Manz, BA, MS
Rahul K. Goel, MD
Omolola Fakunle
Sameh A. Labib, MD, FAAOS
Jason T. Bariteau, MD, FAAOS

This study examines the nuances of tele-health satisfaction in patients presenting with foot and ankle pathologies to a new telemedicine platform.

4:35 PM  PAPER 449

Evidence for Graft Materials Used in Hindfoot and Ankle Arthrodesis: A Systematic Literature Review

David Fitch, PhD
Donald J. Covell, MD
Ryan L. McMillen, DPM

A systematic literature review showed most grafting materials used in foot and ankle arthrodesis are supported by retrospective case series, with the exception of RCTs for autograft and rhPDGF-BB/TCP.

Discussion
THURSDAY EDUCATIONAL PROGRAMS

FLASH FIVE®

8:00 AM - 9:00 AM
Ballroom 6D

◆ FF2 Flash Five®: What's Coming Down the Pike
Moderator: Amy L. Ladd, MD, FAAOS
Robert H. Brophy, MD, FAAOS
Henry D. Clarke, MD, FAAOS
Jason L. Dragoo, MD, FAAOS
Duretti Fufa, MD, FAAOS
Mark Glazebrook, MD
Mark A. Lee, MD, FAAOS
Michael D. McKee, MD, FAAOS
Calin S. Moucha, MD, FAAOS
Robert Z. Tashjian, MD, FAAOS
Douglas B. Unis, MD, FAAOS

Experience a burst of knowledge given in five minutes on topics benefiting orthopaedic surgeons. Fast and focused...each expert takes on a hot topic and provides the most critical points and takeaways.

INSTRUCTIONAL COURSE LECTURE

8:00 AM - 9:30 AM

◆ 301 Comprehensive Approach to Complex Revision
Total Hip Arthroplasty
Moderator: Donald S. Garbuz, MD, FAAOS
Craig J. Della Valle, MD, FAAOS
Wayne G. Paprosky, MD, FAAOS
Bryan D. Springer, MD, FAAOS

Ballroom 6C

This course is intended to be a comprehensive approach to revision problems. The focus is on complex revisions.

◆ 302 How to Keep from Getting in Over Your Head in Revision
Total Knee Arthroplasty
Moderator: Thomas K. Fehring, MD, FAAOS
Daniel J. Berry, MD, FAAOS
William L. Griffin, MD, FAAOS
Steven J. MacDonald, MD

Ballroom 6F

This course emphasizes the principles of revision total knee arthroplasty (TKA) using case-based examples of preoperative planning, exposure alternatives, extraction techniques, and reconstructive options.

◆ 303 Surgical Reconstruction of the Stage 2 (Flexible)
Collapsed Arch
Moderator: Justin K. Greisberg, MD, FAAOS
Brian C. Toolan, MD, FAAOS
James T. Vosseller, MD, FAAOS

Room 28E

Newest concepts in reconstruction of the flexible flat foot, including spring ligaments techniques, alternative fusions, and newest viewpoints on lateral column lengthening, are covered.

◆ 304 Platelet-Rich Plasma, Bone Morphogenetic Protein, and Stem Cells: What Surgeons Need to Know
Moderator: Brian T. Feeley, MD, FAAOS
Frank Petrigliano, MD, FAAOS
Harvey E. Smith, MD, FAAOS
Wellington Hsu, MD, FAAOS
Seth K. Williams, MD, FAAOS

Course presenters discuss the most important biologics in orthopaedic surgery, including growth factors, cell therapy, and pharmacologics to promote bone and soft tissue healing.

◆ 305 The Ethical, Legal, and Food and Drug Administration-Compliant Use and Marketing of Orthobiologics
Moderator: Joanne Halbrecht, MD, FAAOS
Scott P. Bruder, MD, PhD

Room 7B

Food and Drug Administration regulations, truth in advertising laws, and recommended ethical standards for the use and marketing of orthobiologics are covered.

◆ 306 Treating Hand Fractures: Management and the Ability to Treat the Complications that Inevitably Occur
Moderator: A. Lee Osterman, MD, FAAOS
Joshua M. Abzug, MD, FAAOS
Raymond G. Gaston, MD, FAAOS
Meredith N. Osterman, MD, FAAOS

Room 9

The management of hand fractures occurring in all age groups is presented in a case-based manner. Detailed discussion regarding pearls and pitfalls of initial treatment, avoiding the potential complications as well as managing them, can aid orthopaedic surgeons in their practice.

◆ 307 Bone Tumors in the Young Person: Diagnosis and Management
Moderator: Wakenda K. Tyler, MD, MPH
Adam S. Levin, MD, FAAOS
Thomas J. Scharschmidt, MD, FAAOS

Room 30A

This course is a review of the most current treatment of the most common benign and malignant bone tumors in pediatric and young adult patients.

◆ 308 Common Pediatric Fractures for Community Orthopaedic Surgeons: Fix them or Ship them?
Moderator: Rasesh R. Desai, MD
Jose A. Herrera Soto, MD, FAAOS
Viral V. Jain, MD, MBBS
Shital N. Parikh, MD, FAAOS

Room 4

This instructional course lecture focuses on common pediatric fractures seen in community emergency room like supracondylar / elbow fractures, both bone forearm fractures, distal radius fractures, and ankle fractures. It discusses principles of fracture management, pearls and pitfalls of the treatment, possible complications, current trends in management, and postoperative management. There is didactic lectures on each fracture by an eminent faculty followed by audience discussion and a case / clinical scenario.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
309  Physician Assistant Utilization within Your Practice
Moderator: Daniel J. Coll, MBA, PA-C
Susan A. Scherl, MD, FAAOS
Room 29C
Understand the range of strategies for usage of physician assistants within the orthopaedic practice setting. Faculty focuses on reimbursement, utilization, and productivity.

310  Shoulder Arthritis in the Young Adult: Arthroscopy to Arthroplasty
Moderator: John W. Sperling, MD, MBA, FAAOS
Alan S. Curtis, MD, FAAOS
Thomas R. Duquin, MD, FAAOS
Scott A. Rodeo, MD, FAAOS
Room 5
This instructional course lecture presents current concepts and key surgical techniques in the management of shoulder arthritis in the young adult including arthroscopy, biologics, and shoulder arthroplasty.

311  Stemless Shoulder Replacement
Moderator: Geoffrey Nourissat, FACS
Wayne Z. Burkhead, MD, FAAOS
John G. Costouros, MD, FAAOS
Laurent Obert, MD
Room 29B
The aim of the current instructional course lecture is to have an overview of indications and results of stemless total shoulder replacement from European and United States surgeons.

312  Is it the Back or the Hip? Differentiating Lumbar Spine from Hip Pathologies: Key Points of Evaluation and Treatment
Moderator: Stuart H. Hershman, MD, FAAOS
Stephen Gould, MD, FAAOS
Robert P. Norton, MD, FAAOS
Jonathan M. Vigdorchik, MD, FAAOS
Room 1
This course focuses on the causes and overlapping clinical presentation of lumbar spine and hip pathology. Key diagnostic methods, clinical signs, and exam findings used to differentiate them, as well as common treatment options, are discussed.

313  Vertebral Body Tethering: Rationale, Results, and Revisions. State-of-the-Art and Future Directions in Fusionless Scoliosis Correction
Moderator: Baron Lonner, MD, FAAOS
Daniel G. Hoernschemeyer, MD, FAAOS
Firoz Miyanji, MD
Amer Samdani, MD
Room 3
This course provides the basic science and clinical rationale for spinal tethering, techniques, outcomes, complications as well as controversial areas associated with the approach.

314  Patellofemoral 101 – Back to the Basics: How to do a Medial Patellofemoral Ligament, Tibial Tubercle Osteotomy, and Osteochondral Fracture Repair for Recurrent Patellar Instability
Moderator: Sabrina Strickland, MD, FAAOS
Andreas H. Gomoll, MD, FAAOS
Bert Mandelbaum, MD, FAAOS
Seth Sherman, MD, FAAOS
Room 2
The goal of this course is to improve an orthopaedic surgeon's management of patellar instability. The focus is on decision making and surgical technique of medial patellofemoral ligament reconstruction, tibial tubercle osteotomy, osteochondral fracture repair, and acute cartilage injury.

315  Postoperative Pain Control after Osteotomy in an Era of Opioid Addiction
Moderator: Anna N. Miller, MD, FAAOS
Austin T. Fragomen, MD, FAAOS
Christopher A. Iobst, MD, FAAOS
Sarah Pierrie, MD
Room 7A
This crisis has brought together Academy fellows from multiple societies including LLRS, OTA, and POSNA to share and discuss non-opioid strategies for pain control.

SPEED MENTORING FOR RESIDENTS
8:00 AM - 9:30 AM
390 Speed Mentoring for Residents
Moderator: Lisa K. Cannada, MD, FAAOS
Room 8
Learn how to navigate the transition from residency to practicing physician from the pro's. This free session will focus on guidance of the practical and the intangibles you need to start your next phase of our career in a successful manner. (CME credit not available for this session). This session is sponsored by Zimmer Biomet.

PAPER PRESENTATIONS
8:00 AM - 9:30 AM
Ballroom 6A
Adult Reconstruction Knee IV
Moderators: Denis Nam, MD, MSc, FAAOS and Aidin Eslam Pour, MD, FAAOS
PAPER 450
8:00 AM
A Randomized Controlled Trial of Outcomes in Free-Hand vs. Sensor-Guided Balancing in Total Knee Arthroplasty: Results from the Short Term Nana O. Sarpong, MD
Matthew Grosso, MD
Michael B. Held, MD
Carl L. Herndon, MD
Fnu Akshay, MD
Roshan P. Shah, MD, JD, FAAOS
Herbert J. Cooper, MD, FAAOS
Jeffrey A. Geller, MD, FAAOS
The need for objective TKA soft-tissue balancing from subjective to objective has been recognized by a technology that quantifies ligament balance by offering intraoperative evidence-based data during TKA.
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 451: Accuracy of Balance in Tibia and Femur First Total Knee Arthroplasty using Digital Balancing Tools</th>
</tr>
</thead>
</table>
| 8:05 AM  | Jan A. Koenig, MD, FAAOS  
Edgar A. Wakelin, PhD  
Sami Shalhoub, MS  
Christopher Plaskos, PhD |
|          | A tibia-first approach with digital balancing allows surgeons to more accurately achieve a target joint balance in TKA. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 452: Prospective Randomized Blinded Intraoperative Sensor-Balanced Total Knee Arthroplasty Study Assessed by Wearable Sensors</th>
</tr>
</thead>
</table>
| 8:10 AM  | Alexander P. Sah, MD, FAAOS  
Alexander P. Sah, MD, FAAOS  
Alexander P. Sah, MD, FAAOS |
|          | Immediate recovery benefits of a load sensing technology warrant larger studies, with wearable technology possibly revealing these earlier outcome differences compared to standard techniques. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 453: Impact of Intraoperative Technology on Patient Outcomes following Total Knee Arthroplasty</th>
</tr>
</thead>
</table>
| 8:20 AM  | Vivek Singh, MD  
Katherine A. Lygrisse, MD  
Trevor Simcox, MD  
Morteza Meftah, MD  
Vinay Aggarwal, MD  
Ran Schwarzkopf, MD, FAAOS |
|          | This study looks at the impact of intraoperative technology on patient outcomes following total knee arthroplasty. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 454: Robotic Assisted vs. Conventional Primary Total Knee Arthroplasty: Comparison of Outcomes and Post-Acute Costs</th>
</tr>
</thead>
</table>
| 8:25 AM  | Alexander C. Gordon, MD, FAAOS  
Stephanie Kaszuba, MD  
Chad Anderson, PA-C  
Kyle M. Behrens, BS  
Marc Angerame, MD |
|          | Robotic technology and conventional instruments in sensor guided total knee arthroplasty have similar patient-reported outcomes and post-acute costs. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 455: The Use of Navigation or Robotic-Assisted Technology in Total Knee Arthroplasty Does Not Reduce Postoperative Pain</th>
</tr>
</thead>
</table>
| 8:30 AM  | Ran Schwarzkopf, MD, FAAOS  
Stephen Zak, BA  
David Yeroushalmi, BS  
Alex Tang, BS  
Morteza Meftah, MD  
Erik A. Schnaser, MD, FAAOS |
|          | The use of intraoperative technology in total knee arthroplasty does not yield a clinically significant reduction in pain outcomes. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 456: The Impact of Author Financial Conflicts on Robotic-Assisted Joint Arthroplasty Research</th>
</tr>
</thead>
</table>
| 8:40 AM  | Michael J. Defrance, DO  
Michael Yayac, BA  
Paul M. Courtney, MD, FAAOS  
Matthew W. Squire, MD, MS |
|          | This is a study examining whether COI relating to robotic-assisted arthroplasty influences the results of the published outcomes following total hip, total knee, and unicompartmental knee arthroplasty. |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 457: App-Based Rehabilitation Program after Total Knee Arthroplasty: A Randomized Controlled Trial</th>
</tr>
</thead>
</table>
| 8:45 AM  | Henrik C. Backer, MD  
Chia H. Wu, MD, MBA  
Carsten Perka, MD  
Sebastian Hardt |
|          | An app-based knee trainer is an effective tool in improving functional outcome. |
|          | **Discussion** |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 458: A Smartwatch Paired Mobile Application Provides Postoperative Self-Directed Rehabilitation without Compromising Patient Outcomes: A Randomized Controlled Trial</th>
</tr>
</thead>
</table>
| 8:50 AM  | Krishna R. Tripuraneni, MD, FAAOS  
Jared R. Foran, MD, FAAOS  
James C. Ballard, MD, FAAOS |
|          | A self-directed physical therapy protocol does not compromise outcomes in TKA and can be considered a valid alternative, as seen in this RCT. |

<table>
<thead>
<tr>
<th>Time</th>
<th>Paper 459: The Talking Knee is a Reality: Remote Patient Monitoring Prosthesis for Total Knee Arthroplasty</th>
</tr>
</thead>
</table>
| 9:00 AM  | Fred D. Cushner, MD, FAAOS  
Peter J. Schiller, PhD  
John P. Mueller, PhD  
Jeffrey Gross, PhD  
William L. Hunter, MD, MSc |
|          | The results confirm signals generated from an embedded TKA sensor can transmit through bone and cement providing accurate ROM data and may be capable of remotely detecting prosthesis fixation changes. |

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9:05 AM  PAPER 460
Minimizing Surgical Instrument Burden Increases Operating Room Efficiency and Reduces Perioperative Costs in Total Joint Arthroplasty
Graham S. Goh, MD
Eric A. Leviscoff, MD, FAAOS
Robert P. Good, MD, FAAOS
Jess H. Lonner, MD, FAAOS

Lean methodology improves efficiency in instrument tray usage and reduces costs in TJA. Annual savings in instrument processing amounted to over $280,000 on average.

Discussion

PAPER PRESENTATIONS  FREE  NO TICKET REQUIRED

8:00 AM - 9:30 AM  Ballroom 6B
Adult Reconstruction Hip IV
Moderators: Michele R. D’Apuzzo, MD, FAAOS and James J. Purtill, MD, FAAOS

8:00 AM  PAPER 461
Etiology and Complications of Early Aseptic Revision Total Hip Arthroplasty within 90 Days
Tony S. Shen, MD
Alex Gu, MD
Patawat Bovonratwet, MD
Nathaniel Ondock, MD
Peter K. Sculco, MD
Edwin P. Su, MD, FAAOS

Early aseptic revision total hip arthroplasty within 90 days is associated with significantly high 90-day complication rates and two-year rerevision rates.

8:05 AM  PAPER 462
High Incidence of Indolent Periprosthetic Joint Infection with Elevated Inflammatory Markers and Dry Aspiration
Bryan Grommersch
Samir Chihab, MD
Thomas L. Bradbury, MD, FAAOS
George N. Guild, MD, FAAOS

This study examines the outcomes of rTHA with a preoperative dry aspiration, and we hypothesize a high incidence of PJI with indolent organisms.

8:10 AM  PAPER 463
Artificial Intelligence to Identify Arthroplasty Implants from Radiographs of the Hip
Prem N. Ramkumar, MD, MBA
Jaret M. Karnuta, MS
Bryan Luu, BS
Heather Haeberle, MD
Alexander L. Roth, MD
Lukas M. Nyström, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS
Richard Iorio, MD, FAAOS
Viktor Erik Krebs, MD, FAAOS

We found that a system applying a deep-learning algorithm trained on nearly 2,000 AP radiographs had excellent to near-perfect performance in identifying 18 unique hip arthroplasty implants.

Discussion

8:20 AM  PAPER 464
Mortality after Revision Total Hip Arthroplasty
Anay R. Patel, MD
Mitzi S. Laughlin, PhD, ATC
Emily A. Vidal, BS
Sachin Shetty
Aslan Amirian, MD
Ugona N. Ihekweazu, MD
Robin N. Goytia, MD, FAAOS
Vasilios Mathews, MD, FAAOS
Gregory W. Stocks, MD, FAAOS

The purpose of this study is to determine the mortality rate after revision THA.

8:25 AM  PAPER 465
Revisions for Periprosthetic Hip Infections Do Not Fail More than Revisions for Aseptic Loosening, but Mortality is Higher
Francesco Pardo, MD
Francesco Castagnini, MD
Maurizio Montalti, MD
Federalo Giardina, MD
Barbara Bordini, MD
Stefano Lucchini, MD
Cesare Faldini, MD
Francesco Traina, MD, PhD

Revision hips performed for aseptic loosening or periprosthetic hip infections achieved similar survival rates and reasons for rerevision.
<table>
<thead>
<tr>
<th>Time</th>
<th>Paper</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>PAPER 466</td>
<td>Comparison of Asymptomatic and Symptomatic Adverse Local Tissue Reactions in Patients with Head-Neck Taper Corrosion</td>
<td>Kalain Workman, DO, Margaret Weber, Matthew Snyder, BS, Clair Smith, MS, Deepak Kumar, BS, Camilo G. Borrero, MD, Andrew Cordle, MD, PhD, Anthony M. DiGiola, MD, FAAOS, Brian R. Hamlin, MD, FAAOS, Anton Y. Plakseychuk, MD, FAAOS, Kenneth Urish, MD, PhD, FAAOS, Margaret Sims, PA-C</td>
<td>UPMC Department of Orthopedics and Radiology</td>
</tr>
</tbody>
</table>

Patients with asymptomatic pseudotumors have similar MARS MRI characteristics and cobalt levels. **Discussion**

| 8:40 AM | PAPER 467 | Aspirin Is Safe for Venous Thromboembolism Prophylaxis for Patients with a History of Gastrointestinal Issues | Matthew Grosso, MD, Elie Kozaily, MD, Javad Parvizi, MD, FAAOS, Matthew Austin, MD, FAAOS | This is a study examining the safety of ASA for VTE prophylaxis following TJA in patients with prior history of GI issues. **Discussion** |

| 8:45 AM | PAPER 468 | Pigmented Villonodular Synovitis of the Hip in Patients Undergoing Total Hip Arthroplasty: A Retrospective Case-Controlled Analysis | Andrew Ardeljan, BS, Teja S. Polisetty, BS, Joseph Palmer, DO, Justin Toma, MD, BS, Gagan Grewal, MD, MS, Martin W. Roche, MD, FAAOS | The study found patients with pigmented villonodular synovitis of the hip undergoing primary total hip arthroplasty were at increased risk for 90-day medical and 2-year implant-related complications. **Discussion** |

| 8:50 AM | PAPER 469 | Are Current Diagnosis Related Groups-Based Bundled Payment Models for Revision Total Joint Arthroplasty Risk-Adjusting Adequately? An Analysis of Medicare Beneficiaries | Azeem T. Malik, MBBS, Mengnai Li, MD, PhD, Safdar N. Khan, MD, FAAOS, John H. Alexander, MD, Daniel Li, MD, Thomas J. Scharschmidt, MD, FAAOS | Under the proposed DRG-based bundled payment methodology, physicians would be reimbursed the same amount of money for revision TJAs, regardless of the indication (periprosthetic fracture vs. prosthetic joint infection vs. mechanical loosening) and/or case complexity. **Discussion** |

| 9:00 AM | PAPER 470 | Use of Prophylactic Cerclage Cable Prevents Subsidence of a Revision Uncemented Stem: A Retrospective Study | Prasad Antapur, MD, Nastaran Sargazi, MRCS, Rajesh H. Pawar, FRCS (Ortho), Jody M. Blow, Rye Y. Yap, MBCHB, Mark Rowsell, FRCS (Ortho), MBBS | Prophylactic cerclage cable usually applied to prevent fractures can also prevent subsidence of a uncemented modular femoral stem. **Discussion** |

| 9:05 AM | PAPER 471 | Development of a Novel Machine Learning Algorithm for Prediction of Complications after Total Hip Arthroplasty | Akash Shah, MD, Sai Devana, MD, Changhee Lee, Nelson F. SooHoo, MD, FAAOS | We report a novel, well-calibrated ML algorithm for prediction of perioperative complications after THA with superior risk prediction compared to both logistic regression and standard ML algorithms. **Discussion** |

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PAPER PRESENTATIONS

8:00 AM - 9:30 AM
Ballroom 6E
Spine IV

8:00 AM  PAPER 472
Assessing Minimal Clinically Important Difference Thresholds for Minimally Invasive Transforaminal Interbody Fusion at Two Years
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Augustus Rush, MD
Dustin H. Massel, MD
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS

This study aimed to investigate and establish minimal clinically important differences (MCID) at 2-years for PROMIS Physical Function (PF) among patients undergoing minimally invasive TLIF.

8:05 AM  PAPER 473
Surgeon Learning Curve and Clinical Outcomes of Minimally Invasive Anterior Lumbar Interbody Fusion with Posterior Percutaneous Instrumentation
Muhammad Z. Mirza, MD
Sydney Olson
Annalise M. Panthofer, BS
Jon Matsumura, MD
Seth K. Williams, MD, FAAOS

This study addresses surgeon learning curve and complications during the initial learning phase of mini-ALIF approach with posterior percutaneous pedicle screw placement.

8:10 AM  PAPER 474
Avani Vaishnav, MBBS
Jung K. Mok, BS
Hikari Urakawa, MD
Kosuke Sato, MD
Ryan Lee, MBA
Chirag B. Chaudhary, MS
Sheeraz Qureshi, MD, FAAOS

This study evaluates the evolution of image-guidance in minimally invasive MI-TLIF and assesses the learning curve of 3 modalities – fluoroscopy, intraoperative navigation, and robotics.

8:20 AM  PAPER 475
Long-Term Results of Minimally Invasive Transforaminal Lumbar Interbody Fusion in Elderly Patients: A 5-Year Follow-Up Study
Graham S. Goh, MD
Gerald J. Zeng
Yogen Thever
Chang Ming Guo, MBBS MRCS
Wai Mun Yue, MD
Seang-Beng Tan, MD
John L. Chen, ChB, FRCS
Reuben C. Soh, FRCS (Ortho), MBBS

Elderly patients undergoing MIS TLIF had similar perioperative outcomes and achieved comparable improvements in pain, disability, and quality of life that were sustained for up to 5 years.

8:25 AM  PAPER 476
Comparison of Free Hand, Fluoro-Guided, CT Navigation, and Robot-Guided Transforaminal Interbody Fusion and Anterior Lumbar Interbody Fusion
Aaron J. Buckland, FRACS, MBBS
Jack R. Zhong, BA
Carlos Leon
Kimberly Ashayeri, MD
Eaman Balouch, MD, PhD
Nicholas A. O’Maley, BS
Carolyn Stickley, BS
Constance Maglaras, PhD
Brooke K. O’Connell

This single center retrospective study compares the perioperative outcomes between free hand, fluoroscopy guided, navigation, and robot assisted transforaminal and anterior lumbar interbody fusions.

8:30 AM  PAPER 477
Introducing Navigation or Robotics into Transforaminal Lumbar Interbody Fusion Techniques: Are We Optimizing our Index Episode of Care or Just Spending More Money?
Jeffrey Gum, MD, FAAOS
Charles H. Crawford, MD, FAAOS
Mladen Djurasovic, MD, FAAOS
Roger K. Owens, MD, FAAOS
Morgan E. Brown, MS
Leah Y. Carreon, MD

In a propensity matched comparison across TLIF techniques, the utilization of navigation or robotics for MIDLIFs improves the profile of the index episode of care without increasing cost.

Discussion
8:40 AM  PAPER 478
Five-Year Clinical Outcomes of Minimally Invasive Posterior Decompression for Lumbar Spinal Stenosis with Degenerative Spondylolisthesis
Yuto Kobayashi, MD
Koji Tamai, MD
Hiromitsu Toyoda
Hitomoto Terai, MD, PhD
Masatoshi Hoshino, MD, PhD
Akinobu Suzuki, MD, PhD
Shinji Takahashi, MD
Yusuke Hori, MD
Akinobu Suzuki, MD, PhD
Hiroaki Nakamura, MD
Department of Orthopaedic Surgery, Osaka City University

Minimally invasive decompression for lumbar spinal stenosis with degenerative spondylolisthesis was effective, with improvement in back pain, symptoms, and quality of life 5 years after surgery.

8:45 AM  PAPER 479
Risk Factor for Incidence of Postoperative Spinal Epidural Hematoma following Multiple Microendoscopic Laminectomy
Hirofumi Bekki, MD, MSc
Takeshi Arizono, MD
Akihiko Inokuchi, MD, PhD
Ryuta Imamura, MD
Takahiro Hamada, MD
Ryunosuke Oyama, MD
Yuki Hyodo
Eiji Kinoshita, MD
Mariko Kido, MD

For m-MEL, the incidence of POSEH is highest at L2/3 level, and the spinal stenosis is relevant for the incidence. Polite hemostasis and strict suction drainage may be necessary to prevent POSEH especially in cases with severe preoperative spinal stenosis at L2/3 level.

8:50 AM  PAPER 480
Operative Time and Radiographic Differences in the Disc and Foraminal Heights between Lateral and Supine Anterior Lumbar Interbody Fusion
Arash J. Sayari, MD
Zakariah K. Siyaji, BS
Mark Berkowitz, BS
Alexander L. Hornung
Armaan Mohajir
Garrett Harada, MD
Michael T. Nolte, MD
Frank M. Phillips, MD, FAAOS
Gregory Lopez, MD

Compared to traditional, supine ALIF, patients undergoing a lateral ALIF procedure had no clinical difference pre- to postoperatively and no changes in disc or foraminal heights.

9:00 AM  PAPER 481
Minimally Invasive Proximal Screw Stabilization in Long Posterior Instrumented Spinal Fusion for Prevention of Proximal Junctional Kyphosis and Failure
Vikas V. Patel, MD, BSME, FAAOS
Renzo A. Laynes, MD, BA
David C. Ou-Yang, MD
Andriy Noshchenko, MD, PhD

PJK and PJF development trends toward decrease in patients after the minimally invasive technique is applied at upper instrumented levels versus the standard open approach.

9:05 AM  PAPER 482
Comparative Evaluation of Complication Rates and Length of Stay for Patients Undergoing Single Level Minimally Invasive Transforaminal Lumbar Interbody Fusion, Lateral Lumbar Fusion, and Anterior Interbody Fusion
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Michael T. Nolte, MD
Cara E. Geoghegan, BS

This study compared the complication rates and length of stay for TLIF, ALIF, and LLIF patients and determined factors that contribute to inpatient stay longer than 24hrs.

8:00 AM - 9:30 AM  Room 32  Pediatrics III

8:00 AM  PAPER 483
Nonoperative Management of Femoroacetabular Impingement: Clinical Outcomes at 5-Years – A Prospective Study
Andrew Zogby, MD

Nonoperative management can be successful for a large portion of adolescent patients with symptomatic FAI syndrome with durable outcomes at 5-year follow up.
8:05 AM  PAPER 484
On the Rise: The Increasing Frequency of Pediatric Shoulder Stabilization Surgery in the United States
Haley Smith, MD
Neeraj M. Patel, MD, MPH

The frequency of shoulder stabilization procedures has increased steadily in the pediatric population. However, there are geographic differences in these trends and the frequency of complex surgeries.

8:10 AM  PAPER 485
Intermediate Term Results of Combined Surgical Dislocation and Peri-acetabular Osteotomy for Complex Perthes Deformities: Can We Save the Hip?
John C. Clohisy, MD, FAAOS
Serena M. Freiman, BS
Jeffrey J. Nepple, MD, FAAOS
Gail Pashos
Perry L. Schoenecker, MD, FAAOS

At intermediate follow up, combined SD/PAO for complex LCP deformities preserves 87% of hips and provides reliable deformity correction, major pain relief, and acceptable complication/failure rates.

8:20 AM  PAPER 486
Treat the Image or the Infant: Ultrasonographic Abnormalities in Stable Hips
Elizabeth W. Hubbard, MD, FAAOS
Robert K. Lark, MD, FAAOS
Benjamin Alman, MD, FAAOS
Robert D. Fitch, MD, FAAOS

Most abnormalities noted on screening ultrasounds obtained in infants who have clinically stable hips resolve spontaneously and do not require orthopaedic intervention.

8:25 AM  PAPER 487
Part-Time Abduction Bracing in Infants with Residual Acetabular Dysplasia: Does Compliance Monitoring Support a Dose-Dependent Relationship?
Ishaan Swarup, MD
Divya Talwar, MPH, PhD
Wudbhav N. Sankar, MD, FAAOS

This study validates the use of part-time abduction bracing for treating residual acetabular dysplasia in infants 6 months of age, and demonstrates a dose-dependent relationship.

8:30 AM  PAPER 488
Minimum 10-Year Follow Up Of Hip Dysplasia Treated with Periacetabular Osteotomy
Michael C. Willey, MD, FAAOS
Jessica Goetz, PhD
John Davison, MPH
Natalie A. Glass, PhD
Todd O. McKinley, MD, FAAOS
Emily A. Parker, BA
Aspen Miller, BS
Amanda Paulson, DPT
Robert W. Westermann, MD

This study identified risk factors for OA and conversion to THA after PAO in patients with long-term follow up.

8:40 AM  PAPER 489
Opioid Use in Children and Adolescents following Common Orthopaedic Surgeries
Samuel C. Willimon, MD, FAAOS
Asahi Murata, BS
Aanya R. Agrawala, BS
Crystal A. Perkins, MD

Opioid medication use in pediatric patients after orthopaedic surgery is much less than what is traditionally prescribed, with nearly 60% of prescribed mediations unused.

8:45 AM  PAPER 490
Analgesic Prescribing and Post-Discharge Opioid Use among Pediatric Patients with Operative Fractures
Lukas Keil, MD
Mikaela H. Sullivan, MD
Sahil Dadoo, BS
Matthew Stillwagon, MD
Anna D. Vergun, MD, FAAOS

For all operative pediatric fractures, prescribing 8 doses of narcotic is adequate for acute pain through POD5 in 95% of patients; the remaining 5% should be evaluated for possible complications.

8:50 AM  PAPER 491
Earlier Bowel Movements with Oral Methylnaltrexone following Posterior Spinal Fusion for Adolescent Idiopathic Scoliosis
Adrian Lin, BS
Andrew Costandi, MD
Eugene Kim
David L. Skaggs, MD, FAAOS
Lindsay M. Andras, MD, FAAOS
Neha Patel
Carl (yuan-Feng) Lo
Kenneth D. Illingworth, MD

The use of oral methylnaltrexone after PSFI reduces postoperative constipation, which has implications for reducing hospital length of stay and overall morbidity.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
Thursday Educational Programs

9:00 AM  PAPER 492
Bone Deficits in Ambulatory Youth with Spina Bifida Accelerate during Puberty
Robert M. Kay, MD, FAAOS
Tishya Wren, PhD
Nicole Mueske
Susan A. Rethlefsen, PT
Alexander L. Van Speybroeck, MD
Wendy Mack, PhD
Puberty is a critical period for preventing bone deficits in youth with spina bifida.

9:05 AM  PAPER 493
Calcaneal Sliding Osteotomy is More Effective than Calcaneal Lengthening Osteotomy for Correction of Valgus Foot Deformities in Children with Cerebral Palsy
Robert M. Kay, MD, FAAOS
Oussama Abousamra, MD
Susan A. Rethlefsen, PT
Alison Hanson, MPT
Tishya Wren, PhD
CS is more effective than LCL in providing long-lasting correction of valgus foot deformities. Concomitant talonavicular fusion is key to success of both procedures.

9:10 AM  PAPER 494
Implant Removal vs. Single-Stage Implant Exchange for Late Infections after Spinal Fusions for Adolescent Idiopathic Scoliosis
Derek T. Nhan, MD
Paul D. Sponseller, MD, FAAOS
Burt Yaszay, MD, FAAOS
Michelle Marks, PT, MA
Peter O. Newton, MD, FAAOS
After late infections in AIS, neither single-stage implant exchange nor implant removal was associated with recurrent infection; implant exchange provided better maintenance of correction.

Discussion

INSTRUCTIONAL COURSE LECTURE

11:00 AM - 12:30 PM

321  Do a Better Total Hip Arthroplasty: Tips and Tricks to Enhance Your Outcomes in Both Simple and Complex Cases
Moderator: Jay R. Lieberman, MD, FAAOS
James A. Browne, MD, FAAOS
Michael J. Taunton, MD, FAAOS
Robert T. Trousdale, MD, FAAOS
This course reviews perioperative management strategies and surgical techniques (exposure and component implantation) that can improve outcomes in both routine and complex total hip arthroplasty (THA).

322  Outpatient Joint Replacement: Practical Guidelines for Your Program Based on Evidence, Success, and Failure
Moderator: Alexander P. Sah, MD, FAAOS
Charles A. DeCook, MD, FAAOS
Craig J. Della Valle, MD, FAAOS
R. Michael Meneghini, MD, FAAOS
Lessons can be learned from case examples of real-life challenges and failures in the ambulatory surgical center setting to help shape future success of outpatient joint replacement.

323  Individualized Alignment in Total Knee Arthroplasty: Why, When, and How?
Moderator: Mark W. Pagnano, MD, FAAOS
This course reviews fundamental principles of knee alignment in total knee arthroplasty and provides the latest information on indications and techniques for individualized knee alignment.

324  Posttraumatic Ankle Osteoarthritis in the Young Adult: A Spectrum of Treatment Options
Moderator: Douglas N. Beaman, MD, FAAOS
Constantine A. Demetracopoulos, MD, FAAOS
Scott Ellis, MD, FAAOS
Justin D. Orr, MD, FAAOS
This collaboration between LLRS and AOFAS brings Limb Deformity and Ankle experts together to discuss treatment approaches and techniques for post-traumatic osteoarthritis in young patients.

325  Evidence-Based and High-Value Management of Common Disorders of the Elbow and Forearm
Moderator: Kevin Chan, MD
Noah M. Raizman, MD, FAAOS
David C. Ring, MD, FAAOS
Joy V. Sharma, MD, FAAOS
The faculty discusses current best available evidence to guide treatment on common elbow/forearm conditions, including distal biceps injuries, lateral epicondylitis, radial head/olecranon fractures, and cubital tunnel syndrome.

326  Management of Metastatic Disease to Bone
Moderator: Emily E. Carmody, MD, FAAOS
Tessa Balach, MD, FAAOS
Yee-Cheen Doung, MD, FAAOS
Bryan S. Moon, MD, FAAOS
This is a specialist technical skills instructional course lecture to effectively recognize and develop best practices for metastatic disease. It also helps you develop optimal and durable fixation and treatment plans.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
327  Office Management of Common Pediatric Fractures: Treatment Strategies to Optimize Success
Moderator: Bernard D. Horn, MD, FAAOS
Martin J. Herman, MD, FAAOS
Richard W. Kruse, DO, FAAOS
Todd A. Milbrandt, MD, FAAOS
Room 7B
Most pediatric fractures are treated without surgery. This course teaches successful nonsurgical treatment of common pediatric fractures with practical, evidence-based advice and techniques.

328  Shoulder Arthroplasty Management in the Young Patient with Posterior Glenoid Bone Erosion
Moderator: Grant E. Garrigues, MD, FAAOS
Anthony Miniaci, MD, FRCSC
Gregory P. Nicholson, MD, FAAOS
Markus Scheibel, MD
Room 28C
The current management approaches for glenohumeral osteoarthritis with posterior glenoid bone erosion are reviewed with reconstructive challenges presented in an interactive, case-based format.

329  Tips and Tricks for Common, Yet Difficult, Osteopenic Fractures in the Community
Moderator: Frank A. Liporace, MD, FAAOS
Derek J. Donegan, MD, MBA, FAAOS
Mark A. Migell, MD, FAAOS
Richard S. Yoon, MD, FAAOS
Room 29C
This instructional course provides decision-making pearls and tricks for both fixation and arthroplasty for osteopenic proximal humerus, distal humerus, and displaced femoral neck fractures.

330  Complications of Extra-Capsular Hip Fracture Fixation
Moderator: Matthew L. Klima, DO, FAAOS
Tips for the early detection of complications of Extra-Capsular Hip Fracture Fixation and strategies for prevention and management. When to Watch, When to Revise, and When to Replace
Room 9

384  Multiple Ligament Knee Injuries: What Would You Do?
Moderator: Mark D. Miller, MD, FAAOS
Annunziato Amendola, MD, FAAOS
Cory Edgar, MD, PhD
Gregory C. Fanelli, MD, FAAOS
Alan Getgood, MD, FRCS (Ortho)
Darren L. Johnson, MD, FAAOS
Bruce A. Levy, MD, FAAOS
Robert G. Marx, MD, FAAOS
Claude T. Moorman, MD, FAAOS
Gehron Treme, MD, FAAOS
Brian C. Werner, MD, FAAOS
Room 33
Using a series of actual knee multiple ligament injury (MLI) cases, faculty members discuss treatment options for a variety of conditions, including open injuries, four ligament tears, obese MLI, and delayed presentation.

CAREER DEVELOPMENT
11:00 AM - 12:00 PM
Room 28E

CD11 Leadership at Every Level: Principles and Practice
Moderator: Aaron G. Rosenberg, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Thomas K. Fehring, MD, FAAOS
Joshua J. Jacobs, MD, FAAOS
This course is designed to help you implement your leadership skills at the local, regional, and national levels. Specifics of successful leadership are discussed, understanding that leaders are developed not born. Team building, mentoring, and inertia avoidance are discussed along with time management and strategies to maintain balance.

PAPER PRESENTATIONS
11:00 AM - 12:30 PM
Ballroom 6A

Sports Medicine V
Moderators: Brian T. Feeley, MD, FAAOS and Kirk A. Campbell, MD, FAAOS

11:00 AM PAPER 495
Amniotic Suspension Allograft Injection Improves Pain and Function in Patients with Knee Osteoarthritis for 12 Months
Andreas H. Gomoll, MD, FAAOS
Jack Farr, MD, FAAOS
Kelly Kinnerling, PhD
Katie C. Mowry, PhD
Patients that received ASA showed significant improvements in pain and function compared to both HA and saline for up to 12 months postinjection.
11:05 AM
PAPER 496
Intermediate Term Follow Up of a Randomized Clinical Trial Utilizing a Biopolymer Hydrogel for Articular Cartilage Lesions in the Knee
Gennaro Pipino, MD
Raffaele Borghi, MD
Davide C. Vaccarisi, MD
Pier Francesco Indelli, MD, PhD

Patients treated with biopolymer hydrogel and microfracture technique obtained better clinical results than patients treated with only microfracture.

11:10 AM
PAPER 497
Rescue Injection of Amniotic Suspension Allograft Improves Pain and Function in Patients with Knee Osteoarthritis
Eric J. Strauss, MD, FAAOS
Andreas H. Gomoll, MD, FAAOS
Jack Farr, MD, FAAOS
Adam B. Yanke, MD, PhD, FAAOS
William T. Archambault, PhD
Kelly Kimerling, PhD
Katie C. Mowry, PhD

Patients who received a rescue injection of ASA showed significantly greater improvement compared to their original treatment with saline or HA (over 3 months); these improvements persisted for up to 12 months.

11:20 AM
PAPER 498
Intra-Articular Placebo Injection Showed Similar Effects on Knee Osteoarthritis Symptoms as Sham (Dry Needle) Insertion: A Prospective Randomized Controlled Trial
Jeyanesh Tambiah, MBCHB, FRCS
Yusuf Yazici, MD
C. J. Swearingen, PhD
Annemarie K. Tilton, MD
Sarah Kennedy, PhD
Brian J. Cole, MD, MBA, FAAOS

Patient-reported outcomes, including pain, function, and patient global assessment, are equivalent after intra-articular vehicle or sham (dry needle) injection.

11:25 AM
PAPER 499
Single Step Ultrapurified Alginate Gel Transplantation in Patient with Chondral Defects of the Knee: A First-in-Human, Single-Arm Trial
Tomohiro Onodera, MD, PhD
Rikiya Baba, MD
Koji Iwasaki, MD, PhD
Masatake Matsuoka, PhD
Shinji Matsubara, MD, PhD
Eiji Kondo, MD
Koji Suzuki, MD
Masayuki Inoue, MD
Norimasa Iwasaki

The present study provided evidence for the safety and efficacy of an acellular UPAL gel transplantation to facilitate cartilage repair. The UPAL gel transplantation, with a simple and easy handling procedure, could provide a 1-step, minimally invasive, cost-effective cartilage tissue reparative medicine without harvesting donor cells.

11:30 AM
PAPER 500
Medial Open-Wedge High Tibial Osteotomy in Patients Aged Over 65 Years: Clinical and Radiological Comparisons among Different Age Groups
Koji Yabuuchi, MD
Eiji Kondo, MD
Jun Onodera, MD
Koji Iwasaki, MD, PhD
Tomohiro Onodera, MD, PhD
Tomonori Yagi, MD, PhD
Norimasa Iwasaki
Kazuori Yasuda, MD

This study demonstrated that OWHTO using locking plate was an effective procedure for elderly patients. This result suggested age did not influence the clinical and radiologic outcomes after OWHTO.

Discussion

11:40 AM
PAPER 501
Regenerative Effects of Synovial Mesenchymal Stem Cell Derived Exosomes on Osteoarthritis Chondrocytes
Michael J. Sayegh
Dan Li, PhD
Jedediah Bondy
Christopher L. Antonacci, BA, MS
Haixiang Liang, MD, MS
Pooja Swami
Andrew K. Wong, BS
Daniel A. Grande, PhD

Synovial stem cells serve as a source for exosome production, providing greatest total reduction in inflammation and degradation of type II collagen, serving an important role in future therapeutics.

11:45 AM
PAPER 502
Surgical Outcomes of Tibiofemoral Cartilage Restoration for Bipolar Lesions of the Knee: A Systematic Review and Meta-Analysis
Anirudh K. Gowd, MD
Alexander Weimer, BS
Danielle Rider
Edward Beck, MD, MPH
Avinessh Agarwala, MD
Lisa O’Brien, DO
Michael J. Aliaia, MD, FAAOS
Cristin M. Ferguson, MD, FAAOS
Brian R. Waterman, MD, FAAOS

Cartilage restoration, through both ACI and OCA, has modest failure rates in patients with bipolar lesions of the tibiofemoral compartment, with approximately 75% survivorship at mid-term follow up.
11:50 AM  PAPER 503
Predictors of Patient Expectations for Functional Outcomes following Hyaluronic Acid Injections

Fotios P. Tjoumakaris, MD, FAAOS
Morgan Leider, MD
Richard E. Campbell, MD
Donghoon Lee, BS
Matthew D. Pepe, MD, FAAOS
Bradford S. Tucker, MD, FAAOS

The purpose of this study was to identify factors predictive of greater patient expectations for knee function after HA injections.

Discussion

12:00 PM  PAPER 504
Prospective, Randomized, Double-Blind Clinical Trial to Investigate the Efficacy of Autologous Bone Marrow Aspirate Concentrate Post-Meniscectomy: Preliminary Results

Nolan B. Condron
Ron Gilat, MD
Eric Haunschild, BS
Aghogho Evuarherhe
Justin Drager, MD
Nikhil N. Verma, MD, FAAOS
Adam B. Yanke, MD, PhD, FAAOS
Brian J. Cole, MD, MBA, FAAOS

Randomized controlled trial investigating the effects of bone marrow aspirate concentrate on outcomes for patients undergoing meniscectomy.

12:05 PM  PAPER 505
Intra-Articular Injections in the Treatment of Knee Osteoarthritis: A Network Meta-Analysis of Randomized Control Trials

Utkarsh Anil, MD
Amit K. Manjunath, BS
Danielle H. Markus, BA
Eoghan Hurley, MBCHB
Laith M. Jazrawi, MD, FAAOS
Kirk A. Campbell, MD, FAAOS
Eric J. Strauss, MD, FAAOS

Biologic therapies result in better pain improvement at up to 1 year, whereas corticosteroids have a greater effect in the short term.

Discussion
11:20 AM PAPER 509
Seven-Year Radiographic and Clinical Follow Up of Vitamin E-Diffused Polyethylene Liners in Total Hip Arthroplasty: Findings from a Prospective, International, Multicenter Study of 977 Patients
Austin K. Collins, BA
Nicholas Sauder, BA
Isabella S. Florissi, BA
David Shin, BS
Yhan E. Colon Iban, BA
James I. Huddleston, MD, FAAOS
Anders Troelsen, MD, PhD
Charles R. Bragdon, PhD
Henrik Malchau, MD, PhD

At 7-year follow up, vitamin E infused polyethylene liners have a reduced wear rate and non-inferior patient-reported and clinical outcomes compared to cross linked polyethylene.

11:25 AM PAPER 510
Failure to Medically Optimize Increases Complications after Primary Total Hip Arthroplasty
Joseph Statz, MD
Susan M. Odum, PhD
Nicholas Johnson, MD
Jesse E. Otero, MD, FAAOS

Low albumin, elevated BMI, tobacco use, and diabetes are associated with increased risk of postoperative infection, readmission, any complication, and mortality after primary THA.

11:30 AM PAPER 511
Cemented vs. Cementless Femoral Fixation in Hip Fracture Patients Treated with Total Hip Arthroplasty
Nathanael D. Heckmann, MD
Xiao Chen, BA
Alexander M. Ballatori, BA
Andy Ton, BS
Shane Shahrestani, BS, MS
Alexander Christ, MD

The purpose of this study was to compare early complication and readmission rates in hip fracture patients treated with a THA receiving cemented vs. cementless femoral fixation.

11:40 AM PAPER 512
The Effect of Femoral Stem Fixation on Revision and Mortality in Patients Over the Age of 65 Years Undergoing Elective Total Hip Arthroplasty: An Analysis of The American Joint Replacement Registry
Alejandro Gonzalez Della Valle, MD, FAAOS
Susan M. Odum, PhD
Ayushmita De
John W. Barrington, MD, FAAOS
James I. Huddleston, MD, FAAOS
Richard L. Illegen, MD, FAAOS
Bryan D. Springer, MD, FAAOS

The risk of revision for periprosthetic fracture is reduced by 79% with the use of cemented femoral fixation. This benefit must be weighed against the increased risk of mortality.

11:45 AM PAPER 513
The Costs Associated with Total Joint Replacement in Those Over 80 Years of Age are Significantly Greater
Ran Schwarzkopf, MD, FAAOS
Stephen Zak, BA
Katherine A. Lygrisse, MD
Alex Tang, BS
Joseph A. Bosco, MD, FAAOS
William J. Long, MD, FAAOS

Consideration should be given to age as a factor in determining reimbursement in a bundled payment system to reduce the incentive to restrict care to elderly patients.

11:50 AM PAPER 514
Marijuana use associated with increased rates of hip dislocation, lower costs, but no change in opioid consumption at 90 days and one year.
Chukwuweike U. Gwam, MD
Nequesha Mohamed, MD
Sahir Pervaiz, MD, MS
Scott Douglas, MD
Tianyi D. Luo, MD
Johannes F. Plate, MD, PhD
Ronald E. Delanois, MD, FAAOS

The following study was undertaken to compare 90-day and 1-year THA outcomes between matched marijuana users and non-marijuana users.

Discussion

12:00 PM PAPER 515
Trends of Femoral Neck Fracture Treatment using Total Hip Arthroplasty: Reported from the American Joint Replacement Registry
Alexandra Stavrakis, MD
Antonia F. Chen, MD, MBA, FAAOS
John W. Barrington, MD, FAAOS
Paul J. Duwelius, MD, FAAOS
James A. Browne, MD, FAAOS
Scott M. Sporer, MD, FAAOS
Terence J. Gioe, MD, FAAOS
Kimberly Porter
Peter P. Hsiue, MD

The majority of femoral heads used in total hip arthroplasty for femoral neck fractures are ≥36mm in size, and the use of DM in this patient population continues to increase.
12:05 PM  PAPER 516
Spinal Fusion and Total Hip Arthroplasty: Why Timing is Important  
Nequesha Mohamed, MD  
Ethan Remily, DO  
Wayne A. Wilkie, DO  
Sahir Pervaiz, MD, MS  
Scott Douglas, MD  
Oliver Sax, DO, MS  
Johannes F. Plate, MD, PhD  
Qais Naziri, MD, MBA  
Ronald E. Delanois, MD, FAAOS

The current study matched total hip arthroplasty (THA) patients with a prior lumbar spinal fusion to patients that underwent lumbar spinal fusion after THA to assess postoperative outcomes.

11:05 AM  PAPER 518
Isothermal Microcalorimetry for the Diagnosis of Periprosthetic Joint Infection  
Kyle Cichos, BS  
Elie S. Ghanem, MD, FAAOS

The results of this pilot study indicate that the use of isothermal microcalorimetry for detection of PJI may improve the time to diagnosis by nearly 2 full days.

11:10 AM  PAPER 519
Synovial Fluid Absolute Neutrophil Count a Promising Marker for Diagnosing Periprosthetic Joint Infection  
Alisina Shahi, MD, PhD  
Jack Shilling, MD, FAAOS  
Lawrence S. Miller, MD, FAAOS  
Ali R. Oliashirazi, MD, FAAOS  
Javad Parvizi, MD, FAAOS

In this study we presented a new synovial biomarker for diagnosing PJI; absolute neutrophil count.

11:20 AM  PAPER 520
Which Bugs are Bugging Me Now: An Analysis of 159,769 Total Knee Arthroplasties Over the Past Decade  
Vivek Mohan, MD, FAAOS  
Priscilla H. Chan, MS  
Heather A. Prentice, PhD  
Jamila Champsi, MD  
Dana S. Clutter, MD, MS  
Nithin C. Reddy, MD, FAAOS  
Adrian D. Hinman, MD, FAAOS  
Robert S. Namba, MD, FAAOS  
Liz Paxton, PhD, MA

Over the past decade, no significant change was observed in the temporal trend of 90-day deep infection rates or causative organism(s) in our cohort of 159,769 primary total knee arthroplasties.

11:25 AM  PAPER 521
Serum Erythrocyte Sedimentation Rate and C-Reactive Protein are Not Reliable Markers for Screening/Diagnosing Periprosthetic Joint Infection  
Alisina Shahi, MD, PhD  
Alisina Shahi, MD, PhD  
Vishavpreet Singh, MD  
Javad Parvizi, MD, FAAOS

In this study we found that ESR and CRP have very high rate of false negatives for PJI. Therefore, we believe that they are not reliable tests for diagnosing PJI.

11:30 AM  PAPER 522
The Suboptimal Implementation of a Multicriteria Diagnostic Tool for Periprosthetic Joint Infection can be Enhanced by Alpha-Defensin  
Carl A. Deirmengian, MD, FAAOS  
Alexander C. McLaren, MD, FAAOS  
Brett R. Levine, MD, MS  
Carlos A. Higuera Rueda, MD, FAAOS

The suboptimal implementation of a multicriteria diagnostic tool for PJI can be enhanced by alpha-defensin.
11:40 AM PAPER 523
Differences between Acute and Chronic Periprosthetic Joint Infection in a Mouse Model: Transition from an Acute to Chronic Start at an Early Time Period
Masashi Taguchi, MD
Shinsuke Kihara, MD, PhD
Peter Mittwede, MD, PhD
Kimberly Brothers, PhD
Freddie H. Fu, MD, FAAS
Kenneth Urish, MD, PhD, FAAOS
Transition from acute to chronic infection began on day 3 post infection and continued over a one-week time period.

11:45 AM PAPER 524
The Impact of Antibiotic Exposure on Bacterial Burden in a Pre-Clinical Model of Prosthetic Joint Infection
Troy Sekimura, BS
Alexandra Stavriskis, MD
Rishi Trikha, MD
Danielle Greig, MD
Benjamin Kelley, MD
Zainab Mamouei, PhD
Nicolas A. Cevallos
Erik Mayer, MD
Nicholas M. Bernthal, MD, FAAOS
Antibiotic exposure is associated with increased bacterial burden in a pre-clinical model of prosthetic joint infection; however, this effect is mitigated with concurrent probiotic use.

11:50 AM PAPER 525
Chlorhexidine, Hydrogen Peroxide, and Povidone-Iodine Fail to Eradicate Staphylococcus Aureus Biofilm from Infected Implant Materials
John A. Koch
Charles G. Gish
Dana M. Parker, BA
Kimberly Brothers, PhD
Sarah E. Rowe, PhD
Brian P. Conlon
Kenneth Urish, MD, PhD, FAAOS
Antiseptic irrigation solutions rely on oxidative stress to achieve bactericidal effect. Oxidative stress can induce biofilm antibiotic tolerance that have decreased sensitivity to antibiotics.

12:00 PM PAPER 526
In Vitro Analysis of Anti-Biofilm Effect of Intraoperative Irrigation Solutions against Staph Aureus Biofilm
Ajay Premkumar, MD, MPH
Sita Nirupama Nishtala, PhD
Daniel Driscoll, MD
Mathias P. Bostrom, MD, FAAOS
Alberto V. Carli, MD, MSc
Commercial antibacterial solutions vary in their efficacy against MSSA biofilm. Povidone-iodine 10% +/- hydrogen peroxide were the most consistently effective for MSSA biofilm dispersal in vitro.

12:05 PM PAPER 527
In Vitro Analysis of Anti-Biofilm Effect of Intraoperative Irrigation Solutions against Escherichia Coli Biofilm
Daniel Driscoll, MD
Sita Nirupama Nishtala, PhD
Ajay Premkumar, MD, MPH
Mathias P. Bostrom, MD, FAAOS
Alberto V. Carli, MD, MSc
This study analyzed the in vitro efficacy of commercially available intraoperative antibacterial solutions in dispersing Escherichia Coli biofilm developed on plastic, cement, and porous titanium.

Discussion

11:00 AM - 12:30 PM
Ballroom 6E
Spine V
Moderators: Charles J. Banta, MD, FAAOS and Vikas V. Patel, MD, BSME, FAAOS

12:00 PM PAPER 528
What Preoperative Factors are Associated with Achieving a Clinically Meaningful Improvement and Satisfaction after Lumbar Fusion for Degenerative Spondylolisthesis? A Multivariate Analysis of 997 Patients
Graham S. Goh, MD
Reuben C. Soh, FRCS (Ortho), MBBS
Chang Ming Guo, MBBS MRCS
Wai Mun Yue, MD
Seang-Beng Tan, MD
John L. Chen, ChB, FRCS
A patient’s preoperative mental health was independently associated with multiple outcomes, such as clinically meaningful improvement in functional disability, satisfaction, and expectation fulfillment.

Discussion

12:05 PM PAPER 529
Epidemiological Relevance of Elevated Preoperative Patient Health Questionnaire-9 Scores on Clinical Improvement following Lumbar Decompression
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Michael T. Nolte, MD
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Kern Singh, MD, FAAOS
This study evaluates the impact of severity of preoperative depression on improvement of depression and physical function scores up to 1-year.

Discussion

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
11:10 AM  PAPER 530
Risk Factors for Reoperation following 1-2 Level Lumbar Fusions
  *Kevork Hindoyan, MD*
  Hao-Hua Wu, MD
  Daniel D. Cummins, BS
  Alexander Theologis, MD
  Sigurd H. Berven, MD, FAAOS

A comparison of various techniques for 1-2 level lumbar fusion. Circumferential fusion is associated with lower revision rates compared to other methods of achieving lumbar fusion.

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11:20 AM  PAPER 531
Is there Value to Flexion-Extension Radiographs for Degenerative Spondylolisthesis?
  *Aidin Kashigar, MD*
  Leah Y. Carreon, MD
  Joseph Laratta, MD
  Erica F. Bisson, MD, MPH
  Zohrer Ghogawala, MD
  Andrew Y. Yew, MD
  Tino Mkorombindo, BS
  Praveen V. Mummaneni
  Steven D. Glassman, MD, FAAOS

Changes in alignment between supine MRI and upright lateral x-rays provide sufficient information for surgical decision making in most patients with grade 1 degenerative spondylolisthesis.

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11:25 AM  PAPER 532
Should Posterior Midline Structures be Preserved in Decompression Surgery for Lumbar Spinal Stenosis: A Systematic Review and Meta-Analysis
  *Chaofan Zhang*
  Lei Chen, MD
  Jie Li, MD
  Dujun Huang, MD
  Jianhua Lin

Despite heterogeneous and poor data, this study suggests that preservation of midline structure alleviates back pain and decreases the rate of instability.

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11:30 AM  PAPER 533
Comparison of Bilateral Decompression via Unilateral Laminotomy and Conventional Laminectomy for Single-Level Degenerative Lumbar Spinal Stenosis Regarding Low Back Pain, Functional Outcome, and Quality of Life
  *Sang-Bong Ko, MD*
  Chungmu Jun, MD

This study is a comparison of bilateral decompression via unilateral laminotomy and conventional laminectomy for single-level degenerative lumbar spinal stenosis regarding low back pain, functional outcome, and QOLs.

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11:40 AM  PAPER 534
Patients with Lumbar Canal Stenosis above L4-5 Report More Back Pain from Stenosis than Patients with Symptoms Arising from Lower Levels
  *Arthur R. Bartolozzi IV, MD*
  Owen C. Marecic, BA
  Jayme Koltsov, PhD
  Todd Alamin, MD, FAAOS

Patients with canal stenosis above L45 have more back pain versus lower stenotic levels but improve similarly with decompression. Back pain without instability should not be indication for fusion.

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11:45 AM  PAPER 535
At One-Year Follow Up there is No Difference in Patient-Reported Outcomes or Radiographic Alignment in Cortical Bone Trajectory vs. Traditional Pedicle Screw Fixation in Transforaminal Lumbar Interbody Fusion
  *Athan G. Zavras, BA*
  Zakariah K. Siyaji, BS
  Mark Berkowitz, BS
  Ali Piracha
  Garrett Harada, MD
  Michael T. Nolte, MD
  Bryce A. Basques, MD
  Matthew W. Colman, MD, FAAOS

This study assessed the utility of cortical bone trajectory in TLIF and found similar postoperative patient-reported and radiographic outcomes when compared to TLIF with pedicle screw instrumentation.

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11:50 AM  PAPER 536
Multimodal Analgesic Management for Lumbar Decompression Surgery in the Ambulatory Setting: Clinical Case Series and Review of the Literature
  *Nathaniel W. Jenkins, BS, MS*
  Conor P. Lynch, MS
  Elliot Cha, MSc
  James M. Parrish, MPH
  Shruthi Mohan, BS
  Caroline N. Jadczak, BS
  Cara E. Geoghegan, BS
  Kern Singh, MD, FAAOS

This case series characterized the use of proper patient selection and multimodal analgesic protocols with lumbar decompression procedures in the ambulatory surgical center setting.

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12:00 PM  PAPER 537
Treatment Strategy for Deep Surgical Site Infection after Transforaminal Lumbar Interbody Fusion
  *Masakazu Toi*
  Keishi Maruo, MD
  Fumihiro Arizumi, MD
  Toshiya Tachibana, MD

Early postoperative spine infection can be cured by irrigation and debridement. Removal of the cage and extension of the fixation or reimplantation may be useful strategies in cases of osteomyelitis.
12:05 PM
K-Wireless Robotic and Navigation Assisted Pedicle Screw Placement in Adult Degenerative Spine Surgery
Fedan Avrumova, BS
Kyle Morse, MD
Madison R. Heath, BS
Roger F. Widmann, MD, FAAOS
Darren R. Lebl, MD, FAAOS

Understanding limitations and benefits when integrating k-wireless robotic pedicle screw instrumentation with navigation in adults undergoing posterior instrumented spine fusion surgery.

PAPER PRESENTATIONS

11:00 AM - 12:30 PM
Room 32
Musculoskeletal Oncology II
Moderators: Christian M. Ogilvie, MD, FAAOS and Zhiqing Xing, MD, PhD, FAAOS

11:00 AM
Early Experience in Pathologic Humerus Fractures Treated with the Photodynamic Bone Stabilization System Shows Limitations Related to Patient Selection
John W. Krumme, MD
Ashley MacConnell, MD
Brock W. Adams, MD, FAAOS
Albert J. Aboulafia, MD, FAAOS
Matthew T. Wallace, MD, FAAOS
James S. Jelinek, MD
Robert M. Henshaw, MD, FAAOS

This is documentation of early failures utilizing the photodynamic bone stabilization system for pathologic fractures due to myeloma and metastatic carcinoma with a high failure rate in the distal humerus.

11:05 AM
African-American Patients are at Higher Risk of Postoperative Complications and Longer Time to Operative Fixation for Pathologic Fractures of the Long Bones: A Propensity Score Matched Analysis
Micheal Raad, MD
Varun Puvanesarajah, MD
Claire McDaniel, MD
Umashanth Srikumar, MD, MBA, FAAOS
Adam S. Levin, MD, FAAOS
Carol D. Morris, MD, MS

In patients undergoing fixation for pathologic fracture, African-American patients experience more postoperative adverse events and longer time to fixation compared to non-African-American patients.

11:10 AM
Progression of Metastatic Bone Lesions after an Intramedullary Nailing: A Retrospective Study
Punthitra Arpornsuksant, BS
Carol D. Morris, MD, MS
Adam S. Levin, MD, FAAOS

A study determining the incidence and factors contributing to local progression of metastatic bone lesions in patients who receive an intramedullary nail in the femur, tibia, or humerus.

11:15 AM
A Graphic Guide to the Percutaneous Tripod Acetabular Reconstruction for Metastatic Cancer
Sandip P. Tarpada, MD
Rui Yang, MD
Jichuan Wang, MD
Megan Mizera, MD
Milan K. Sen, MD, FAAOS
Bang H. Hoang, MD, FAAOS
David S. Geller, MD, FAAOS

The tripod technique offers an attractive alternative to open surgery for patients with periacetabular metastatic disease. This guide may help other surgeons to be acquainted to this technique.

11:20 AM
Supraacetabular and Column Screws with Cementoplasty may be Superior to Harrington Rod Construct for Reconstruction of Acetabular Bone Metastases: Finite Element Analysis and Case Series
Jui-Yo Hsu, MD
Chia-Che Lee, MD
Bo-Hsiung Hsu
Chih-Chien Hung, MD
Chen-Yu Wang
Wei-Hsin Lin, MD
Rong-Sen Yang, DMed, PhD
Shau-Huai Fu, MD

Column screw(s)-cementoplasty technique provides stable reconstruction and improves functional status in patients with periacetabular metastases, with early weight-bearing ambulation.
11:30 AM  PAPER 544
Improvement of Pain and Ambulatory Function following Minimally Invasive Ablation-Osteoplasty-Reinforcement-Internal Fixation (AORIF) for Periacetabular Osteolytic Metastases
Francis Y. Lee, MD, PhD, FAAOS
Courtney Toombs, MD
Kareme D. Alder, BS
Kristin Yu, BA
Christopher M. Dussik, BS
Dieter Lindskog, MD, FAAOS
Gary E. Friedlaender, MD, FAAOS
Igor Latich
AORIF is an effective percutaneous endoskeletal reconstruction method that represents a viable alternative to reconstruct periacetabular metastatic bone defects.

Discussion

11:40 AM  PAPER 545
Acetabular Development after Noninvasive Expandable Endoprosthetic Reconstruction with Hip Hemiarthroplasty
John H. Alexander, MD
Zackery J. Beauchamp
Deandre S. White, BA, BS
G D. Letson, MD, FAAOS
Odion T. Binitie, MD, FAAOS
Symptomatic acetabular dysplasia following femoral endoprosthetic reconstruction with hip hemiarthroplasty is a common, but not universal, event that is associated with younger patient age.

11:45 AM  PAPER 546
Proximal Tibia Hemiarthroplasty Reconstruction following Resection of Malignant Bone Tumors in Skeletally Immature Patients
Tyler N. Kelly, BS
Richard J. O’Donnell, MD, FAAOS
Lee Morse, MD
Rosanna L. Wustrack, MD, FAAOS
Melissa N. Zimel, MD, FAAOS
Proximal tibia hemiarthroplasty reconstruction after tumor resection in a skeletally immature patient is a novel approach to preserve the distal femoral physis and delay total knee arthroplasty.

11:50 AM  PAPER 547
The Natural History of Benign Childhood Bone Tumors of the Extremities in a Longitudinal Radiographic Study
Christopher Collier, MD
Grant Nelson, MD
Keegan Conry, MD
Christos Kosmas, MD
Patrick J. Getty, MD, FAAOS
Raymond W. Liu, MD, FAAOS
This study describes the natural history of benign childhood bone tumors of the extremities, reporting an overall prevalence rate of 18.9% in an asymptomatic population.

Discussion

12:00 PM  PAPER 548
Nonsurgical Outcomes for Periacetabular Metastasis
Cory G. Couch, MD
Oliver Sroka, BS
Dennis I. English, MD
Chung M. Chan, MBBS, FAAOS
Mark T. Scarborough, MD, FAAOS
Andre R. Spiguel, MD, FAAOS
Patients with metastatic periacetabular lesions can successfully be treated nonsurgically with protected weight-bearing, chemotherapy, radiation therapy, and bisphosphonates with good clinical outcomes.

12:05 PM  PAPER 549
Use of Magnetic Growing Intramedullary Nails with Intercalary Allograft Reconstruction after Tumor Resection
Lee M. Zuckerman, MD, FAAOS
Use of an internal lengthening nail for intercalary allograft reconstruction resulted in a 79% union rate and allowed for secondary limb-lengthening when necessary.

SHOWDOWNS®  FREE  NO TICKET REQUIRED
1:30 PM - 2:30 PM
Ballroom 6D
◆ SD2 Controversies in Total Knee Arthroplasty: What is Best for Your Patients?
Moderator: Jay R. Lieberman, MD, FAAOS
Matthew P. Abdel, MD, FAAOS
Robert L. Barrack, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Steven J. MacDonald, MD
R. Michael Meneghini, MD, FAAOS
Michael A. Mont, MD, FAAOS
Despite the success of total knee arthroplasty, there still are controversial topics where surgeons disagree regarding the best way to perform the operation.
THURSDAY EDUCATIONAL PROGRAMS

**SYMPOSIUM K**

1:30 PM - 3:00 PM
Ballroom 20B

*You Never Forget Your First: Lessons Learned in Early Arthroplasty Practice*

Moderator: C. Lowry Barnes, MD, FAAOS

During this innovative symposium, early career hip and knee arthroplasty surgeons will review specific challenges they have encountered with a panel of senior arthroplasty surgeons.

I. Panel Discussion Facilitator
   - Antonia F. Chen, MD, MBA, FAAOS

II. Postoperative Mortality
    - Anna Cohen-Rosenblum, MD

III. Panel Discussion Facilitator
     - James I. Huddleston, MD, FAAOS

IV. Intraoperative Periprosthetic Femur Fracture
    - Ugonna N. Ihekweazu, MD

V. Total Hip Arthroplasty after Acetabular Fracture
    - Jenny J. Jin, MD

VI. Extensor Mechanism Rupture after Total Knee Arthroplasty
    - Ryland P. Kagan, MD

VII. Navigating Partnership
     - Paul Lichstein, MD

VIII. Business Challenges in Private Practice
      - Cody L. Martin, MD

IX. Logistics of Changing Jobs in Early Practice
    - Julie L. Shaner, MD

X. Arthrofibrosis after Total Knee Arthroplasty
    - Jeffrey B. Stambough, MD

XI. Femoral Nerve Palsy after Total Hip Arthroplasty
    - Linda Suleiman, MD

**SYMPOSIUM L**

1:30 PM - 3:00 PM
Ballroom 6B

*Minimally Invasive Treatment of Pelvic Metastatic Bone Disease: Ablation, Osteoplasty, Cementoplasty, and Internal Fixation*

Moderator: Joseph Benevenia, MD, FAAOS

Individualized treatment of patients with metastatic disease of the pelvis is evolving and fascinating. Novel strategies are today available to improve outcomes and reduce morbidity.

I. Minimally Invasive Fixation of Pelvic Metastases by CT-Assisted Surgical Navigation
   - Nicola Fabbri, MD

II. Minimally Invasive Ablation, Osteoplasty, and Reinforcement vs. Internal Fixation of Pelvic Metastases
    - Francis Y. Lee, MD, PhD, FAAOS

**INSTRUCTIONAL COURSE LECTURE**

1:30 PM - 3:00 PM

◆ 341 The Treatment and Management of Acetabular Bone Loss in Revision Total Hip Arthroplasty
    - Moderator: Wayne G. Papposky, MD, FAAOS
    - Room 28C

◆ 342 Cemented Femoral Stem Fixation: Back to the Future
    - Moderator: Bryan D. Springer, MD, FAAOS
    - Room 29B

◆ 343 The Evolution of Achieving Soft Tissue Balance through Bone and Implant Modifications
    - Moderator: Gregory Golladay, MD, FAAOS
    - Room 9

◆ 344 Management of the Diabetic Foot and Ankle
    - Moderator: Dolfi Herscovici, DO, FAAOS
    - Room 29C

- The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
THURSDAY EDUCATIONAL PROGRAMS

◆ 345 Musculoskeletal Ultrasound of the Extremities: Clinical and Ultrasonographic Correlation
Moderator: Mandeep Virk, MD, FAAOS
Gina Ciavarra, DMed
Mohini Rawat, DPT
William Walter, MD
Musculoskeletal ultrasonography is an important imaging modality that provides diagnostic accuracy at low cost. Its use and clinical pearls are discussed in this course.

◆ 346 Simple Hand Problems that Aren’t: Avoiding Snakes in the Grass
Moderator: Julie E. Adams, MD, FAAOS
Mark E. Baratz, MD, FAAOS
Michael S. Bednar, MD, FAAOS
A. Lee Osterman, MD, FAAOS
Some hand problems may seem deceptively simple but with improper management can become “bad actors.” Participants learn to recognize and appropriately manage these conditions and avoid complications.

◆ 347 Beyond Simple Supracondylar Fractures: Tips and Tricks for Complex Pediatric Elbow Trauma
Moderator: Aristides I. Cruz, MD, FAAOS
Joshua M. Abzug, MD, FAAOS
Craig P. Eberson, MD, FAAOS
Peter D. Fabricant, MD, MPH
This instructional course lecture discusses common yet complex pediatric elbow injuries that are underrepresented compared to pediatric supracondylar humerus fractures.

◆ 348 Coding and Reimbursement Update: What You Need to Know for 2021
Moderator: R. Dale Blasier, MD, FAAOS
Julie Y. Bishop, MD, FAAOS
Christopher P. Kaufman, MD, FAAOS
Adam S. Levin, MD, FAAOS
This course offers important guidance and updates to coding and reimbursement issues for physicians by physicians actively involved in the process.

◆ 349 Patient Satisfaction, Reimbursement, and Online Reputation Management
Moderator: Glenn B. Pfeffer, MD, FAAOS
Chrissy Daniels, MS
Orrin Franko, MD
Course faculty discusses patient satisfaction ratings and online reputation management, and their effect on orthopaedic practice and reimbursement.

Moderator: Mark A. Mighell, MD, FAAOS
Akin Cil, MD
Joaquin Sanchez-Sotelo, MD, FAAOS
Matthew P. Willis, MD, FAAOS
Surgical management of complex three- and four-part proximal humerus fractures has improved with new technologies such as locked plates and the reverse shoulder arthroplasty. The goal is to better understand when to hold ‘em (fix), when to fold ‘em (arthroplasty), and when to walk away (non-operative management). The course focuses on technical tips to assist in each surgical option together with expert opinion and literature review.

◆ 351 New Developments in Hip Fracture Treatment to Reduce Morbidity and Mortality
Moderator: Richard F. Kyle, MD, FAAOS
Lisa K. Cannada, MD, FAAOS
Steven A. Olson, MD, FAAOS
Emil H. Schemitsch, MD, FAOrthops
There have been major changes in the treatment of various hip fracture patterns in the proximal femur. This course teaches the correct device to use in each hip fracture pattern and the technique used.

◆ 352 The Assessment and Management of Complex Fracture and Fracture Dislocation of the Proximal Forearm
Moderator: Jesse B. Jupiter, MD, FAAOS
Brandon E. Earp, MD, FAAOS
Jesse B. Jupiter, MD, FAAOS
Michael D. McKee, MD, FAAOS
David C. Ring, MD, FAAOS
Fractures of the proximal forearm represent a compendium of injury patterns involving both the forearm axis and elbow articulation with unique requirement of surgical stabilization.

◆ 353 CT-Based 3-Dimensional Planning, Patient-Specific Instrumentation, and Intraoperative Guidance in Shoulder Arthroplasty: How and When to Utilize the Technology
Moderator: Ian R. Byram, MD, FAAOS
Oke Anakwenze, MD, FAAOS
April D. Armstrong, MD, FAAOS
George S. Athwal, MD
Emilie V. Cheung, MD, FAAOS
Charles Jobin, MD, FAAOS
Richard B. Jones, MD, FAAOS
Jay D. Keener, MD, FAAOS
Jonathan C. Levy, MD, FAAOS
Anand M. Murthi, MD, FAAOS
Ira M. Parsons, MD, FAAOS
This course offers a comprehensive review of CT-based shoulder arthroplasty, including how to implement 3-dimensional planning, patient-specific instrumentation, and intraoperative guidance into your shoulder arthroplasty practice.
1:30 PM - 3:00 PM

Ballroom 20A

Practice Management/Rehabilitation III
Moderator: David T. Neuman, MD, FAAOS

1:30 PM

The Geographic Movement Patterns and Career and Personal Interests of Orthopaedic Surgery Residents in the United States

Nathan C. Sherman, MBA, MD
Jacob Sorenson
Ansa Khwaja, MD
Gregory L. DeSilva, MD, FAAOS

Orthopaedic surgery residents are likely to remain in the same geographical region for both medical school and residency. There are significant gender differences in reported career interests.

1:35 PM

Clinical Parameters Based Criterion (CPC) for Categorization and Prioritization of the Patients for Hip and Knee Arthroplasty

Mujeeb Ashraf, FRCS, MBBS
Hatem Al-Harbi, MBBS, FRCSC
Tarek I. Elawady, MD
Ahmer Waheed, DDS
Mohsin S. Khan, MD, MPH

This study reviews clinical based criterion for categorizing and selection of patients awaiting total knee arthroplasty.

1:40 PM

Trends in Orthopaedic Related Google Search Volume during the COVID-19 Pandemic in the United States

Cesar D. Lopez, BS
Michael Constant
Joel Peterson, MD
Elise Bixby, MD
Thomas R. Hickernell, MD
Charles M. Jobin, MD, FAAOS

States with earlier reopening dates were found to have significantly higher orthopaedic related search interest, compared to states with later reopening dates.

1:50 PM

Functional Capacity Evaluation following Workplace-Related Orthopaedic Injuries

Nasima Mehraban, MD
Daniel D. Bohl, MD, MPH
Alexader J. Idarraa, BA
Adam G. Wright-Chisem, MD
Kevin Wu
Dev P. Patel, BA
Simon Lee, MD, FAAOS
Kamran S. Hamid, MD, MPH, FAAOS
Kern Singh, MD, FAAOS

The present study characterizes the outcomes of functional capacity evaluations ordered by orthopaedic surgeons and musculoskeletal physicians following workplace-related injury.

1:55 PM


Martin Collier, MD
Cory Janney, MD

We performed a bibliometric analysis of orthopaedic surgery applicants to determine if applicants were publishing research in higher impact factor journals during medical school.

2:00 PM

New Persistent Opioid Use following Orthopaedic Foot and Ankle Surgery: A Study of 348 Patients

Nasima Mehraban, MD
Daniel D. Bohl, MD, MPH
Emily E. Hejna, MPH
George B. Holmes, MD, FAAOS
Johnny L. Lin, MD, FAAOS
Simon Lee, MD, FAAOS
Kamran S. Hamid, MD, MPH, FAAOS

The rate of new persistent opioid use following orthopaedic foot and ankle surgery is 8.9%, and greater perioperative opioid prescription is a modifiable risk factor for persistent use.

2:10 PM

Local Trends in Total Joint Arthroplasty and Orthopaedic Surgeon Distribution in the United States

Brian Perez, MD
Christopher Scanlon, MD
Matthew Sloan, MD
Amanda M. Alvarez, PhD
Austin Yu, BA
Matthew L. Webb, MD
Neil P. Sheth, MD, FAAOS

Patients in rural areas have decreasing access to TJA services despite an increased density of orthopaedists in rural states outside the South. Rural Southern states have a scarcity of orthopaedists.

2:15 PM

Can We Believe the Positive Results of Randomized Control Trials?

Justin J. Koh, MD
Paul Tornetta III, MD, FAAOS
Jeansol Kang, MD

We sought to evaluate a series of RCTs from literature to determine: the calculated risk of a false positive outcome; and the actual error rate in multiple outcome reporting (alpha error).
2:20 PM  PAPER 558

Use of a Wearable Fitness Device to Measure Strain in Orthopaedic Surgeons

Ilda B. Molloy, MD, MS
Ida L. Gitajn, MD
Paul M. Werth, MA, MS
David S. Jevsevar, MD, MBA, FAAOS

We performed a prospective blinded cohort study measuring physiological stress in orthopaedic surgeons through a wearable fitness device.

Discussion

2:30 PM  PAPER 559

The Impact of the COVID-19 Pandemic on Orthopaedic Surgery Residency Applicants During the 2021 Residency Match Cycle in the United States: A Prospective Cohort Study of Rising Fourth-Year Medical Students

Nicholas C. Danford
Connor Crutchfield, BA
Amiethab Aiyer, MD, FAAOS
Charles M. Jobin, MD, FAAOS
William N. Levine, MD, FAAOS
Thomas S. Lynch, MD, FAAOS

We review the impact of the COVID-19 pandemic on orthopaedic surgery residency applicants during the 2021 match cycle.

2:35 PM  PAPER 560

Leadership Trends in Orthopaedic Surgery Sports Medicine Fellowships

Nicholas C. Schiller, MSc
Andrew Sama, BA
Chester J. Donnally, MD
Benjamin I. Schachner, MPH, MS
Amanda F. Spielman, BS
Christopher Dodson, MD, FAAOS
Michael G. Ciccotti, MD, FAAOS
Michael G. Ciccotti, MD, FAAOS

This is the first study to evaluate the demographic and training backgrounds of current sports medicine fellowship directors.

Discussion

3:30 PM - 5:00 PM  SYMPOSIUM M

Ballroom 20A

Tough Questions in Total Hip and Total Knee Arthroplasty
Moderator: Adolph V. Lombardi, MD, FAAOS

Tough questions surrounding hip and knee arthroplasty involve modifiable risks, bilateral staging, physiotherapy, postoperative activity, venous thromboembolism and infection prophylaxis, pain management, and outpatient settings.

I. Should We Use Vancomycin Powder Topically?
   Robert L. Barrack, MD, FAAOS

II. Which Patients are Candidates for Outpatient Arthroplasty?
    Keith R. Berend, MD, FAAOS

III. Should We Advise Patients Not to Return to High-Level Sporting Activity after Arthroplasty?
     Michael E. Berend, MD, FAAOS

IV. Should We Mandate Smoking Cessation for All Patients?
    Michael P. Bolognesi, MD, FAAOS

V. What Is the Most Accurate Predictor of Diabetic Control and How Long Should Patients be Advised to Take Dental Prophylaxis?
    John J. Callaghan, MD, FAAOS

VI. When can Patients Resume Driving after Arthroplasty?
    C. Anderson Engh, MD, FAAOS

VII. Obesity: Is there an Absolute Cutoff?
     Richard Iorio, MD, FAAOS

VIII. Is Formal Postoperative Physical Therapy Necessary?
      Joshua J. Jacobs, MD, FAAOS

IX. Are there Any Contraindications to Tranexamic Acid in 2021?
    Mark W. Pagnano, MD, FAAOS

X. When Should Negative Pressure Dressings be Used in Primary Arthroplasty?
    Christopher L. Peters, MD, FAAOS

XI. When Should We Not Use a First-Generation Cephalosporin for Prophylaxis?
     Robert T. Trousdale, MD, FAAOS

3:30 PM - 4:30 PM  THE WAY I SEE IT… ® (TWISI)

Ballroom 6D

TWISI3 Health Care 2021: How Orthopaedic Leaders are Preparing for the Future
Moderator: Eric C. Makhni, MD, MBA, FAAOS
Kevin J. Bozic, MD, MBA, FAAOS
Kevin Counihan
Edward M. Delsole, MD
Bryan T. Kelly, MD, FAAOS
Ken Yamaguchi, MD, FAAOS

What are the biggest challenges facing United States healthcare? Learn from top orthopaedic leaders how to identify and thrive in the face of these challenges.
THURSDAY EDUCATIONAL PROGRAMS

SYMPOSIUM N
3:30 PM - 5:00 PM
Room 32
Technological Innovations in Orthopaedic Education: Where We Are and Where We Are Headed
Moderator: Paul J. Cagle, MD, FAAOS
Orthopaedic training is evolving with emerging technologies augmenting the hands-on experience. This symposium will discuss five different technologies and their roles in orthopaedic education.

I. Experiential Learning with Productive Failure through High-Fidelity Immersive Virtual Reality
   Danny Goel, MD, MBA
II. The Role of Mobile Simulation Platforms in Orthopaedic Education
    Dawn LaPorte, MD, FAAOS
III. The Role of Procedural Learning Theory in Orthopaedics and its Implications for Learning with Surgical Videos
     Daniel London, MD, MS
IV. The Role of Low-Fidelity Simulation in the Orthopaedic Residency Curriculum
    Gregg T. Nicandri, MD, FAAOS
V. Connecting Simulation with Real-World Operating Room Training and the Role of Technology
    Ann E. Van Heest, MD, FAAOS

INSTRUCTIONAL COURSE LECTURE
3:30 PM - 5:00 PM

◆ 361 Advances in Adult Hip Osteotomy Surgery: Evolution and Innovation Improves Traditional Procedures
   Moderator: John C. Clohisy, MD, FAAOS
   Room 8
   Martin Beck, MD
   Michael D. Stover, MD, FAAOS
   Ira Zaltz, MD, FAAOS
   Hip osteotomy surgery has evolved markedly over the past decade. This course highlights contemporary diagnostic and surgical strategies to optimize outcomes of these procedures.

◆ 362 Preoperative Optimization Prior to Elective Joint Replacement
   Moderator: Michael O’Malley, MD, FAAOS
   Room 28C
   Antonia F. Chen, MD, MBA, FAAOS
   Brian A. Klatt, MD, FAAOS
   Sandra B. Nelson, MD
   Learn practical methods to medically optimize your patients prior to elective total joint arthroplasty to reduce infection risk.

◆ 363 What the New Revision Total Knee Arthroplasty Surgeon Needs to Know
   Moderator: Neil P. Sheth, MD, FAAOS
   Michael P. Ast, MD, FAAOS
   Brett R. Levine, MD, MS
   Giles R. Scuderi, MD, FAAOS
   Room 29C
   Surgeons new to revision TKA can learn a great deal from experiences revision surgeons that span multiple generations.

◆ 364 Forefoot Success
   Moderator: William M. Granberry, MD, FAAOS
   Richard M. Marks, MD, FAAOS
   Jeremy J. McCormick, MD, FAAOS
   Room 4
   This course presents a review of forefoot conditions from metatarsalgia to hallux valgus. This includes mechanics of disease, results of reconstructions, and emerging technologies.

◆ 365 Ultrasound Use for the Busy Orthopaedic Surgeon
   Moderator: Henry T. Goitz, MD, FAAOS
   Richard A. Scheuring, DO
   Room 1
   This program will provide the participant a navigational guide to the use of ultrasound in a busy orthopaedic practice. The tips and pearls of injection will be presented as well as the unique uses for ultrasound in the more challenging diagnostic and therapeutic cases. Participants will gain a unique perspective of how to use ultrasound and when best to use it as well.

◆ 366 Managing Challenges in Thumb Carpometacarpal Arthritis
   Moderator: David S. Zelouf, MD, FAAOS
   Jesse B. Jupiter, MD, FAAOS
   Amy L. Ladd, MD, FAAOS
   Marco Rizzo, MD, FAAOS
   Richard J. Tosti, MD, FAAOS
   Ballroom 6F
   This course presents options for management of thumb carpometacarpal (CMC) arthritis and explores controversies and challenges. The role of nonoperative treatment and indications for surgery are explored.

◆ 367 Developmental Dysplasia of the Hip from Birth to Arthroplasty: Clear Indications and New Controversies
   Moderator: Stuart L. Weinstein, MD, FAAOS
   Pablo Castaneda, MD
   Wudbhav N. Sankar, MD, FAAOS
   Room 3
   This course, designed for both the general orthopaedist and the pediatric specialist, covers key concepts and controversies in diagnosis and treatment of developmental dysplasia of the hip from birth through adulthood.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
368 Surgical Management of Pediatric Foot Deformity: Complications, Misconceptions, and Future Directions
Moderator: Jacob R. Zide, MD, FAAOS
Jeffrey E. Johnson, MD, FAAOS
Anthony I. Riccio, MD, FAAOS
Perry L. Schoenecker, MD, FAAOS
Room 7B
Course faculty reviews operative management of the adolescent bunion, pes planus, skewfoot, tarsal coalition, and cavovarus foot. Indications for arthrodesis and common surgical pitfalls are discussed.

369 Build Your Practice for Carpal Tunnel Syndrome and Distal Radius Fractures: Improve Outcomes and Value
Moderator: Robin N. Kamal, MD, FAAOS
David C. Ring, MD, FAAOS
Julie B. Samora, MD, MPH
Arnold-Peter C. Weiss, MD, FAAOS
Room 7A
Learn how to successfully build your practice in value-based payment models for high-impact diagnoses such as carpal tunnel syndrome and distal radius fractures.

370 The Business of Medicine: Hospital-Based, Academic, Private Practice – Learning How to Succeed
Moderator: Kevin D. Plancher, MD, MPH, FAAOS
Peter G. Mangone, MD, FAAOS
Craig M. McAllister, MD, FAAOS
Allston J. Stubbs, MD, MBA
Room 5
This course gives physicians a comprehensive understanding of all aspects of medicine from health insurance and coding to marketing and enhancing your visibility to compete in the current healthcare marketplace.

371 Traumatic Elbow Instability: How to Fix it, and When to Phone a Friend
Moderator: Michael J. O’Brien, MD, FAAOS
John E. Conway, MD, FAAOS
Matthew L. Ramsey, MD, FAAOS
Felix H. Savoie III, MD, FAAOS
Room 9
Learn the keys to management of traumatic elbow instability, including soft tissue injuries, fracture-dislocations, sports-related injuries, and the treatment of stiffness and complications.

372 Revision Reverse Shoulder Arthroplasty
Moderator: Scott P. Steinmann, MD, FAAOS
Niloofar Dehghan, MD, MSC, FAAOS
John W. Sperling, MD, MBA, FAAOS
Thomas W. Wright, MD, FAAOS
Room 2
As reverse shoulder arthroplasty becomes more common, there is an increasing number of cases needing revision. This instructional course will discuss all aspects of revision, including bone loss, instability and infection.

373 Development of Programs to Optimize Recovery after Trauma: The Healing Power of Trauma Survivors
Moderator: Heather A. Vallier, MD, FAAOS
Mark A. Kalina
Anna N. Miller, MD, FAAOS
Megen J. Simpson, MD
Room 6C
Factors important to successful recovery will be described. Development of nontraditional programming will be presented, including peer trauma survivors to mentor patients.

374 The Role of Arthroplasty in Acute and Failed Fracture Surgery
Moderator: Emil H. Schemitsch, MD, FAAOS
Michael D. McKee, MD, FAAOS
Adam A. Sassoon, MD, FAAOS
Andrew H. Schmidt, MD, FAAOS
Room 29B
The failure rate of operative intervention remains high with management of complex intra-articular fractures. There remains significant room for improvement in the care of these injuries. This course illustrates how the use of currently available evidence-based medicine studies can aid in decision making with regard to treatment of common extremity injuries with open reduction/internal fixation versus acute arthroplasty. The evidence around the role of arthroplasty for failed fracture surgery of the upper and lower extremity is presented.

387 A Case-Based Approach to High Risk Total Hip Arthroplasty: When Do I Do Something Differently?
Moderator: Douglas E. Padgett, MD, FAAOS
Douglas A. Dennis, MD, FAAOS
James I. Huddleston, MD, FAAOS
Jean Yves Lazennec, MD
Room 31
Arthur L. Malkani, MD, FAAOS
David J. Mayman, MD, FAAOS
Wayne G. Paprosky, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS
Andrew J. Shimmin, MD
Jonathan M. Vigdorchik, MD, FAAOS
This session highlights the spectrum of high risk for instability cases in total hip replacement and covers how to decrease that risk.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
**THURSDAY EDUCATIONAL PROGRAMS**

**PAPER PRESENTATIONS**

**3:30 PM**

**3:30 PM - 5:00 PM**

**Ballroom 20B**

**Shoulder and Elbow V**

Moderators: Catherine M. Rapp, MD, MBA, FAAOS and Misty Suri, MD, FAAOS

**3:30 PM**

**Triceps Tongue Approach for the Treatment of AO Type C Distal Humerus Fractures**

*Morgan B. Weber, MD*

*Elizabeth Cho, BA*

*Imad I. Abushahin, MD*

*Peter J. Evans, MD, PhD, FAAOS*

*B. Todd Bafus, MD, FAAOS*

This is a comparison of triceps Tongue approach vs. olecranon osteotomy for AO Type C distal humerus fractures: matched cohort analysis.

**3:35 PM**

**Surgical Elbow Dislocation Approach to the Distal Humerus**

*Maria A. Walsh, BA, BS*

*Benjamin W. Hoyt, MD*

*Desraj Clark, MD*

*Raymond A. Pensy, MD, FAAOS*

The surgical elbow dislocation approach to the distal humerus permits near total exposure of the anterior articular surface and the entirety of the capitellum.

**3:40 PM**

**PAPER 563**

**The Role of Ulnar Nerve Subcutaneous Anterior Transposition during Open Reduction and Internal Fixation of Distal Humerus Fractures: A Retrospective Cohort Study**

*Abdulaziz F. Ahmed, MD*

*Ashik Parambathkandi*

*Geraldine K. Wai Jing, MD*

*Motasem H. Salameh, MD*

*Aiman S. Mudawi, MD*

*Yousef A. Abuodeh, MBBS, MD*

*Maamoun Abou Samhadaneh, MD*

*Ghalib Ahmed, FRCS (Ortho), MBCHB, MRCSEd*

In this study, the overall rate of postoperative ulnar nerve neuropathy was 20.6%, with the subgroup rates being 35.7% and 14.5% for transposition and no transposition, respectively. The recovery of ulnar nerve dysfunction was noted in 65% of patients with no difference between both groups.

**Discussion**

**3:50 PM**

**PAPER 564**

**Complications, Reoperations, and Long-Term Outcomes after Open Reduction Internal Fixation of Mason Classification Type II and Type III Radial Head Fractures**

*Dafang Zhang, MD*

*George S. Dyer, MD, FAAOS*

*Brandon E. Earp, MD, FAAOS*

*Philip E. Blazar, MD, FAAOS*

Long-term outcomes of radial head ORIF are favorable. Fixation with plate and screws versus screws alone is associated with complications and reoperations after ORIF of isolated radial head fractures.

**3:55 PM**

**PAPER 565**

**Complications after Primary Radial Head Replacement: Mid- to Long-Term Follow Up**

*Matthew Cherches, MD*

*Gopal R. Lalchandani, MD*

*Ryan Halvorson, BS*

*Lisa L. Lattanza, MD, FAAOS*

*Nicolas H. Lee, MD, FAAOS*

*Utku Kandemir, MD, FAAOS*

Radiographic findings of stress shielding and radiocapitellar arthritis are common after radial head arthroplasty at mid-term follow up.

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*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
4:00 PM  PAPER 566
Does Delaying Reverse Total Shoulder Arthroplasty Treatment of Proximal Humeral Fracture Result in Higher Rates of Revision and Complication?

Henry Seidel, BS
Sarah Bhattacharjee
Jason L. Koh, MD, MBA, FAAOS
Jason Strelzow, MD, FAAOS
Lewis L. Shi, MD, FAAOS

Following proximal humeral fracture, delayed treatment with reverse total shoulder arthroplasty is associated with higher rates of revision and complication compared to acutely performed arthroplasty.

Discussion

4:10 PM  PAPER 567
Factors Influencing Time to Return to Sport following Clavicular Fractures in Adolescent Athletes

Michael J. Kissenberg, MD, FAAOS
Briggs Ahearn, MD
Ellen Shanley, PhD, PT
Charles A. Thigpen, PhD
Stephan G. Pill, MD, FAAOS

Treatment of clavicle fractures following best practice guidelines provide a predictable return to athletics in adolescent athletes, including collision sports.

Discussion

4:15 PM  PAPER 568
Risk Factors for Implant Removal following Surgical Fixation of Midshaft Clavicle Fractures

Brandon E. Earp, MD, FAAOS
Peter J. Ostergaard, MD
Matthew Hall, MD
Grace Xiong, MD
Dafang Zhang, MD

The rate of implant removal after plate-and-screw fixation of midshaft clavicle fractures is high. Implant removal is associated with younger age and anterior plate positioning.

4:20 PM  PAPER 569
Risk Factors for Loss of Reduction after Open Reduction and Internal Fixation of Isolated Olecranon Fractures in Adults

Daniel Lynch, BS
Erik Contreras, MD
Sarah E. Hafez, MPH
Amy L. Speckacter, MD, FAAOS
Kanu S. Goyal, MD, FAAOS

We present a study discussing potential risk factors for failure of ORIF of isolated olecranon fractures in adults.

Discussion

4:30 PM  PAPER 570
Midterm Outcomes of Suture Anchor Fixation for Displaced Olecranon Fractures

Michael Gutman, BA
Jacob Kirsch, MD
Joseph A. Abboud, MD, FAAOS

Suture anchor fixation of displaced olecranon fractures in patients with comminuted 2-3 cm osseous fragments or osteoporotic bone resulted in excellent midterm functional outcomes.

Discussion

4:35 PM  PAPER 571
Regional Anesthesia Increases Perioperative Opioid Demand in Proximal Humerus and Humeral Shaft Fracture Surgery

Daniel J. Cunningham, MD
Micaela A. LaRose, BA
Gloria Zhang, BS
Ariana Paniagua, BA
Christopher Klifto, MD
Mark Gage, MD

Regional anesthesia did not improve inpatient or outpatient opioid demand in patients undergoing operative treatment of proximal humerus and humeral shaft fractures.

Discussion
THURSDAY EDUCATIONAL PROGRAMS

3:35 PM  PAPER 573
Definitive Fixation to Flap Coverage within a 48 Hour “Safe Window” Reduces Deep Infection Rate in Gustilo Type IIIB Open Tibial Shaft Fractures

Paul Tornetta III, MD, FAAOS
Khalid Al-Hourani, MD
Jeff J. Foote, MD, MSc
Aleksi Reito, MD, PhD
Heather A. Vallier, MD, FAAOS
Saan Morshed, MD, FAAOS
Ross K. Leighton, MD
Michael J. Bosse, MD, FAAOS
Chad Coles, MD
Michael Kelly, MBBS, MD
SPARTA Investigators

Study to investigate the impact of delay from definitive fixation to flap coverage in IIIB tibial fractures is a collaboration between US and UK trauma centers.

3:40 PM  PAPER 574
A Machine Learning Algorithm to Identify Patients with Tibial Shaft Fractures at Risk of Infection after Operative Treatment

Paul Tornetta III, MD, FAAOS
Laurent A. Hendrickx
Mohit Bhandari, MD, FRCSC
Anne Eva J. Bulstra, MD
Sofia Bzovsky, MSc
Job N. Doornberg, MS
J.C. Goslings, MD, PhD
Ruurd Jaarsma, FRACS, MD
Kyle J. Jeray, MD, FAAOS
Gino M. Kerkhoffs, MD, PhD
Brad Petrisor, MD
David C. Ring, MD, FAAOS
Emil H. Schemitsch, MD, FAAOS
Marc F. Swiontkowski, MD
David Sanders, MD
Sheila Sprague, PhD
Machine Learning Consortium

A machine learning prediction model was developed to estimate the probability of infection for patients treated operatively for tibial shaft fractures.

3:50 PM  PAPER 575
Regional Anesthesia Improves Inpatient but Worsens Outpatient Opioid Demand in Ankle and Distal Tibia Fracture Surgery

Daniel J. Cunningham, MD
Micaela A. Larose, BA
Isabel Delaura
Billy I. Kim
Jonathan D. Kim, BS
Terry Lee
Gloria Zhang, BS
Keith Whitlock, MD
Mark Gage, MD

Local regional and epidural analgesia were associated with reduced inpatient but increased outpatient opioid demand after adjusting for baseline characteristics in ankle fracture patients.

3:55 PM  PAPER 576
Definitive Fixation of Open Tibia Fractures: Does Reopening the Traumatic Wound Increase Complication Rates?

Alan W. Reynolds, MD
Mariano Garay Claudio, MD
Frances H. Philp, MS
Gregory T. Altman, MD, FAAOS
Chima D. Nwankwo, MD

For open tibia fractures that underwent staged fixation, no differences in infection or nonunion were observed between those performed by reopening the traumatic wound versus through new incisions.

4:00 PM  PAPER 577
Open Ankle Fractures: Is Immediate Internal Fixation Safe?

Ahmed Thabet Hagag, MD
John J. Pisquiy, MD, MHA
Rami Khalifa, MD, PhD
Griffin Biedron, MD
Reid Tompkins, MD
Ahmed Elabed, MD
Amr A. Abdeljawad, MD, PhD, FAAOS

The timing of primary open reduction and internal fixation for ankle fractures is controversial. We report on operative outcomes of immediate versus delayed ORIF of open ankle fractures.

4:10 PM  PAPER 578
Small Residual Fracture Gaps are Associated with Significant Delays in Healing in Length Stable Tibia Fractures Treated with Intramedullary Nailing

Peter S. Chang, MD
Daniel Bechtold, MD
Omolade Sogade, BA
Timothy Rooney
Christopher McAndrew, MD, FAAOS
Anna N. Miller, MD, FAAOS
Marshall B. Berkes, MD, FAAOS

Small residual fracture gaps in length stable tibial shaft fractures treated with intramedullary nailing are associated with delayed healing and increased risk of nonunion.

4:15 PM  PAPER 579
Body Mass Index Independently Predicts Infection after Tibial Plateau Fracture Open Reduction Internal Fixation

John P. Chapman, MD
Christopher W. Reb, DO, FAAOS
Matthew Patrick, MD, FAAOS
Heather K. Vincent, PhD, MS
Jennifer E. Hagen, MD, FAAOS

Body mass index independently predicts infection after tibial plateau fracture repair.

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4:20 PM  PAPER 580
The Incidence of Patella Baja after Tibial Nailing: Implications for Post-Nailing Anterior Knee Pain
Zachary S. Rogozinski, MD
Daniel R. Schlatterer, DO, FAAOS
Charles Moon, MD, FAAOS
Steven M. Kane, MD, FAAOS
Donald D. Davis, MD
John Garlich, MD
Christopher R. Johnson, MD

There is an association between AKP and patella baja after IP tibial nailing. We conclude that future work on AKP in tibial nailing should focus on patella baja prevention, diagnosis, and treatment.

Discussion

4:30 PM  PAPER 581
Assessment of Malreduction Standards for the Syndesmosis in Bilateral CT Scans of Uninjured Ankles
Jeremy Kubik, MD, FRCSC
Natalie Rollick, MD
Jessica D. Bear, MD
Owen J. Diamond, MD
Joseph Nguyen, MPH
Laura J. Kleeblad, MD
David L. Helfet, MD, FAAOS
David Wellman, MD, FAAOS

Our findings suggest current radiographic parameters are insufficient to differentiate mild inherent syndesmotic anatomical asymmetry from malreduction.

4:35 PM  PAPER 582
Early vs. Delayed Weight-Bearing after Open Reduction Internal Fixation of Unstable Ankle Fractures
Zachary A. Rockov, MD
Evan Nigh, MD
Jonathan H. Garfinkel, MD
Naudereh Noori, MD
Jeremy Y. Chan, MD
Amit Pujari
Carol Lin, MD, MA, FAAOS
Charles Moon, MD, FAAOS
Milton T. Little, MD, FAAOS

This retrospective study comparing early weight-bearing (within 6 weeks postoperatively) to delayed weight-bearing (after 6 weeks postoperatively) after ORIF for unstable ankle fractures.

Discussion
FRIDAY EDUCATIONAL PROGRAMS

SYMPOSIUM 0

8:00 AM - 10:00 AM
Ballroom 20A
Elimination of the Inpatient Only List: What We Don’t Know Will Hurt Us and Our Patients
Moderator: Joseph A. Bosco III, MD, FAAOS
I. Non-Financial Effects
   C. Lowry Barnes, MD, FAAOS
II. Financial Implications Surgeons
   Michael P. Bolognesi, MD, FAAOS
III. Hospital Financial Implications
   Richard Iorio, MD, FAAOS
IV. Inpatient, Outpatient, or In-Between? The Goldilocks Patient
   Claudette M. Lajam, MD, FAAOS

In 2020, CMS eliminated Inpatient Only designation for musculoskeletal procedures. This symposium addresses impact at the level of the surgeon, the institution, and the patient, and offers strategies to mitigate negative effects.

INSTRUCTIONAL COURSE LECTURE

401 The Complex Primary Total Hip Arthroplasty: Contemporary Techniques to Solve Challenging Technical Problems in Primary Total Hip Arthroplasty
Moderator: Daniel J. Berry, MD, FAAOS
James A. Browne, MD, FAAOS
George J. Haidukewych, MD, FAAOS
Rafael J. Sierra, MD, FAAOS

This course teaches contemporary techniques to manage challenging primary total hip arthroplasty (THA) problems including post hip/acetabular fracture, dysplasia, protrusio, ankylosis, and more.

402 Anterior Total Hip Arthroplasty: How to Minimize the Learning Curve and Avoid Complications
Moderator: John C. Clohisy, MD, FAAOS
Paul E. Beaule, MD, FAAOS
Michael Leunig, PhD
Joseph T. Moskal, MD, FAAOS

Direct anterior THA is a preferred technique for surgeons/patients. This course will highlight solutions for the surgical challenges of performing or adopting direct anterior THA.

403 Minimizing Opioids in Total Joint Arthroplasty
Moderator: Mark W. Pagnano, MD, FAAOS
David F. Dalury, MD, FAAOS
Tad M. Mabry, MD, FAAOS
R. Michael Meneghini, MD, FAAOS

This course provides the latest information on mitigating perioperative pain, and thus narcotic usage, when treating patients undergoing lower extremity arthroplasties.

404 Techniques in Unicompartmental Knee Arthroplasty Fixed vs. Mobile, Medial vs. Lateral, and Manual vs. Robotic
Moderator: Neil P. Sheth, MD, FAAOS
Keith R. Berend, MD, FAAOS
Richard A. Berger, MD, FAAOS
Jess H. Lonner, MD, FAAOS

Tips and Tricks for performing fixed or mobile bearing, medial or lateral, and manual or robotic unicompartmental knee arthroplasty.

405 Infection in Arthroplasty: The Basic Science of Bacterial Biofilms in its Pathogenesis, Diagnosis, Treatment, and Prevention
Moderator: Fares S. Haddad, FRCS
William V. Arnold, MD, FAAOS
Thorsten M. Seyler, MD, PhD
Paul Stoodley, PhD

Course faculty discuss the surest state of affairs with regard to orthopaedic infections and the challenge that biofilm formation presents to the orthopaedic community.

406 Scope of the Problem: Arthroscopy of the Foot and Ankle You Need to Know About!
Moderator: Emil H. Schemitsch, MD, FAAOS
Abdel-Rahman Lawendy, FRCS
Michael D. McKee, MD, FAAOS
William T. Obremskey, MD, MPH, FAAOS

A primary goal of the symposium will be to achieve consensus opinions on many current issues and controversies regarding the management of compartment syndrome. This will have important implications given the impact on patient outcomes including amputation, the need for multiple procedures and poor functional outcomes.

407 Thromboembolism Prophylaxis for Orthopaedic Surgeons: Update 2021
Moderator: Joshua J. Jacobs, MD, FAAOS
Douglas E. Padgett, MD, FAAOS
Vincent D. Pellegrini, MD, FAAOS

This is a comprehensive review of all aspects of pharmacologic and non-pharmacologic venous thromboembolism (VTE) prophylaxis for the practicing orthopaedic surgeon.

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409 Management of Early Onset Scoliosis – From Mehta Casts to Magnetically Expandable Rods: State of the Art in 2021
Moderator: John T. Smith, MD, FAAOS
Room 5
Graham Fedorak, MD, FAAOS
Sumeet Garg, MD, FAAOS
John A. Hefflin, MD, FAAOS
This course addresses management of early onset scoliosis including evaluation of the new patient, Mehta cast treatment, and the decision-making process and technical details of growth friendly surgery.

410 The Debate is On: Discussing the Controversies Surrounding Pediatric Fracture Care
Moderator: Joshua M. Abzug, MD, FAAOS
Brian K. Bright, MD, MPH, FAAOS
Michelle S. Caird, MD, FAAOS
Aristides I. Cruz, MD, FAAOS
Room 29B
This course presents both sides of some controversies following common fractures in children. Treatment strategies for the fractures are presented as well as ways to avoid complications. Teaching methods include illustrative cases presented to the panel with evidence-based discussion for the controversies.

411 Telemedicine after COVID-19: Incorporating Virtual Visits into an Orthopaedic Practice
Moderator: Robert A. Gallo, MD, MHA, FAAOS
Richard C. Mather, MD, MBA, FAAOS
Miho J. Tanaka, MD, FAAOS
Room 29C
Telemedicine can be a valuable adjunct to orthopaedic practices. Practices must consider rules/regulations, operational processes, legal ramifications, and practical considerations to maximize its potential.

412 Opioid Trends in Spine Surgery
Moderator: Daniel K. Park, MD, FAAOS
Safdar N. Khan, MD, FAAOS
Daniel R. Possley, DO, FAAOS
Balroom 6C
This course is a key information resource of the effects of pre, intra, postoperative and alternatives to opiate use and how to protect yourself as a spine surgeon.

413 Posterior Cruciate Ligament Surgery: The Step-by-Step Road to Success
Moderator: Gonzalo Samitier Solis, MD
Ramon B. Cugat, MD
Bruce A. Levy, MD, FAAOS
Room 3
AOSSM
AANA
This is a surgical skills video-based course about posterior cruciate ligament (PCL) reconstruction and difficult related knee situations. Discussion includes all therapeutic steps to treat this common pathology successfully with a special focus on surgical technique.

414 Mini-Review of Sports Medicine Upper Extremity
Moderator: Katherine J. Coyner, MD, FAAOS
Leah C. Brown, MD, FAAOS
Asif M. Ilyas, MD, FAAOS
Room 6F
The goal of this symposium is to provide a comprehensive overview of sports medicine related injuries to the upper extremity. Highlighting the controversies in treatment and surgical pearls and pitfalls through case presentations.

415 Proper Usage and Understanding of Antibiotics in the Treatment of Musculoskeletal Infections
Moderator: David W. Lowenberg, MD, FAAOS
Javad Parvizi, MD, FAAOS
Gina Suh, MD, FAAOS
Room 2
The course focus is on knowledge of how microbes gain a foothold and then evade common modes of treatment in the host. The proper usage of antibiotics as well as their role and limitations in treatment of these infections are defined, including implant-related factors in infection.

481 Minimally Invasive Surgery vs. Standard Open Techniques in the Lumbar Spine: Indications, Contraindications, and Controversies
Moderator: Michael D. Daubs, MD, FAAOS
Neel Anand, MD, FAAOS
Norman B. Chutkan, MD, FAAOS
Scott D. Daffner, MD, FAAOS
John C. France, MD, FAAOS
Robert D. Lawrence, MD, FAAOS
Alpesh A. Patel, MD, MBA, FAAOS
Kern Singh, MD, FAAOS
Steven M. Theiss, MD, FAAOS
Seth K. Williams, MD, FAAOS
Room 31
Learn state-of-the-art indications and contraindications for minimally invasive surgery (MIS) versus open techniques in the lumbar spine through case presentations and faculty and participant discussions.

482 Proximal Humerus Fractures: Sling, Plate, Nail, or Replace? When, Why, and How
Moderator: Brent A. Ponce, MD, FAAOS
Gregory J. Della Rocca, MD, PhD, FAAOS
Derek J. Donegan, MD, MBA, FAAOS
Armodios M. Hatzidakis, MD, FAAOS
Scott R. Jacobson, MD, FAAOS
Room 33
Charles M. Jobin, MD, FAAOS
Frank A. Liporace, MD, FAAOS
Wesley P. Phipatanakul, MD, FAAOS
Dominique Rouleau, MD
Benjamin W. Sears, MD, FAAOS
Richard S. Yoon, MD, FAAOS
The treatment of proximal humerus fractures is controversial. The indications, advantages, disadvantages, and technological advances of operative techniques most relevant in 2020 will be presented.
FRIDAY EDUCATIONAL PROGRAMS

PAPER PRESENTATIONS

8:00 AM - 10:00 AM

Spine VI
Moderator: Chadi A. Tannoury, MD, FAAOS

Friday

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8:00 AM PAPER 583
Are Postoperative Prophylactic Antibiotics Necessary in Spine Surgery? A Propensity Matched Analysis
Matthew V. Abola, MD
Charles C. Lin, MD
Lawrence J. Lin
William Schreiber-Stainthorp, BS
Anthony Frempong-Boadu, MD
Aaron J. Buckland, FRACS, MBBS
Themistocles S. Protopsaltis, MD, FAAOS

For patients undergoing inpatient spine surgery, postoperative antibiotic administration did not reduce surgical site infection rates when compared to preoperative antibiotic administration alone.

8:05 AM PAPER 584
Pain Plan Implementation Decreases Postoperative Opioid Use, Hospital Length of Stay, and Clinic Resource Utilization for Patients Undergoing Elective Spine Surgery
Seth K. Williams, MD, FAAOS
Harjot S. Uppal, BS
Scott Hetzel, MS
Miranda Bice, MD
Kristin N. Hesselbach, BS
Trisha Ludwig, PharmD
Emma L. Klosterman, MD
Sydney I. Rozenfeld, BA

Pain Plan implementation significantly decreased inpatient and outpatient opioid use, hospital length of stay, and clinic resource utilization in patients undergoing elective spine surgery.

8:10 AM PAPER 585
In-Clinic vs. Online Multidisciplinary Exercise-Based Rehabilitation for Treatment of Low Back Pain: A Prospective Clinical Trial
Bahar Shahidi, DPT, PhD
Kamshad Raiszadeh, MD, FAAOS
Jonathan Tapicer, MSc

Both online and in-clinic multidisciplinary rehabilitation programs administered through an integrated practice unit reduce pain, disability, and opioid use in individuals with low back pain.

8:20 AM PAPER 586
The Influence of Obesity on Postoperative Outcomes following Anterior Lumbar Interbody Fusion
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS

Comparative study of the impact of obesity on postoperative patient-reported outcomes and MCID achievement for pain, disability, and physical function following anterior lumbar interbody fusion.

8:25 AM PAPER 587
Utilizing Big Data to Determine the Safety Profile of Recombinant Human Bone Morphogenetic Protein-2 in Spinal Fusion Surgery: An Analysis of 5 Databases from 2003 to 2017
Don Y. Park, MD, FAAOS
Yuxi Tian
Marc A. Suchard, MD, PhD

This is the largest longitudinal observational study to date about rhBMP and was found safe and effective in spinal fusion, with lower postoperative infections and no difference in cancer rates.

8:30 AM PAPER 588
Assessing Pseudarthrosis after Anterior Cervical Discectomy and Fusion with Dynamic Radiographs Using Novel Angular Measurements
Themistocles S. Protopsaltis, MD, FAAOS
Dainn Woo, MD
Anand Segar, MD
Ethan W. Ayres, MD, MPH
Dennis Vasquez-Montes, MS
Michael L. Smith, MD
Yong H. Kim, MD, FAAOS
Aaron J. Buckland, FRACS, MBBS

This is an introduction of novel angular measures for assessing potential pseudarthrosis in ACDF.

Discussion

8:40 AM PAPER 589
A Prospective, Randomized, Multicenter Study of Intraosseous Basivertebral Nerve Ablation for the Treatment of Chronic Low Back Pain: 12-Month Results
Jad Khalil, MD, FAAOS
Mathew Smuck, MD
Kevin Barrette, MD
D. S. Kreiner
Steven R. Garfin, MD, FAAOS

Twelve months follow up of randomized controlled trial comparing basivertebral nerve ablation to standard care shows improvement in patient outcome measures in patients with vertebrogenic back pain.

Discussion

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8:45 AM  
PAPER 590
Utilizing Previous Patient Opioid Experiences for Pain Plan Implementation: Role of Opioid Use Categorization on Inpatient and Outpatient Opioid Use, Length of Stay, Pain Scores, and Clinic Resource Utilization following Elective Spine Surgery

Seth K. Williams, MD, FAAOS  
Sydney I. Rozenfeld, BA  
Scott Hetzel, MS  
Miranda Bice, MD  
Trisha Ludwig, PHARMD  
Kristin N. Hesselbach, BS  
Emma L. Klosterman, MD  
Harjot S. Uppal, BS

Pain Plan implementation with categorization based on patient-reported past opioid experiences has proven to be a useful tool in managing postoperative pain at our institution.

8:50 AM  
PAPER 591
Long Cervical Fusions: Are Multiple Segmental Plates Less Likely to Fail than a Single Long Plate?

Fernando Rios Mendoza, MD  
Nicole Record, DO  
Darryl D’Lima, MD, PhD  
Robert K. Eastlack, MD, FAAOS

Multiple separate segmental plates are superior to traditional long cervical plates in biomechanical stability for long anterior cervical fusions.

9:00 AM  
PAPER 592
Utility of a Novel Lumbar Virtual Spine Examination during the COVID-19 Pandemic

Scott Wagner, MD  
Rakesh Patel, MD, FAAOS  
Ilyas Aleem, MD, FAAOS  
Donald Fredericks, MD  
Sandra Hobson, MD  
Paul A. Anderson, MD, FAAOS  
Brett Freedman, MD, FAAOS  
Arjun Sebastian, MD, FAAOS  
Melvin D. Helgeson, MD, FAAOS

We found that a standardized telehealth lumbar spine examination performed similarly across multiple domains compared to an in-person examination.

9:05 AM  
PAPER 593
The Effects of Decompression Surgery for Cervical Spondylotic Myelopathy on the Cervical Segmental Kinematics

Yuichiro Morishita, MD, PhD  
Taniguchi Ryota, MD  
Osamu Kawano, MD  
Takeshi Maeda

We evaluated the effects of cervical laminoplasty on the cervical kinematic changes in cervical spondylotic myelopathy.

9:10 AM  
PAPER 594
Evaluation of Thoracic Intervertebral Disc Degeneration in Different Age Groups and Establishment of a Predictive Model of the Severity and Pattern: A Kinematic MRI Study

Zorica Buser, PhD  
Mohamed K. Mesregah, MD  
Michael Repajic  
Kishan N. Patel, BS  
Sidney I. Roberts, BA  
Carson H. Gardner, BS  
Jeffrey C. Wang, MD, FAAOS

The severity of IVD degeneration and the number of degenerated levels increased with age. Disc degeneration was more accelerated in the mid-thoracic levels.

9:20 AM  
PAPER 595
The Influence of Cognitive Behavioral Therapy on Lumbar Spine Surgery Outcomes: A Systematic Review and Meta-Analysis

James M. Parrish, MPH  
Nathaniel W. Jenkins, BS, MS  
Conor P. Lynch, MS  
Elliot Cha, MSc  
Michael T. Nolte, MD  
Shruthi Mohan, BS  
Carla E. Geoghegan, BS  
Kern Singh, MD, FAAOS

We conducted a systematic review and meta-analysis of randomized clinical trials to evaluate the influence of cognitive behavioral therapy on patient-reported outcomes following lumbar spine surgery.

9:25 AM  
PAPER 596
Determining Lowest Instrumental Vertebrae on Prone X-Ray can Save Fusion Levels with Good Correction and Balance in Adolescent Idiopathic Scoliosis Patients Compared to Traditional Methods

Vishal Sarwahi, MD, FAAOS  
Jesse M. Galina, BS  
Sayyida Hasan, BS  
Aaron M. Atlas, BS, MS  
Yungtai Lo, PhD  
Terry D. Amaral, MD, FAAOS

TV on prone x-ray is an effective and better way to determine the lowest instrumented vertebra. At 2-year follow up, this study did not find coronal decompensation.
FRIDAY EDUCATIONAL PROGRAMS

9:30 AM PAPER 597
A Nationwide Analysis on the Effects of Depressive Disorders Following 1- to 2- Level Lumbar Fusion for Degenerative Disc Disease
Rushabh Vakharia, MD
Chester J. Donnally, MD
Ivan Golub, MD
Samuel Swiggett, MD
Nicholas U. Ahn, MD
Alexander Vaccaro, MD, MBA, FAAOS
Afshin Razi, MD, FAAOS

This study analyzes the impact of depressive disorders in patients undergoing primary 1- to 2- level lumbar fusion for the treatment of degenerative disc disease.

9:40 AM PAPER 598
Long-Term Risk of Bladder Dysfunction after Decompression in Cauda Equina Syndrome Patients
Henry Seidel, BS
Sarah Bhattacharjee
Sean C. Pirkle, BA
Michael J. Lee, MD, FAAOS
Mostafa H. El Daflrawy, MD

Cauda equina syndrome patients who undergo spinal decompression surgery are at higher risk for future bladder dysfunction, with 3.3% requiring a urologic procedure after 5 years.

9:45 AM PAPER 599
Bone Turnover Markers Reflect Fusion Status after Spinal Fusion Surgery
Ryota Hyakkan, MD
Masahiro Kanayama, MD
Masahiko Takahata, MD
Fumihiro Oha, MD
Yukitoshi Shimamura, MD
Takeru Tsujimoto
Yuichi Hasegawa, MD
Tomoyuki Hashimoto, PhD
Norimasa Iwasaki

The current prospective study revealed the difference of temporal profile of bone turnover markers between in solid fusion cases and pseudarthrosis cases after lumbar spinal fusion surgery.

9:50 AM PAPER 600
Neurological Function and Ambulation Status after Total En Bloc Spondylectomy for Spinal Tumor in Patients with no Neurological Symptoms
Yuki Kurokawa, MS, PT
Satoru Demura, MD
Satoshi Kato, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Makoto Handa
Ryohei Annen
Yuki Kurokawa, MS, PT
Hiroyuki Tsuchiya, MD

The incidence of neurological deficit after TES in patients with no neurological symptoms was 31.0%. Almost all of patients (88.1%) could walk indoors independently one month after TES.

9:55 AM PAPER PRESENTATIONS
8:00 AM - 10:00 AM
Ballroom 6B
Adult Reconstruction Knee VI
Moderator: Glenn D. Wera, MD, FAAOS

8:00 AM PAPER 601
Patient Satisfaction after Total Joint Arthroplasty: Analysis of Medical Comorbidities and Demographics
Brandon Petrone, DO
Nicholas Frane, DO
Erik Stapleton, DO, MS
Aaron M. Atlas, BS, MS
Kevin F. Lutsky, MD, FAAOS
Randy M. Cohn, MD, FAAOS

Analysis of the modifiable and non-modifiable patient factors after total joint arthroplasty will help us better understand the driving forces affecting satisfaction after surgical procedures.

8:05 AM PAPER 602
Predictors of Total Hip and Knee Arthroplasty Patient Satisfaction in an Integrated US Healthcare Delivery System
Liz Paxton, PhD, MA
Priscilla H. Chan, MS
Margaret Wang, PhD
Ronald A. Navarro, MD, FAAOS
Nithin C. Reddy, MD, FAAOS
Jim Bellows, PhD
Kate Koplan
Christopher D. Grimsrud, MD, FAAOS

Evaluating predictors of patient satisfaction with care and surgery results is important for quality improvement and enhancing total joint arthroplasty (TJA) care delivery processes.
8:10 AM  PAPER 603  
The Disconnect between Patient Expectations and Surgeon Priorities in Total Joint Arthroplasty  
Derek F. Amanatullah, MD, PhD, FAAOS  
Harsh Shah, BS, MPH  
Patrick Le  
Andrew Barrett, MD  
Prerna Arora, MS  
Robin N. Kamal, MD, FAAOS  
This study elucidates which aspects of care patients prefer during their total joint arthroplasty surgical care.

Discussion

8:20 AM  PAPER 604  
The Effect of Sensory Deficit following Total Knee Arthroplasty on Patient Satisfaction and Kneeling Ability  
Anton Kurdin  
Brett M. Macdonald  
Lyndsay Somerville, PhD  
Doug Ross, FRCS  
Steven J. MacDonald, MD  
Brent Lanting, MD  
The purpose of this study was to evaluate if postoperative numbness influenced patient satisfaction or kneeling ability. Numbness does not appear to affect patient satisfaction or kneeling ability.

8:25 AM  PAPER 605  
Does Patient Satisfaction after Primary TKA Correlate with the Patient-Reported Outcome Measures? Findings from the FORCE-TJR Registry  
David C. Ayers, MD, FAAOS  
Mohamed A. Yousef, MD, PhD  
Hua Zheng, PhD  
Patricia Franklin, MD, MBA  
The patient dissatisfaction rate 5 years after TKA is 8.1% which is significantly lower than 18.1% at 1-year. The PROM scores are associated with patient satisfaction at 1-year, 2-years, and 5-years.

8:30 AM  PAPER 606  
Is it the Surgeon, the Patient, or the Device? A Comprehensive Clinical and Radiological Evaluation of Factors Influencing Patient Satisfaction in 648 Total Knee Arthroplasties  
Salvatore Risitano  
Lorenzo Rissolio, MD  
Luigi Sabatini, MD  
Alessandro Masse, MD  
Pier Francesco Indelli, MD, PhD  
This study showed that female gender, younger age, lower radiologic stage of osteoarthritis, presence of polyarthritis, and lower back pain, were all associated with worse clinical results after TKA.

Discussion

8:40 AM  PAPER 607  
Tourniquet Use and Spinal Anesthesia Increase Satisfactory results after Total Knee Arthroplasty: A Randomized Study  
Mikko T. Rantasalo, MD  
Riku Palanne  
Rami Madanat, MD  
Anne Vakkuri, MD, PhD  
Noora Skants, MD, PhD  
In this 395-patient randomized study, tourniquet and spinal anesthesia used together resulted most favorable outcome regarding post-TKA satisfaction. at a 12-month follow up.

8:45 AM  PAPER 608  
Evaluating the Success of Perioperative Self-Guided Meditation in Reducing Sleep Disturbance after Total Knee Arthroplasty  
Michael S. Cremins, PA-C, PhD  
Rebecca Teng  
Smita S. Vellanky, MSc  
Robert M. Belniak, MD, FAAOS  
Guided self-meditation improves actual hours slept but has no impact on pain-related awakenings.

8:50 AM  PAPER 609  
YouTube as a Source of Patient Information for Total Knee Arthroplasty: Quantitative Analysis of Video Reliability, Quality, and Content  
Mitchell K. Ng, MD  
Ahmed Emara, MD  
Robert M. Molloy, MD  
Michael R. Bloomfield, MD, FAAOS  
Jonathan L. Schaffer, MD, FAAOS  
Viktor Erik Krebs, MD, FAAOS  
Nicolas S. Piuzzi, MD  
Alison K. Klika, MS  
Academic and physician sourced YouTube total knee arthroplasty videos are of higher quality than their non-academic counterparts.

Discussion

9:00 AM  PAPER 610  
Factors Associated with Early Return to Driving following Total Joint Arthroplasty  
Evan M. Dugdale, MD  
Matthew Siljander, MD  
Robert T. Trousdale, MD, FAAOS  
Following total joint arthroplasty, 95% of patients that drove preoperatively were able to return to driving postoperatively. Over 99% of patients have returned to driving without a car accident.

9:05 AM  PAPER 611  
Examining the Relationship between Value and Patient Satisfaction with Treatment in Total Joint Arthroplasty  
Paul M. Werth, MA, MS  
Michael B. Sparks, MD, FAAOS  
David S. Jevsevar, MD, MBA, FAAOS  
This study aims to determine if there is a relationship between value and patient satisfaction with treatment for TKA and THA procedures.
Does Preoperative Opioid Consumption Influence Patient Satisfaction following Total Knee Arthroplasty?

**Austin F. Smith, MD**
Arthur L. Malkani, MD, FAAOS
Nolan S. Smith, BA
Langan S. Smith, BS
Madhusudhan R. Yakkanti, MD, FAAOS

Patients with a history of chronic preoperative opioid use had statistically significant lower satisfaction scores compared to patients without a history of opioid use prior to TKA.

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Musculoskeletal Health Literacy is Associated with Outcome and Satisfaction of Total Knee Arthroplasty

**Arvind Narayanan, MD**
Kurt Stoll, MD
Lincoln F. Pratson, MD
Christopher W. Olcott, MD, FAAOS
Daniel J. Del Gaizo, MD, FAAOS

Patients with lower musculoskeletal health literacy have worse outcome scores and are less likely to be satisfied with their operation after primary total knee arthroplasty.

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Didactic Adult Reconstruction Resident Education Compares Favorably to other Orthopaedic Subspecialties

**Sumon Nandi, MD, MBA, FAAOS**
Stephanie Zhang
R. Frank Henn, MD, FAAOS
Bruce F. Gomberg, MD, FAAOS

Orthopaedic resident knowledge of sports and adult reconstruction at a national board review was greater than that of all other subspecialties. Resident proficiency was lowest in hand and wrist topics.

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The Utility of Virtual Reality as a Learning Tool for Trainees in Unicompartmental Knee Arthroplasty: A Randomized Controlled Trial

**Musa Zaid, MD**
Jeffrey J. Barry, MD
Derek T. Ward, MD

In a randomized controlled trial for trainees performing a complex, unfamiliar procedure (UKA), VR training demonstrated equivalent surgical competence to traditional technique guides and videos.

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Resident Participation in Unicompartmental Knee Arthroplasty Does Not Increase Postoperative Complications

**Alan G. Shamrock, MD**
Zain M. Khazi, BS
Trevor Gulbrandsen, MD
Jacob Elkins, PhD
Timothy S. Brown, MD, FAAOS
Nicholas Bedard, MD

Resident participation in UKA cases was associated with longer operative times, however this did not result in increased 30-day postoperative complications.

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Resident Involvement during Revision Total Knee Arthroplasty is Not Associated with Increased Risk of 30-Day Postoperative Complications

**Trevor Gulbrandsen, MD**
Zain M. Khazi, BS
Alan G. Shamrock, MD
Jacob Elkins, PhD
Timothy S. Brown, MD, FAAOS
Nicholas Bedard, MD

Resident involvement in rTKA cases is not associated with an increased risk of 30-day postoperative complications.

---

Impact of Resident Involvement on Complication Rates in Revision Total Knee Arthroplasty

**Mackenzie Sowers, BS**
Bradley Alexander, BS
Jared Watson
Kelly M. Chandler, BS
Gerald McGwin, MS, PhD
Nicola Maffulli, MD, PhD
Roshan Jacob, BS, MD
Ashish Shah, MD, FAAOS
Sameer Naranje, MD, MS

Resident involvement in revision total knee arthroplasty was associated with a significant increase in operative time; however, there were no significant increases in postoperative complication rates.

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* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
### Friday Educational Programs

**PAPER PRESENTATIONS**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Abstract</th>
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<tbody>
<tr>
<td>8:00 AM</td>
<td>PAPER 619</td>
<td>The Competitive Orthopaedic Trauma Fellowship Applicant: A Program Director’s Perspective</td>
<td>Mohamad Shaath, MD, Stephen J. Warner, MD, PhD, James F. Kellam, MD, FAAOS, Timothy S. Achor, MD, FAAOS</td>
<td>The purpose of this study was to determine the relative importance of components orthopaedic trauma fellowship directors use when ranking applicants.</td>
</tr>
<tr>
<td>8:10 AM</td>
<td>PAPER 621</td>
<td>Nutritional Laboratory Screening is Low Yield and Inconsistent for all Patients Undergoing Primary Total Joint Arthroplasty</td>
<td>Kevin L. Mekkawy, DO, Sandesh Rao, MD, Yash Chaudhry, BA, DO, Mitchell Solano, MD, Robert S. Sterling, MD, FAAOS, Julius K. Oni, MD, FAAOS, Harpal S. Khanuja, MD, FAAOS</td>
<td>Retrospective review of all primary TJA cases performed at a tertiary care medical center in 2018. We analyzed the prevalence of abnormal nutritional values and identify factors associated with them.</td>
</tr>
<tr>
<td>8:20 AM</td>
<td>PAPER 622</td>
<td>Reduced Opioid Prescribing following Arthroscopic Meniscectomy does Not Negatively Impact Patient Satisfaction</td>
<td>David A. Bloom, BA, Amit K. Manjunath, BS, Daniel J. Kaplan, MD, Alexander J. Egol, BA, Eric J. Strauss, MD, FAAOS, Kirk A. Campbell, MD, FAAOS, Michael J. Allaia, MD, FAAOS</td>
<td>This study reports that a significant reduction in postoperative prescriptions did not result in a statistically or clinically significant change in patient satisfaction with pain control.</td>
</tr>
<tr>
<td>8:25 AM</td>
<td>PAPER 623</td>
<td>The Effect of Mobile Applications on Patient Compliance and Outcomes following Total Joint Arthroplasty of the Hip and Knee: A Systematic Review and Meta-Analysis</td>
<td>Ayesha Abdeen, MD, FAAOS, Rubén Monárrez, MD, Amin Mohamadi, MD, MPH, Jacob M. Drew, MD, FAAOS</td>
<td>This study was a meta-analysis and systematic review of mobile application usage in total joint arthroplasty of the hip and knee.</td>
</tr>
<tr>
<td>8:30 AM</td>
<td>PAPER 624</td>
<td>Evaluation of Self-Reported Publications in Orthopaedic Sports Medicine Fellowship Applications</td>
<td>Alan Zhang, MD, FAAOS, Xavier Cortez, BS, Ryan Freshman, MD, Brian T. Feeley, MD, FAAOS, ChunBong B. Ma, MD, FAAOS, Drew Lansdown, MD, FAAOS</td>
<td>There is a low rate of inaccurate self-reporting of Completed publications in applications for orthopaedic sports medicine fellowship.</td>
</tr>
<tr>
<td>8:40 AM</td>
<td>PAPER 625</td>
<td>What was the Change in Telehealth Usage and Proportion of No-Show Visits for an Orthopaedic Trauma Clinics during the COVID-19 Pandemic?</td>
<td>Matthew Siow, MBA, MD, James T. Walker, MD, Elise Britt, MD, John Kozy, MD, Audrey Zanzucchi, Paul J. Girard, MD, FAAOS, Alexandra K. Schwartz, MD, FAAOS, William T. Kent, MD</td>
<td>Telehealth visits increased from 0% to 37% during the peri-COVID-19 period, with no difference in no-show rate. We present implementation strategy for a telehealth-naïve orthopaedic trauma clinic.</td>
</tr>
<tr>
<td>8:45 AM</td>
<td>PAPER 626</td>
<td>The Impact of a Nurse Navigator Led Preoperative Course on Outcomes following Total Joint Arthroplasty</td>
<td>Justin Turcotte, MBA, PhD, McKayla Kelly, BS, Steffanie S. Dolle, BSN, Nandakumar Menon, Jeanne Angeles, BS, James H. MacDonald, MD, FAAOS, Paul J. King, MD, FAAOS</td>
<td>Participation in preoperative education is associated with decreased LOS and cost after TJA. Opportunity to enhance the impact of preoperative education on postoperative ER utilization exists.</td>
</tr>
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</table>
8:50 AM  PAPER 627
Left-Handedness among Orthopaedic Surgeons and Trainees
Samir Sabharwal, MD, MPH
James S. Mackenzie, MD
Robert S. Sterling, MD, FAAOS
James R. Ficke, MD, FAAOS
Dawn LaPorte, MD, FAAOS
In total, 15% of orthopaedic surgeons and trainees who responded to our survey were LHD. LHD respondents reported significantly higher rates of ambidexterity in both scalpel/cautery use and suturing.

Discussion

9:00 AM  PAPER 628
Same-Day vs. One-Day Discharge: Rates and Reasons for Emergency Department Return after Total Joint Arthroplasty
Justin Turcotte, MBA, PhD
Grayson Kelmer, BS
McKayla Kelly, BS
Paul J. King, MD, FAAOS
Same-day discharge does not increase the risk of 30-day revisit to the ED after TJA. Consideration of risk factors and ED returns without readmission may reduce costs related to TJA.

9:05 AM  PAPER 629
Early Returns in Patient Satisfaction for In Person and Telehealth Physical Therapy Services during the COVID-19 Pandemic
Erica Fritz, DPT
Joseph Nguyen, MPH
James A. Gallegro, MPT, PT
Matthew J. Grundstein, DPT
Kayla A. Hazel, DPT, PT
Charles Fisher, MBA, PT
Jeanne Marie Cioppa-Mosca, MBA, PT
Michael M. Alexiades, MD, FAAOS
The COVID-19 pandemic has transformed physical therapy from in-person to telehealth care. This study compared patient satisfaction between these two services, finding no overall difference.

9:10 AM  PAPER 630
Patients Benefit from Recording Postoperative Instructions after Ankle Fracture Surgery
Blake J. Schultz, MD
Sam Y. Jiang, BA
Ariene J. Garcia, BS
Michael J. Gardner, MD, FAAOS
Julius A. Bishop, MD, FAAOS
Patients found smartphone recording of postoperative instructions useful, reviewing it afterwards and sharing with others. It increased patient's confidence in their ability to follow instructions.

Discussion

9:20 AM  PAPER 631
Adult Reconstruction Fellowship Interviewee Perceptions of Virtual vs. In-Person Interview Formats
Neil Pathak, MD
Logan Petit, MD
Christopher Schneble, MD
Joseph B. Kahan, MD, MPH
Lee E. Rubin, MD, FAAOS
After the rank list deadline, a questionnaire study sent to fellowship interviewees (13 in-person; 13 virtual) showed that perceptions on interview format were similarly favorable between both groups.

9:25 AM  PAPER 632
Decrease in Resident Knee and Shoulder Arthroscopic Case Volume after 2013 Implementation of Accreditation Council of Graduate Medical Education Minimum Case Requirements
Samir Sabharwal, MD, MPH
Adam A. D’Sa, BA
Gregory Toci, BS
Suresh K. Nayar, MD
Dawn LaPorte, MD, FAAOS
After implementation of ACGME case minimums in 2013, the numbers of arthroscopic knee and shoulder cases performed by orthopaedic surgery residents decreased significantly.

9:30 AM  PAPER 633
Determining the “Ideal” Resident: An Analysis of Orthopaedics and Other Medical and Surgical Specialties
Christopher Wilson, BS
Robert A. Gallo, MD, MHA, FAAOS
Orthopaedic surgery faculty valued various subjective and objective applicant characteristics over their nonorthopaedic counterparts but did not differ between two orthopaedic surgery programs.

Discussion

9:40 AM  PAPER 634
Effect of Osteosarcopenia on Postoperative Functional Outcome and Subsequent Fracture in Elderly Hip Fracture Patients
Kyoung H. Moon, MD
Gi Cheol Bae, MD
The postoperative functional outcomes for the osteosarcopenia group showed significantly worse than for the normal group and the subsequent fracture rate was also significantly higher in the osteosarcopenia group.

9:45 AM  PAPER 635
Revisiting Association of Perioperative Nurses Guidelines for Wide-Awake Local Anesthesia No Tourniquet Hand Surgery
Steven M. Koehler, MD, FAAOS
Alba Avoricani, BA
Qurratul-Ain Dar, BS
Kenneth H. Levy
Low intra- and postoperative infection rates demonstrate the safety of administering lidocaine with only one circulating nurse present for hand surgery under WALANT technique.
9:50 AM  
**PAPER 636**  
Perioperative Complications and Modifiable Risk Factors in Charcot Foot Reconstruction  
*Madeline Lyons, MD*  
Patrick C. Mcgregor, MD  
William Adams, PhD  
Michael S. Pinzur, MD, FAAOS  
Preoperative medical optimization, regional anesthesia, and hospitalist comanagement are effective in creating a safe perioperative environment for patients undergoing charcot foot reconstruction.

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<th>PAPER PRESENTATIONS</th>
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<tr>
<td>Ballroom 6E</td>
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<tr>
<td><strong>Sports Medicine VI</strong></td>
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<tr>
<td>Moderators: Eric C. Makhni, MD, MBA, FAAOS and Sanjeev Bhatia, MD, FAAOS</td>
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</tbody>
</table>
| **8:00 AM** | **PAPER 637**  
Femoral Head Blood Flow following Arthroscopic Femoral Osteochondroplasty: An In-Vivo Dynamic Contrast Enhanced-MRI Study  
*Lionel E. Lazaro, MMED*  
Jonathan P. Dyke, PhD  
Adam C. Cady, BOC, MSc  
Michael B. Banffy, MD, FAAOS |  |
| Keeping the femoral osteochondroplasty within the previously described safe zone (anterior to the 12 o’clock) maintains the perfusion to the FH. |  |
| **8:05 AM** | **PAPER 638**  
Risk Factors for Long-Term Hip Osteoarthritis in Patients with Femoroacetabular Impingement without Surgical Intervention  
*Heath Melugin, MD*  
Rena Hale, PhD  
Jun Zhou, MD, PhD  
Matthew D. Laprade, BS  
Christopher Bernard, MS  
Devin P. Leland, MD  
Ryan R. Wilbur  
Bruce A. Levy, MD, FAAOS  
Aaron J. Krych, MD, FAAOS |  |
| At mean follow up of 24.7 years, 14% of hips had symptomatic OA and 4% underwent THA. BMI > 29, male sex, and increased age at the time of presentation with hip pain were risk factors. |  |
| **8:10 AM** | **PAPER 639**  
Measuring the False-Profile Radiograph Anterior Center Edge Angle: The Effect of Hip Rotation, Pelvic Tilt, and Pelvic Obliquity on Two Measurement Techniques  
*Alexander J. Mortensen, MD*  
Joseph Mozingo, PhD  
Lindsay L. Schuring, BS, MS  
Andrew E. Anderson, PhD  
Stephen K. Aoki, MD, FAAOS |  |
| The anterior center edge angle is most sensitive to pelvic tilt, followed by pelvic rotation. Rotation toward a lateral view results in greater error than rotation toward an anterior-posterior view. |  |
| **8:20 AM** | **PAPER 640**  
The Safe Zones for Endoscopic Proximal Hamstring Repair: A Cadaveric Assessment of Standard Portal Placement and Relationship to Major Neurovascular Structures  
*Jason Ina, MD*  
Charles Su, MD, PhD  
Mark Labelle, MD  
Lakshmanan Sivasundaram, MD  
Shane J. Nho, MD, FAAOS  
Richard C. Mather, MD, MBA, FAAOS  
Michael J. Salata, MD |  |
| Establishment of the lateral portal in a vertical orientation for endoscopic proximal hamstring repair places the major neurovascular structures at highest risk of iatrogenic injury. |  |
| **8:25 AM** | **PAPER 641**  
Efficacy and Safety of Arthroscopic Proximal Hamstring Repair, Minimum Two-Year Follow Up  
*Brian Lau, MD*  
Amanda N. Fletcher, BA, MD  
Gregory F. Pereira, MD  
Richard C. Mather, MD, MBA, FAAOS |  |
| Endoscopic hamstring is technically feasible, safe, and efficacious. Mid-term follow up demonstrates high patient satisfaction, return to sport and work, and low complication rates. |  |
| **8:30 AM** | **PAPER 642**  
Functional Outcomes after Nonsurgical Management of Complete Proximal Hamstring Tendon Ruptures  
*Alirio J. deMeireles, MD*  
Robert N. Kent, BS  
Ashmeth Bedi, MD, FAAOS  
Eileen A. Crawford, MD, FAAOS |  |
| Greater tendon retraction and younger age are associated with worse functional outcomes in patients who opt for nonsurgical management of complete proximal hamstring tendon ruptures. |  |

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
FRIDAY EDUCATIONAL PROGRAMS

8:40 AM PAPER 643
Ten-Year Outcomes after Labral Repair in Patients with Femoroacetabular Impingement and Borderline Dysplasia
Timothy Beals, DO
Rui Soares, BS
Karen K. Briggs, MPH
Marc J. Philippon, MD, FAAOS
The purpose of this study is to report on the minimum 10-year outcomes of patients who underwent arthroscopic labral repair for FAI with borderline dysplasia.

8:45 AM PAPER 644
Minimum 2-Year Outcomes of All-Arthroscopic Capsular Autograft Labral Reconstruction
Michael P. Kucharik, BS
Paul F. Abraham, BS
Mark Nazal, MD, MPH
Wendy M. Meek
Scott D. Martin, MD, FAAOS
All-arthroscopic capsular autograft labral reconstruction has shown excellent improvements in patient-reported outcome measures and offers minimal donor-site morbidity.

8:50 AM PAPER 645
Autograft vs. Allograft: The Evidence in Hip Labral Reconstruction and Augmentation
Joseph D. Cooper, MD
Rui Soares, BS
Travis J. Dekker, MD
Joseph Ruzbarsky, MD
Lauren Pierpoint
Marc J. Philippon, MD, FAAOS
The purpose of this study is to compare allograft and autograft hip labral reconstructions and augmentation.

9:00 AM PAPER 646
An Injury Prevention Program for Professional Ballet: A Randomized Controlled Investigation
Angelina Vera, MD
Bene D. Barrera
Leif E. Peterson, MSPH, PhD
David Dong, BS
Kevin E. Varner, MD, FAAOS
Patrick C. McCulloch, MD, FAAOS
Joshua D. Harris, MD, FAAOS
This prospective randomized controlled investigation of an injury prevention program for professional ballet showed an 82% decrease in injury rate for the intervention group.

9:05 AM PAPER 647
Hip-Spine Relationship in Femoroacetabular Impingement: Does Hip Arthroscopy Affect Pelvic Mobility?
Jessica Stambaugh, MD
Patrick B. Morrissey, MD, FAAOS
David M. Glassman, MD, FAAOS
Ethan Bernstein, MD
Brian Barlow, MD, FAAOS
Compensatory spinopelvic mobility may be affected by hip arthroscopy in young active adults with femoroacetabular impingement.

9:10 AM PAPER 648
The Relationship and Time Between Femoroacetabular Impingement Surgery and Anterior Cruciate Ligament Reconstruction: Analysis of a Claims Database
Clare E. Wise, BS
Marc R. Saffer, MD, FAAOS
Jeremy Truntzer, MD
Robin N. Kamal, MD, FAAOS
Analysis of relationship and timing between ACL injury and femoroacetabular impingement on a population-health scale using a large healthcare database.

9:20 AM PAPER 649
Machine Learning Algorithms Predict Clinically Significant Improvement in Sports-Specific Function for Athletes Undergoing Hip Arthroscopy for Femoroacetabular Impingement Syndrome
Kyle Kunze, MD
Evan M. Polce, BS
Benedict U. Nwachukwu, MD, MBA
Jorge A. Chahla, MD, PhD
Shane J. Nho, MD, FAAOS
Machine learning can predict clinically significant outcome improvement in athletes that undergo hip arthroscopy with a high accuracy and allows for the development of online risk calculation tools.

9:25 AM PAPER 650
Low Return to Active Duty after Hip Arthroscopy
Seam P. Kearney, MD, FAAOS
Objective outcomes improve after hip arthroscopy in military athletes, but only 32% return to duty. Residual postoperative hip dysfunction can limit return to duty and sport in athletes.

9:30 AM PAPER 651
Hip Arthroscopy Utilization Disparities and Complications Among Ethnic Groups
Rafael Buerba Siller, MD
William Schulz
Dharmesh Vyas, MD, FAAOS
Hip arthroscopy utilization has increased significantly since 2006 in the White population but its utilization has remained low in the ethnic minority population.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
9:40 AM PAPER 652
Activity Level and Sport Type in Adolescents Correlates with Development of Cam Morphology: A Prospective Study of 221 Young Adult Hips
Robert W. Westermann, MD
Elizabeth Scott, MD
Anthony C. Schneider, BS
Andy Schaver, BS
Natalie A. Glass, PhD
Michael C. Willey, MD, FAAOS
This prospective comparison study investigated whether adolescent participation in sports with elevated flexed hip-loading would be associated with increased Alpha Angle at skeletal maturity.

9:45 AM PAPER 653
Symptomatic Femoroacetabular Impingement Over Age 40 Demonstrate Molecular Characterization at Risk for Osteoarthritis
Srino Bharam, MD, FAAOS
Chelsea N. Matzko, BA
Haixiang Liang, MD, MS
Michael A. Mashura, MD
Daniel A. Grande, PhD
The purpose of this study was to compare the cell activity and histological appearance of articular chondrocytes harvested from patients with FAI and examine the relationship of patient age.

9:50 AM PAPER 654
Hip Corticosteroid/Anesthetic Injections: Is the Reported Increase in Rates of Osteoarthritis Progression and Femoral Head Collapse Real?
Michael P. Kucharik, BS
Paul F. Abraham, BS
Nathan Varady, BS
Kirstin M. Small, MD
Nehal Shah, MD
Luis S. Beltran, MD
Wendy M. Meek
Scott D. Martin, MD, FAAOS
When excluding patients with pre-injection osteonecrosis or stress insufficiency fracture of the femoral head, complication rates of hip steroid injection are much lower than previously suggested.

8:00 AM - 10:00 AM
Room 28C
8:00 AM PAPER 655
What is the Quality of Surgical Care for Patients with Hip Fractures at Critical Access Hospitals?
Azeem T. Malik, MBBS
Janice M. Bonsu, BS, MPH
Megan Roser, BA
Safdar N. Khan, MD, FAAOS
Laura Phieffer, MD, FAAOS
Thuan V. Ly, MD, FAAOS
Ryan Harrison, MD, FAAOS
Carmen E. Quatman, MD, PhD
Patients who received hip fracture surgical care at CAHs had a lower risk of major medical and surgical complications and lower Medicare reimbursements than those who had surgery at non-CAHs.

8:05 AM PAPER 656
Association between Hospital Surgical Volume and Complications after Total Hip Arthroplasty in Femoral Neck Fracture: A Propensity Score Matched Cohort Study
Takahisa Ogawa, MD, MPH
Tetsuya Jinno, PhD
Significant associations between an increase in hospital surgical volume and successful THA surgical outcomes, supporting at least 20 cases a year hospital surgical volume to improve clinical outcome.

8:10 AM PAPER 657
Alice Wignall, BS, MBCHB
Vasilis Giannoudis, MBCHB
Andreea M. Jimenez Jimenez, MD
Chiranjit De, MBBS, MRCS
Simon W. Sturdee, FRCS (Ortho), MBCHB
Peter Giannoudis, MD, FACS
Hemant G. Pandit, FRCS, FRCS (Ortho)
Ashish Gulati, FRCS (Ortho), MS
Jeya Palan, PhD, MBBS
COVID positive patients presenting with a hip fracture were almost seven times (38%) more likely to die compared to COVID negative patients (6%), reflecting the seriousness of the COVID-19 infection.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
While prior research on opioids in elderly hip fracture patients has primarily focused on short-term risks, our results suggest that addiction and chronic opioid use may represent hazards as well.

Multiple injuries, evidence of other forms of elder abuse, volume depletion, and fractures of the skull, lumbar spine, and rib may help predict elder abuse in fracture patients over 60 years.

Fragility fracture of upper extremity and foot/ankle should be recognized as sentinel events and warrant bone health assessment and appropriate treatment.

Even at two years postintertrochanteric fracture, over 10% of patients lose their ability to live independently at home, with approximately 4% requiring transfer to institutionalized care.

Mean adjusted Medicare reimbursement for hip fractures to physicians has decreased, while mean adjusted reimbursement to hospitals for hip fracture episodes of care increased from 2012-2017.

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FRIDAY EDUCATIONAL PROGRAMS

9:10 AM PAPER 666
Association between Femoral Stem Type and the Risk of Aseptic Revision following Hemiarthroplasty
Kanu M. Okike, MD, MPH, FAAOS
Priscilla H. Chan, MS
Nithin C. Reddy, MD, FAAOS
Robert A. Burri, MD, FAAOS
Liz Paxton, PhD, MA
Heather A. Prentice, PhD

In the hemiarthroplasty treatment of older patients with hip fracture, all routinely-utilized uncemented stems were associated with a higher risk of aseptic revision as compared to cemented fixation.

Discussion

9:20 AM PAPER 667
Initial Femoral Stem Position in Cementless Bipolar Hemiarthroplasty for Femoral Neck Fracture in Elderly Patients is Associated with Early Implant Subsidence: A Radiographic Analysis
I-Ning Lo, MD
Yun-Hsuan Tseng, MD
Chien-Shun Wang
Tzu Cheng Yang, MD
Chun Cheng J. Lin, MD
Chao-Ching Chiang, MD

Older age, lower canal fill ratio, implant position B and C, and less medial overhang of stem were independent risk factors for early implant subsidence for bipolar hemiarthroplasty.

9:25 AM PAPER 668
Management of Low Periprosthetic Distal Femoral Fractures: Plate Fixation vs. Distal Femoral Endoprosthetic Replacement
Oisín Keenan
Lauren A. Ross, BS, MBCHB
Matthew Magill, MBCHB
Caitlin Brennan, MRCS
Nicholas D. Clement, FRCS (Ortho)
Matthew Moran, MSc, FRCS (Ortho)
James Patton, MD
Chloe Scott, FRCS

Early postoperative failures of lateral locking plate fixation for periprosthetic distal femur fractures must be balanced against later aseptic loosening seen in the distal femoral replacement group.

9:30 AM PAPER 669
Immediate Unrestricted Weight-Bearing Does Not Affect Reoperation Rates following Lateral Locked Plate Fixation of Periprosthetic Distal Femoral Fractures
Lauren A. Ross, MBCHB
Oisín Keenan
Matthew Magill, MBCHB
Matthew Moran, MSc, FRCS (Ortho)
Chloe Scott, FRCS

Allowing immediate unrestricted weight-bearing does not affect reoperation rates following lateral locked plate fixation of periprosthetic distal femoral fractures.

Discussion

9:40 AM PAPER 670
Outcome following Open Reduction Internal Fixation of Acetabular Fractures in the Elderly
Ethan Sanders, BS
Alexandra A. Finless
Andrew Adamczyk, MD
Johanna Dobransky, MA
Geoffrey P. Wilkin, MD, FRCSC
Wade T. Goffon, BSCH, MD
Paul E. Beaule, MD, FAAOS
Allan Liew, FRCSC, MD
Steven R. Papp, MD
George A. Grammatopoulos, MRCS
University of Ottawa Orthopaedics

Matta grade of reduction as predictive of outcome following ORIF for acetabular fractures in the elderly. Anatomic reduction leads to improved survivorship, and similar Oxford Hip Score to ORIF-THA.

9:45 AM PAPER 671
“You Have to Wait 48 Hours” or Do We Really? No Difference in Mortality or Complication Rate for Patients on Direct Factor Xa Inhibitors Undergoing Hip Fracture Surgery
John M. Yingling, DO
David Keller, DO
Deborah Li, MD, MPH
Luke G. Menken, DO
John J. Feldman, MD
Li Sun, DO
Frank A. Liporace, MD, FAAOS
Richard S. Yoon, MD, FAAOS

Comparative study of patients who were delayed for surgery due to preoperative prescription of Factor Xa inhibitors versus patients who were not delayed for surgery.

9:50 AM PAPER 672
The Risk of Thromboembolic Events in Surgically Treated Hip Fractures: A Retrospective Cohort Study
Stephane Pelet, MD, PhD
Philippe Beauchamp-Chalifour, MD
Etienne Belzile, MD

The risk of thromboembolic events is higher than expected in the geriatric hip fracture population treated for this condition (4.7% vs. 1.3-1.8% at 3 months previously described).

Discussion
FRIDAY EDUCATIONAL PROGRAMS

SYMPOSIUM P

11:00 AM - 12:30 PM
Ballroom 20A

Optimizing the Results of Total Hip Arthroplasty: Managing the Simple and the Complex Total Hip Arthroplasty
Moderator: Jay R. Lieberman, MD, FAAOS

This symposium focuses on preoperative strategies and surgical techniques to limit complications and enhance outcomes in both simple and complex total hip arthroplasty.

I. Anterior Approach for Total Hip Arthroplasty and Acetabular Component Implantation
Keith R. Berend, MD, FAAOS

II. Failed Femoral Fracture Fixation and Total Hip Arthroplasty
Michael P. Bolognesi, MD, FAAOS

III. Posterior Approach for Total Hip Arthroplasty and Acetabular Component Implantation
James A. Browne, MD, FAAOS

IV. Medical Optimization Prior to Total Hip Arthroplasty
Antonia F. Chen, MD, MBA, FAAOS

V. Preoperative Templating: It's Not Just Component Size
Craig J. Della Valle, MD, FAAOS

VI. Anterior Approach and Femoral Component Implantation
Adolph V. Lombardi, MD, FAAOS

VII. Bearing Surface Selection
William J. Maloney, MD, FAAOS

VIII. Prior Acetabular Fracture or Osteotomy
Bryan D. Springer, MD, FAAOS

IX. Degenerative Dysplasia of the Hip and Total Hip Arthroplasty
Robert T. Trousdale, MD, FAAOS

X. Spinal Deformity and THA
Jonathan M. Vigdorchik, MD, FAAOS

SYMPOSIUM Q

11:00 AM - 12:30 PM
Room 32

Annual Meeting Highlights
Moderators: Amy L. Ladd, MD, FAAOS and Claudette M. Lajam, MD, FAAOS

This special symposium features highlights from the best papers and posters presented at this year’s Annual Meeting, as selected by the AAOS Program Committees.

I. Adult Reconstruction Hip
Paul J. Dwelius, MD, FAAOS

II. Foot & Ankle
Mark C. Drakos, MD, FAAOS

III. Shoulder & Elbow
Edward V. Craig, MD, FAAOS

INSTRUCTIONAL COURSE LECTURE

11:00 AM - 12:30 PM

421 How Do I Get Out of this Problem? Effectively Solving Common Intraoperative and Early Postoperative Challenges in Primary Total Knee Arthroplasty
Moderator: Mark W. Pagnano, MD, FAAOS
Henry D. Clarke, MD, FAAOS
Raymond H. Kim, MD, FAAOS
Kevin I. Perry, MD, FAAOS

This course covers how to solve common intraoperative and postoperative challenges in primary total knee arthroplasty, including exposure, ligament balance, stability, patellar tendon problems, wound, and knee motion problems.

422 Arthritis of the Ankle Joint: Refining and Expanding Options in Management
Moderator: Steven L. Haddad, MD, FAAOS
Paul T. Fortin, MD, FAAOS
William C. McGarvey, MD, FAAOS

This course provides the attendee with the entire toolkit in managing ankle arthritis. Both joint preserving and joint sacrificing methods are explored in depth, with significant use of video tips and tricks to achieve the desired patient outcome for all procedures. Discussion makes the attendee a veteran in future patient consultation and decision making.

423 An Orthopaedist’s Introduction to the American Medical Association Guides to Permanent Physical Impairment by Examples Using the 4th, 5th, and 6th Editions
Moderator: J. Mark Melhorn, MD, FAAOS

The need for accurate impairment and disability evaluations continues to increase. This course is designed to select the most common musculoskeletal diagnoses and review how to evaluate and rate using the 4th, 5th, and 6th editions of the American Medical Association Guides.

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Friday Educational Programs

424  Soft Tissue Masses: A Visual Guide to the Good, the Bad, and the Ugly
Moderator: Ginger E. Holt, MD, FAAOS
Cara A. Cipriano, MD, FAAOS
Nathan W. Mesko, MD, FAAOS
Robert J. Wilson, MD

Orthopaedists must recognize the unique characteristics of benign and malignant soft tissue masses to determine which masses require further evaluation.

425  We All Want to be Safe and Reliable: How do We Transform Our Workplace into a High-Reliability Organization?
Moderator: Karl M. Koenig, MD, MS, FAAOS
Matthew S. Hepinstall, MD, FAAOS
Morteza Meftah, MD
David C. Ring, MD, FAAOS

This instructional course lecture defines the principles, tools, and behaviors needed for transformation to a high-reliability organization (HRO), to reduce harm and improve efficiency and value.

426  Comprehensive Management of Spinal Infections
Moderator: Christopher G. Furey, MD, FAAOS
Zachary L. Gordon, MD, FAAOS
Timothy A. Moore, MD, FAAOS
Joseph D. Smucker, MD, FAAOS

This course is a comprehensive review of the principles for the evaluation and management of spondylodiscitis, spinal epidural abscess, and postoperative infections of the spine.

427  Endoscopic Spine Surgery: Game Changer or Advertisement
Moderator: Daniel K. Park, MD, FAAOS
Choll W. Kim, MD, PhD
Jeffrey S. Roh, MD

Endoscopic spine surgery popularity has increased recently. This ICL will review both biportal and uniportal techniques to address spinal pathologies.

428  Surgical Treatment of Patellar Instability
Moderator: Shital N. Parikh, MD, FAAOS
David Dejour, MD
John P. Fulkerson, MD, FAAOS
Robert A. Teitge, MD, FAAOS

The surgical skills instructional course lecture focuses on indications, pearls, and pitfalls of common surgical techniques to address patellofemoral instability, including medial patellofemoral ligament reconstruction, osteotomies, and trochleoplasty.

429  Mini-Review of Sports Medicine Lower Extremity
Moderator: Volker Musahl, MD, FAAOS
Geoffrey S. Baer, MD, FAAOS
Asheesh Bedi, MD, FAAOS
Fotios P. Tjoumakaris, MD, FAAOS

This course provides a review of relevant topics in sports medicine lower extremity injuries, including hip pathology, ligamentous knee injuries, and ankle sports injuries.

430  Tendinopathy: What’s New, What Works?
Moderator: Geoffrey D. Abrams, MD, FAAOS
Neal L. Millar, MD
George A. Murrell, MD
Scott A. Rodeo, MD, FAAOS

Room 9

This session updates practicing clinicians on the best evidence of medical/surgical treatments of tendinopathy and discusses state-of-the-art therapies.

431  Difficult Proximal Femur and Shaft Fractures: Tips and Tricks
Moderator: Utku Kandemir, MD, FAAOS
Animesh Agarwal, MD, FAAOS
Paul J. Girard, MD, FAAOS
John T. Gorczyca, MD, FAAOS

Room 8

Some injury patterns in proximal femur and femoral shaft are associated with high risk for problems. Knowledge of how to manage difficult fractures is critical to achieve good outcomes.

432  Forearm Fractures: Diagnosis and Contemporary Treatment Strategies
Moderator: Asif M. Ilyas, MD, FAAOS
Hesham Abdelfattah, MD
Irfan H. Ahmed, MD, FAAOS
Raymond A. Pensy, MD, FAAOS

Room 29B

Forearm fractures are common injuries often requiring surgical management. The course focuses on reviewing accurate diagnosis, efficient surgical management, and avoiding complications.

433  Periprosthetic Fractures of the Hip and Knee: A Case-Based Instructional Course Lecture
Moderator: George J. Haidukewych, MD, FAAOS
Paul J. Duwelius, MD, FAAOS
Donald S. Garbuz, MD, FAAOS
Kevin L. Garvin, MD, FAAOS
Cody Green, MD
Curtis W. Hartman, MD, FAAOS
Richard F. Kyle, MD, FAAOS
Joshua Langford, MD, FAAOS
Donald G. Lewallen, MD, FAAOS
Frank A. Liporace, MD, FAAOS
Jeffrey R. Petrie, MD

Room 31

This case-based periprosthetic hip and knee fracture course gives the participant an opportunity to interact in small group format with national faculty to learn current treatment techniques.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
Friday Educational Programs

**Adolescent Hip Pain: A Case-Based Approach to Common Causes**

Moderator: John C. Clohisy, MD, FAAOS
Young Jo Kim, MD, PhD, FAAOS
Jeffrey J. Nepple, MD, FAAOS
Christopher L. Peters, MD, FAAOS
James Ross, MD, FAAOS
Moritz Tannast, MD
Ira Zaltz, MD, FAAOS

This case-based course explores current evaluation and management strategies for adolescent patients with hip pain.

**Paper Presentations**

11:00 AM - 12:30 PM
Ballroom 6B

**Adult Reconstruction Hip VI**
Moderators: Oliver Marin-Pena, MD and Arjun Saxena, MD, MBA, FAAOS

11:00 AM  **PAPER 673**

**What are the Reasons and Risk Factors for 30-Day Readmission after Outpatient Total Hip Arthroplasty?**

Aaron Chen
Pawatut Bovonratwet, MD
Tony S. Shen, MD
Nathaniel Ondeck, MD
Wasif Islam, BS
Michael P. Ast, MD, FAAOS
Edwin P. Su, MD, FAAOS

Overall, the rate of 30-day readmission after outpatient THA was low. Patients who are at high risk for 30-day readmission after outpatient THA include those with older age and bleeding disorder.

11:05 AM  **PAPER 674**

**Non-Narcotic Total Joint Arthroplasty Using an Alternative to Opioids Multimodal Pain Protocol: A Comparison of 90-Day Outcomes**

Thomas A. Novack, MD
Michael J. Pompliano, MD
Jennifer Kurowicki, MD
Ryan Finkel, MD
Iciar M. Davila Castrodad, MD
John J. Callaghan, MD
Craig Wright, MD, FAAOS
Anthony Festa, MD, FAAOS
Anthony J. Scillia, MD, FAAOS
Vincent K. McInerney, MD, FAAOS

An opioid-free, multimodal pain management pathway is a safe and effective option in patients undergoing TJA, and does not increase length of stay, 90-day complication rates, return ED visits, or hospital readmission rates.

11:10 AM  **PAPER 675**

**Hip Replacement or Hip Resurfacing with a Highly Cross-Linked Polyethylene Acetabular Bearing: A Qualitative and Quantitative Preference Study**

James W. Pritchett, MD, FAAOS

It is not well known if patients can consistently recognize functional or other differences between a total hip replacement (THR) and a hip resurfacing (HRA). This study evaluated patient preferences for HRA vs. THR.

Discussion

11:20 AM  **PAPER 676**

**Geographic Variability in Medicare Hospital Reimbursement for Primary Total Hip and Knee Arthroplasty Episodes of Care**

Jack Haglin, BS
Michael L. Moore, BS
David Decker, MD
Jeffrey Hassebrock, MD
Justin Makovicka, MD
Joshua Bingham, MD

The mean Medicare reimbursement to hospitals for all primary total hip and knee arthroplasties billed to Medicare from 2011 to 2017 decreased by various amounts by state and region.

11:25 AM  **PAPER 677**

**Automated Identification of Orthopaedic Implants in Radiographs Using Deep Learning**

Vineet Batta, MBBS, MS(Tr&Orth)
Ravi Patel, BA, MBBS
Elizabeth G. Thong, MD
Anil A. Bharath
Darrel Francis
James P. Howard, BA, MD

A neural network to identify the manufacturers and models of orthopaedic joint implants from radiographs outperforms human experts, and represents a prototypic tool for planning joint revision surgery.

11:30 AM  **PAPER 678**

**Association between Race/Ethnicity and Total Joint Arthroplasty Utilization in a Universally Insured Population**

Kanu M. Okike, MD, MPH, FAAOS
Richard N. Chang, MPH
Kathryn E. Royse, MPH, MSPH
Liz Paxton, PhD, MA
Adrian D. Hinman, MD, FAAOS

Disparities in total joint arthroplasty utilization persist in a universally insured population of patients enrolled in a managed healthcare system.

Discussion

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11:40 AM  PAPER 679
Impact of Sickle Cell Disease on Complications following Primary Total Hip Arthroplasty: A Matched Cohort Analysis  
Amil R. Agarwal, BA  
Safa C. Fassihi, MD  
Alex Gu, MD  
Seth Stake, MD  
Tom G. Pollard, MD  
Joshua Campbell, MD  
Gregory Golladay, MD, FAAOS  
Savyasachi C. Thakkar, MD

Sickle cell patients undergoing THA for AVN had significantly higher two-year medical and surgical complications, including thromboembolic events, periprosthetic joint infection, and aseptic loosening.

11:45 AM  PAPER 680
Long-Term Result of Culture-Expanded Autologous Adipose Tissue-Derived Mesenchymal Stem-Cell Implantation for Mid-to-Large Sized Nontraumatic Osteonecrosis of Femoral Head: A Propensity Score Matched Analysis with Simple Multiple Drilling  
Kang Sup Yoon, MD, PhD  
Soong Joon Lee, MD  
Pil Whan Yoon, MD, PhD

Compared to multiple drilling, adipose derived mesenchymal stem-cell implantation showed better significant survival for mid-to-large sized osteonecrosis of femoral head after a mean 5-year follow up.

11:50 AM  PAPER 681
Nonsurgical Weight Loss from BMI>40 to BMI<40 Prior to Total Hip Arthroplasty is Not Associated with Reduced Readmissions and Complications  
Austin H. Middleton, MD  
Andrew D. Kleven, DPT  
Ashley Creager, MD  
Adam Edelstein, MD

Retrospective cohort study on the effect of nonsurgical weight loss prior to total hip arthroplasty on readmissions and complications.

12:00 PM  PAPER 682
The Effect of a Total Hip Arthroplasty Bundled Payment Program on Perioperative Smoking and Obesity  
Oren Feder, MD  
Mackenzie A. Roof, BS  
Shengnan Huang, MS  
Lorraine Hutzler, MHA  
James D. Slover, MD, FAAOS  
Joseph A. Bosco, MD, FAAOS

These findings indicate that preoperative patient optimization and selection with respect to smoking and weight loss may be effective at BMI>50, but more work is needed for those with BMI>40 and <50.

12:05 PM  PAPER 683
Higher Preoperative NarxCare Scores Associated with Adverse Outcomes After Primary Total Hip Arthroplasty  
Ahmed Emara, MD  
Daniel Grits  
Alison K. Klika, MS  
Robert M. Molloy, MD  
Viktor Erik Krebs, MD, FAAOS  
Wael K. Barsoum, MD, FAAOS  
Carlos A. Higuera Rueda, MD, FAAOS  
Nicolas S. Piazza, MD

Patient NarxCare Score over or equal to 300 associated with higher length of stay, non-home discharge disposition, 90-day readmission, and emergency department visits.

11:00 AM - 12:30 PM  PAPER PRESENTATIONS
11:00 AM  PAPER 684
Pitching Behaviors in Youth Baseball Pitchers: A Comparison to Pitch Smart Guidelines  
Justin J. Greiner, MD  
Cameron A. Trotter, BS  
Scott Hetzel, MS  
Timothy A. McGuine, ATC, PhD  
Brian Walczak, DO, FAAOS  
Geoffrey S. Baer, MD, FAAOS

One-hundred youth baseball teams were analyzed for compliance with the Pitch Smart Guidelines. A significant number of teams and pitchers were non-compliant. Further education is necessary.

11:05 AM  PAPER 685
Long-Term Sports Participation after Ulnar Collateral Ligament Reconstruction in Non-Professional Baseball Players  
Somnath Rao, BA  
Robert A. Jack, MD  
Donald P. Willier, BS  
Taylor D’Amore  
Robert E. Gallivan, BSCE  
Steven B. Cohen, MD, FAAOS  
Christopher Dodson, MD, FAAOS  
Michael G. Cicciotti, MD, FAAOS

The purpose of this study was to evaluate non-professional baseball athletes who undergo UCL reconstruction in order to determine their long-term progression of level of play and surgical outcomes.
Actual Pitches vs. Total Throw Count in Youth Pitchers

**Michael T. Freehill, MD, FAAOS**
Michael J. Rose, BSME
Katherine A. McCollum, BS
Stephen M. Cain, PhD

In the current study, the percentage of pitches of the total throws was 21% ± 3% on the day a player pitched.

---

Return to Sport and Weightlifting Analysis following Distal Biceps Tendon Repair

**Edward Beck, MD, MPH**
Anirudh K. Gowd, MD
Joseph N. Liu, MD
Bhargavi Maheshwer, BS
Grant Garcia, MD
Mark S. Cohen, MD, FAAOS
Gregory P. Nicholson, MD, FAAOS
Brian J. Cole, MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS

This study demonstrated a high rate of return to sport in patients undergoing repair of distal biceps tendon injury. Additionally, small but appreciable decrease in strength was observed.

---

Surgical Outcomes of Arthroscopic Debridement and Osteochondral Autograft Transplantation for Osteochondritis Dissecans of the Humeral Capitellum: Selection of Procedures based on Lesion Size Measurement Using Three-Dimensional Computed Tomography Imaging

**Yoshikazu Kida, MD, PhD**
Kenji Takahashi, MD, PhD

The size of OCD lesion was measured by 3-D CT. OAT was selected for the large lesion (>100 mm2), and arthroscopic debridement for the small lesion (<100 mm2). Both clinical results were excellent.

---

Achilles Tendon Rupture: A Matched Cohort Analysis of Return to Play and Player Performance from 1999-2018 in Elite Union of European Football Association Professional Soccer Players

**Enrico Forlenza, MD**
Opheleie Lavoie-Gagne
Yining Lu, MD
Jorge A. Chahla, MD, PhD
Brian Forsythe, MD, FAAOS

Retrospective study aiming to determine the rate and time to return to play (RTP) for professional soccer players after Achilles tendon rupture and evaluate player performance.

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Clinical Outcomes and Return to Sport for Chronic Exertional Compartment Syndrome: A Comparison of Open vs. Endoscopically Assisted Lower Extremity Compartment Release

**Taylor D’Amore**
Sommnath Rao, BA
Richard J. Gawel, BS
Zachary S. Aman, BA
Bryson Kemler, MD
James Liu, MD
Kevin B. Freedman, MD, FAAOS
Sommor Hammad, MD, FAAOS

The purpose of this study was to assess and compare patient-reported outcomes and return to sport rates between open and endoscopically assisted fasciotomies for lower extremity CECS.

---

Early Sport Specialization among Former NCAA Collegiate Athletes: Trends, Scholarship Attainment, and Attrition

**Caitlin Rugg, MD**
Monica Coughlan, MD
Justine N. Li, ATC
Sharon L. Hame, MD, FAAOS
Brian T. Feeley, MD, FAAOS

Former NCAA athletes (1960-2018) had low rates of early sport specialization. Specialization is rising over time, had no association with scholarship attainment, and correlated with increased burnout.

---

The Psychological Impact of the COVID-19 Pandemic on High School and Collegiate Athletes

**Justin Hellwinkel, MD, MSc**
David Trofa, MD
Rifat Ahmed, BS
Frank Alexander, ATC, MS
Thomas S. Lynch, MD, FAAOS
Christopher S. Ahmad, MD, FAAOS

The COVID-19 pandemic has placed significant strain on athletes, resulting in higher rates of depressive symptoms, most notably among females and those who identify strongly as an athlete.
12:00 PM  PAPER 693
Twenty-Five-Year Function after Proximal Tibial Osteotomy: Paired Outcomes in Patients with Bilateral Total Knee Arthroplasties following Unilateral Osteotomy

Mario Hevesi, MD, PhD
Ryan R. Wilbur
Lucas Keyt, BS
Matthew P. Abdel, MD, FAAOS
Robert T. Trousdale, MD, FAAOS
Bruce A. Levy, MD, FAAOS
Daniel B. Saris, MD, PhD
Michael J. Stuart, MD, FAAOS
Aaron J. Krych, MD, FAAOS

Long-term function of TKA following proximal tibial osteotomy is excellent, with patients demonstrating comparable outcome scores and equivalent knee preference between PTO-TKA and TKA-only knees.

12:05 PM  PAPER 694
Management of First Time Patellar Dislocations – A Network Meta-Analysis of Randomized Controlled Trials

Eoghan Hurley, MBCHB
Christopher Colasanti, MD
Delon McAllister, BS, MS
Utkarsh Anil, MD
Michael J. Alaia, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Kirk A. Campbell, MD, FAAOS

The current study demonstrates that MPFL-Reconstructions results in the lowest rate of recurrent patellar instability.

12:10 PM  PAPER 695
Oral Contraceptive Pills Double the Risk for Venous Thromboembolism after Knee Arthroscopy and Anterior Cruciate Ligament Reconstruction

Sophia Traven, MD
Kevin X. Farley, BA
Michael B. Gottschalk, MD, FAAOS
Brett Goodloe, MD
Shane K. Woolf, MD, FAAOS
John W. Xerogeanes, MD, FAAOS
Harris Slone, MD, FAAOS

OCP use is associated with double the risk for VTE after simple knee arthroscopy and ACL reconstruction.

12:15 PM  PAPER 696
Meniscal and Mechanical Symptoms are Associated with Cartilage Damage, Not Meniscal Pathology

Evan Farina, MD
Natalie Lowenstein, BS
Yuchiao Chang, DPHT (OXON)
Jeffrey N. Katz, MD
Elizabeth G. Matzkin, MD, FAAOS

Contrary to current dogma, this study demonstrates that traditionally defined “meniscal” and “mechanical” knee symptoms are strongly associated with the burden and severity of underlying cartilage damage rather than with specific meniscal pathology.

Discussion
Friday

SYMPOSIUM

Room 32

Artificial Intelligence in Orthopaedics: Machine Learning, Natural Language Processing, and Deep Learning
Moderator: Hamid Ghaednia, PhD
Advances in machine learning, natural language processing, and deep learning and implications for patient care, innovation, and quality/safety in orthopaedic surgery

I. Clinical Prediction Models
   Michiel E. Bongers, MD
II. Deep Learning
   Synho Do, PhD
III. Natural Language Processing
   Olivier Q. Groot, BS
IV. Natural Language Processing
   Aditya V. Karhade, MD, MBA
V. Clinical Prediction Models
   Jacobien Oosterhoff, MD
VI. Conclusion
   Joseph H. Schwab, MD, FAAOS

INSTRUCTIONAL COURSE LECTURE

1:30 PM - 3:00 PM

◆ 441 The Basics of Performing Revision Total Hip Arthroplasty
   Moderator: Adolph V. Lombardi, MD, FAAOS
   Steven J. MacDonald, MD
   Christopher L. Peters, MD, FAAOS
   A structured approach to revision total hip arthroplasty, with an understanding of etiology, surgical approaches, implant removal, and reconstruction methods, can improve durability and outcomes.

◆ 442 Tips and Tricks to Save You During Revision Total Knee Arthroplasties: Video-Based Demonstrations
   Moderator: Matthew P. Abdel, MD, FAAOS
   John J. Callaghan, MD, FAAOS
   Brian Chalmers, MD, FAAOS
   R. Michael Meneghini, MD, FAAOS
   This course provides the latest information on managing patients with failed total knee arthroplasties (TKAs) that require complex exposures, metaphyseal fixation to manage bone loss and improve biologic fixation, intraoperative infection management, and extensor mechanism reconstructions.

◆ 443 The Trouble with Tendons: Pulling Our Gait to Normalcy!
   Moderator: Steven L. Haddad, MD, FAAOS
   Scott Ellis, MD, FAAOS
   Jeremy J. McCormick, MD, FAAOS
   William C. McGarvey, MD, FAAOS
   Delves into tendon disorders/ruptures about the foot and ankle, both from degenerative conditions and sports injuries. Most important, the participant learns how to reconstruct each tendon discussed, in combination with restoring alignment, to achieve a more normal gait, return to function, and eliminate pain. With respect to athletic endeavors, rehabilitation and return to play complement surgical technique tips.

◆ 444 Treatment Following a First-Time Shoulder Dislocation: What Should I Do?
   Moderator: Albert Lin, MD, FAAOS
   Asheesh Bedi, MD, FAAOS
   Jonathan F. Dickens, MD, FAAOS
   John M. Tokish, MD, FAAOS
   This ICL will explore treatment considerations following a first time traumatic dislocation, including timing, type of sport, level of competition, and nonoperative versus operative options.

◆ 445 Degenerative Conditions of the Wrist: An Update
   Moderator: Mark H. Gonzalez, MD, PhD, FAAOS
   Steven I. Grindel, MD, FAAOS
   Daniel P. Mass, MD, FAAOS
   Alfonso Mejia, MD, MPH
   The Lecture will discuss the pathology evaluation and current treatment options for patients suffering from degenerative conditions of the wrist.

446 Surgical Techniques for Skeletally Immature Anterior Cruciate Ligament
   Moderator: Shital N. Parikh, MD, FAAOS
   Daniel W. Green, MD, FAAOS
   Benton E. Heyworth, MD, FAAOS
   Eric J. Wall, MD, FAAOS
   The presence of physis and potential for growth disturbances makes pediatric anterior cruciate ligament surgery challenging. This course focuses on varied surgical techniques to highlight pearls and complications.

◆ 447 Bullying in Orthopaedic Surgery: The Perfect Crime
   Moderator: Mary K. Mulcahey, MD, FAAOS
   Lisa K. Cannada, MD, FAAOS
   Lisa L. Lattanza, MD, FAAOS
   Kevin Pei, FACS, MD
   The prevalence of discrimination, bullying and harassment in orthopaedic surgery and the implications for one's career will be discussed in detail.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
448 How to Avoid and Treat the Most Common Complications after Reverse Total Shoulder Arthroplasty
Moderator: Peter N. Chalmers, MD, FAAOS
Jason Hsu, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
Robert Z. Tashjian, MD, FAAOS
This instructional course lecture will teach participants how to avoid, diagnose, and treat the most common complications after reverse total shoulder arthroplasty.

449 Adult Lumbar Disc Herniation: Treatment, Complications, Outcomes, and Evidence-Based Data for Patient and Health Professional Counseling
Moderator: Brian J. Neuman, MD, FAAOS
Amit Jain, MD
Sang D. Kim, MD, FAAOS
Sang Hun Lee, MD, FAAOS
This course provides evidence-based treatment options for adult patients with lumbar disc herniation to aid surgeons in counseling patients and healthcare professionals.

450 Elbow Trauma: An Evidence-Based Approach to Improving Outcomes!
Moderator: Emil H. Schemitsch, MD, FAAOS
Michael D. McKee, MD, FAAOS
Aaron Nauth, MD
William T. Obremskey, MD, MPH, FAAOS
A primary goal of the instructional course lecture is to achieve consensus opinions on many current issues and controversies regarding the treatment of elbow injuries.

451 Anterior Surgical Approaches for Acetabular Fracture Fixation: Is there a Best Way?
Moderator: Mark S. Vrahas, MD, FAAOS
Marius Keel, MD
Keith A. Mayo, MD, FAAOS
Henry C. Sagi, MD, FAAOS
Review the main anterior approaches for acetabular fracture fixation. Discuss the best option for the fracture, the patient, and you – the treating surgeon.

452 Open Fractures: Principles of Management
Moderator: Michael J. Patzakis, MD, FAAOS
L. Scott Levin, MD, FAAOS
Randall E. Marcus, MD, FAAOS
Charalampos Zalavras, MD, FAAOS
This course offers a comprehensive approach to the management of open fractures emphasizing principles and evidence-based practices. Areas covered include antibiotic therapy and prevention of infection, debridement and wound management options, and fracture stabilization guidelines and techniques. Promotion of fracture healing options are reviewed.

485 What is Wrong with this Painful Total Knee Arthroplasty? Making the Diagnosis; Deciding When to Operate and What to Do
Moderator: Daniel J. Berry, MD, FAAOS
Robert L. Barrack, MD, FAAOS
Craig J. Della Valle, MD, FAAOS
James I. Huddleston, MD, FAAOS
Michael H. Huo, MD, FAAOS
Harpal S. Khanuja, MD, FAAOS
Jay R. Lieberman, MD, FAAOS
Mark W. Pagnano, MD, FAAOS
Javad Parvizi, MD, FAAOS
Kevin I. Perry, MD, FAAOS
This is a case-based course on contemporary assessment of painful total knee arthroplasties (TKA) emphasizing how to make and treat specific diagnoses needing reoperation and when not to reoperate.

486 Elbow Arthroplasty: All Things Considered
Moderator: Scott P. Steinmann, MD, FAAOS
Julie E. Adams, MD, FAAOS
Daniel H. Doty, MD, FAAOS
Ken Faber, MD, FRCSC
Robert N. Hotchkiss, MD, FAAOS
Graham J. King, MD, FAAOS
Rodrigo J. Liendo, MD
Mark A. Mighell, MD, FAAOS
Mark E. Morrey, MD, FAAOS
Matthew L. Ramsey, MD, FAAOS
David C. Ring, MD, FAAOS
This case-based instructional course lecture addresses contemporary issues in elbow arthroplasty. New surgical approaches for primary arthroplasty are discussed as well as efficient techniques for revision surgery. Emphasis is placed on avoiding complications. This case-based ICL presents challenging cases and provides a global perspective on cutting-edge advances in elbow arthroplasty and alternatives.
Friday Educational Programs

1:35 PM PAPER 698
Analysis of Long-Term Outcomes Following Surgical Contracture Release of the Elbow Without Continuous Passive Motion: A Case Series
Brittany Ammerman
Padmavathi Ponnuru
Gary F. Updegrove, MD
April D. Armstrong, MD, FAAOS
Elbow contracture release surgery demonstrates sustained positive outcomes for patients, by increasing flexion and flexion-extension arc, decreasing pain and improving patient satisfaction.

1:40 PM PAPER 699
Osteocapsular Arthroplasty for Elbow Contracture – Long-Term Results
Dani Rotman, DMed
Jorge L. Rojas Lievano
Jaeman Kwak
Shawn W. O’Driscoll, MD, FAAOS
The improvement in elbow ROM, pain, and overall patient satisfaction, achieved following arthroscopic OCA for elbow contracture is both significant and durable.

1:50 PM PAPER 700
Prospective Randomized Trial of Continuous Passive Motion vs. Physical Therapy after Arthroscopic Release of Elbow Contracture
Shawn W. O’Driscoll, MD, FAAOS
Jorge L. Rojas Lievano
Maegan Shields, MD
Mark E. Morrey, MD, FAAOS
Joaquin Sanchez-Sotelo, MD, FAAOS
Dave Shukla, MD, FAAOS
Tammy Olson
James S. Fitzsimmons, BS
Anthony M. Vaichinger, BS
Postoperative rehabilitation of the elbow was faster and better with CPM than with PT following arthroscopic contracture release of contractures.

1:55 PM PAPER 701
Two Staged Revision of the Infected Total Elbow Arthroplasty with an Articulating Spacer: What is the Optimal Device?
Josef K. Eichinger, MD, FAAOS
Charles Cody White, MD
William E. Allen, BS
Venkatraman Kothandaraman, BS
Richard J. Friedman, MD, FAAOS
When revision is required, the type of antibiotic spacer chosen matters significantly with regard to functional capabilities and patient-reported outcomes.

2:00 PM PAPER 702
Comparison of Patient Demographics and Patient-Related Risk Factors for Mechanical Loosening following Primary Total Elbow Arthroplasty
Samuel Swiggett, MD
Miriam Weisberg, MD
Rushabh Vakharia, MD
Eric Roth, MD
Joseph Ehiorobo, MD
Michael A. Mont, MD, FAAOS
Jack Choueka, MD, FAAOS
This study compares patient demographics and identifies patient-related risk factors for mechanical loosening.

2:10 PM PAPER 703
Complications after Acute Distal Triceps Tears: An Analysis of 107 Cases
David Macknet, MD
Samuel Ford, MD
Ryan Mak
Bryan J. Loeffler, MD, FAAOS
Raymond G. Gaston, MD, FAAOS
The rates of major complications (14%), reoperations (13.1%), and rerupture (8.4%) posttraumatic triceps tendon repair are higher than previously described in the literature.

2:15 PM PAPER 704
Return to Sport following Distal Triceps Repair
Avinesh Agarwalla, MD
Anirudh K. Gowd, MD
Joseph N. Liu, MD
Grant Garcia, MD
Robert W. Wysocki, MD, FAAOS
John J. Fernandez, MD, FAAOS
Nikhil N. Verma, MD, FAAOS
Distal triceps repair enables 89.7% of patients to return to sport by 5.9+/4.4 months following surgery. However, 29.5% of patients were unable to return to their pre-injury level of activity.

2:20 PM PAPER 705
Hyaluronic Acid injection for Chronic Tennis Elbow: A Prospective, Randomized, Blinded Trial with One Year of Follow Up
Gershon Zinger, MD, MS
Bregman Alexandre, MD
Aybek Sharipov, MD
Oren Sarig, MD
Ori Safran, MD
Shaul Beyth, MD
Hyaluronic acid injections reduce pain and improve function in patients with chronic tennis elbow. Pain relief continues to improve for at least one year following the injections.

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2:30 PM  PAPER 706
**Anconeus Muscle Flap Transfer for Failed Surgical Treatment of Recalcitrant Chronic Lateral Epicondylitis**

*Shao-Min Shi, MD*
*Vishwajit Kode*
*Mark chu Xu, MD*
*Glenn G. Shi, MD, FAAOS*
*Steven I. Grindel, MD, FAAOS*

Nineteen patients with chronic lateral epicondylitis had failure of previous treatments that were managed with anconeus muscle flap transfer. Ninety-five percent of patients were satisfied with pain.

2:35 PM  PAPER 707
**Work-Related Outcomes following Repair of Distal Biceps Tendon Rupture**

*Anirudh K. Gowd, MD*
*Joseph N. Liu, MD*
*Bhargavi Maheshwer, BS*
*Grant Garcia, MD*
*Edward Beck, MD, MPH*
*Mark S. Cohen, MD, FAAOS*
*Gregory P. Nicholson, MD, FAAOS*
*Brian J. Cole, MD, MBA, FAAOS*
*Nikhil N. Verma, MD, FAAOS*

This study demonstrates that patients of heavy-duty work should expect to return to work later due to cumulative work strain, however, most patients should expect to return to work within 8 months.

2:40 PM  PAPER 022
**Clinical and Radiographic Outcomes of Reverse and Anatomic Total Shoulder Arthroplasty in Patients with an Intact Rotator Cuff and No Previous Surgery**

*Richard J. Friedman, MD, FAAOS*
*Bradley S. Schoch, MD*
*Josef K. Eichinger, MD, FAAOS*
*Pierre-Henri Flurin, MD*
*Thomas W. Wright, MD, FAAOS*
*Joseph D. Zuckerman, MD, FAAOS*
*Christopher Roche, MS, MBA*

Primary aTSA and primary rTSA patients in patients with OA and an intact rotator cuff with no previous history of shoulder surgery had similar clinical and radiographic outcomes.

2:45 PM  PAPER 030
**Finite Element Analysis of Glenoid Baseplate Retroversion in Reverse Total Shoulder Arthroplasty**

*Richard J. Friedman, MD, FAAOS*
*Shuchun Sun, MS*
*Xin She*
*Jordan Esposito, BS, MD*
*Josef K. Eichinger, MD, FAAOS*
*Hai Yao, PhD*

rTSA can tolerate large retroversion angles up to 25°, with the micromotion and forces generated between the glenoid baseplate and host bone staying well below the failure threshold.

1:30 PM - 3:00 PM  PAPER PRESENTATIONS  Ballroom 6A
**Hand and Wrist II**

1:30 PM  PAPER 708
**Preoperative Diagnosis and Management of Cubital Tunnel Syndrome: How Does it Vary and What Does it Cost?**

*Devin Collins, DO*
*Charles A. Daly, MD*
*Michael B. Gottschalk, MD, FAAOS*
*Eric R. Wagner, MD*
*Corey Spencer, BS*
*Alexander M. Dawes, BS*
*Paul T. Greenfield*

Cubital tunnel syndrome lacks a standard diagnostic regimen. Effective diagnostic studies are underutilized in favor of more invasive, traditional, and expensive tests with less evidence for efficacy.

1:35 PM  PAPER 709
**The Effect of Corticosteroid Injections on Postoperative Complications in Carpal Tunnel Release**

*David Kirby, MD*
*Megan R. Donnelly, BS*
*Daniel B. Buchalter, MD*
*Matthew L. Gonzalez, MD*
*Louis W. Catalano, MD, FAAOS*
*Jacques H. Hacquebord, MD, FAAOS*

Corticosteroid injections in the preoperative period are associated with postoperative infection after carpal tunnel release.

1:40 PM  PAPER 710
**Does Collagen Nerve Wrapping Prevent Perineural Adhesions and Permit Nerve Gliding in a Rabbit Compressive Neuropathy Model?**

*Neil V. Shah, MD, MS*
*Karan Dua, MD*
*Qurratul-Ain Dar, BS*
*Hanbin Wang, BA, BS*
*John N. Carter, PhD*
*Westley Hayes, MS*
*Alba Avoricani, BA*
*Steven M. Koehler, MD, FAAOS*

Although collagen nerve wraps do not restore nerve gliding, they successfully treat simulated compression neuropathy in a rabbit model via facilitation of Schwann cell repopulation.

1:50 PM  PAPER 711
**Long-Term Outcomes and Mortality following Carpal Tunnel Release in Patients over 80 Years of Age**

*Dafang Zhang, MD*
*Brandon E. Earp, MD, FAAOS*
*Kyra Benavent, BS*
*Philip E. Blazar, MD, FAAOS*

There are long-term benefits from CTR in patients 80 years of age or older. The mortality rate of this cohort mirrors that of the general population, and CTR is justified in the super elderly.
1:55 PM  PAPER 712
Immediate Postoperative Symptom Improvement following Carpal Tunnel Release May Not be Captured by Patient-Reported Outcomes Measurement Information System
David Bernstein, MD, MBA
Calvin H. Englert, BA
Bilal Mahmood, MD
Warren C. Hammert, MD

Nearly 75% of patients subjectively report their CTS is better at their first follow-up visit within three weeks of CTR; however, PROMIS does not capture this improvement.

2:00 PM  PAPER 713
Boston Carpal Tunnel Scores Alone Do Not Predict Intervention Type for Patients with Carpal Tunnel Syndrome or Cubital Tunnel Syndrome
Aaron Chen
Frank Chen, BS
Jona Kerluku, BS
Lauren E. Wessel, MD
Joseph Nguyen, MPH
Daniel Osei, MD, MSc
Duretti Fufa, MD, FAAOS

In this retrospective study, we explore whether BCTQ scores alone are predictive of patients receiving conservative, injection, or surgical interventions after a diagnosis of CTS or CuTS.

2:10 PM  PAPER 714
Repair vs. Anterior Interosseous Nerve End-to-Side Coaptation in Ulnar Nerve Injuries: Prospective Study
Michael Polmear, MD, MS
Jordan T. Carter, BS
Rami Khalifa, MD, PhD
Fernando Herrera, MD
Gilberto A. Gonzalez, MD
John Dunn, MD

Ulnar nerve primary repair plus AIN SETS coaptation yielded superior strength and improved upper extremity function following a proximal ulnar nerve injury compared to primary repair alone.

2:15 PM  PAPER 715
Rate of and Risk Factors for Developing Trigger Finger after Carpal Tunnel Release: A Review of 556 Cases from 2017-2019
Jeremy Raducha, MD
Winston Jiang
Lindsey G. Kahan, BS
Christopher Cochran, MD
James Dove, MD
Arnold-Peter C. Weiss, MD, FAAOS

An increased rate of trigger finger occurs following carpal tunnel release and is significantly associated with a prior history of trigger finger and dominant hand surgery.

2:20 PM  PAPER 716
Higher Surgical Costs Associated with Hospital Outpatient Carpal Tunnel Release
Devan Patel, MD
Peter G. Brodeur, MA
Joseph A. Gil, MD
Aristides I. Cruz, MD, FAAOS

In our large database study, we found carpal tunnel release in the hospital outpatient setting had a significantly higher cost compared to management in an ASC setting.

2:30 PM  PAPER 717
Problematic Initial Recovery after Carpal Tunnel Release Surgery
Claire B. Ryan, MD
Harrison Miner
Shyam Ramachandran, BS
David C. Ring, MD, FAAOS
Amirreza Fatehi, MD

This is a retrospective study of problematic initial recovery among people having carpal tunnel release surgery in a setting of routine measurement of symptoms of depression and anxiety.

2:35 PM  PAPER 718
Predicting Return to Work after Carpal Tunnel Surgery
Risa Reid, MD
Robert C. Chadderdon, MD, FAAOS
Tobias N. Von Bergen, MD
Matthew R. Delarosa, MD
John S. Gaul, MD, FAAOS

Our study outlines factors that influence surgeon-directed return to work after CTR surgery and can serve as a guide to systematize postoperative protocols.

1:30 PM - 3:00 PM
Ballroom 6B
Adult Reconstruction Hip VII
Moderators: Bryce C. Allen, MD, FAAOS and Nicolas O. Noiseux, MD, MS, FAAOS

Tranexamic Acid is Safe in Total Joint Arthroplasty Patients with a History of Coronary Artery Disease
Ran Schwarzkopf, MD, FAAOS
Stephen Zak, BA
Alex Tang, BS
Mohamad Sharan, MD
Daniel Waren, MSPH
Joshua C. Rozell, MD

Topical and IV TXA are equally safe to use in patients with a history of CAD and coronary stents in comparison to the control cohort.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
1:35 PM  PAPER 720
Patient-Specific Total Hip Arthroplasty Dislocation Risk Using a Machine Learning Algorithm

Cody Wyles, MD
Hilal Maradit-Kremers, MSc
Poulami Barman, MS
David G. Lewallen, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Mark W. Pagnano, MD, FAAOS
Michael J. Taunton, MD, FAAOS
Robert T. Trousdale, MD, FAAOS
Rafael J. Sierra, MD, FAAOS

This machine learning-enabled THA dislocation risk calculator demonstrates high accuracy statistics and is responsive to implant and surgical approach decisions.

1:40 PM  PAPER 721
Universal Screening for Malnutrition Prior to Total Joint Arthroplasty: Can it be Cost-Effective?

Yale Fillingham, MD
Michael T. Torchia, MD, MS
David D. Christensen, MD

Universal screening for malnutrition prior to total joint arthroplasty is cost-effective at parameters commonly found in routine clinical practice.

1:50 PM  PAPER 722
Outcomes of Primary Total Hip Arthroplasty following Septic Arthritis of the Native Hip: A Case-Controlled Study

Jacob W. Bettencourt, BS
Cody Wyles, MD
Douglas R. Osmun, MD
Arlen D. Hanssen, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Matthew P. Abdel, MD, FAAOS

A history of septic arthritis prior to primary THA led to a 10-fold increased risk of PJI, particularly if performed within 5 years of the diagnosis.

1:55 PM  PAPER 723
Surgical Treatment of Femoroacetabular Impingement: Minimum 10-Year Outcomes

Hamed Vahedi Kafshgari, MD
Steven J. Yacovelli
Claudio Diaz, MD
Javad Parvizi, MD, FAAOS

A study examining long-term success rate and risk factors for failure of surgical treatment for FAI.

2:00 PM  PAPER 724
A Prior History of Hip Arthroscopy is Not Associated with Worse Patient-Reported Outcomes following Total Hip Arthroplasty

Ida S. Lindman, MD
Jonatan Nättman, MSc
Axel B. Öhlin, MD, MSc
Karina A. Svensson, MD
Louise J. Karlsson, MD
Maziar Mohaddes, MD
Ola Rolfsen, MD, PhD
Mikael Sansone, MD, PhD

A prior hip arthroscopy for femoroacetabular impingement syndrome does not affect the patient-reported outcomes after a subsequent total hip arthroplasty surgery.

2:10 PM  PAPER 725
Femoral Prosthesis Geometry is a Risk Factor for Failure of Cementless Primary Total Hip Arthroplasty

Nithin C. Reddy, MD, FAAOS
Richard N. Chang, MPH
Heather A. Prentice, PhD
Liz Paxton, PhD, MA
Matthew P. Kelly, MD, FAAOS
Monti Khatod, MD, FAAOS

Type 1 single wedge, designs had a higher aseptic revision risk due to periprosthetic fracture, aseptic loosening, and instability relative to type 2 double wedge designs following primary elective total hip arthroplasty.

2:15 PM  PAPER 726
Predicting Dissatisfaction following Total Hip Arthroplasty Using a Bayesian Model Averaging Approach: Results from the Australian Arthroplasty Clinical Outcomes Registry

Jan P. Van Meirhaeghe, MD
Robert B. Molnar, MD
Sam Adie, MBBS, MPH

Our study confirms the high rates of patient satisfaction following THA, with postoperative complications being the only determinant of dissatisfaction.

2:20 PM  PAPER 727
Predictors of One-Year Outcomes after Total Hip Arthroplasty via the American Joint Replacement Registry

Chancellor F. Gray, MD, FAAOS
Prakash Jayakumar, MD
Paul Rizk, MD
James J. Huddleston, MD, FAAOS
Kevin J. Bozic, MD, MBA, FAAOS
Hari K. Parvataneni, MD, FAAOS

The AJRR represents a large repository of data, including longitudinally collected PROMs, to provide powerful preoperative predictors of patient outcomes and clinical improvement 1-year after THA.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
Friday

2:30 PM  PAPER 728
Morbidity and Mortality in Patients Undergoing Lower Limb Reconstruction during the SARS-CoV2 Pandemic: A Comparative Analysis from a Specialist Center in the United Kingdom
Yuvraj Agrawal, MD, FRCS (Ortho)
Akash D. Sharma, FRCS (Ortho), MBBS
George Cooper, FRCS (Ortho)
Jonathan D. Stevenson, FRCS (Ortho), MBCHB
Michael C. Parry, MB, ChB
David J. Dunlop, MD

We report the morbidity and mortality in patients who underwent lower limb reconstruction during the SARS-CoV-2 pandemic. There was no observed spike in complications in the perioperative period.

2:35 PM  PAPER 729
Routine Radiographs after Total Joint Arthroplasty: Is there Clinical Value?
Nicolas O. Noiseux, MD, MS, FAAOS
Alexander A. Hart, MPH
David DeMik, MD

Following total joint arthroplasty 98% and 68% attended follow up at 6/12 weeks, and 12 months postop. Routine 1 year postop radiographs resulted in a change in clinical management for 0 patients.

1:30 PM - 3:00 PM  Ballroom 20B
Adult Reconstruction Knee VII

1:30 PM  PAPER 730
The Prevalence and Outcomes of Unexpected Positive Intraoperative Cultures in Presumed Aseptic Revision Knee Arthroplasty
Brent Lanting, MD
Michael Neufeld, MD
Matthew G. Teeter, PhD
Michael Shehata, ChB, MD
Douglas Naudie, MD, FRCS
Richard W. McCalden, MD
Edward Vassarhelyi, MD, MSc

The primary purpose of this study was to determine the prevalence of unexpected positive culture in presumed aseptic revision TKA and the infection-free implant survival in this patient population.

1:35 PM  PAPER 731
Rerevision Knee Arthroplasty in a Tertiary Center: Infective Indication for Surgery and Multiple Previous Surgeries are Associated with Poor Clinical and Functional Outcomes
Lennart Von Fritsch
Shiraz Sabah, MD
Joshua Xu, BS, MD
Antony Palmer, MA, BMBCh
Benjamin J. Kendrick, FRCS (Ortho), MBBS
Andrew J. Price, FRCS
Christian Merle, MD
Abtin Alvand, FRCS (Ortho), MBBS

In a cohort of 250 rerevisions, 2-year revision-free survival was 71.3%. Infective indications, number of previous procedures, and the Elixhauser score were independent predictors of a poor outcome.

1:40 PM  PAPER 732
Young Patients have High Early Reoperation and Revision Rates after First-Time Aseptic Revision Total Knee Arthroplasty
Rafael Walker-Santiago, MD
Jason Tegettoff
Ajay Aggarwal, MD, FAAOS
James A. Keeney, MD, FAAOS

In this study, the authors report a two-fold higher rate of component revision, infection, and extensor mechanism failure among younger revision TKA patients compared with traditional aged patients.

1:50 PM  PAPER 733
Metaphyseal Cones in Revision Total Knee Arthroplasty with Cemented and Cementless Stems: Excellent Survivorship with some Caveats about Stem Fixation
Jeremy Gililland, MD, FAAOS
Michael C. Mahan, MD
Brenna Blackburn, MPH, PhD
Christian S. Earl
Lucas Anderson, MD, FAAOS
Christopher L. Peters, MD, FAAOS
Christopher E. Pelt, MD, FAAOS

The purpose of this study was to evaluate our experience with 3D printed titanium metaphyseal cones with both short cemented and longer cementless stems from a clinical and radiographic perspective.

1:55 PM  PAPER 734
Outcomes of Tibia Tantalum Cones, Titanium Cones, and Titanium Sleeves in Revision Knee Arthroplasty
Emmanuel Gibon, MD, PhD
Edvinas Sipavicius, BS
Terrie Vasilopoulos, PhD
Justin T. Deen, MD, FAAOS
Chancellor F. Gray, MD, FAAOS
Hernan A. Prieto, MD
Hari K. Parvataneni, MD, FAAOS
Luis Pulido, MD, FAAOS

Tantalum cones, titanium cones and sleeves are reliable reconstruction methods in revision TKA.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
2:00 PM  
PAPER 735
The Biomechanical Advantage of Cones and Stems in Revision Total Knee Arthroplasty
Fernando J. Quevedo-Gonzalez, PhD
Nicholas Schraut, MD
Kathleen Meyers, MS
Joseph D. Lipman, MS
Timothy M. Wright, PhD
Michael P. Ast, MD, FAAOS

Investigate through finite element models: Do metaphyseal cones provide any biomechanical advantage in revision TKA? Do short-cemented stems provide biomechanical advantage over long uncemented stems?

Discussion

2:10 PM  
PAPER 736
Revision Knee Arthroplasty for Stiffness and Unexplained Pain Associated to Poor Patient-Reported Outcomes: Analysis of 6,500 Revisions from the United Kingdom National Joint Registry
Shiraz Sabah, MD
Abtin Alvand, FRCS (Ortho), MBBS
Robert Middleton, MA, BM BCh
Simon G. Abram, MA, MRCSED
Antony Palmer, MA, BMBCch
David J. Beard, MA, MSc
Andrew J. Price, FRCS

Revision knee arthroplasties for stiffness and unexplained pain were associated with poor patient-reported outcomes.

2:15 PM  
PAPER 737
Knee Arthroscopy Prior to Revision Total Knee Arthroplasty is Associated with Increased Rerevision for Stiffness
Christian Klement, PhD
Young-Min Kwon, MD, PhD, FAAOS
Ruben V. Oganesyan, MD
Anand Padmanabha, MD
Venkatsaiakhil Tirumala, BS, MS
Liang Xiong, MD, PhD

This cohort matched study shows that patients who had prior knee arthroscopy demonstrated a significantly higher likelihood of requiring rerevision compared to patients without prior arthroscopy.

2:20 PM  
PAPER 738
Outcomes of Tourniquetless Revision Total Knee Arthroplasty: A Matched Cohort Analysis
Young-Min Kwon, MD, PhD, FAAOS
Venkatsaiakhil Tirumala, BS, MS
Christian Klement, PhD
Ruben V. Oganesyan, MD
Anand Padmanabha, MD

These results of this study suggest that the tourniquetless revision TKA is a viable option in selected patients due to comparable clinical outcomes.

Discussion

2:30 PM  
PAPER 739
Low Dose Aspirin is Safe and Effective for Venous Thromboembolism Prevention in Revision Total Knee Arthroplasty
Daniel Waren, MSPH
Alex Tang, BS
Stephen Zak, BA
Richard Iorio, MD, FAAOS
Joseph A. Bosco, MD, FAAOS
James D. Slover, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS

Many studies have studied the efficacy of different doses of aspirin, but mainly in primary total joint arthroplasty. In this study, we found that 81 mg aspirin BID is safe and effective in patients undergoing rTKA.

Discussion

2:35 PM  
PAPER 740
The Effectiveness of Closed Incision Negative Pressure Therapy vs. Standard of Care Dressing in Mitigating Surgical Site Complications in High-Risk Patients after Revision Knee Arthroplasty: A Randomized Clinical Trial
Carlos A. Higuera Rueda, MD, FAAOS
Ahmed Emara, MD
Yeni Nieves, MS
Alison K. Klika, MS
Nicolas S. Piuzzi, MD
Herbert J. Cooper, MD, FAAOS
Michael B. Cross, MD, FAAOS
George N. Guild, MD, FAAOS
Denis Nam, MD, MSc, FAAOS
Michael P. Nett, MD, FAAOS
Giles R. Scuderi, MD, FAAOS
Fred D. Cushner, MD, FAAOS
Ronald P. Silverman, FACS, MD
The PROMISES Trial Group

Closed incision negative pressure wound therapy after revision total knee diminishes 90-day surgical site complication rates among high-risk patients compared to silver impregnated dressings.

2:40 PM  
PAPER 741
Preoperative Opioid Use is a Risk Factor for Complication following Aseptic Revision Total Knee Arthroplasty
Jacob M. Wilson, MD
Kevin X. Farley, BA
Greg Erens, MD, FAAOS
Thomas L. Bradbury, MD, FAAOS
George N. Guild, MD, FAAOS

Patients who are taking opioid medications prior to revision TKA have elevated odds of complications following surgery.

Discussion
FRIDAY EDUCATIONAL PROGRAMS

SYMPOSIUM T

3:30 PM - 5:00 PM
Room 32
Deformity Correction: Analysis and Preoperative Planning
Moderator: Reid B. Nichols, MD, FAAOS

This symposium covers the most important aspect of Deformity Correction Analysis and preoperative planning. Specific planning for internal and external fixation is covered.

I. Preoperative Planning for Intramedullary Nail / Internal Lengthening Nail
   Austin T. Fragomen, MD, FAAOS

II. Preoperative Planning for Hexapod Correction
    Raymond W. Liu, MD, FAAOS

III. Preoperative Planning for Plate-Assisted Osteotomy
     Reid B. Nichols, MD, FAAOS

IV. Deformity Analysis: The Lower Extremity
    David A. Podeszwa, MD, FAAOS

INSTRUCTIONAL COURSE LECTURE

3:30 PM - 5:00 PM

461 The Spine and Its Influence on Total Hip Arthroplasty and Instability
   Moderator: Matthew P. Abdel, MD, FAAOS
   Craig J. Della Valle, MD, FAAOS
   Rafael J. Sierra, MD, FAAOS
   Jonathan M. Vigdorchik, MD, FAAOS
   Room 29B

This instructional course lecture provides cutting-edge information on the evolving topic of hip-spine interactions in patients with spinal pathologies, and how acetabular component position is influenced.

462 Update on Infection in Arthroplasty
   Moderator: Antonia F. Chen, MD, MBA, FAAOS
   Barry D. Brause, MD
   Carl A. Deirmengian, MD, FAAOS
   Brian A. Klatt, MD, FAAOS
   Room 29C

Hot topics in the field of infection in arthroplasty are covered, including novel tests for diagnosing periprosthetic joint infection (PJI), treatment methods for PJI, and postoperative treatment of PJI using antimicrobials.

463 Periprosthetic Joint Infection of the Knee: Contemporary Diagnosis and Management
   Moderator: Bryan D. Springer, MD, FAAOS
   Michael P. Bolognesi, MD, FAAOS
   Denis Nam, MD, MSc, FAAOS
   Javad Parvizi, MD, FAAOS
   Room 30C

This course provides the latest information on diagnosing and treating acute and chronic periprosthetic knee infections.

464 Proximal Humerus Fractures: Leave it Alone, Fix it, or Replace it?
   Moderator: Albert Lin, MD, FAAOS
   Hyunnin M. Kim, MD, FAAOS
   Michael D. McKee, MD, FAAOS
   Lewis L. Shi, MD, FAAOS

While techniques have improved, outcomes following management of proximal humerus fractures remain unpredictable. Current, evidence-based treatment options are discussed for this challenging fracture.

465 Posttraumatic Arthritis of the Distal Radioulnar Joint: Contemporary Perspectives
   Moderator: Jesse B. Jupiter, MD, FAAOS
   Charles Cassidy, MD, FAAOS
   Marco Rizzo, MD, FAAOS
   David S. Zelouf, MD, FAAOS
   Room 4

Arthritis of the distal radioulnar joint can be disabling. This course covers in depth the indications, techniques, and outcomes of alternative surgical treatments.

466 Costing for the Clinician: How to Understand Cost in Orthopaedic Care
   Moderator: Brian Cunningham, MD, FAAOS
   Karl M. Koenig, MD, MS, FAAOS
   Joseph Levy, PhD
   Nathan N. O’Hara, MHA
   Room 7B

Significant resources have been devoted to exposure and education around patient reported outcomes; however, little help has been provided to understand the cost side of the value equation.

467 Innovations in Shoulder Arthroplasty
   Moderator: Robert Z. Tashjian, MD, FAAOS
   Jay D. Keener, MD, FAAOS
   Joaquin Sanchez-Sotelo, MD, FAAOS
   Markus Scheibel, MD
   Ballroom 6C

This instructional course lecture reviews what is new or about to be new in shoulder arthroplasty that has or will change the treatment options.

468 Complex Spine Deformity: Achieving Maximal Correction with Minimal Risk for Complications
   Moderator: Robert H. Cho, MD, FAAOS
   Selina Poon, MD, FAAOS
   David L. Skaggs, MD, FAAOS
   Michelle C. Welborn, MD, FAAOS
   Room 1

Correction of severe spinal deformity can be overwhelming. Learn about the various techniques to make the correction safer from the experts in the field.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
469 Pediatric and Adolescent Spine Care for the General Orthopaedic Surgeon
Moderator: Suken A. Shah, MD, FAAOS
Craig P. Eberson, MD, FAAOS
A. Noelle Larson, MD, FAAOS
Burt Yaszay, MD, FAAOS
Room 30A
This instructional course lecture will prepare you to evaluate children for common spinal conditions and equip you with evidence-based algorithms for treatment. Attendees will engage in case-based learning to emphasize concepts in diagnosis and treatment of children and adolescents presenting with common spinal conditions and stay out of trouble.

470 Dilemmas for the Team Physician: Return to Play and the Management of In-Season Injuries
Moderator: Matthew T. Provencher, MD, FAAOS
Jonathan D. Packer, MD, FAAOS
Scott A. Rodeo, MD, FAAOS
Marc R. Safran, MD, FAAOS
Ballroom 6F
In this course, experienced team physicians discuss the in-season management of common injuries and the safe return-to-play. The role of orthobiologics is discussed.

471 Advanced Surgical Techniques in Femoroacetabular Impingement: An In-Depth Approach
Moderator: Jeffrey J. Nepple, MD, FAAOS
John C. Clohisy, MD, FAAOS
Michael Leunig, PhD
Room 28C
This course focuses on detailed review of preoperative imaging with direct correlation to findings at the time of surgery. Utilizing a video-based discussion of the surgical treatment, participants are exposed to a variety of surgical techniques in femoroacetabular impingement with detailed discussion of surgical preference and surgical pearls.

472 Readiness to Return to Play after Anterior Cruciate Ligament Reconstruction: Optimizing Performance and Clinical Outcome
Moderator: Mary K. Mulcahey, MD, FAAOS
Sommer Hammoud, MD, FAAOS
Timothy E. Hewett, PhD
Room 5
Factors influencing return to play following ACL reconstruction including neuromuscular control, graft type, post-operative rehabilitation, and psychological readiness will be discussed in detail.

473 Ulnar Collateral Ligament Injuries: Where Do We Stand in 2021?
Moderator: Anthony A. Romeo, MD, FAAOS
Peter N. Chalmers, MD, FAAOS
Jeffrey R. Dugas, MD, FAAOS
Brandon Erickson, MD
Room 3
This ICL will cover the breadth of ulnar collateral ligament injuries from risk factors and non-operative management to UCL repair and reconstruction.

Moderator: Rachel M. Frank, MD, FAAOS
Jorge A. Chahla, MD, PhD
Kristofer J. Jones, MD, FAAOS
Benedict U. Nwachukwu, MD, MBA
Room 8
This ICL provides a comprehensive overview of orthobiologic techniques for sports medicine pathologies, utilizing an evidence-based approach focusing on the value of all available approaches.

475 Do All Fractures Need Surgery? How Do I Decide?
Moderator: Nirmal C. Tejwani, MD, FAAOS
Robert F. Ostrum, MD, FAAOS
Paul Tornetta, MD, FAAOS
Philip R. Wolinsky, MD, FAAOS
Room 2
This instructional course lecture helps surgeons make decisions for common fractures in the face of conflicting literature on the merits of operative versus non-operative care.

476 Calcaneus and Talus Fractures: Pearls and Pitfalls
Moderator: Utku Kandemir, MD, FAAOS
Reza Firoozabadi, MD, FAAOS
Todd S. Kim, MD, FAAOS
Brian M. Weatherford, MD, FAAOS
Room 9
Calcaneus and talus fractures are life-changing. Knowledge of injury mechanisms, treatment options and indications is critical to avoid problems and achieve good outcome.
Dealing with significant glenoid bone deformities is critical for success in RSA. This ICL will demonstrate most current concepts through case presentations.

This course focuses on avoiding and getting out of trouble in the “not-so-simple” community fracture. Learn tips and tricks from the experts in this comprehensive case presentation.

During preoperative risk assessment, providers should consider the effect of pre- and postoperative opioid usage on outcomes. We evaluated the correlation of PROMIS PF with legacy patient-reported outcome measures to validate its use in patients undergoing minimally invasive transforaminal lumbar interbody fusion.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
3:55 PM

**PAPER 746**

**Osteoporosis is a Predictor of Two-Year Adverse Outcomes following Short Fusion for Degenerative Lumbar Disease**

*Neil V. Shah, MD, MS*

*Salem Najjar, BA*

*Adam J. Woffert, BA*

*Alexander Rompala, BS*

*George A. Beyer, MD, MS*

*Sharar Shah*

*Harleen Kaur, BA*

*Dillon Sedaghatpour, MD*

*Peter G. Passias, MD, FAAS*

*Virgine Lafage, PhD*

*Frank J. Schwab, MD*

*Bassel Diebo, MD*

*Carl B. Paulino, MD, FAAS*

Orthopaedic Research Laboratory of Brooklyn at SUNY Downstate

Patients with osteoporosis undergoing 2-3-level lumbar fusion for degenerative disc disease are at higher risk of 2-year medical, surgical, and implant-related complications.

**4:00 PM**

**PAPER 747**

**The Incidence and Risk Factors of Subsequent Lumbar Spine Surgery after Lumbar Disc Arthroplasty: A Minimum Two-Year Follow Up**

*Dean C. Perfetti, MD*

*Jesse M. Galina, BS*

*Austen Katz, MD*

*Alan Job, MD*

*Jeff S. Silber, MD, FAAS*

*David Essig, MD, FAAS*

*Alexander Satin, MD*

Increased reoperation rates provide a plausible view of how second-generation lumbar disc arthroplasty devices fared in the general spine community in comparison to those in FDA IDE trials.

**Discussion**

**4:10 PM**

**PAPER 748**

**Dysphagia should be Reported as a Separate Legacy Outcome Measure after Anterior Cervical Discectomy and Fusion**

*Philip Zakko, MD*

*Rafid Kasir, MD*

*Nai-Wei Chen, PhD*

*Daniel K. Park, MD, FAAS*

Dysphagia should be reported separately when looking at ACDF outcomes due to weak correlations between dysphagia scores and legacy patient-reported outcome measures in patients undergoing ACDF.

**4:15 PM**

**PAPER 749**

**The Minimum Clinically Important Difference for Patient Health Questionnaire-9 in Minimally Invasive Transforaminal Interbody Fusion**

*Elliot Cha, MSc*

*James M. Parrish, MPH*

*Nathaniel W. Jenkins, BS, MS*

*Conor P. Lynch, MS*

*Cara E. Goeghegan, BS*

*Caroline N. Jadczak, BS*

*Shruthi Mohan, BS*

*Kern Singh, MD, FAAS*

This study investigated and established minimal clinically important differences (MCID) for the PHQ-9 among patients undergoing minimally invasive transforaminal lumbar interbody fusion.

**4:20 PM**

**PAPER 750**

**Fusion, Foraminotomy, and Arthroplasty of the Cervical Spine in Elite Athletes: A Systematic Review and Meta-Analysis Evaluating Return to Play**

*Venkat Boddapati, MD*

*Josephine R. Coury, MD*

*Joseph Lombardi, MD*

*David Trofa, MD*

*Zeeshan M. Sardar, MD*

*Ronald A. Lehman, MD, FAAS*

*K. Daniel Riew, MD, FAAS*

The return to play rate after cervical spine surgery in professional athletes is 74.1%. ACDF is the most commonly performed procedure, followed by PCF, and CDA.

**Discussion**

**4:30 PM**

**PAPER 751**

**Correlation Between Spino-Pelvic Parameters and Reoperation Rates when Decompressing Above or Below a Prior Fusion**

*Zachary H. Goldstein, MD*

*Kyle Ridlen*

*Kasey E. Meeks, BS*

*Barrett Boody, MD*

*Rick C. Sasso, MD, FAAS*

*Paul E. Kraemer, MD, FAAS*

Well-aligned lumbar lordosis distribution index is associated with lower rates of reoperation following decompression above or below a prior fusion.
The Oswestry Disability Index and Short Form-12 Physical Component Summary are not Impacted by Recall Bias in Lumbar Laminectomy Patients: A Prospective Study Using Data from Fitness Trackers

Dennis Bienstock
Dhruv S. Shankar
Jinseong Kim, BS
Michael Gao, BS
Komal Srivastava, MS
Wesley Bronson, MD
Saad Chaudhary, MD, FAAOS
Jashvant Poeran, MD, PhD
James C. Iatridis, PhD
Andrew C. Hecht, MD, FAAOS
Mount Sinai Spine Research Group

In a prospective study of lumbar laminectomy patients, recall bias did not play a role in patients’ completion of the Oswestry Disability Index and Short Form-12 Physical Component Summary.

Discussion

Revision to Reverse Total Shoulder Arthroplasty: Do Short Stem and Stemless Implants Reduce the Operative Burden Compared to Convertible Stems?

Patrick J. Denard, MD, FAAOS
Brian C. Werner, MD, FAAOS
Joru Steinbeck, MD
Matthew J. Smith, MD, FAAOS
Albert Lin, MD, FAAOS
Benjamin W. Sears, MD, FAAOS
Armoudios M. Hatzidakis, MD, FAAOS
Sven Lichtenberg, MD
Evan S. Lederman, MD, FAAOS

Revision of stemless to RSA had lower operative times compared to either nonconvertible or convertible stems.

The Relationship between Preoperative Opioid Use and Adverse Events following Total Shoulder Arthroplasty

Kiera Kingston, MD
Charles D. Qin, MD
Mia Qin, MD
Lewis L. Shi, MD, FAAOS
Jason Strelzow, MD, FAAOS

Chronic preoperative opioid use is associated with increased risk of early postoperative complications, 90-day readmission, and early revision surgery for patients undergoing aTSA and rTSA.

Does Commercially Available Shoulder Arthroplasty Preoperative Planning Software Agree with Surgeon Measurements of Version, Inclination, and Subluxation?

Brandon Erickson, MD
Peter N. Chalmers, MD, FAAOS
Patrick J. Denard, MD, FAAOS
Evan S. Lederman, MD, FAAOS
John G. Horneff, MD, FAAOS
Brian C. Werner, MD, FAAOS
Matthew T. Provencher, MD, FAAOS
Anthony A. Romeo, MD, FAAOS

Preoperative planning software for shoulder arthroplasty has limited agreement in measures of version, inclination, and subluxation measurements while surgeons have high inter-reliability.

Increasing Severity of Anemia is Associated with Poorer Outcomes in Total Shoulder Arthroplasty: An Analysis of 15,185 Cases

Jeffrey Hassebrock, MD
Matthew K. Doan, BS
Jordan R. Pollock, BS
Michael L. Moore, BS
Justin Makovicka, MD
John M. Tokish, MD, FAAOS
Karan Patel, MD

Analysis of the association between anemia severity and postoperative outcomes in patients undergoing total shoulder arthroplasty.

Press-Fit Humeral Implants in Revision Shoulder Arthroplasty May Be as Effective as Cemented Arthroplasty

Amrit Vinod, MD
Sonja Pavlesen
Matthew J. DiPaola, MD, FAAOS
Anthony Ngo, BS
Thomas R. Duquin, MD, FAAOS

Press-fit humeral stems for revision shoulder arthroplasty is a reasonable option for managing patients with adequate humeral bone stock.
<table>
<thead>
<tr>
<th>Time</th>
<th>Presentation</th>
<th>Authors</th>
<th>Abstract</th>
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<tbody>
<tr>
<td>4:00 PM</td>
<td><strong>Fixed vs. Variable Angle Humeral Neck Cut in Anatomic Total Shoulder Arthroplasty: A Randomized Controlled Trial</strong>&lt;br&gt;<strong>Christopher Joyce, MD</strong>&lt;br&gt;Manan S. Patel, BA&lt;br&gt;Arjun Singh, BS&lt;br&gt;Michael Stone, MD&lt;br&gt;John G. Horneff, MD, FAAOS&lt;br&gt;Luke S. Austin, MD, FAAOS&lt;br&gt;Mark D. Lazarus, MD, FAAOS</td>
<td>Fixed angle humeral components do not affect glenohumeral joint anatomy any differently than variable angle devices during anatomic shoulder arthroplasty, and both adequately restore anatomy.</td>
<td>Discussion</td>
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<tr>
<td>4:10 PM</td>
<td><strong>Long-Term Outcomes of a Hybrid Glenoid Compared with a Cemented Pegged Implant</strong>&lt;br&gt;<strong>Evan Vellios, MD</strong>&lt;br&gt;Sridhar Pinnamaneni, MD&lt;br&gt;Jennifer A. Estrada, BA&lt;br&gt;Anthony Finocchio, BS&lt;br&gt;Laurence U. Okeke, BA&lt;br&gt;Harry G. Greditzer, MD, MSc&lt;br&gt;Edward V. Craig, MD, FAAOS&lt;br&gt;Joshua S. Dines, MD, FAAOS&lt;br&gt;David M. Dines, MD, FAAOS&lt;br&gt;Samuel A. Taylor, MD, FAAOS&lt;br&gt;Russell F. Warren, MD, FAAOS&lt;br&gt;Lawrence V. Guilotta, MD, FAAOS&lt;br&gt;HSS Shoulder Arthroplasty</td>
<td>At more than 10 year follow up, there appears to be no difference in functional outcome scores or revision surgery rates between hybrid and pegged glenoid components used in primary anatomic TSA.</td>
<td>Discussion</td>
</tr>
<tr>
<td>4:15 PM</td>
<td><strong>The Use of Preoperative Planning to Decrease Costs and Increase Efficiency in Operating Room for Shoulder Arthroplasty</strong>&lt;br&gt;<strong>Christian A. Martinez, BS</strong>&lt;br&gt;Vani J. Sabesan, MD, FAAOS&lt;br&gt;Diego Lima, MD&lt;br&gt;Gregory J. Gilot, MD, FAAOS&lt;br&gt;Bhavya Sheth, BS&lt;br&gt;Kiran Chatha, MD</td>
<td>This study found no correlation between preoperative planning and costs or efficiency in the operating room; further studies are needed to address confounding variables.</td>
<td><strong>Discussion</strong></td>
</tr>
<tr>
<td>4:20 PM</td>
<td><strong>Anatomic Total Shoulder Arthroplasty for Primary Glenohumeral Osteoarthritis is Associated with Excellent Outcomes and Low Revision Rates in the Elderly</strong>&lt;br&gt;<strong>Jennifer Tangtiphaboontana, MD</strong>&lt;br&gt;Andrew Jensen, MD&lt;br&gt;Erick Marigi, MD&lt;br&gt;Katherine E. Mallett, MD&lt;br&gt;John W. Sperling, MD, MBA, FAAOS&lt;br&gt;Joaquin Sanchez-Sotelo, MD, FAAOS</td>
<td>Elderly patients with primary glenohumeral osteoarthritis and an intact rotator cuff have excellent clinical and functional outcomes with low secondary rotator cuff tear rates after anatomic TSA.</td>
<td><strong>Discussion</strong></td>
</tr>
<tr>
<td>4:30 PM</td>
<td><strong>Racial and Gender Shoulder Arthroplasty Utilization Disparities of High and Low Volume Centers in New York State</strong>&lt;br&gt;<strong>Alexander R. Markes, MD</strong>&lt;br&gt;Ayoosh Pareek, MD&lt;br&gt;Addisu Mesfin, MD, FAAOS&lt;br&gt;ChunBong B. Ma, MD, FAAOS&lt;br&gt;Derek T. Ward, MD</td>
<td>Shoulder arthroplasty nearly doubled in annual utilization from 2009 to 2017, but racial and gender disparities endured particularly among Hispanic residents' utilization of high volume centers.</td>
<td><strong>Discussion</strong></td>
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<td>4:35 PM</td>
<td><strong>Outpatient vs. Inpatient Total Shoulder Arthroplasty: A Cost and Outcome Comparison in a Comorbidity Matched Analysis</strong>&lt;br&gt;<strong>Ivan Ye</strong>&lt;br&gt;Andrew Carbone, MD&lt;br&gt;Alexander J. Vervaecke, MD&lt;br&gt;Jashvant Poeran, MD, PhD&lt;br&gt;Nicole Zubizarreta, MPH&lt;br&gt;Leesa M. Galatz, MD, FAAOS&lt;br&gt;Paul J. Cagle, MD, FAAOS</td>
<td>After eliminating selection bias, outpatient TSA/rTSA was associated with reduced readmission rates and cost, even after eliminating initial surgery and hospitalization costs.</td>
<td><strong>Discussion</strong></td>
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</table>
Friday Educational Programs

**PAPER PRESENTATIONS**

**3:30 PM - 5:00 PM**

**Ballroom 6A**

**Adult Reconstruction Hip VIII**
Moderator: Jason Jennings, MD, FAAOS and Vivek M. Shah, MD, FAAOS

**3:30 PM**

**PAPER 764**

The Influence of Femoral Fixation on Mortality and Revision following Femoral Neck Fractures: A Matched Cohort Analysis from the American Joint Replacement Registry

*Alejandro Gonzalez Della Valle, MD, FAAOS*

*Bryan D. Springer, MD, FAAOS*

*Ayushmita De*

*Susan M. Odum, PhD*

*Jeffrey B. Stambough, MD*

*James I. Huddleston, MD, FAAOS*

*Richard L. Illgen, MD, FAAOS*

Preoperative diagnosis other than instability and the revision of the acetabular component seemed to be protective of dislocation in aseptic partial revision THA.

**3:35 PM**

**PAPER 765**

Periprosthetic Femur Fracture Risk: Influenced by Stem Choice, Not Surgical Approach

*William G. Hamilton, MD, FAAOS*

*Robert A. Sershon, MD*

*James F. McDonald, BS*

*Henry Ho, MSc*

Retrospective cohort study investigating the incidence of periprosthetic femur fracture in our institution’s experience (2007-2018), considering differences in the stem design and surgical approach.

**3:40 PM**

**PAPER 766**

Revision Surgery for Instability following Total Hip Arthroplasty: Does Timing Matter?

*Nathanael D. Heckmann, MD*

*Jaewon Yang, MD*

*Kevin Ong, PhD*

*Edmund Lau, MS*

*Brian C. Fuller, MD, FAAOS*

*Daniel D. Bohl, MD, MPH*

*Craig J. Della Valle, MD, FAAOS*

Revision THA for instability performed in the early postoperative period was associated with significantly higher rates of PJI compared to those performed later in the postoperative period.

**3:50 PM**

**PAPER 767**

What Factors Reduce the Incidence of Early Dislocations in Liner and Acetabular Hip Revisions?

*Jesus M. Villa, MD*

*Tejbrir S. Pannu, MD, MS*

*Preetesh D. Patel, MD, FAAOS*

*Wael K. Barsoum, MD, FAAOS*

*Carlos A. Higuera Rueda, MD, FAAOS*

*Aldo M. Riesgo, MD*

This study studies the impact of cement fixation in relation to periprosthetic fractures.

**3:55 PM**

**PAPER 768**

Indication and Healthcare Resource Utilization Trends for Revision Total Hip Arthroplasty in the United States

*Alexander Upfill-Brown, MD, MSc*

*Peter P. Hsiue, MD*

*Troy Sekimura, BS*

*Clark J. Chen, BS*

*Fiachra Rowan, MD*

*Amir Khoshbin, MD*

*Alexandra Stavrikas, MD*

The number of revision total hip arthroplasty (rTHA) procedures is increasing in the United States. This study evaluates the surgical indication trends and other factors associated with rTHA.

**4:00 PM**

**PAPER 769**

Do All Rigid and Unbalanced Spines Present the Same Risk of Dislocation following Total Hip Arthroplasty? A Comparison Study Between Patients with Ankylosing Spondylitis and History of Spinal Fusion

*Akhil Katakam, BA*

*Hany S. Bedair, MD*

*Christopher M. Melnic, MD*

Increasing lumbar lordosis angle increases the risk for dislocation following total hip arthroplasty among patients with ankylosing spondylitis or history of lumbosacral spinal fusion.

**4:10 PM**

**PAPER 770**

Outcomes of Isolated Head-Liner Exchange vs. Full Acetabular Revision in Revision Total Hip Arthroplasty

*Elyse J. Berlinberg, BS*

*Mackenzie A. Roof, BS*

*Oren Feder, MD*

*Morteza Meftah, MD*

*William J. Long, MD, FAAOS*

*Ran Schwarzkopf, MD, FAAOS*

This retrospective comparative study analyzed 2-year outcomes between patients undergoing isolated head/liner exchange versus full acetabular revision for revision total hip arthroplasty.
Clinical Outcome after Total Hip Arthroplasty in Adult Patients with a History of Infection of the Hip in Childhood: A Mid-Term Follow-Up Study

Rajesh Malhotra, MS
Sahil Batra, MS, MBBS

There was no risk of infection after THA in the patients in whom infection had been quiescent for more than 10 years. These young active patients pose a challenge to orthopaedic surgeons.

Contemporary Results of Total Femoral Replacements for Non-Oncologic Conditions

Jacob W. Bettencourt, BS
Cody Wyles, MD
Rafael J. Sierra, MD, FAAOS
Kevin I. Perry, MD, FAAOS
Douglas R. Osmom, MD
Arlen D. Hanssen, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Matthew P. Abdel, MD, FAAOS

Although TFR for non-oncologic conditions had considerable rates of reoperation for hip dislocations and PJI, they did provide patients effective end-stage limb salvage with improved pain and function.

The Inaccuracy of ICD-10 Coding in Revision Total Hip Arthroplasty and its Implication on Revision Data

Katherine A. Lygrisse, MD
Mackenzie A. Roof, BS
Lauren N. Keitel, BS
John J. Callaghan, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS
Nicholas Bedard, MD

The purpose of this study is to determine the accuracy of ICD-10-PCS coding for rTHA and discuss the implications on registry data.

Septic Revision Total Hip Arthroplasty is Not Adequately Compensated by Work Relative Value Units

Theodore Quan, BS
Matthew J. Best, MD
Alex Gu, MD
Seth Stake, MD
Safa C. Fassihi, MD
Gregory Golladay, MD, FAAOS
Savyasachi C. Thakkar, MD

Although revision total hip arthroplasty for infection is more complex and requires longer operative times than aseptic hip revisions, physicians are not appropriately reimbursed for this procedure.

Fracture Mapping of Posterior Wall Fractures of the Acetabulum

Matthew D. Hnatow, MD
David-Alan C. Rubin, MD
Heba Ahmad, BS
Catherine G. Ambrose, PhD
Milton L. Routt, MD, FAAOS

We evaluated a wide range of posterior wall acetabulum fractures using both standard CT reconstructions and 3D surface rendered images. After meticulous superimposition of these fracture lines, zones of comminution, and areas of marginal impaction, we demonstrate three distinct fracture types that can best be characterized as cranial peripheral, caudal peripheral, and non-peripheral.

Is Letournel's Golden Rule Really Golden? Indirect Reduction of the Posterior Pelvic Ring

Krishna C. Vemulapalli, MD, BS
Milton L. Routt, MD, FAAOS
Timothy S. Achor, MD, FAAOS
James F. Kellam, MD, FAAOS

This study is a CT evaluation of indirect reduction and percutaneous fixation of the posterior pelvic ring.

Exam under Anesthesia Improves Agreement on Mechanical Stability and Operative Indications among Experienced Pelvic Surgeons

Adam K. Lee, MD, FAAOS
Douglass Tucker, BS
John Carney, MD
Ailene Nguyen, BA
Ram Alluri, MD
Geoffrey Marecek, MD, FAAOS

The addition of EUA improved agreement among experienced surgeons regarding the presence of mechanical instability and need for fixation.
FRIDAY EDUCATIONAL PROGRAMS

3:55 PM PAPER 779
**Does Obesity Lead to Increased Systemic Complications in Operative Acetabular Fractures?**
*Megan Lameka, MD*
Clay A. Spitler, MD, FAAOS
Scott Mabry, MD
Tyler P. Montgomery, BS
Gerald McGwin, MS, PhD

In patients with operative acetabular fractures, obesity does not affect the rates of systemic complications (pneumonia, sepsis, ARDs, VTE, or mortality).

---

4:00 PM PAPER 780
**Risk Factors for Early Conversion Total Hip Arthroplasty after Pipkin 4 Femoral Head Fracture**
*Clay A. Spitler, MD, FAAOS*
Kyle Cichos, BS
Jacob K. Hawkins, MD
Elie S. Ghanem, MD, FAAOS
Gerald McGwin, MS, PhD
Patrick F. Bergin, MD, FAAOS
Parker A. White, MD

Higher rates of conversion to THA were seen in Pipkin 4 fractures: Shear type fxs; posterior wall comminution, SSI, and hip instability. Impaction type; older age, fracture pattern, and hip instability.

---

4:10 PM PAPER 781
**Heterotopic Ossification is Associated with Worse Functional Outcomes following Internal Fixation of Acetabular Fracture**
*Naah Joseph, MD*
Christopher Flanagan, MD
Isabella Heimke, BA
Heather A. Vallier, MD, FAAOS

Tobacco use, higher BMI, diabetes, posttraumatic OA, and the development of heterotopic ossification were associated with worse functional outcomes following operative fixation of acetabular fracture.

---

4:15 PM PAPER 782
**Intraoperative Hypothermia Leads to Increased Transfusion Requirements in Patients with Pelvic and Acetabular Trauma**
*Rahul K. Goel, MD*
Adam Boissonnault, MD
Helyn Grissom, MD
Roberto C. Hernandez-Irizarry, MD
Sona Arora, MD
Mara L. Schenker, MD, FAAOS
Michael A. Maceroli, MD

For patients with pelvic trauma, intraoperative hypothermia is a risk factor for postoperative blood transfusion. This modifiable factor should be closely monitored.

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4:20 PM PAPER 783
**Administration of Venous Thromboembolism Chemoprophylaxis within 12 Hours of Pelvic and Acetabular Surgery Has No Effect on Estimated Blood Loss, Perioperative Change in Hemoglobin, or Need for Transfusion**
*Lukas Keil, MD*
Sean A. Flannigan, BS
Robert F. Ostrum, MD, FAAOS
Jesse C. Hahn, MD, FAAOS

Implementation of an institutional protocol to administer rather than hold LMWH within 12h of pelvic and acetabular surgery has no effect on EBL, immediate or 24h Δ Hgb, or transfusion rate.

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4:30 PM PAPER 784
**Tranexamic Acid Does Not Affect Intraoperative Blood Loss or In-Hospital Outcomes after Acetabular Fracture Surgery**
*Harsh Wadhwa, BS*
Seth S. Tigchelaar, PhD
Michael J. Chen, MD
Julius A. Bishop, MD, FAAOS
Michael J. Gardner, MD, FAAOS

Perioperative intravenous tranexamic acid use does not decrease blood loss, need for transfusion, or improve in-hospital outcomes of acetabular open reduction and internal fixation.

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4:35 PM PAPER 785
**Blood Loss during Acetabular Surgery: Does Surgical Delay Matter? A Unique Analysis using Quantitative Methods**
*Natalie L. Zusman, MD*
Erik Woelber, MD
Natasha McKibben
David Gallagher, BS
Austin R. Thompson, BS
Darin M. Friess, MD, FAAOS
Zachary M. Working, MD

Intraoperative blood loss as calculated from data rather than surgeon opinion appears to be affected by time to surgery. There may be benefit in delaying surgery for specific, fragile patients.

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PAPER PRESENTATIONS

3:30 PM - 5:00 PM
Ballroom 6D

Practice Management/Rehabilitation V
Moderator: Ira H. Kirschenbaum, MD, FAAOS

3:30 PM PAPER 786
Wide-Awake Local Anesthesia No Tourniquet Hand Surgery Does Not Require Postoperative Opioid Pain Management: A Retrospective Review of Outcomes
Neil V. Shah, MD, MS
Qurratul-Ain Dar, BS
Alba Avoricani, BA
Alexander Rompala, BS
Kenneth H. Levy
Steven M. Koehler, MD, FAAOS

The WALANT anesthetic technique improves postoperative pain outcomes, and can safely be paired with opioid restriction.

3:35 PM PAPER 787
Patient Complaints in Orthopaedic Surgery: An Empirical Analysis Utilizing a Large National Database
Andrew B. Rees, BS
Shumaila Sarfani, MD
Justin W. Vickery, MD
John E. Kuhn, MD, FAAOS
Henry J. Domenico, MS
Mitchell B. Galloway, BS, MS
James Pichert, PhD
William O. Cooper, MD, MPH

Understanding patient complaints in orthopaedics is critical in both preventing complications and reducing malpractice risk. This study analyzes patient complaint utilizing a large national database.

3:40 PM PAPER 788
Improving Surgical Triage in Spine Clinic: Predicting Likelihood of Surgery Using Machine Learning
Samuel Broida, BS
Mariah L. Schrum, BS
Jaepil E. Yoon, MD
Aidan P. Sweeney, MS
Neil Dhruv, BS
Matthew Gombolay, PhD
S T. Yoon, MD, PhD

Our deep learning model that uses patient intake forms and prior MRI reports is able to accurately predict whether or not a patient will receive a surgical recommendation.

3:50 PM PAPER 789
Postoperative Red Blood Cell Transfusion is an Independent Risk Factor for Postoperative Venous Thromboembolism in Orthopaedic Surgery Patients
Ramakanth R. Yakkanti, MD
Kaushik Ravipati, BS
Bhaya Sheth, BS
Bilal Arif, BS
Victor H. Hernandez, MD, MS

This study evaluates a trend of postoperative transfusion after orthopaedic surgery being an independent risk factor for postoperative venous thromboembolism.

3:55 PM PAPER 790
Reduction in Facility Reimbursement Rates following the Removal of Total Hip Arthroplasty from the Inpatient Only List Does Not Accurately Reflect Cost Savings
Jeffrey Lynch, DO
Michael Yayac, BA
Chad A. Krueger, MD, FAAOS
Paul M. Courtney, MD, FAAOS

A study examining if the reduction in facility reimbursement rates is justified by comparing the difference in true facility costs between inpatient and outpatient THA.

4:00 PM PAPER 791
Disparity in Surgical Treatment of Common Musculoskeletal Injuries to the Shoulder and Knee is Associated with Insurance Type
Steven J. Svoboda, MD, FAAOS
Deliya B. Wesley, MPH, PhD
Melissa Wright, MD
Wiemi Douoguih, MD, FAAOS
Andrew E. Lincoln, SCD

Social determinants of health such as insurance type lead to disparity in treatment of common orthopedic injuries with Medicaid patients receiving surgery less often than those with private insurance.

4:10 PM PAPER 792
Tranexamic Acid as a Blood Conservation Strategy in Revision Joint Arthroplasty: A Retrospective Review
Bishoy Saad, DO
Arianna Giamakos, DO
R. Sterling Haring, DO, MPH
Sherif Elkattawy, BS
Richard S. Yoon, MD, FAAOS
Frank A. Liporace, MD, FAAOS

This is a study on tranexamic acid use and its effect on blood loss, transfusion rates, and length of hospital stay in revision total joint arthroplasty.
Outcome of Preoperative Cefazolin Use for Infection Prophylaxis in Patients with Self-reported Penicillin Allergy

Laura Michaud, MD  
David Yen, MD  
Hope H. Yen, BS, BSN

Cefazolin was found to be commonly used, with the incidence of cross-reaction with penicillin less than that reported, having implications for prophylaxis and antibiotic stewardship.

What Drives Underrepresented Minority Students to Train at Your Program: An Analysis of Survey Data

Ajith Malige, MD  
Lawrence Wells, MD, FAAOS  
Jaysson T. Brooks, MD  
Addisu Mesfin, MD, FAAOS  
Divya Talwar, MPH, PhD  
Tomasin M. Leska, BS  
Hannah M. Kleivins

The presence of URM faculty is an important factor when URM applicants decide where they would like to complete their orthopaedic surgery residency training.

Orthopaedic Staffed Urgent Care vs. the Emergency Department Setting: Cost and Quality Implications of Low-Energy Fracture Care

Christian A. Pean, MD  
Mackenzie Bird  
Daniel B. Buchalter, MD  
Kenneth A. Egol, MD, FAAOS

Orthopaedic staffed urgent care models are a more cost effective alternative to the ED for those with fractures requiring procedural treatment and low acuity patients managed on an out-patient basis.

Introduction a Novel Swab Optimized for Detection of Pathogen DNA/RNA from Implants and Surfaces

Karan Goswami, MD  
Courtney L. Jarvis, PhD  
Timothy Tan, MD  
Emanuele Chisari, MD  
Javad Parvizi, MD, FAAOS

This is a study investigating a novel swab for the detection of pathogen DNA/RNA from implants and surfaces.

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3:55 PM  PAPER 801
The Effect of Medicare's Bundled Payments for Care Initiative on Patient Risk Factors Prior to Total Knee Arthroplasty
Oren Feder, MD
Mackenzie A. Roof, BS
Shengnan Huang, MS
Lorraine Hutzler, MHA
James D. Slover, MD, FAAOS
Joseph A. Bosco, MD, FAAOS

Our findings indicate that preop patient optimization with respect to weight loss may be effective at BMI>50, but more work is needed for those with BMI>40 but <50 and active smokers undergoing TKA.

4:00 PM  PAPER 802
The Effect of the Comprehensive Care for Joint Replacement Model (CJR) on 90-Day Episode of Care Costs, Quality, and Patient Selection
Hyunkyu Ko, PhD
Brook I. Martin, PhD
Richard Nelson
Christopher E. Pelt, MD, FAAOS

The Comprehensive Care for Joint Replacement model appears to modestly reduce the episode-of-care costs. However, potential for unintended consequences should remain under close evaluation.

4:10 PM  PAPER 803
Increased Emergency Department Visits Associated with Decreased Length of Stay after Total Knee Arthroplasty have Modest Impact on 90-Day Episode of Care Costs and Did Not Result in Increased Rates of Readmission
Michael G. Zywiel, MD
Mayilee Canizares, PhD
Timothy S. Leroux, MD
Raja Rampersaud, FRCSC, MD

While shortened lengths of stay have been associated with increased ED visits, the latter have minimal overall cost impact and have not resulted in increased hospital readmission rates.

4:15 PM  PAPER 804
Comparison between Socioeconomic Parameters and Postoperative Emergency Department Visits in Primary Total Knee Arthroplasty
Jonathan H. Shaw, MD
Ayooluwa Ayoola, BS
Luke D. Wesemann, BS
Mahjabeen Waris, BS
Michael D. Gabbard, MD
Michael A. Charters, MD, FAAOS
Wayne T. North, MD

Area deprivation index and other socioeconomic parameters may predict risk of postoperative emergency department visits following total knee arthroplasty.

4:20 PM  PAPER 805
Insurance Payer Type Affects Outcomes after Revision Total Joint Arthroplasty: A Matched Cohort Analysis
Christian Klement, PhD
Young-Min Kwon, MD, PhD, FAAOS
Venkatsaiakhil Tirumala, BS, MS
Evan Smith, MD
Liang Xiong, MD, PhD

This study demonstrates that, compared to privately insured patients, patients with government-sponsored insurance were at an increased risk for developing complications perioperatively.

4:30 PM  PAPER 806
Efficacy and Cost-Effectiveness of Postoperative Radiographs after Total Knee Arthroplasty
Aseal Birir
Nathan H. Varady, BS
Troy B. Amen, BA
Antonia F. Chen, MD, MBA, FAAOS

Over 99% postoperative radiographs after TKA provide no clinical utility. Radiographs ordered during a nonroutine visit are an extremely reliable indicator for when imaging may be of higher value.

4:35 PM  PAPER 807
The Cost-Effectiveness of Wound Dressings for Infection Prophylaxis in Total Joint Arthroplasty
Yehuda E. Kerbel, MD
Gregory J. Kirchner, MD, MPH
Alexander Lieber, MD
Matthew L. Webb, MD
Lucas Nikkel, MD
Vincent M. Moretti, MD, FAAOS

A break-even cost analysis determined Xeroform-gauze is economically justifiable with respect to TJA infection prophylaxis, but more specialized dressings require greater reductions in infection rate.
Allied Health Program Continuing Education

Allied Health Professionals: The AAOS is not accredited to offer credit for nurses and other Allied Health Professionals. To determine if activities offering AMA PRA Category 1 Credits™ are acceptable for your licensing or certification needs please contact the relevant organizations directly.

Orthopaedic Technologists: The National Association of Orthopaedic Technologists (NAOT) have applied to the National Board for Certification of Orthopaedic Technologists for approval of 8 contact hours for each CAST1 and CAST2 courses (16 total hours for both courses).

Orthopaedic Physician Assistants: The National Association of Orthopaedic Technologists have applied to the National Board for Certification of Orthopaedic Physician Assistants for approval of 8 contact hours for each CAST1 and CAST2 courses (16 total hours for both courses).

GENERAL
Certificates for sessions will be provided by NAOT. Please make sure your email is correct when registering for the courses. For credit that may be acceptable to state medical associations, specialty societies or state boards of medical licensure, please contact those organizations.

CAST1 – Introduction to Splinting Clinical and Emergency Room Setting
TUESDAY, AUGUST 31
8:15AM - 5:00PM
Room 30C
Sponsored by the National Association of Orthopaedic Technologies
Moderators: Erik Duke, OTC

Overview
This full-day course will utilize informative lectures and a hands-on workshop to provide attendees with a comprehensive information on the fundamentals of splinting and casting.

Program
8:00 AM – 8:15 AM  Introductions - Erik Duke, OTC
8:15 AM – 9:30 AM  Introduction to Splinting and Complications - Sean Conkle, OTC
9:30 AM – 10:30 AM  Upper Extremity Demonstrations - Sean Conkle, OTC
Volar Splint - Sean Conkle, OTC
Thumb Spica Splinting - Sean Conkle, OTC
Sugar Tong Splinting - Sean Conkle, OTC
Reverse Sugar Tong Splinting - Sean Conkle, OTC
Co-aptation Splint - Sean Conkle, OTC
10:30 AM – 10:45 AM  Break
10:45 AM – 12:30 PM  Hands on Workshop for Upper Extremity Splinting - Sean Conkle, OTC
12:30 PM – 1:30 PM  Lunch
1:30 PM - 2:45 PM  Lower Extremity Demonstration - Kathe Bagnato, OTC
Jones Dressing for Short Leg Splinting - Kathe Bagnato, OTC
Short Leg Posterior Stirrup Splint w/ toe plate - Kathe Bagnato, OTC
2:45 PM - 3:00 PM  Break
3:30 PM – 4:45 PM  Hands on Workshop for Lower Extremity Splinting - Kathe Bagnato, OTC
4:45 PM – 5:00 PM  Questions

CAST2 – Casting Clinical Basic
WEDNESDAY, SEPTEMBER 1
8:15AM - 5:00PM
Room 30C
Sponsored by the National Association of Orthopaedic Technologies
Moderators: Erik Duke, OT-C

Overview
This full-day course will provide didactic lectures as well as an advanced hands-on workshop, providing attendees with possible complications and solutions in splinting and casting.

Program
8:00 AM- 8:15 AM  Introductions - Erik Duke, OTC
8:15 AM – 8:45 AM  Cast Complications - Erik Duke, OTC
8:45 AM – 10:00 AM  Upper Extremity Casting - Erik Duke, OTC
Short Arm Cast - Erik Duke, OTC
Short Arm Thumb Spica - Erik Duke, OTC
Boxer Cast - Erik Duke, OTC
10:00 AM – 10:15 AM  Break
10:15 AM – 12:30 PM  Hands on Workshop for Upper Extremity Casting - Erik Duke, OTC
12:30 PM – 1:30 PM  Lunch
1:30 PM – 2:45 PM  Demonstration Lower Extremity Casting - Chris Rice, OTC
Short Leg Cast - Chris Rice, OTC
2:45 PM – 3:00 PM  Break
3:00 PM – 4:45 PM  Hands on Workshop for Lower Extremity Casting - Chris Rice, OTC
4:45 PM – 5:00 PM  Questions

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AWARD WINNER ADULT RECONSTRUCTION HIP

Direct Anterior Approach for Hip Hemiarthroplasty
David A. Molho, MD
Jordan Brand, MD
Justin P. Kuether, MD
Joseph B. Kahan, MD, MPH
Lidia Ani, MD
Lee E. Rubin, MD, FAAOS

This video demonstrates management of hip fractures with hemiarthroplasty via the direct anterior approach. Data from a single-center study comparing hemiarthroplasty approaches are presented.

Cement-in-Cement Revision Arthroplasty Technique
Mary Nugent, FRCS (Ortho)
Peter Smitham, FRACS, FRCS (Ortho), PhD
Lucian B. Solomon, FAORTHA, MD, PhD
Zoran Paovic
Roumen B. Stamenkov, MD, MS
Donald Howie, MD, PhD
Stuart A. Callary, PhD
Kerry Costi, BA (Biol Sc)

This video demonstrates the surgical technique for cement-in-cement revision of a femoral stem.

AWARD WINNER ADULT RECONSTRUCTION KNEE

Medial Unicompartmental Knee Arthroplasty With a Fixed-Bearing Implant
Philip Winnock De Grave, MD

Fixed-bearing unicompartmental knee arthroplasty is a good treatment option for medial end-stage osteoarthritis. The surgical technique with conventional instruments is safe and reliable.

AWARD WINNER FOOT AND ANKLE

Posterolateral Approach for Trimalleolar Ankle Fracture
Blake J. Schultz, MD
Christian A. Pean, MD
Dylan T. Lowe, MD
Kenneth A. Egol, MD

The posterolateral approach to the ankle aids in accurate visualization, reduction, and fixation of the posterior malleolus and the fibula in patients with a trimalleolar fracture pattern.

AWARD WINNER HAND AND WRIST

The Extended Flexor Carpi Radialis Approach to the Distal Radius
Tomas J. Saun, MD
Andrea Chan, MD
Ryan Paul, MD

This video shows distal radius fracture fixation via an extended flexor carpi radialis approach. The technical pearls and our current experience with this technique from 2018 to 2020 are presented.

AWARD WINNER PEDIATRICS

The Metaizeau Technique for Management of Displaced Radial Neck Fractures
Jay P. Patel, MD
Folorunsho Edobor-Osula, MD, FAAOS
Jeremy Hreha, MD

This video shows the Metaizeau technique, a common percutaneous method to manage displaced pediatric radial neck fractures that avoids the risks and complications associated with an open approach.

AWARD WINNER SHOULDER AND ELBOW

Intercostal Nerve Transfers for Brachial Plexopathy
Amy L. Speeckaert, MD, FAAOS
Austin P. Seaman, BS
Daniel Lynch, BS
John P. Mickley, BS
Amy Moore, MD
Ryan Schmucker, MD

This video presents a surgical technique for intercostal nerve transfer with the use of a sural nerve graft for the management of traumatic brachial plexopathy.

Modified Weaver-Dunn Reconstruction for Acromioclavicular Joint Dislocation
Brian W. Hill, MD
Manan S. Patel, BA
Patrick Casey, BS
Joseph A. Abboud, MD, FAAOS

This video describes the epidemiology of acromioclavicular joint injuries, reviews the basic anatomy of the acromioclavicular joint, reviews a case presentation, and discusses the current literature.

AWARD WINNER SPORTS MEDICINE

Posterior Cruciate Ligament Tibial Avulsion: A Novel Open Approach and Results of Surgical Management
Jairo F. Estrada Sierra, MD
Oscar A. Mejía, MD
Salvador J. Gomez Bermudez, MD
Francisco Javier Monsalve, MMED
William H. Marquez, MD

A novel open approach for the management of posterior cruciate ligament tibial avulsions is an excellent treatment option for patients without associated intra-articular injuries.
High thoracic pedicle subtraction osteotomy in the treatment of severe congenital kypho-scoliosis in the adult is demonstrated.

The anterolateral approach allows access to the entire length of the humerus and versatile implant selection. The radial nerve is identified early to prevent iatrogenic injury.

This video presents a novel approach for the fixation of posterolateral fracture fragments in patients with a tibial plateau fracture, aided by the placement of a rim plate.

Instability via the direct anterior approach for total hip arthroplasty is minimized by preserving capsular structures, performing provocative stability tests, and optimizing soft-tissue tension.

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Intra-articular Adductor Canal Block in Total Knee Arthroplasty
Anna Jungwirth-Weinberger, MD
Kilian Rueckl, MD
Ulrich Bechler, MD
Matthieu Zingg, MD
Friedrich Boettner, MD
Maximilian Kasparek, MD

This video demonstrates the proper placement of an intra-articular adductor canal block during total knee arthroplasty.

Severe Varus Knee
Yongseuk Lee, MD
Joo Sung Kim, MD

This video shows the management of soft-tissue imbalance in a patient with a severe varus knee, which is performed selectively and sequentially according to the degree and site of imbalance.

Simultaneous Bilateral Total Knee Arthroplasty With a Robotic Surgical Assistant
Brendan P. Klar, MD
Ricky Torres
Danielle Klar

A robotic surgical assistant allows for efficient simultaneous bilateral total knee arthroplasty without moving the robotic unit during the procedure and results in excellent alignment and outcomes.

Refining the Repicci Minimally Invasive Resurfacing Technique for Ease, Accuracy, and Reproducibility
Martin H. Redish, MD, FAAOS
Robert W. Eberle, MS

Addressing the technique, instruments, and component, we developed a refined version of Repicci minimally invasive unicompartmental knee arthroplasty that yields reproducible surgical methods and results.

Tourniquet-Free Total Knee Arthroplasty
Christopher E. Pelt, MD, FAAOS
Michelle Zeidan, MD

Total knee arthroplasty is commonly performed with a tourniquet. This video discusses controversies and the literature on tourniquet-free total knee arthroplasty and shows anatomy and our technique.

Arthroscopic-Assisted Lower Trapezius Transfer
Rami Alrabaa, MD
Liana J. Tedesco, MD
John T. Heffernan, MD
David Kovacevic, MD, FAAOS

This video demonstrates the technique for arthroscopic-assisted lower trapezius transfer with the use of an Achilles tendon allograft as an interpositional graft.

Various Techniques for Anterior Closing Wedge Osteotomy of the Tibia
Mahmoud Almasri, FRCSC
Frank R. Noyes, MD, FAAOS

This video reviews six techniques for a slope-reducing anterior closing wedge osteotomy of the proximal tibia. An algorithm and key technical considerations for the osteotomy are outlined.
FOOT AND ANKLE

**Posterolateral Approach for Trimalleolar Ankle Fracture**
Blake J. Schultz, MD  
Christian A. Pean, MD  
Dylan T. Lowe, MD  
Kenneth A. Egol, MD

The posterolateral approach to the ankle aids in accurate visualization, reduction, and fixation of the posterior malleolus and the fibula in patients with a trimalleolar fracture pattern.

**Achilles Tendon Repair Using the Modified Giftbox Technique**
Sean Fitzpatrick, MD  
Timothy Miller, MD, FAAOS

The modified giftbox technique for Achilles tendon repair is a novel technique associated with outcomes comparable to those of traditional techniques but with several key advantages.

**Lateral Column Lengthening as Treatment for Planovalgus Foot Deformity in Ambulatory Patients With Neuromuscular Disorders**
Cosma Calderaro, MD  
Luca Labianca, MD  
Barbara Maestri, MD  
Federico Fantoni, MD  
Andrea Ferretti, MD  
Francesca Latini, MD

Lateral column lengthening arthrodesis is successful in the management of neuromuscular planovalgus foot deformity. Currently, the decision regarding what procedure to perform is controversial.

**Posterior Tibial Tendon Transfer for Management of Drop Foot**
Victor Hoang, DO  
Troy S. Watson, MD, FAAOS

This video describes transfer of the posterior tibial tendon anteriorly to the dorsum of foot for the management of drop foot after deep peroneal nerve transection.

**Endoscopic Augmentation Repair of the Interosseous Talocalcaneal Ligament for Chronic Subtalar Instability**
Yuki Tochigi, MD, PhD  
Satoru Ozeki, MD

This video shows a novel endoscopic technique for augmentation repair of the interosseous talocalcaneal ligament, which is a promising technique for the management of subtalar instability.

**Minimally Invasive Management of Hallux Rigidus**
Dominic S. Carreira, MD, FAAOS  
Logan Thayer, BS

This video discusses an emerging technique for arthroscopic chielectomy and débridement, which is a minimally invasive treatment option for the management of hallux rigidus.

**Fusion Takedown Total Ankle Arthroplasty Surgical Technique**
Timothy R. Daniels, MD, FRCSC  
Shahin Kayum, MD  
Ryan Khan, CCRP  
Andrew Marsh, MD  
Sahil Kooner, MD

Fusion takedown and conversion to total ankle arthroplasty is an alternative treatment option for patients with a symptomatic ankle fusion.

**Management of Severe Ankle and Hindfoot Deformity: Technique Using Femoral Head Allograft for Tibiotalocalcaneal Fusion Using a Cup-and-Cone Reamer**
Victor Hoang, DO  
Taylor Anthony  
Shivali Gupta, DO  
Ryan S. Chang  
Troy S. Watson, MD, FAAOS

Femoral head allograft for tibiotalocalcaneal fusion may be useful in patients with a large talar body defect and a severe fixed deformity of the ankle and hindfoot.

**First Metatarsophalangeal Lateral Collateral Ligament Repair in an Athlete**
Kempland Corbin Walley, MD  
Paul Talusan, MD, FAAOS  
Stefano Muscatelli, MD  
James R. Holmes, MD, FAAOS  
David M. Walton, MD

This video describes first metatarsophalangeal lateral collateral ligament repair in a young, female gymnast with varus laxity. The patient had satisfactory mid-term and long-term outcomes.

**Total Talus Arthroplasty**
Justin T. Smith, MD  
Zein S. El-Zein, MD  
David Ciufo, MD  
Paul T. Fortin, MD, FAAOS

Video demonstration of a total talus arthroplasty performed on a 23-year-old female with avascular necrosis of her talus, including explanation of pre-operative and post-operative considerations.

**Isolated Contracture of Extensor Hallucis Longus After Open Reduction and Internal Fixation of a Tibial Fracture**
Shayar Kian, MS  
Blake J. Schultz, MD  
Guillem Gonzalez-Lomas, MD, FAAOS  
Steven C. Sheskier, MD, FAAOS

This video discusses the peculiar case presentation of an isolated contracture of the extensor hallucis longus tendon after open reduction and internal fixation of a tibial stress fracture.

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HAND AND WRIST

**The Extended Flexor Carpi Radialis Approach to the Distal Radius**
Tomas J. Saun, MD
Andrea Chan, MD
Ryan Paul, MD

This video shows distal radius fracture fixation via an extended flexor carpi radialis approach. The technical pearls and our current experience with this technique from 2018 to 2020 are presented.

**Thumb Metacarpophalangeal Joint Arthrodesis (Fusion)**
Kanu S. Goyal, MD, FAAOS
Daniel Lynch, BS
Tyler Evans
Kyle A. Deistler
Austin J. Roebke, MD

This video demonstrates thumb metacarpophalangeal joint arthrodesis (fusion) with the use of a single screw in a patient with arthritis after a ligamentous injury.

**Maximizing Efficiency With Endoscopic Carpal Tunnel Release**
Austin P. Seaman, BS
Daniel Lynch, BS
Abhishek Julka, MD
Austin J. Roebke, MD

This video presents tips and tricks for increasing efficiency during endoscopic carpal tunnel release. Indications, contraindications, technical considerations, and outcomes are discussed.

**Offering an Alternate Solution: Total Wrist Arthrodesis After Failed Four-Corner Fusion**
Corey Spencer, BS
Emily L. Demain, BSN
Alexander M. Dawes, BS
Charles A. Daly, MD
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD

This video discusses total wrist arthrodesis, which is an effective salvage treatment option for patients with a nonunion after failed four-corner fusion.

**Partial Trapeziectomy and Pyrocarbon Interpositional Implant for Trapeziometacarpal Osteoarthritis: Surgical Technique**
Augusto Marcuzzi, MD
Fabio Vita, MD
Federico Pillia, MD
Cesare Faldini, MD
Roberto Adani
Gianluca Sapino, MD
Andrea Gennaro

This video shows the surgical technique for and the results of partial trapeziectomy and a pyrocarbon interpositional implant to manage Eaton-Littler stage III trapeziometacarpal osteoarthritis.

**Tendon Transfers After Radial Nerve Avulsion**
Kristin Sandrowski, MD
Dylan T. Lowe, MD
Nader Paksima, DO, FAAOS

This video is a case-based review of radial nerve avulsion and demonstrates a standard technique for tendon transfers.

**Zone I Flexor Tendon Repair: Techniques and Outcomes**
Michael J. Moses, MD
Ali Azad, MD
Dylan T. Lowe, MD
Nader Paksima, DO, FAAOS

This video provides a case-based review of zone II flexor tendon injuries and demonstrates a cross-locked cruciate technique for direct repair of the tendon.

**Hook of Hamate Excision for Symptomatic Nonunion**
Ali Azad, MD
James R. Mullen, MD
Nader Paksima, DO, FAAOS

This video demonstrates the surgical approach to the motor branch of the ulnar nerve in combination with hook of hamate excision.

**Distal Ulnar Resection: Surgical Technique As Described By Darrach**
Arien L. Cherones
Nicholas Iannuzzi, MD, FAAOS
Kent Yamaguchi, MD

Here we will be demonstrating resection of the distal ulna. The procedure is commonly referred to as the Darrach.

**Matched Resection of the Distal Ulna: Surgical Technique as Described by Watson**
Nicholas Iannuzzi, MD, FAAOS
Kent Yamaguchi, MD
Arien L. Cherones

Distal radioulnar joint arthritis can be managed via matched resection of the distal ulna; however, the procedure is not ideal for patients lacking a functional triangular fibrocartilage complex.

**Distal Ulnar Hemiresection and Interposition: Surgical Technique as Described by Bowers**
Arien L. Cherones
Nicholas Iannuzzi, MD, FAAOS
Kent Yamaguchi, MD
Arien L. Cherones

This video demonstrates hemiresection and interposition of the distal ulna as described by Bowers to manage rheumatoid, posttraumatic, or degenerative arthritis of the distal radioulnar joint.

**Posterior Interosseous Artery Flap: Surgical Technique**
Jerry I. Huang, MD, FAAOS
Jeffrey Friedrich, MD
Charles L. Rodriguez-Feo, MD
Yusha (katie) Liu, MD, PhD
Arien L. Cherones

Posterior interosseous artery flap is suitable for providing vascular skin to the dorsal region of hand as far as the proximal phalanx of the thumb and the first web space.
**Proximal Interphalangeal Joint Hemihamate Reconstruction**

David V. Tuckman, MD, FAAOS

This video demonstrates proximal interphalangeal joint reconstruction with the use of a hemihamate osteoarticular graft.

**A Cadaver Model Review of Trigger Finger and Trigger Thumb Anatomy**

Devin Collins, DO
David C. Rehak, MD

This video reviews the relevant surgical anatomy of trigger finger and trigger thumb, providing a brief overview of the diagnosis and management.

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**MUSCULOSKELETAL ONCOLOGY**

**Limb-Salvage Surgery With a Proximal Tibia Replacement in Haiti**

Scott C. Nelson, MD, FAAOS
Lee M. Zuckerman, MD, FAAOS

Limb-salvage surgery in underserved regions of the world is discussed and reviewed. The case presentation of a patient who underwent proximal tibia replacement in Haiti is discussed.

**Radical Resection of an Ewing’s Sarcoma of a Left Scapula with Endoprosthetic Replacement.**

Justin Koss, BS
Tyler Hoskins
David Goyette, BS
Jay Patel, DO
James C. Wittig, MD, FAAOS

This is a video of male who presented with left shoulder pain. Biopsy revealed Ewing’s sarcoma in his scapula. A total resection with endoprosthetic replacement was performed.

**Surgical Pearls in Recapping T-saw Laminoplasty for Thoracic Spinal Tumor**

Kazuya Shinmura, MD
Satoru Demura, MD
Satoshi Kato, MD
Noriaki Yokogawa, MD
Makoto Handa
Ryohei Annen
Motoya Kobayashi, MD
Yohei Yamada, MD
Hiroyuki Tsuchiya, MD

Recapping T-saw laminoplasty opens up an excellent surgical field and allows for the physiologic and anatomic reconstruction of the vertebral arch after the excision of spinal cord tumors.

**Radical Resection of a Ewing’s Sarcoma of the Femoral Shaft**

Saige Mitchell
Christopher Mazzei, BS
Tyler Hoskins
David Goyette, BS
Jay Patel, DO
Stephen Barr, BS
Samantha Frank
Eric I. Chang, FACS, MD
James C. Wittig, MD, FAAOS

Radical resection of a Ewing’s Sarcoma of the Femoral Shaft utilizing a vascularized fibular free flap.

**Extra-Articular Resection of the Proximal Humerus for Osteosarcoma**

Scott Buzin, DO
Matthew D’Ambrosio, DO
Tyler Hoskins
David Goyette, BS
Christopher Mazzei, BS
Justin Koss, BS
Jay Patel, DO
James C. Wittig, MD, FAAOS

The purpose of this video is to demonstrate the surgical approach to radically resecting an osteosarcoma of the proximal humerus and fixing the bone utilizing a tumor prosthesis.

**En Bloc Resection of C5 Presumed Osteoblastoma**

Rachel Bratescu, MD
David Dong, BS
Derek Klavas, MD
Rex A. Marco, MD, FAAOS

A patient presented with a left-sided C5 mass and neck pain. Initial biopsy was consistent with osteoblastoma. He underwent staged en-bloc tumor excisionlearning points are demonstrated.

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**PEDIATRICS**

**The Metaizeau Technique for Management of Displaced Radial Neck Fractures**

Jay P. Patel, MD
Folorunsho Edobor-Osula, MD, FAAOS
Jeremy Hreha, MD

This video shows the Metaizeau technique, a common percutaneous method to manage displaced pediatric radial neck fractures that avoids the risks and complications associated with an open approach.

**Fresh, Precut Osteochondral Allograft Core Transplantation for the Management of Capitellum Osteochondritis Dissecans**

Sagar S. Chawla, MD
Arien L. Cherones
Michael G. Saper, DO, ATC

This video demonstrates the surgical technique for fresh, precut osteochondral allograft transplantation.
Single-Incision Approach to Tibial and Fibular Osteotomies in the Management of Rotational Deformities
Katherine Rosenwasser, MD
Philip K. McClure, MD, FAAOS
John E. Herzenberg, MD, FAAOS

Rotational malalignment is a cause of pain and dysfunction in growing children. This video presents a novel, single-incision approach to tibial and fibular osteotomies for torsional correction.

Transcapitellar Pinning for Proximal Radial Shaft Fracture in a Pediatric Patient
Barbara Minkowitz, MD, FAAOS
Jennifer R. Ristic, PA-C
Eytan D. Mendelow, BS

This video highlights indications for the surgical management of an angulated, proximal third radial shaft fracture in a 5-year-old child via a transcapitellar approach.

Lateral Epicondyle Avulsion in a Skeletally Mature Adolescent
Barbara Minkowitz, MD, FAAOS
Jennifer R. Ristic, PA-C
Alice Chu, MD
Allie Davanzo
Kelsey Kaplowitz
Eytan D. Mendelow, BS

This video discusses the case presentation of a 15-year-old patient with a displaced lateral epicondyle avulsion fracture.

Guided Growth Surgery: Diagnosis, Technique, and Efficacy in Patients with Genu Valgum
Barbara Minkowitz, MD, FAAOS
Joseph M. Israeli
Jennifer R. Ristic, PA-C
Allie Davanzo

This video describes guided growth surgery as a treatment option for the management of pathologic genu valgum and reviews all surgical approaches that can be used.

Posterior Approach to the Knee and Contracture Release for Arthrogryposis
Steven Rivero, MD
Folorunsho Edobor-Osula, MD, FAAOS
Brian D. Batko, MD

Release of select posterior knee structures and serial long leg casting achieves near-full extension of the knee to allow for standing and potential ambulation in children with arthrogryposis.

Management of Chronic Radiocapitellar Joint Dislocation With Hexapod External Fixator
Madison Craft
Rami Khalifa, MD, PhD
Ahmed Thabet Hagag, MD
Amr A. Abdelgawad, MD, PhD, MBA, FAAOS

A hexapod external fixator with an osteotomy of the ulnar is a reliable treatment plan to achieve closed reduction in a patient with a chronic radiocapitellar joint dislocation.

Pediatric Trigger Finger Release
Matthew J. Michel, MD
Dominick V. Congiusta, MD, MPH
Folorunsho Edobor-Osula, MD, FAAOS

This video discusses pediatric trigger finger, providing a case presentation and demonstrating a release.

Complex Synpolydactylly Reconstruction With SPY Angiography
Ashok Para
Andrew R. Leggett, MD
Alice Chu, MD
Ashley Ignatiuk, FRCSC, MD, MSc

This video demonstrates complex synpolydactylly reconstruction and resection of supernumerary digit with the use of SPY angiography.

Minimally Invasive Suture Button Repair of Displaced Lesser Trochanter Fracture in an Adolescent Elite Ballerina
Anthony Gualtieri, MD
Dylan T. Lowe, MD
Elizabeth Barchi, MD
Andrew E. Price, MD, FAAOS

This video describes an adolescent, high-level ballet dancer who underwent minimally invasive open repair of a lesser trochanteric avulsion fracture with the use of a suture button construct.

Mini-Open Cam Resection for Femoroacetabular Impingement
Alexander R. Hoberman, MD
David B. Merkow, MD
Dylan T. Lowe, MD
Pablo Castaneda, MD

This video discusses the case presentation of a patient with femoroacetabular impingement who underwent osteochondroplasty and recontouring via mini-open cam resection and labral examination.

Surgical Hip Dislocation and Morscher Procedure for Management of Posttraumatic Coxa Breva
Arthur Manoli, MD
Ira Zaltz, MD, FAAOS

A Morscher osteotomy can be performed to lengthen the femoral neck and restore the greater trochanter to a more functional position in patients with a complex posttraumatic hip deformity.

Posterior Sternoclavicular Dislocation in an Adolescent: Review and Closed Reduction
Joseph W. Anderson, MD
Michael W. Honeycutt, MD
Grayson A. Domingue
Randall Madison, MD
Brian Hulon

This video discusses an adolescent patient treated for a posterior sternoclavicular dislocation. Imaging studies, reduction technique, post-reduction management, and published outcomes are reviewed.
Surgical Hip Dislocation
Justin T. Smith, MD
Ira Zaltz, MD, FAAOS

This video demonstrates surgical hip dislocation in a 16-year-old girl with femoroacetabular impingement and includes an explanation of preoperative and postoperative considerations.

Periacetabular Osteotomy for Management of Acetabular Dysplasia
Justin T. Smith, MD
Ira Zaltz, MD, FAAOS

This video demonstrates a periacetabular osteotomy in a 17-year-old boy with acetabular dysplasia and reviews preoperative and postoperative considerations.

Practice Management/Rehabilitation

Is Medicine an Art? Stress Management, Art Exhibitions and Total Hip and Knee Arthroplasty in Ambulatory Surgery
Yves Michaud, MD

Confidence is important to encourage patient participation in care, which is critical for recovery. An artistic component may create a link between emotions and medicine.

Shoulder and Elbow

Intercostal Nerve Transfers for Brachial Plexopathy
Amy L. Speeckaert, MD, FAAOS
Austin P. Seaman, BS
Daniel Lynch, BS
John P. Mickley, BS
Amy Moore, MD
Ryan Schmucker, MD

This video presents a surgical technique for intercostal nerve transfer with the use of a sural nerve graft for the management of traumatic brachial plexopathy.

Modified Weaver-Dunn Reconstruction for Acromioclavicular Joint Dislocation
Brian W. Hill, MD
Manan S. Patel, BA
Patrick Casey, BS
Joseph A. Abboud, MD, FAAOS

This video describes the epidemiology of acromioclavicular joint injuries, reviews the basic anatomy of the acromioclavicular joint, reviews a case presentation, and discusses the current literature.

Revision of Failed Total Shoulder Arthroplasty to Reverse Total Shoulder Arthroplasty With Dissimilar Implant Manufacturers: Case Presentation and Surgical Technique
Jason Lipof, MD
Alexander Greenstein, MD
Ilya Voloshin, MD, FAAOS
David Quinzi, MD

This video discusses the case presentation of a patient in whom total shoulder arthroplasty failed and was revised to reverse total shoulder arthroplasty with dissimilar implant manufacturers.

Surgical Management of Periprosthetic Humeral Shaft Fractures via a Tibial Strut Allograft: Case Presentation and Surgical Technique
Alexander Greenstein, MD
Jason Lipof, MD
David Quinzi, MD
Ilya Voloshin, MD, FAAOS

This video reviews the management of a periprosthetic humeral shaft fracture with the use of a tibial strut allograft.

Lower Trapezius Transfer for Irreparable Posterosuperior Rotator Cuff Tear: From Anatomy to Surgical Procedure
William H. Marquez, MD
Santiago Ordoñez Arango, MD
Jose Luis Osma, MD
Oscar A. Mejía, MD
Santiago Vanegas-Alzate, MBBS
Juan C. Marulanda, MD
Alvaro Vanegas, MD
Francisco Javier Monsalve, MMED

Lower trapezius transfer is an effective treatment option for patients with an irreparable posterosuperior rotator cuff tear, resulting in improvements in function and shoulder pain.

Snapping Triceps Syndrome: Evaluation and Surgical Management
Nicholas R. Pagani, MD
Michael S. Guss, MD

This video demonstrates a surgical technique for the management of snapping triceps syndrome that involves posterior transposition of the medial tendinous portion of the triceps.

Steindler Flexorplasty
Risa Reid, MD
Raymond G. Gaston, MD, FAAOS
Bryan J. Loeffler, MD, FAAOS

Steindler flexorplasty is a reliable procedure associated with low morbidity; therefore, it should be included in the armamentarium of treatment options to restore elbow flexion.

Optimal Technique for Open Reduction and Internal Fixation of Radial Capitellum Fractures
John P. Mickley, BS
Hisham Awan, MD, FAAOS
Austin J. Roebke, MD

This video presents the technique for open reduction and internal fixation of radial capitellum fractures. Indications, contraindications, technical considerations, and outcomes are discussed.

Arthroscopic Decompression of Spinoglenoid Notch Cyst via an Intra-articular Approach
Shady A. Mahmoud, MD
Saeed Mohammad, MD
Konrad I. Gruson, MD, FAAOS

This video describes arthroscopic decompression of a spinoglenoid notch cyst via an intra-articular approach.

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Allograft Prosthetic Composite With Anterior Flange Technique: Revision Reverse Total Shoulder Arthroplasty in the Setting of Humeral Bone Loss
Grant E. Garrigues, MD, FAAOS
Lisa G. Friedman, MD

The case presentation of a patient with humeral bone loss treated via revision reverse total shoulder arthroplasty with an allograft prosthetic composite is discussed.

A Novel Technique for Rotator Cable-Preserving Repair of Isolated Subscapularis Tears: Modified Double-Row Suture Bridge Repair
Jung Gon Kim, MD
Dong Hyun Lee, MD
Changhee Baek, MD

This video discusses a novel modified double-row suture bridge technique for rotator cable-preserving repair of isolated subscapularis tears.

Conjoint Tendon Lengthening for Alleviation or Prevention of Anterior Shoulder Pain After Reverse Total Shoulder Arthroplasty
Robert C. Williams, MD
Gregory Gomez, MD
G R. Huffman, MD, FAAOS

This video demonstrates conjoint tendon lengthening for the prevention or alleviation of anterior shoulder pain after reverse shoulder arthroplasty.

Revision of Failed Latarjet Procedure via the Eden-Hybinette Procedure
Marcio Cohen, MD
Alexandre D. Zaluski, MD
Marcus V. Galvao Amaral, MD, MSc
Geraldo Motta, MD, MSc
Martim T. Monterio

This video discusses a patient with epilepsy and severe bipolar bone loss in whom the Latarjet procedure failed. The patient underwent revision via the Eden-Hybinette procedure.

Subacromial Balloon Arthroplasty for Irreparable Rotator Cuff Tear
John G. Horneff, MD, FAAOS
Manan S. Patel, BA
Joseph A. Abboud, MD, FAAOS

This video demonstrates the management of an irreparable posterosuperior rotator cuff tear via subacromial balloon arthroplasty.

Pedicled Pectoralis Transfer as a Novel Approach to Paralysis of the Deltoid
Eric R. Wagner, MD
Charles A. Daly, MD
Alexander M. Dawes, BS
Michael B. Gottschalk, MD, FAAOS
Corey Spencer, BS

This video presents pedicled pectoralis transfer as a novel technique for the treatment of patients with complex deltoid paralysis for whom limited treatment options exist.

Glenohumeral Arthrodesis: A Salvage Option for Patients with Severe Posttraumatic Deformity
Alexander M. Dawes, BS
Charles A. Daly, MD
Eric R. Wagner, MD
Corey Spencer, BS
Michael B. Gottschalk, MD, FAAOS

Glenohumeral arthrodesis is a salvage treatment option that should be considered in patients with severe posttraumatic shoulder deformity.

The Role of Capsular Release After Distal Humerus Fracture
Michael J. Moses, MD
Ali Azad, MD
Dylan T. Lowe, MD
Nader Paksima, DO, FAAOS

This video provides a case-based review of capsular release for the management of elbow stiffness after distal humerus fracture.

Button Repair: A Novel Technique for Lateral Ulnar Collateral Ligament Repair in Terrible Triad Injuries
Liana J. Tedesco, MD
Michael B. Held, MD
R K. Kadiyala, MD, PhD, FAAOS
Matthew W. Konigsberg, MD

This video describes a technique that involves the use of a cortical button for the management of a lateral ulnar collateral ligament injury in a patient with a terrible triad injury of the elbow.

Anatomic Total Shoulder Arthroplasty Using a Bone-Sparing, Precision, Multiplanar Humeral Prosthesis
Liana J. Tedesco, MD
John T. Heffernan, MD
William N. Levine, MD, FAAOS

This video demonstrates surgical steps for anatomic total shoulder arthroplasty with the use of a bone-sparing, precision, multiplanar humeral prosthesis.

Distal Triceps Tendon Rupture Repair
Tyler Luthringer, MD
Dylan T. Lowe, MD
Kenneth A. Egol, MD, FAAOS

A patient with an acute distal triceps tendon rupture is treated via suture anchor repair of the triceps tendon to the footprint of the olecranon tip.
Augmented Repair of Large to Massive Delaminated Rotator Cuff Tears With Autologous Long Head of the Biceps Tendon Graft: The Arthroscopic Cuff-Plus Technique
Giuseppe Milano, MD
Giacomo Marchi, MD
Maristella F. Saccomanno, MD, PhD
Alessandra Scaini, MD
Niccolò Vaisitti, MD
Giuseppe Bertoni, MD
Alessandro Colosio, MD
This video discusses an arthroscopic cuff-plus technique for superior capsule reconstruction with the use of the long head of the biceps tendon in patients with a rotator cuff tear.

Revision Arthroscopic Bankart Repair for Recurrent Anterior Shoulder Instability
Matthew Gotlin, MD
Eoghan Hurley, MBCHB
Dylan T. Lowe, MD
Andrew S. Rokito, MD, FAAOS
This video discusses the case presentation of a patient with anterior shoulder instability in whom prior shoulder stabilization failed. The patient is treated via revision arthroscopic Bankart repair.

Superior Capsule Reconstruction Using a Dermal Allograft
Erik Contreras, MD
Julie Y. Bishop, MD, FAAOS
Gregory L. Cvetanovich, MD
This video demonstrates the surgical technique for superior capsule reconstruction with the use of a dermal allograft and discusses indications and outcomes.

Open Reduction and Ligament Reconstruction of Locked Anteroinferior Sternoclavicular Joint Dislocations
Erel Ben Ari, MD
Kevin Magone, MD
Dylan T. Lowe, MD
Costas Bizekis
Andrew S. Rokito, MD, FAAOS
Mandeep Virk, MD, FAAOS
This video discusses a 52-year-old man with an anteroinferior sternoclavicular joint dislocation who had unusual symptoms and was treated via open reduction and allograft reconstruction.

Retracted Short Head of the Biceps Tears: An Unusual Pattern of Distal Biceps Injury
Jorge L. Rojas, MD
Jennifer Tangtiphaiboontana, MD
Artit Boonrod, MD
Michal J. Harasymczuk, MD
Arunnit Boonrod, MD
Jay Smith, MD
Shawn W. O’Driscoll, MD, FAAOS
Most surgeons are not familiar with retracted short head of the biceps tears. These injuries may be isolated or part of a complete tear. They masquerade as muscle-tendon junction injuries.

Arthroscopic Superior Capsule Reconstruction With Doubled Autologous Semitendinosus Tendon Graft: A Technical Note
Giuseppe Milano, MD
Maristella F. Saccomanno, MD, PhD
Alessandra Scaini, MD
Marco Adriani, MS
Giuseppe Bertoni, MD
Andrea G. Salvi
Giacomo Marchi, MD
This video describes a new technique for superior capsule reconstruction with the use of autologous semitendinosus tendon.

Outerbridge-Kashiwagi Procedure for the Management of a Supracondylar Humerus Fracture Malunion (O-K Procedure)
Rami Alrabaa, MD
Matthew E. Simhon, MD
R K. Kadiyala, MD, PhD, FAAOS
This video presents the technique for the Outerbridge-Kashiwagi procedure for the management of a mechanical block secondary to posttraumatic heterotopic bone formation.

Complex Monteggia Fractures: Anatomic Reduction Optimizes Outcome
Jaehon M. Kim, MD, FAAOS
Jimmy J. Chan, MD
Danil Rybalko, MD
Andy Chang, MD
Michael R. Hausman, MD, FAAOS
Complex Monteggia fractures are characterized by comminution of the proximal ulna with fracture extension into the coronoid. Anatomic reduction directly affects surgical outcomes.

Arthroscopic Decompression of Spinoglenoid Cyst via Intra-articular Approach
Konrad I. Gruson, MD, FAAOS
Yehia Bedeir, MBCHB, MS
Shady A. Mahmoud, MD
Saeed Mohammad, MD
The case presentation of a 55-year-old man with a spinoglenoid notch cyst resistant to nonsurgical management is discussed. Arthroscopic decompression was performed via an intra-articular approach.

Six Steps to Maximize Glenoid Exposure
Eric M. Black, MD, FAAOS
Nancy J. Moontasri, MD
This video demonstrates six steps to maximize glenoid exposure.

Arthroscopic-Assisted Internal Fixation of Capitellum Fractures
James Dieterich, MD
Yiyang Zhang, MD
Trevor Jackson, MD
Michael R. Hausman, MD, FAAOS
The classification of capitellum fractures and evidence supporting arthroscopic-assisted fixation are discussed. Arthroscopic-assisted internal fixation of a capitellum fracture is demonstrated.

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SPINE

High Thoracic Pedicle Subtraction Osteotomy in the Management of Severe Congenital Kyphoscoliosis in the Adult
Cesare Faldini, MD
Alberto Ruffilli, MD, PhD
Francesca Barile, MD
Michele Fiore, MD
Marco Manzetti, MD
Stefano Pasini, MD
Fabrizio Perna, MD
Angelo Toscano, MD, PhD
Valentina Viglione, MD

High thoracic pedicle subtraction osteotomy in the treatment of severe congenital kypho-scoliosis in the adult is demonstrated.

Arthroscopic-Assisted Transpedicular Approach for Spinal Cord Decompression
Ghanshyam Kakadiya, MBBS, MS
Kshitij Chaudhary, MBBS, MS

Arthroscopic-assisted transpedicular decompression may improve the surgical field and magnification, thereby ensuring complete decompression without injuring the dura or the spinal cord.

Anterior Spinal Cord Decompression via a Posterolateral Approach for Thoracic Ossification of the Posterior Longitudinal Ligament
Noriaki Yokogawa, MD
Satoshi Kato, MD
Satoru Demura, MD
Kazuya Shinmura, MD
Makoto Handa
Ryohei Annen
Motoya Kobayashi, MD
Yohei Yamada, MD
Hiroyuki Tsuchiya, MD

This video demonstrates anterior spinal cord decompression via a posterolateral approach for the management of a large ossification of the posterior longitudinal ligament in the kyphotic curve.

Minimally Invasive Lateral Access and Robotic Spinal Fusion Surgery
Amit Jain, MD
Adam Margalit, MD
Jacob Babu, MD
Krishna Vangipuram Suresh, BS
Ijezie Ikwezunma, BA, BS

This video highlights the advantage of combining the powerful, oblique interbody fusion technique with minimally invasive, robotic-assisted posterior fusion via a single-position lateral workflow.

Sublaminar Decompression for Lumbar Degenerative Stenosis and Deformity
Bo Zhang, MD
Khaleel M. Kebaish, MD, FAAOS
Kevin Wang, BA

This video describes the indications for, outcomes of, and advantages of a novel sublaminar decompression technique compared with those of traditional laminectomy.

SPORTS MEDICINE

Posterior Cruciate Ligament Tibial Avulsion: A Novel Open Approach and Results of Surgical Management
Jairo F. Estrada Sierra, MD
Oscar A. Mejia, MD
Salvador J. Gomez Bermudez, MD
Francisco Javier Monsalve, MMED
William H. Marquez, MD

A novel open approach for the management of posterior cruciate ligament tibial avulsions is an excellent treatment option for patients without associated intra-articular injuries.

Dual Suture-Button Fixation With a Buttress Plate for Ankle Syndesmotic Injury
Gregory R. Sprows, MD
Garrett T. Maxwell
Hilda H. Kriel, MD
Robert A. Probe, MD, FAAOS

This video demonstrates an isolated ankle syndesmotic injury in a 16-year-old football player. A clamp is used for reduction, and dual suture-button devices and a buttress plate are used for fixation.

Elbow Ulnar Collateral Ligament Reconstruction via the Docking Plus Technique
Marc G. Lubitz, MD
Benjamin Donohue, MD, FAAOS
Timothy E. Kremchek, MD, FAAOS

Ulnar collateral ligament reconstruction via the docking plus technique is based on the docking technique. The graft is longer and crosses the joint four times, providing more valgus resistance.

The Shoulder Telehealth Assessment Tool in Transition to Distance Orthopaedics
Gregory R. Sprows, MD
Jaycen Brown, MD
Brett N. Robin, MD, FAAOS

Telehealth shoulder examinations are a challenge. This video shows a technique for a comprehensive virtual shoulder examination via a pictorial guide called the Shoulder Telehealth Assessment Tool.

Radiographic Measurements in Hip Preservation Surgery
Dominic S. Carreira, MD, FAAOS
Thomas Ueland, BS

A systematic approach is critical in interpreting plain radiographs of the hip. This video reviews techniques for measuring parameters frequently required in the work up of the pre-arthritic hip.
Cortical Button Fixation for Proximal Tibiofibular Joint Instability: A Technical Report
Danielle Rider
Anirudh K. Gowd, MD
Brian R. Waterman, MD, FAAOS
Edward Beck, MD, MPH
Darren S. Nabor, MD

This video describes the pearls and pitfalls associated with the diagnosis and surgical management of tibiofibular joint instability via suspensory device fixation.

The Virtual Knee Examination
Joseph D. Lamplot, MD
Sridhar Pinnamaneni, MD
Stephanie Swensen, MD
Cort Lawton, MD
Joshua S. Dines, MD, FAAOS
Danyal Nawabi, MD, FRCS (Orth)
Warren Young, MD
Scott A. Rodeo, MD, FAAOS
Samuel A. Taylor, MD, FAAOS

This video discusses a comprehensive knee physical examination for sports medicine telehealth visits.

The Virtual Shoulder Examination
Sridhar Pinnamaneni, MD
Stephanie Swensen, MD
Joseph D. Lamplot, MD
Cort Lawton, MD
Joshua S. Dines, MD, FAAOS
Danyal Nawabi, MD, FRCS (Orth)
Warren Young, MD
Scott A. Rodeo, MD, FAAOS
Samuel A. Taylor, MD, FAAOS

This video provides a comprehensive shoulder physical examination for telehealth visits.

Mini-Open Distal Biceps Tendon Repair Using All-Suture Anchors
Muhammad J. Abbas, BS
Toufic R. Jildeh, MD
Austin G. Cross, BS
Eric Guo, BA
Luke Hessburg, BA
Kelechi Okoroha, MD

Mini-open distal biceps repair is a safe and effective treatment option for the management of distal biceps tendon ruptures, resulting in excellent functional outcomes and minimal complications.

Fundamentals of Hip Arthroscopy
Eric Secrist, MD
Kenneth Weeks, MD

This video is an introduction to the fundamentals of hip arthroscopy, including indications, relevant anatomy, operating room setup, arthroscopic technique, and postoperative protocol.

Endoscopic-Assisted Quad Tendon ACL Graft Harvest with All-inside Graft Preparation
Robert Duerr, MD
Benjamin H. Ormseth, BS

This video will review the existing literature and describe our preferred technique for minimally invasive quad tendon harvest and ACL reconstruction.

Capsule-Preserving Approach to Arthroscopic Decompression of the Subspine
Robert W. Westermann, MD
Andy Schaver, BS
Christopher M. Larson, MD, FAAOS

This video details a capsule-preserving approach to arthroscopic decompression of the subspine.

All-Inside Repair of Radial Meniscus Root Tears
David W. Mao, MBBS
Dave Lee

Two all-inside techniques for anatomic radial root tear repair for medial and lateral meniscus preservation are shown: an all-inside meniscal repair device and an antegrade suture passer technique.

Arthroscopic Fixation of Os Acetabuli/Acetabular Rim Fracture
Anthony Essilfie, MD
Dylan T. Lowe, MD
Thomas Youm, MD, FAAOS

This video overview and case presentation demonstrates a technique for arthroscopic acetabular rim fracture fixation in a patient with femoroacetabular impingement and a labral tear.

Remnant-Preserving, Outside-in Anterior Cruciate Ligament Reconstruction Using a Posterior Transseptal Portal
Yongseuk Lee, MD
Hyun Jin Yoo, MD

This video shows remnant-preserving anterior cruciate ligament reconstruction via a transseptal portal. This technique affords a more favorable visual field and more proper femoral tunnel positioning.

Remnant-Preserving Posterior Cruciate Ligament Reconstruction Using a Posterior Transseptal Portal and a Posterior Cruciate Ligament Fovea Landmark Technique
Yongseuk Lee, MD
Hangyeol Choi, MD

This video shows posterior cruciate ligament reconstruction via a transseptal portal and a fovea landmark technique, which affords proper tibial and femoral tunnel positioning without fluoroscopy.

Superior Capsule Reconstruction With Over-the-Top Remnant Rotator Cuff Repair
Joshua A. Russell, MD
Theodore Shybut, MD, FAAOS

This video demonstrates superior capsule reconstruction with over-the-top remnant rotator cuff repair for the management of retracted and irreparable supraspinatus tendon tears.

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Acute Severe Anteromedial and Anterolateral Instability of the Knee: Comprehensive Open Repair
Daniele Mazza, MD
Edoardo Viglietta
Edoardo Monaco, MD
Raffaele Iorio, MD
Susanna M. Pagnotta, MD
Fabio Marzilli, MD
Andrea Ferretti, MD

Open repair is a valid treatment option for the management of multiligamentous knee lesions in the acute phase. Every knee surgeon should be able to perform this procedure.

Anterior Cruciate Ligament Repair for Acute Tears: Surgical Technique
Edoardo Monaco, MD
Daniele Mazza, MD
Alessandro Carrozzo, MD
Alessandro Annibaldi
Giuseppe Argento, MD
Edoardo Colantoni, MD
Andrea Ferretti, MD

The one-year clinical and radiographic outcomes of primary arthroscopic anterior cruciate ligament repair are excellent in a carefully selected subset of patients.

Iliotibial Band Z-Plasty Lengthening: Surgical Technique
Rodrigo Guiloff, MD
Alex Vaisman, MD
Domingo J. Andreani

The video discusses the surgical technique for iliotibial band Z-plasty lengthening in patients with iliotibial band friction syndrome in whom nonsurgical treatment failed.

Revision Chronic Pectoralis Major Tendon Tear Reconstruction With Achilles Tendon Allograft Augmentation
Dylan T. Lowe, MD
Jordan W. Fried, BA
Laith M. Jazrawi, MD, FAAOS

This video discusses the case presentation of a patient with a chronic pectoralis major tendon tear who was treated via surgical reconstruction with the use of Achilles tendon allografts.

Surgical Repair of Distal Rectus Femoris Myotendinous Rupture
Eoghan Hurley, MBCHB
Dylan T. Lowe, MD
Guillem Gonzalez-Lomas, MD, FAAOS

A patient with a rectus femoris myotendinous rupture is treated via acute surgical repair.

Arthroscopic Suture Repair of a Tibial Spine Avulsion Fracture in an Adult
Douglas Matijakovich, MD
Ralph Cook, MD
Daniel Charen, MD
James N. Gladstone, MD, FAAOS

This video demonstrates arthroscopic anterior cruciate ligament repair via a suture technique in an adult with a tibial spine avulsion fracture.
Medial Patellofemoral Ligament Repair Technique
Justin T. Smith, MD
Joseph Guettler, MD, FAAOS
Anthony Arveschoug, MD

This video demonstrates medial patellofemoral ligament repair in a 17-year-old girl who sustained a first-time lateral patella dislocation and has a large patellar chondral injury.

Medial Patellofemoral Ligament Reconstruction Using Knotless Anchors
Adam Kahn, MD
Tuan A. Bui, MD
Cody S. Lee, MD
Aravind Athiviraham, MD, FRCSC, FAAOS

This video demonstrates medial patellofemoral ligament reconstruction with the use of knotless suture anchors.

All-Arthroscopic Meniscal Allograft Transplantation Technique With Bone Plugs and Preloaded Sutures
Gonzalo Samitier, MD, PhD
Gustavo Vinagre, MD, PhD
Eduard Alentorn-Geli, MD, MSc, PhD
Ramon B. Cugat, MD

All-arthroscopic meniscal allograft transplantation (MAT) technique with bone plugs, preloaded sutures and direct fixation of posterior horn. Technical note with several innovative solutions for MAT.

Combined Posterior and Anterior Osteochondral Allografting of the Lateral Femoral Condyle
Brian B. Gilmer, MD, FAAOS
Davison M. Beenfeldt, BSME

This video reviews the posterior approach to the knee and relevant anatomy. The procedure for combined posterior and anterior osteochondral allografting of the lateral femoral condyle is demonstrated.

TRAUMA

Open Reduction and Internal Fixation of Humeral Shaft Fractures: The Anterolateral Approach
Jaehon M. Kim, MD, FAAOS
Danil Rybalko, MD
James Dieterich, MD
Jimmy J. Chan, MD
Michael R. Hausman, MD, FAAOS
Chase B. Anson, MD

The anterolateral approach allows access to the entire length of the humerus and versatile implant selection. The radial nerve is identified early to prevent iatrogenic injury.

Rim Plating of the Tibial Plateau With an Extended Anterolateral Approach
Robert J. Teasdale, MD
Jae-Woo Cho, MD
Arun Aneja, MD, PhD
Jong-Keon Oh, MD, PhD

This video presents a novel approach for the fixation of posterolateral fracture fragments in patients with a tibial plateau fracture, aided by the placement of a rim plate.

Repair of Humeral Shaft Nonunion With Plate and Screw Fixation and Iliac Crest Bone Graft
Nicole Stevens, MD
Blake J. Schultz, MD
Dylan T. Lowe, MD
Kenneth A. Egol, MD

Proximal third humeral shaft nonunions are best managed via nonunion takedown followed by plate and screw compression and iliac crest bone grafting, which results in excellent clinical outcomes.

Orthomesh3D: Computerized Correction of Forearm Malunion Deformities Using Open Source Software
Anastasios Papadonikolakis, MD, FAAOS
Fiesky A. Nunez, MD
Pavlos Papadonikolakis
Josh C. Tan, MS
Kerry Danelson, PhD

Computerized deformity correction using open source 3D visualization software provides precision and consistency.

Open Reduction and Internal Fixation of a Proximal One-Third Humeral Shaft Fracture
Justin T. Smith, MD
Patrick J. Wiater, MD, FAAOS

This video shows open reduction of a proximal one-third humeral shaft fracture in a 46-year-old woman via an anterolateral approach, a proximal humerus plate, and circumferential cable fixation.

Sternoclavicular Joint Reconstruction for Medial Clavicle Fracture Nonunion
Nicole Stevens, MD
Emily M. Pflug, MD
Dylan T. Lowe, MD
Philipp Leucht, MD, FAAOS

A patient with a medial clavicle fracture nonunion and a sternoclavicular dislocation underwent sternoclavicular reconstruction with the use of a gracilis allograft, which resulted in a good outcome.

Management of a Chronic Elbow Dislocation With an Internal Fixator
Blake J. Schultz, MD
Christian A. Pean, MD
Dylan T. Lowe, MD
Kenneth A. Egol, MD

Internal fixators are a treatment option for the management of chronic elbow dislocations, affording early joint stability and return of range of motion.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Staged Reconstruction of a Moore Type 4 Fracture-Dislocation
Blake J. Schultz, MD
Dylan T. Lowe, MD
Christian A. Pean, MD
Michael J. Alaia, MD, FAAOS
Kenneth A. Egol, MD

This video demonstrates treatment of a patient with a Moore type 4 knee fracture-dislocation with a posterolateral corner injury and an anterior cruciate ligament rupture.

Transtibial Amputation With Osteomyoplastic Reconstruction and Simultaneous Acute Targeted Muscle Reinnervation
Nicole J. Hung, BA
Gopal R. Lalchandani, MD
Abhinav Janghala, MD
Saam Morshed, MD, FAAOS

Total talar and navicular extrusions are rare injuries that can be managed via transtibial amputation with osteomyoplastic reconstruction and simultaneous acute targeted muscle reinnervation.

Ultra-distal Volar Rim Fracture, Case Presentation -and Surgical Technique
Jou Hua Wang, MD
Hsin Chuan Chen, MD
Pei-Yuan Lee, MD
Ming-Hsien Hu, MD

We present a case with an extremely small volar rim fragment in distal radius fracture. The fragment was found to be flipped over upside-down. A reduction surgical technique is presented in detail.

Repair of an Achilles Tendon Avulsion Fracture With Suture Anchor Fixation
Charles Wang, MD
Laviel A. Fernandez, MD
Shobhit Minhas, MD
Abhishek Ganta, MD
Kenneth A. Egol, MD, FAAOS
Sanjit R. Konda, MD, FAAOS

The background, pathophysiology, and surgical outcomes of Achilles tendon avulsion fractures are discussed, and a novel surgical technique involving suture anchor fixation is demonstrated.

Lumbopelvic Fixation for Sacral Fractures With Spinopelvic Dissociation
Hesham Saleh, MD
Christian A. Pean, MD
Dylan T. Lowe, MD
Blake J. Schultz, MD
Charla R. Fischer, MD, FAAOS
Philipp Leucht, MD, FAAOS

This video reviews spinopelvic dissociation and demonstrates a standard technique for iliosacral screw fixation and lumbopelvic fixation.

Colles Fractures
Daniele Mazza, MD
Vincenzo Masi, MD
Giorgio Princi, MD
Guido Koverech
Dario Perugia, MD
Andrea Ferretti, MD

This video reviews the management of Colles fractures, which is based on patient characteristics, radiographs, and surgeon experience.

Subtrochanteric Femur Malunion: Deformity Correction With Application of a Blade Plate
Arien L. Cherones
David Barei, MD, FAAOS
Corey J. Schifferman, MD
Robert C. Jacobs, MD

Our plan was a two-step non-union/malunion repair. The first step uses a 95° blade plate to capture the proximal fragment and correct alignment. The second step is to revise to a reconstruction intramedullar nail.

Anterior Subcutaneous Pelvic Internal Fixator: Application and Removal
Davis Rogers, MD
Micheal Raad, MD
Babar Shafiq, MD, FAAOS
Dahlia N. Shafiq

A technique for the placement of an anterior subcutaneous pelvic internal fixator with the use of percutaneous posterior pelvic screws for the management of a type LC-III pelvic ring injury is shown.

Reamer-Irrigator-Aspirator Surgical Technique
Megan C. Couso, MD
Jason A. Lowe, MD, FAAOS
Nathan C. Sherman, MBA, MD

This video reviews the case presentation of a patient who underwent elbow arthrodesis via a reamer-irrigator-aspirator autograft for the management of segmental bone loss and to aid in fusion.

Bone Marrow Aspiration
John M. Yingling, DO
Frank A. Liporace, MD, FAAOS
Richard S. Yoon, MD, FAAOS

This video demonstrates a technique for harvesting bone marrow aspirate concentrate for fracture healing, nonunion management, and fusion.
Antibiotic-Coated, Locked Intramedullary Nail: Cement Recipe and Assembly Technique

Olivia Rice
Joseph R. Hsu, MD, FAAOS
Laurence Kempton, MD, FAAOS
Brad M. Askam, MD
Andrew Chen, MD, MPH
Scott Dart, MD

This video shows an antibiotic-coated, locked intramedullary nail assembly technique. The antibiotic cement cocktail and how to easily coat the nail with antibiotic-impregnated cement are reviewed.

Triceps Hemi-Peel Approach to the Distal Humerus

Olivia Rice, MD
Joseph R. Hsu, MD, FAAOS
David Macknet, MD
Laurence Kempton, MD, FAAOS

The triceps hemi-peel approach can be used to achieve excellent distal humerus articular exposure, preserve extensor strength, and avoid an olecranon osteotomy.
Two Poster Sessions offer twice as many presentations.
Discover new advances and observe more than 1,000 visual presentations of the latest medical, clinical, or scientific orthopaedic research.

Session I: Tuesday – Wednesday
Session II: Thursday – Friday

POSTER SESSION I

ADULT RECONSTRUCTION HIP  P0001-P0080

Poster No. P0001
Combinational Therapy with Antibiotics and Antibiotic-Loaded Adipose-Derived Stem Cells Reduce Abscess Formation in Implant-Related Infection in Rats

Junya Yoshitani, MD
Tamon Kabata, MD
Katsuhiro Hayashi, MD
Yoshitomo Kajino, MD
Daisuke Inoue, MD
Takaaki Ohmori, MD
Takuro Ueno, MD
Ken Ueoka, MD
Yuki Yamamura, MD
Atsushi Taninaka
Hiroyuki Tsuchiya, MD

Department of Orthopaedic Surgery Graduate School of Medical Science Kanazawa University

ADSCs with antibiotics has an antimicrobial effect in implant-related infection. Local administration of ADSCs with antibiotics represents a novel treatment strategy for implant-associated osteomyelitis.

Poster No. P0002
False Negative Alpha-Defensin: A Case Control Study

Jesus M. Villa, MD
Preston W. Grieco, MD
Tejibir S. Pannu, MD, MS
Carlos A. Higuera Rueda, MD, FAAOS
Aldo M. Riesgo, MD

The objective of this study is to identify characteristics associated with negative alpha-defensin results in the presence of an established hip or knee periprosthetic joint infection diagnosis.

Poster No. P0003
Debridement, Antibiotics, and Implant Retention and its Utilization to Treat Periprosthetic Joint Infections

Jeffrey B. Stambough, MD
Bryan D. Springer, MD, FAAOS
Ayushmita De
Heena Jaffri, MPH
James A. Browne, MD, FAAOS
David G. Lewallen, MD, FAAOS

This study is to present clinical evidence of the effectiveness of DAIR to treat PJI.

Poster No. P0004
First Evidence of Osseointegration in Retrieved 3D-Printed Off-the-Shelf Acetabular Implants

Harry Hothi, MSc, PhD
Lorenzo Dall’Ava, MSc
Anna Di Laura, PhD
Roberto Tirabosco, MD
Antti Eskelinen, MD, PhD
Johann Henckel, MD
Alister Hart, FRCS

Off-the-shelf, 3D-printed acetabular implants may promote enhanced osseointegration compared to highly porous conventionally manufactured acetabular implants.

Poster No. P0005
Greater Trochanteric Pain Syndrome: Validation of a Published Intraoperative Endoscopic Classification System

Benjamin G. Domb, MD, FAAOS
Shawn Annin
Ajay Lall, MS
Mitchell Meghpara, MD
David R. Maldonado, MD
Jackob Shapira, MD
Philip Rosinsky, MD
Hari K. Ankem, MD

This validation study supports that the classification system proposed by Lall et al. may allow surgeons a reproducible, yet efficient, process to classify and treat peritrochanteric pathology.

Poster No. P0006
The Association between Labral Size and Intra-Articular Damage in Dysplastic Patients: An Analysis of 1,765 Hips Treated via Hip Arthroscopy

Benjamin G. Domb, MD, FAAOS
Jackob Shapira, MD
Mitchell J. Yelton, BS
Jeffrey Chen, BA
Philip Rosinsky, MD
David R. Maldonado, MD
Ajay Lall, MS

An inverse relationship may exist between acetabular depth and labral size. A larger labrum correlates with worse intra-articular damage compared to dysplastic hips with a relatively small labrum.

Poster No. P0007
Three-Dimensional Predictors of Femoroacetabular Impingement Disease Progression in the Contralateral Hip

Jeffrey J. Nepple, MD, FAAOS
Lucas M. Fowler, BS
John C. Clohisy, MD, FAAOS
Wahid Abu-Amer, MD
Cecilia Pascual-Garrido, MD, PhD

The role of bony morphology in the pathophysiology of FAI is poorly understood. Our study aimed to determine independent predictors of symptom development and progression to surgery.
Poster No. P0008
Spinopelvic Mobility Affects Accuracy of Acetabular Anteversion Measurements on Cross Table Lateral Radiographs
Daniel Bracey, MD, PhD
Vishal Hegde, MD
Andrew J. Shimmin, MD
Jason M. Jennings, MD, FAAOS
Jim Pierrepoint, PhD
Douglas A. Dennis, MD, FAAOS
We compare anteversion measurements made on CTL radiographs and CT scans to determine if spinopelvic mobility parameters affect the accuracy of measurements.

Poster No. P0009
Ten-Year Radiosterometric Analysis of Polyethylene Wear between Oxidized Zirconium and Cobalt Chrome Articulations in Total Hip Arthroplasty
Andrew S. Poole, MD
Andrew Clout, MBBS
Matthew G. Teeter, PhD
Lyndsay Somerville, PhD
Douglas Naudie, MD, FRCS
Richard W. McCalden, MD
Radiosterometric analysis was utilized to evaluate the 10-year in vivo wear rate of two common bearing materials. Oxidized zirconium femoral heads showed significantly lower wear rates at 10 years.

Poster No. P0010
Intraarticular Injections of the Hip and Knee with Triamcinolone versus Ketorolac: A Randomized Controlled Trial
Lucian C. Warth, MD
Kevin Jurgensmeier, BS
Darin Jurgensmeier, MD
Peter G. Fuerst, PhD
Steven B. Daines, MD, FAAOS
Ketorolac compares in efficacy to corticosteroid for intraarticular injections, and may be a safer and cost-effective treatment alternative for primary degenerative joint disease.

Poster No. P0011
An Exploratory Analysis of Patient-Perceived Efficacy of Cannabidiol Use for Arthritic Joint Pain
Maximillian P. Ganz, DO, MS
Nicholas Frane, DO
Erik Stapleton, DO, MS
Cesar R. Iturriaga, DO
Vijay J. Rasquinha, MD
Patients using Cannabidiol for arthritis reported high rates of symptomatic relief and reductions in pharmacologic treatments including decreasing/cessation of opioids and anti-inflammatories.

Poster No. P0012
Biomechanical Analysis of a Novel Osteochondral Graft Specific to the Femoral Head and with Potential for Use in the Management of Osteonecrosis
Patrick M. Morgan, MD
Complete osteochondral resurfacing of the femoral head with a thin dome of donor tissue results in a biomechanically stable construct when measured against typical postoperative forces.

Poster No. P0013
Risk Factors and their Interactions for Osteonecrosis of the Femoral Head: A Significant Additive Interaction between Alcohol Intake and Smoking
Tetsuro Tani
Wataru Ando, MD
Wakaba Fukushima, MD, PhD
Hidetoshi Hamada, MD
Masaki Takao, MD
Nobuhioko Sugano, MD
We investigated risk factors and their interactions for osteonecrosis of the femoral head. A significant additive interaction between alcohol intake and smoking was found.

Poster No. P0014
Elevated Fructosamine Levels are Associated with Increased Risk for Periprosthetic Joint Infection
Noam Shohat, MD
Karan Goswami, MD
D’Andrew Gursay, BS
Leigham S. Breckenridge
Ran Schwarzkopf, MD, FAAOS
Javad Parvizi, MD, FAAOS
A study assessing the utility of fructosamine in predicting adverse outcomes in general, and periprosthetic joint infection in particular, following total hip arthroplasty.

Poster No. P0015
Fracture Patterns and Associations with Cementless Stem Design Features from 127 Primary Hip Replacements: Quantification Using a Novel Manual Segmentation Technique
Jonathan N. Lamb, MBBS
Sam Jain, FRCS (Ortho), MBCHB
Samuel W. King, BA, MBCHB
Jonathan P. Simpson, MBCHB
Amr Mohsen, FRCS (Ortho)
Timothy Board, FRCS
Robert M. West, MSc
Hemant G. Pandit, FRCS, FRCS (Ortho)
Fracture patterns are associated with implant design features. A calcar collar and grit blasted finish were associated with more distal fracture locations and less metaphyseal splitting fractures.
**Poster No. P0016**
Calcar-Collar Contact during Simulated Periprosthetic Fractures of the Femur Increases Construct Stiffness and Resistance to Fracture and is Dependent on the Degree of Initial Separation on Implantation in a Composite Femur Model

*Jonathan N. Lamb, MBBS*
Oliver S. Coltart
Isaiah Aderkanmbi, DPHIL (OXON)
Todd Stewart, PhD
Hemant G. Pandit, FRCS, FRCS (Ortho)

Calcar-collar contact reduces the risk of postoperative periprosthetic fractures of the femur. Likelihood of calcar collar contact depends on initial separation on implantation.

**Poster No. P0017**
A Multicenter Observational Cohort Study Describing Fracture Classification and Treatment Strategies in 575 Postoperative Periprosthetic Femoral Fractures around Cemented Polished Taper Slip Stems in Total Hip Arthroplasty

*Jonathan N. Lamb, MBBS*
Oliver Townsend, MBBS, MRCS
Chloe Scott, FRCS
Benjamin J. Kendrick, FRCS (Ortho), MBBS
Robert G. Middleton
Stephen A. Jones, MD
Timothy Board, FRCS
Sam Jain, FRCS (Ortho), MBCHB
Hemant G. Pandit, FRCS, FRCS (Ortho)

This large series of periprosthetic fractures around cemented polished taper slip stems highlights several features that predict fracture characteristics based on patient and implant factors.

**Poster No. P0018**
Inpatient vs. Outpatient Pain and Satisfaction after Total Hip Arthroplasty: Results of a Prospective, Randomized Multicenter Trial

*Timothy Tan, MD*
Nitin Goyal, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS
Sarah Padgett, PA-C
Michael M. Kheir, MD
Robert Hopper, PhD
William G. Hamilton, MD, FAAOS
William J. Hozack, MD, FAAOS

Outpatients had lower pain and greater satisfaction on the day of surgery. Despite slightly increased pain the day after surgery, outpatients reported higher satisfaction scores at 4-week follow up.

**Poster No. P0019**
The Impact of Functional Combined Anteversion on Hip Range-of-Motion: A New Optimal Zone to Reduce Risk of Impingement in Total Hip Arthroplasty

*Matthew T. Thompson*
Patrick B. O’Connor, MBBS
Christina I. Esposito, PhD
Thomas H. Donnelly
William J. Donnelly, FRACS

We used a virtual hip range-of-motion tool and functional imaging to investigate whether there is an ideal functional combined anteversion for reduced risk of impingement in total hip arthroplasty.

**Poster No. P0020**
The Cost of Robot-Assisted Total Hip Arthroplasty: Comparing Safety and Hospital Charges to Conventional Total Hip Arthroplasty

*Yehuda E. Kerbel, MD*
Gregory J. Kirchner, MD, MPH
Alexander Lieber, MD
Vincent M. Moretti, MD, FAAOS

Using statistically matched cohorts, we reveal that robot-assisted THA has a non-superior safety profile to conventional THA while incurring greater hospital charges.

**Poster No. P0021**
Change in Preoperative Pelvic Position in Total Hip Arthroplasty Patients through Functional Range of Motion

*William J. Donnelly, FRACS*
Patrick B. O'Connor, MBBS
Christina I. Esposito, PhD
James McGree, PhD
Nikola M. Poli

This study evaluated ranges of sagittal pelvic motion during standing, sitting, and lying in patients undergoing total hip arthroplasty.

**Poster No. P0022**
Contemporary Cemented Femoral Stem Fixation through the Direct Anterior Approach for Selected Patients has Fewer Early Complications than Cementless Fixation

*Kwame A. Ennin, MD, MS*
Karim A. Elsharkawy, MD, FAAOS
Shuvie Dasgupta, MS
Roger H. Emerson, MD, FAAOS

Cemented stems are protective in patients above 70 and can be done safely through the anterior approach, while a higher rate of complications was observed with cementless stems.
Poster No. P0023
Do Obese Patients Have Lower Rates of Clinically Meaningful Improvement or Satisfaction after Total Hip Arthroplasty? A Matched Cohort Study
Graham S. Goh, MD
Gerald J. Zeng
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Hee-Nee Pang, MBBS, MRCS
Darren Tay, MBBS, FRCS (Ortho)
Shi-Iu Chia, MBBS, FRCS (Ortho)
Ngai-Nung Lo, MD
Seng-Jin Yeo, FRCS
Ming Han Lincoln Liow, FRCS (Ortho), MBBS

Despite poorer implant survivorship, obese patients undergoing THA may experience a similar level of clinical meaningful improvement and satisfaction as their non-obese counterparts.

Poster No. P0024
Ninety-Day Perioperative Outcomes of Direct Anterior Total Hip Arthroplasty: Unilateral, Simultaneous, and Staged Bilateral
Camilo Restrepo, MD
Daisuke Inoue, MD
William J. Hozack, MD, FAAOS

This is a study comparing early clinical outcomes of simultaneous bilateral, unilateral, and staged bilateral DAA-THA.

Poster No. P0025
Pelvic Tilt and the Pubic Symphysis to Sacrococcygeal Junction Distance: Risk Factors for Hip Dislocation
William G. Rainer, DO
Matthew P. Abdel, MD, FAAOS
Brett Freedman, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Michael J. Taunton, MD, FAAOS

In this case-control study, mean pelvic tilt in patients who dislocated following THA was more posteriorly rotated by 3 degrees with odds of dislocation increasing with increasing posterior rotation.

Poster No. P0026
Effect of Intraoperative Use of Technology on Patient-Reported Outcomes following Total Hip Arthroplasty
Vivek Singh, MD
Chelsea Sue Sicat, MS
Trevor Simcox, MD
Joshua C. Rozell, MD
Ran Schwarzkopf, MD, FAAOS
Roy Davidovitch, MD, FAAOS

We study the effect of intraoperative use of technology on patient-reported outcomes following total hip arthroplasty.

Poster No. P0027
Sagittal Characteristics that Predict the Unstable Total Hip Replacement
Amedeo Falsetto, MD
Moritz Innmann, MDC
Ethan Sanders, BS
Johannes Weishorn, MD
Johanna Dobransky, MA
Christian Merle, MD
Paul E. Beaule, MD, FAAOS
George A. Grammatopoulos, MRCS

This study highlights the value of standing spinopelvic measurements, which we show to accurately identify THA-instability risk. The PI-LL and PFA can guide surgeons to avoid future dislocations.

Poster No. P0028
Is American Joint Replacement Registry Data Representative of National Data? A Comparative Analysis
Richard L. Iligen, MD, FAAOS
Bryan D. Springer, MD, FAAOS
Kevin J. Bozic, MD, MBA
Scott M. Sporer, MD, FAAOS
James I. Huddleston, MD, FAAOS
Kimberly Porter
James A. Browne, MD, FAAOS

This study shows the representativeness of our registry data against NIS data.

Poster No. P0029
Heterotopic Ossification following Direct Anterior Total Hip Arthroplasty with and without Postoperative Non-Steroidal Anti-Inflammatories
Cesar R. Iturriaga, DO
Brandon Naylor, DO
Matthew J. Caid, DO
Yash B. Bisen, BA
Keith R. Reinhardt, MD, FAAOS

This is an evaluation of the influence of celecoxib on the incidence of heterotopic ossification after primary total hip done via anterior approach.

Poster No. P0030
Canceled Total Joint Arthroplasty: Who, What, Why, and When?
Chad A. Krueger, MD, FAAOS
Elie Kozaily, MD
Zane Y. Gouda
Paul M. Courtney, MD, FAAOS
Matthew Austin, MD, FAAOS

This is a study to identify the etiology of cancelation for scheduled TJA and to determine the subsequent fate of those patients.
Poster No. P0031
The Role of Preoperative Analgesia in Total Knee Arthroplasty Outcomes

Ethan Remily, DO
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Scott Douglas, MD
Oliver Sax, DO, MS
Qais Naziri, MD, MBA
Ronald E. Delanois, MD, FAAOS

This study examined two-year readmission, revision, and complication rates in matched patients receiving either NSAIDs, tramadol, or opioids prior to their total knee arthroplasty.

Poster No. P0032
The Temporal Relationship between Preoperative Clostridium Difficile Infections and Outcomes in Total Hip Arthroplasty

Scott Douglas, MD
Ethan Remily, DO
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Oliver Sax, DO, MS
Sahir Pervaiz, MD, MS
Evan B. Polsky
Aaron J. Johnson, MD
Ronald E. Delanois, MD, FAAOS

This study examined readmissions, revisions, and complications in patients experiencing C. Diff infections within six months or outside six months of their total hip arthroplasty compared to a control.

Poster No. P0033
Anesthesia and Surgical Time in Direct Anterior vs. Posterior Approach Total Hip Arthroplasty

R. Michael Meneghini, MD, FAAOS
Kent Kraus, BS
Julian Dilley, MD
Mary Ziemba-Davis

Despite equivocal clinical results, DA approach THA consumes substantially more OR time when compared to the posterior approach in both the hospital and ASC setting.

Poster No. P0034
The Association between Socioeconomic Status and Early Complications of Total Hip Arthroplasty in Ontario, Canada

Hosam Matar, MD, MSc
Amit Atrey, MD, FRCS (Ortho)
Amir Khoshbin, MD
Michael Paterson
Suriya J. Aktar, MSc, PhD
Bheeshma Ravi, FRCS

This study examined the association between socioeconomic status and early complications of total hip arthroplasty in Ontario, Canada.

Poster No. P0035
Effects of Documented and Undocumented Psychiatric Conditions on Total Hip Arthroplasty Outcomes.

Katherine A. Lygrisse, MD
Andrew J. Clair, MD
Alex Tang, BS
Vivek Singh, MD
David Yeroushalmi, BS
Claudette M. Lajam, MD, FAAOS

This study evaluates the effect of documented and undocumented psychiatric conditions on length of stay and discharge disposition following total hip arthroplasty.

Poster No. P0036
Incision Site Fat Thickness and 90-Day Complications for Direct Anterior and Posterior Approach Total Hip Arthroplasty

Bryce C. Allen, MD, FAAOS
Gregory R. Sprowls, MD
Kathleen F. Lundquist, BA, MS
Clint D. Barnett, MD, FAAOS

Regardless of BMI, sex, or age, more soft tissue was encountered with a PA compared to a DAA. Excess incisional fat was associated with wound complications following a DAA and PJI after PA.

Poster No. P0037
Controlled Hypotension during Neuraxial Anesthesia for Elective Primary Total Hip Arthroplasty is Not Associated with Increased Odds of In-Hospital Common Medical Complications

Alejandro Gonzalez Della Valle, MD, FAAOS
Sarain Liu, MD, PhD
Haoyan Zhong, MA
Danya Demeo
Huong Do, MA
Meghan Kirksey, MD, PhD
Jacques YaDeau, MD

Controlled hypotension can be used during elective total hip arthroplasty without jeopardizing safety.

Poster No. P0038
Femoral Neck Notching in Dual Mobility Implants: Is this a Reason for Concern?

Katherine A. Lygrisse, MD
Chelsea N. Matzko, BA
Roshan P. Shah, MD, JD, FAAOS
William B. Macaulay, MD, FAAOS
Herbert J. Cooper, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS
Matthew S. Hepinstall, MD, FAAOS

This study sought to investigate the incidence of femoral notching associated with use of DM implants and to identify risk factors.
Poster No. P0039
Eighteen-Year Results of Cementless Total Hip Arthroplasty with Alumina-on-Highly Cross-Linked Polyethylene Bearings in Patients Younger than 30 Years Old
Young-Hoo Kim, MD
Jangwon Park, MD, MSc
Young-Soo Jang, MD
In the study of 45 patients (54 hips), the survival rate was 98% for the femoral component and 96% for the acetabular component at 17.8 years (range, 17-19 years).

Poster No. P0040
Outcome of Surgical Treatment in Patients with Borderline Acetabular Dysplasia: A Comparative Analysis of Hip Arthroscopy and Periacetabular Osteotomy
Jeffrey J. Nepple, MD, FAAOS
Maria Schwabe, MD, MPH
Elizabeth A. Graesser, MD
Cecilia Pascual-Garrido, MD, PhD
John C. Clohisy, MD, FAAOS
Significant differences in patient characteristics and radiographic parameters were present between hips indicated for PAO vs. HA emphasizing need for careful diagnosis and treatment decision making.

Poster No. P0041
The Rule of Thirds for Detection of Excessive and Deficient Acetabular Coverage: Reliable and Validated
Vera M. Stetzelberger, MD
Angela M. Moosmann
Simon D Steppacher, MD
Joseph M. Schwab, MD, FAAOS
Guoyan Zheng, PhD
Moritz Tannast, MD
The “rule of thirds” is a practical and useful tool that can be used to reliably categorize anterior and posterior femoral head coverage as excessive, normal, and deficient using the acetabular wall index.

Poster No. P0042
Differential Impact of Spinopelvic Relationship between Two Types of Seated Position Radiography before Total Hip Arthroplasty
Yohei Ohyama, MD
Kentaro Ikawaki, MD, PhD
Shingo Maeda, MD
Yohei Ohyama, MD
Yoichi Ohta
Akio Kobayashi, MD
This prospective, observational radiographic study demonstrated that spinopelvic sagittal alignment in the relaxed seated position influenced spinopelvic mobility between functional seated positions.

Poster No. P0043
A Novel Geometric Algorithm for Spinopelvic Tilt and Mobility Adjusted Acetabular Component Position: A Post Lewinnek Method for Finding the Functional Safe Zone in Total Hip Arthroplasty
Russell J. Bodner, MD, FAAOS
Sagittal plane functional anatomy of the hip is represented by a triangular construct allowing calculation of architectural values for pelvic and acetabular parameters and optimal cup positions.

Poster No. P0044
Deep Learning Artificial Intelligence Model for Prediction of Hip Dislocation following Primary Total Hip Arthroplasty from Postoperative Radiographs
Pouria Rouzrokht, MD, MPH
Cody Wyles, MD
Taghi Ramazanian, MD
Kenneth A. Philbrick, PhD
Michael J. Taunton, MD, FAAOS
Hilal Maradit-Kremers, MSc
Bradley J. Erickson, MD, PhD
This study demonstrates that a deep learning-enabled image classifier model was capable of high performance in predicting future dislocation based solely off postoperative AP pelvis radiographs.

Poster No. P0045
Denosumab Reduces Osteoclast Activity within Osteolytic Lesions after Total Hip Arthroplasty: A Proof of Concept Trial
J. Mark Wilkinson, ChB, FRCS (Ortho)
Mohit Mahatma
Raveen L. Jayasuriya, MBCHB, MRCS
David Hughes, MBBS, PhD
Simon Buckley, MD
Andrew Gordon, FRCS (Ortho), PhD
Andrew J. Hamer, MD
Wassim Tomouk
Robert Kerry
In this phase 2 clinical trial, a single dose of denosumab reduced osteoclast activity within osteolytic lesions and was safe to administer.

Poster No. P0046
Revision Total Hip Arthroplasty Patients with Intraoperative Volume Overload Require More Aggressive Postoperative Resuscitation and Monitoring
Yehuda E. Kerbel, MD
Nicolas Pascual-Leone, BA
Ariana T. Meltzer-Bruhn, BA
Kevin Pirruccio, BA
Neil P. Sheth, MD, FAAOS
The degree of intraoperative volume overload in revision THA significantly impacts a patient’s need for ICU level care, blood pressure support, additional blood work, and increased length of stay.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0047
How does Contact Length Impact Titanium Tapered Splined Stem Stability: A Biomechanical Matched Pair Cadaveric Study

Ioannis Gkiatas, PhD
Michael A. Malahias, MD
William Xiang, BS
Kathleen Meyers, MS
Lisa A. Torres, MS
T. David Tarity, MD, FAAOS
Jose A. Rodriguez, MD, FAAOS
Mathias P. Bostrom, MD, FAAOS
Timothy M. Wright, PhD
Peter K. Sculco, MD
Hospital for Special Surgery Revision Total Hip

We study the effect of contact length in titanium tapered splined stem stability.

Poster No. P0048
Similar Rate of Intraoperative Femoral Complications and Early Return to the Operating Room in Patients Undergoing Elective Total Hip Arthroplasty through the Direct Anterior and the Posterior Approach: A Match Paired Analysis of 4,696 Cases

Alejandro Gonzalez Della Valle, MD, FAAOS
Ethan Krell, BS, MS
Amethia D. Joseph, MHA
David C. Landy, MD, PhD
Yi Zhang, MS
Friedrich Boettner, MD
Jose A. Rodriguez, MD, FAAOS
Michael M. Alexiades, MD, FAAOS

Within the selection criteria specified by our matching strategy, and in the hands of devoted arthroplasty surgeons who are beyond their learning curve, there was no difference in early relevant complications prompting return to the operating room in patients undergoing elective hip arthroplasty through the DA or PA.

Poster No. P0049
Does Surgical Approach or Intraoperative Imaging have the Greatest Effect on Component Position Accuracy in Total Hip Arthroplasty?

Michael Ruffolo, MD
Sarah Pierrie, MD
Susan M. Odum, PhD
Nicholas Johnson, MD
Thomas K. Fehring, MD, FAAOS
John L. Masonis, MD, FAAOS

Acetabular component alignment in primary THA is more accurate using a direct anterior approach compared to a posterior approach regardless of the use of intraoperative imaging.

Poster No. P0050
Effect of Departmental Opioid-Sparing Protocol on Opioid Prescribing Patterns in Total Hip Arthroplasty Patients

Ariana Lott, MD
Elyse J. Berlinberg, BS
Lorraine Hutzler, MHA
Joseph A. Bosco, MD, FAAOS
Claudette M. Lajam, MD, FAAOS

The introduction of postoperative outpatient pain protocols for total hip arthroplasty patients resulted in a significant decrease in daily mean MME prescribed and mean prescription length.

Poster No. P0051
Utilization of Prescription Monitoring Program to Predict Opioid Use after Primary Total Hip Arthroplasty and Total Knee Arthroplasty

Amethia D. Joseph, MHA
Alejandro Gonzalez Della Valle, MD, FAAOS
Ethan Krell, BS, MS
Amber A. Hamilton, BA
Huong Do, MA
Joseph Nguyen, MPH
Jose A. Rodriguez, MD, FAAOS

The goal of the current study was to identify preoperative and in-hospital factors associated with the amount of filled opioid prescriptions after THA and TKA.

Poster No. P0052
What is the Clinical Utility of Synovial Alpha-Defensin Testing of Antibiotic Spacers Prior to Reimplantation?

Christopher N. Carender, MD
David DelMik, MD
Jesse E. Otero, MD, FAAOS
Nicolas O. Noiseux, MD, MS, FAAOS
Timothy S. Brown, MD, FAAOS
Nicholas Bedard, MD

Alpha-defensin (AD) testing does not add clinical utility to other commonly utilized tests for determining if an antibiotic spacer is persistently infected prior to reimplantation.

Poster No. P0053
Acute Postoperative Infections after Total Hip Arthroplasties: Erythrocyte Sedimentation Rate, C-Reactive Protein, and Aspiration Thresholds

Evan M. Dugdale, MD
Mason E. Uvodich, MD
Douglas R. Osmon, MD
Nicolas O. Noiseux, MD, MS, FAAOS
Timothy S. Brown, MD, FAAOS

Optimal thresholds for acute postoperative THA infections within 6 weeks include synovial WBCs ≥4390 cells/µL, CRP ≥100 mg/L, and/or synovial neutrophils ≥74%.
Poster No. P0054
Serum D-Dimer can Predict Failure following Reimplantation

Steven J. Yacovelli
Karan Goswami, MD
Noam Shohat, MD
Alisina Shahi, MD, PhD
Javad Parvizi, MD, FAAOS

A study evaluating the ability of serum D-dimer and other standard-of-care serum biomarkers to predict failure following reimplantation.

Poster No. P0055
Antibiotic-Loaded Synthetic Calcium Sulfate Beads Do Not Improve Debridement with Antibiotics and Implant Retention Outcomes: A Matched Case-Control Study

T. David Tarity, MD, FAAOS
Allina A. Nocon, MPH, PhD
William Xiang, BS
Ioannis Gkiatas, PhD
Andy Miller, MD
Peter K. Sculco, MD

This is a matched case-control study on efficacy of antibiotic-loaded synthetic calcium sulfate beads in improving DAIR outcomes.

Poster No. P0056
Perioperative Antibiotic Prophylaxis: Single and 24-hour Doses are Equally Effective in Primary Total Joint Arthroplasty

David D. Christensen, MD
Wayne E. Moschetti, MD, MS
Marcel G. Brown, BA
Adriana P. Lucas, MS
David S. Jevsevar, MD, MBA, FAAOS
Yale Fillingham, MD

In a retrospective review study of 3,317 patients, single-dose prophylactic antibiotics did not lead to an increased risk of PJI or short-term complications after routine primary TJA.

Poster No. P0057
Complications in the Treatment of Periprosthetic Joint Infection after Total Hip Arthroplasty: When Do They Occur?

Katherine Li, MD
Mario Cuadra, MD
Jesse E. Otero, MD, FAAOS
William L. Griffin, MD, FAAOS
Bryan D. Springer, MD, FAAOS

High rate of complications were seen with two-stage exchange for periprosthetic total hip infections. Risks are identified.

Poster No. P0058
No Benefit to Extended Oral Antibiotic Prophylaxis following Primary Total Joint Arthroplasty in the Morbidly Obese

Christopher N. Carender, MD
David DeMik, MD
Nicolas O. Noiseux, MD, MS, FAAOS
Jacob Elkins, PhD
Timothy S. Brown, MD, FAAOS
Nicholas Bedard, MD

Extended oral antibiotic prophylaxis in patients with BMI >40 kg/m2 undergoing primary THA or TKA does not reduce rates of wound complications or PJI. Prospective studies are needed.

Poster No. P0059
Serum CD64 as a Marker for Chronic Periprosthetic Joint Infection

Landon Polakof, MD
Dheeraj Yalamanchili, MD
Eytan Debbi, MD, PhD
Sota Kitahara, MD
Guy D. Paiement, MD, FAAOS

This study utilized prospectively collected data to evaluate the utility of serum CD64 as a marker for periprosthetic joint infection.

Poster No. P0060
Improper Administration of Vancomycin Prophylaxis is Common and Predisposes Patients to Increased Risk of Infectious Complications following Total Joint Arthroplasty

Oren Feder, MD
David Yeroushalmi, BS
Claudette M. Lajam, MD, FAAOS
Joseph A. Bosco, MD, FAAOS
William B. Macaulay, MD, FAAOS

Prophylactic intravenous Vancomycin usage was assessed for proper administration compliance and correlated with rates of wound complications and periprosthetic joint infections.

Poster No. P0061
Complete Blood Platelet and Lymphocyte Ratios Increase Diagnostic Accuracy of Periprosthetic Joint Infection following Total Hip Arthroplasty

Christian Klemt, PhD
Young-Min Kwon, MD, PhD
Venkatsaiakhil Tirumala, BS, MS
Ruben V. Oganesyan, MD
Liang Xiong, MD, PhD

Both PLR and PVR calculated from complete blood counts, when combined with serum and synovial fluid markers, have increased diagnostic sensitivity and specificity comparable to alpha defensin.
Poster No. P0062
Increasing Complications and Failures with Increasing Body Mass Index in 2-Stage Exchange Revision for Infected Total Hip Arthroplasty

Yehuda E. Kerbel, MD
Ariana T. Meltzer-Bruhn, BA
Nicolas Pascual-Leone, BA
Matthew Stein, MD
Gregory J. Kirchner, MD, MPH
Gwo-Chin Lee, MD, FAAOS

In a retrospective cohort comparison of patients undergoing 2-stage revision for infected THA, stratification by BMI demonstrated that as BMI increased, so did complications and failures.

Poster No. P0063
Greater Prevalence of Depressive Symptoms in Patients Undergoing 2-Stage Revision for Periprosthetic Joint Infection

Vishal Hegde, MD
Daniel Bracey, MD, PhD
Roseann M. Johnson, BA
Douglas A. Dennis, MD, FAAOS
Jason M. Jennings, MD, FAAOS

This study aims to identify the prevalence of depressive symptoms in patients prior to treatment for PJI.

Poster No. P0064
Projected Economic Burden of Periprosthetic Joint Infection of the Hip and Knee in the United States

David A. Kolin, BA, MSc
Ajay Premkumar, MD, MPH
Kevin X. Farley, BA
Jacob M. Wilson, MD
Alexander S. McLawhorn, MD, MBA
Michael B. Cross, MD, FAAOS
Peter K. Sculco, MD

Using the most recent data, the combined annual hospital costs related to PJI of the hip and knee were estimated to be $1.85 billion by 2030, including $753.4 million for hip and $1.1 billion for knee.

Poster No. P0065
The Iodine-Supported Titanium Implants Maintain the Antimicrobial Effect against Multiple Bacteria for Eight Weeks after Indwelling

Ken Ueoka, MD
Tamon Kabata, MD
Yoshitomo Kajino, MD
Daisuke Inoue, MD
Takaaki Ohmori, MD
Takuro Ueno, MD
Tomoharu Takagi, MD
Junya Yoshitani, MD
Yuki Yamamuro, MD
Atsushi Taninaka
Toshiharu Shirai, MD
Hiroyuki Tsuchiya, MD
Department of Orthopaedic Surgery Graduate School of Medical Science Kanazawa University

The iodine-supported titanium implant still had 65.0% iodine content at 8 weeks after indwelling in vivo and had significant antibacterial effects against MSSA, MRSA, and P. aeruginosa.

Poster No. P0066
Association between Race/Ethnicity and 90-Day Emergency Department Visits in Patients Undergoing Elective Total Hip Arthroplasty in a Universally Insured Population

Adrian D. Hinman, MD, FAAOS
Priscilla H. Chan, MS
Kathryn E. Royse, MPH, MSPH
Liz Paxton, PhD, MA
Ronald A. Navarro, MD, FAAOS

ED visits in the year prior to THA surgery are a risk factor for postoperative ED visits among all racial/ethnic groups studied while regular primary care visits reduce 90-day ED returns in Black patients.

Poster No. P0067
Preoperative Opioid Use: How Much is Too Much for Total Hip Arthroplasty?

Nequesha Mohamed, MD
Ethan Remily, DO
Scott Douglas, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Oliver Sax, DO, MS
Ali Jreisat, MD, MBA
Qais Naziri, MD, MBA
Ronald E. Delanois, MD, FAAOS

We assessed one-year complications in total hip arthroplasty patients based on preoperative opioid usage.
Poster No. P0068
The Survival of Dual-Mobility Cups and Constrained Liners in Primary Total Hip Arthroplasty: The Femoral Head Size Matters
Aarni Oskari Pakarinen, MB
Perttu Neuvonen, MD, PhD
Aleksi Reito, MD, PhD
Olli Lainiala, MD, PhD
Antti Eskelinen, MD, PhD
According to our study based on a national register, DMCs and CLs with 36 mm femoral head size seem to have few revisions after primary THA, while CLs with <36 mm femoral head have inferior outcomes.

Poster No. P0069
Weight-Based Aspirin Dosing May Further Reduce the Incidence of Venous Thromboembolism following Primary Total Joint Arthroplasty
Christopher R. Halbur, BS
Trevor Gulbrandsen, MD
Christopher West, MD
Timothy S. Brown, MD, FAAOS
Nicolas O. Noisieux, MD, MS, FAAOS
This is a retrospective study evaluating a weight-based VTE prophylaxis protocol after undergoing primary total joint arthroplasty procedures.

Poster No. P0070
Non-Inferiority of Aspirin vs. Other Anticoagulants for Venous Thromboembolism Prophylaxis after Total Hip Arthroplasty
Stefano Muscatelli, MD
Huiyong Zheng, BA, MS
Richard E. Hughes, PhD
Mark E. Cowen, MD
Brian R. Hallstrom, MD, FAAOS
Aspirin is not inferior as an alternative to other anticoagulants for pharmacologic VTE prophylaxis in patients after total hip arthroplasty.

Poster No. P0071
Femoral Axes Cannot Accurately Predict Femoral Rotation in Gap-Balanced Total Knee Arthroplasty
Ian Schroeder, MD
Phillip H. Behrens, MD
Ankur P. Patel, BA
Andrew I. Spitzer, MD, FAAOS
Femoral axes cannot accurately predict femoral rotation in G=gap-balanced TKA.

Poster No. P0072
Physical Function after Primary Total Knee Arthroplasties Stratified by Preoperative Patient-Reported Mental Health Score
Christopher M. Melnic, MD
Anis Paschalidis
Akhil Katakam, BA
Michael McTague, MPH
Antonia F. Chen, MD, MBA, FAAOS
Rachel Sisodia
Hany S. Bedair, MD
Marilyn Heng, MD, MPH, FAAOS
Poor mental health should not be a contraindication for performing total knee arthroplasty.

Poster No. P0073
Concomitant Malnutrition and Frailty is an Uncommon, but Significant Risk Factor for Mortality and Complication following Primary Total Knee Arthroplasty
Andrew M. Schwartz, MD
Jacob M. Wilson, MD
Kevin X. Farley, BA
Thomas L. Bradbury, MD, FAAOS
George N. Guild, MD, FAAOS
Frailty and hypoalbuminemia represent distinct conditions and are independent risk factors for a complication after TKA. Their coexistence imparts a synergistic association with the risk of post-TKA complications.

Poster No. P0074
Outcomes of Total Knee Arthroplasty with a Prior Contralateral Above-Knee Amputation: A Report of 10 Cases
Timothy G. Visser, MD, MBA
Mark W. Mason, MD, FAAOS
Total knee arthroplasty in the setting of a contralateral above-knee amputation may improve knee pain but has a high rate of significant complications and is unlikely to improve ambulatory status.

Poster No. P0075
The Effect of Intravenous Ferric Carboxymaltose on Hemoglobin Response in Patients with Postoperative Anemia following Same-Day Bilateral Total Knee Arthroplasty: A Randomized Controlled Trial
Mansoo Kim, PhD
In Jun Koh, MD, PhD
Keun Young Choi, MD
Yong In, MD
Postoperative intravenous ferric carboxymaltose is a feasible and efficacious management option in simultaneous bilateral total knee arthroplasty patients with functional iron deficiency anemia.
Poster No. P0076
Trends in Episodic-Based Medicare Hospital Reimbursement for Major Joint Replacement: 2011-2017

Jack Haglin, BS
Jaymeson Arthur, MD
Justin Makovicka, MD
David Deckey, MD
Jordan R. Pollock, BS
Mark J. Spangehl, MD, FAAOS

The mean Medicare reimbursement to hospitals decreased for both DRGs included in the CJR model from 2011 to 2017. Meanwhile, the average charge submitted by hospitals increased.

Poster No. P0077
Rapid Decline in Online Search Queries for Hip and Knee Arthroplasties Concurrent with the COVID-19 Pandemic

Atul F. Kamath, MD, FAAOS
Tarun Jella, MPH
Linsen T. Samuel, MD, MBA
Alexander J. Acuña, BS
Ahmed Emara, MD

We found a significant decline in internet search queries related to total joint arthroplasty parallel to the onset of the COVID-19 pandemic.

Poster No. P0078
The Cost-Effectiveness of Chlorhexidine Gluconate Wash for Infection Prophylaxis in Total Joint Arthroplasty

Yehuda E. Kerbel, MD
Gregory J. Kirchner, MD, MPH
Owen R. Maley, MD, BS
Alexander Lieber, MD
Lucas Nikkel, MD
Vincent M. Moretti, MD, FAAOS

Using a break-even cost analysis, we demonstrate that chlorhexidine gluconate wash is cost-effective for preventing periprosthetic joint infection following both primary TKA and THA.

Poster No. P0079
Impact of Electronic Patient Rehabilitation Platforms on Patient-Reported Outcomes and Engagement in Employer Directed Joint Replacement Travel Programs

Steven Fitzgerald, MD, FAAOS
Matthew Musto, DO
Matthew J. Kraay, MD, FAAOS

Electronic telehealth patient engagement and rehab platforms facilitate effective communication, patient navigation, and care coordination and may contribute to improved outcomes after TJA.

Poster No. P0080
Readmission Rates after Total Hip and Knee Arthroplasty Vary across Different Datasets

Ryland P. Kagan, MD
Stephanie Zhao
Jamil S. Kendall, MD
Alicia J. Johnson, MPH
Alicia Sampson, BSN, RN

This study reports differences and disagreement for readmission rates after total hip and knee arthroplasty across different datasets.

Poster No. P0081
Long-Term Review of Metal-Backed Patella Implants in Knee Arthroplasty: Failure Mode and Importance to Current Practice

Kenneth A. Gustke, MD, FAAOS
Carlos Meheux, MD
Katheryne Downes, PhD

A long-term survivorship analysis of metal-backed patellae demonstrated over 75% of failures occurring after 10 years due to polyethylene wear and warrants caution with resurfaces of use.

Poster No. P0082
Platelet Deficiency Represents a Reversible Risk Factor for Periprosthetic Joint Infection in a Mouse Model

Danielle Greig, MD
Rishi Trikha, MD
Troy Sekimura, BS
Nicolas A. Cevallos
Benjamin Kelley, MD
Zeinab Mamouei, PhD
Michael Yeaman, PhD
Nicholas M. Bernthal, MD, FAAOS

Using both mechanistic ex vivo studies and an in vivo mouse model, platelet deficiency was found to be a dose-dependent, reversible risk factor for periprosthetic joint infection.

Poster No. P0083
Prosthetic Joint Infection: A Lower Chance of Success for Patients with Previous Aseptic Revision

James A. Keeney, MD, FAAOS
Jason Tegethoff
William M. Ralston, DO
Rafael Walker-Santiago, MD
Ajay Aggarwal, MD, FAAOS

The authors report a significantly higher rate of infection, extensor mechanism complication, and rerevision among patients treated for infection after aseptic revision TKA compared with primary TKA.
Poster No. P0084
Repeat Revision Total Knee Replacement for Failed Management of Periprosthetic Infection has Long-Term Success but Often Requires Multiple Operations: A Case Control Study
Harshakumar D. Rajgor, MBCHB, MRCS
Huan Dong, BA, MBCHB
Rajpal Nandra, MBBS, BS
Michael C. Parry, MB, ChB
Jonathan D. Stevenson, FRCS (Ortho), MBCHB
Lee Jeys, FRCS

Rererepeat revision knee arthroplasty has a high reoperation rate and complications.

Poster No. P0085
Preoperative Allergy Testing for Patients Reporting Penicillin and Cephalosporin Allergies is Cost-Effective in Preventing Infection after Total Knee and Hip Arthroplasty
Nicholas R. Pagani, MD
Michael A. Moverman, MD
Richard N. Puzzitiello, MD
Mariano Menendez, MD
C. Lowry Barnes, MD, FAAOS
Joseph Kavolus, MD

Economic analysis demonstrates that routine preoperative allergy testing and clearance is a cost-effective infection prevention strategy among patients undergoing total joint arthroplasty.

Poster No. P0086
Mid-Term Outcomes of a One-Stage Revision with Non-Modular Components for Total Knee Arthroplasty Prosthetic Joint Infections
Hunter S. Cameron
Edward M. Nelsen-Freund, MD, FAAOS

This study describes an effective one-stage revision technique used to treat total knee arthroplasty prosthetic joint infections with high function and low rates of reinfection.

Poster No. P0087
Evaluating Predictive Factors as well as Comparing Mortality between Successes and Failures in the Use of Debridement, Antibiotics, and Implant Retention for Total Knee Arthroplasty Periprosthetic Joint Infection
Rui Xiang Toh, MD
Zhen Ning Yeo, MBBS
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Ming Han Lincoln Liow, FRCS (Ortho), MBBS
Hee-Nee Pang, MBBS, MRCS
Darren Tay, MBBS, FRCS (Ortho)
Shi-lu Chia, MBBS, FRCS (Ortho)
Ngai-Nung Lo, MD
Seng-Jin Yeo, FRCS

High preoperative ESR >108 and Staphylococcus PJI are predictors of unsuccessful DAIR treatment. Mortality was high but comparable between successes and failures.

Poster No. P0088
Understanding Femoral Rotation in Total Knee Replacement: Is it Really 3 Degrees?
Michael P. Ast, MD, FAAOS
Christina J. Mafier, BA
Mallery K. Wilson, BS, MSPH
Kaitlin M. Carroll, BS
Seth A. Jerabek, MD
Steven B. Haas, MD, FAAOS
David J. Mayman, MD, FAAOS

Appropriate femoral rotation in TKR is not as simple as it has been previously described and malrotation can lead to flexion instability and patella maltracking.

Poster No. P0089
To Understand the Fear/Apprehension Factors that Play on a Patient's Mind before Undergoing Total Knee Arthroplasty
Sanjay B. Londhe, FRCS, MS
Ravi V. Shah
Amit P. Doshi, BS, MBA
Asit K. Shah, MD, PhD, FAAOS
Sanjay B. Londhe, FRCS, MS

This study clearly demonstrates that the majority of the patients are more apprehensive of the postoperative pain they are likely to experience post TKA which can be alleviated by counseling.

Poster No. P0090
Brandon Lentine, MD
Michael Blankstein, MD, FAAOS
Nathaniel J. Nelms, MD, FAAOS

Our survey characterizes current corticosteroid injection practices within the AAHKS membership.

Poster No. P0091
Adductor Canal Block Provides Minimal Benefit in Addition to Periarticular Injection in Total Knee Arthroplasty
Andrew D. Hagar, MD
Christopher Fang, MD
Joseph H. Dannenbaum, MD, FAAOS
James Nairus, MD, FAAOS
James V. Bono, MD, FAAOS
Carl T. Talmo, MD, FAAOS

Routine use of adductor canal blocks in total knee arthroplasty does not offer additional clinical benefit over periarticular injection alone.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
The Addition of an Adductor Canal Block to a Multimodality Pain Management Program for Total Knee Arthroplasty: Is there an Advantage?

Siddharth B. Joglekar, MD
Norman D. Bontogon, MSN
Ravinder Singh
Steve S. Chung, PhD
Gay Sammons, PhD

The adductor canal block can be safely added to TKA enhanced recovery protocols with the expectation of increased pain control as demonstrated by significantly reduced overall opioid consumption.

Preoperative Marijuana and Total Knee Arthroplasty: Outcomes at 90 Days and 1 Year

Nequesha Mohamed, MD
Chukwuweike U. Gwam, MD
Sahir Pervaiz, MD, MS
Scott Douglas, MD
Tianyi D. Luo, MD
Johannes F. Plate, MD, PhD
Ronald E. Delanois, MD, FAAOS

We compared opioid consumption, readmissions, revisions, and complications after TKA in a matched cohort of marijuana users and nonusers.

Total Knee Arthroplasty is associated with Greater Immediate Postsurgical Opioid Use than Total Hip Arthroplasty

Siddharth A. Mahure, MD
James Feng, MD
David N. Kugelman, MD
Joshua C. Rozell, MD
Ran Schwarzkopf, MD, FAAS
William J. Long, MD, FAAOS

Narcotic use for TKA is significantly greater than that for THA and the implementation of THA protocols in the face of opioid epidemic to TKA could be beneficial to avoid opioid abuse and decrease pain.

Functional Outcomes of All-Polyethylene vs. Metal-Backed Unicompartmental Knee Arthroplasty in Obese Patients

Wayne Y. Foo, MPH
Ming Han Lincoln Liow, FRCS (Ortho), MBBS
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Hee-Nee Pang, MBBS, MRCS
Darren Tay, MBBS, FRCS (Ortho)
Shi-Iu Chia, MBBS, FRCS (Ortho)
Ngai-Nung Lo, MD
Seng-Jin Yeo, FRCS

Higher obesity patients with AP implant after UKA had poorer functional outcomes compared to their counterparts with MB implant as well as lower obesity patients with AP implant.

Preferential Selection of Surgical Patients in the Comprehensive Care for Joint Replacement Model

Hyunkyu Ko, PhD
Brook I. Martin, PhD
Richard Nelson
Christopher E. Pelt, MD, FAAOS

CJR hospitals with high volume and historic episode costs achieved greater cost reduction in costs, improved quality. Those heterogeneous effects could be associated with patient selection.

Forgotten Joint Score after Total Knee Arthroplasty is Not Lower than that after Total Hip Arthroplasty: A Multiple Regression Analysis of a Cohort of 1,163 Cases

Susumu Takemura, MD
Yukihide Minoda, MD
Ryo Sugama, MD
Yoichi Ohta
Nobuo Yamamoto, MD
Hiroaki Nakamura, MD

Multiple regression analysis revealed that there was no difference in the FJS between TKA and THA. The FJS should be age-adjusted when used for comparisons between TKA and THA.

Do Patients Forget about their Total Hip Replacements the Same as Patients after Total Knee Replacements? A Pilot Study

Wolfgang Fitz, MD
Lukas Eckhard, MD
Todd Jones, BA
Natalie Schudrowitz, BA
Vibav Mouli, MS
Jamie E. Collins, MA

Hip replacements tend to be more “forgotten” over time compared to knee replacements; this study explores the specific activities of the Forgotten Joint Score that may explain these differences.

Outcomes and Risk Factors Associated with Rerevision Surgery following Periprosthetic Fracture Treated with Revision Arthroplasty

Christian Klemt, PhD
Young-Min Kwon, MD, PhD, FAAOS
Janna Van Den Kieboom, MD
Venkatsaiakhil Tirumala, BS, MS
Liang Xiong, MD, PhD
Ruben V. Oganesyan, MD

The overall complication rate of rerevision surgery following failed revision surgery for periprosthetic fracture was higher than revision surgery.
Poster No. P0100
Does Deviation from Critical “One-Hour Antibiotic Window” before Incision Increase the Risk of Periprosthetic Joint Infection?

Neil V. Shah, MD, MS
Christopher Garnett, BA
Tzu Hsuan Cheng, MD
Qais Naziri, MD, MBA
Aditya V. Maheshwari, MD, FAAOS

No infections were noted in patients undergoing in single-stage bilateral total knee arthroplasty, even after receiving antibiotic prophylaxis outside the 1-hour window before the second incision.

Poster No. P0101
The Impact of Asymptomatic Human Immunodeficiency Virus-Positive Disease Status on Complications in Patients Undergoing Total Knee Arthroplasty: A Propensity Score-Matched Analysis

Neil V. Shah, MD, MS
Matthew J. Lettieri, BA
Kayla Basedow, BS
Salem Najjar, BA
Sharan Shah
Allen Vaynblat, BA
Bassel Diebo, MD
Yi-Loong C. Woon, MD
Qais Naziri, MD, MBA

Asymptomatic human immunodeficiency virus status does not significantly increase medical, surgical, or overall rates of postoperative complications of total knee arthroplasty for osteoarthritis.

Poster No. P0102
Clinical Efficacy of Tourniquet Use during a Primary Total Knee Arthroplasty: A Retrospective Review

Christopher Dijanic, MD
Christopher Michel, MD
Jamie Grossman, MD
Robert Dolitsky, MD
Justin Fernicola, MD
Mark Woernle, MD
Gregory Parker, MD
George Gorgy, MD
Mark W. Gesell, MD, FAAOS

When performing a TKA, limiting tourniquet time should be considered. It has been shown to have equivalent outcomes with lower postoperative complications.

Poster No. P0103
Primary Total Knee Arthroplasty in Patients with Polio: Arthrofibrosis Rate Double in Affected Limb

Matthew Siljander, MD
Kevin I. Perry, MD, FAAOS
Robert T. Trousdale, MD, FAAOS
Michael J. Taunton, MD, FAAOS
David G. Lewallen, MD, FAAOS
Matthew P. Abdel, MD, FAAOS

Patients with polio who undergo TKA have good 10-year implant survivorship, but high rates of reoperations due to arthrofibrosis and periprosthetic fractures (most occurring in the affected limb).

Poster No. P0104
Renal Transplant Recipients have Similar Costs and Complication Rates to Matched Controls after Primary Total Knee Arthroplasty

Scott Douglas, MD
Ethan Remily, DO
Nequesha Mohamed, MD
Sahir Pervaiz, MD, MS
Oliver Sax, DO, MS
Wayne A. Wilkie, DO
Justin A. Stafford, DO
Ronald E. Delanois, MD, FAAOS
Aaron J. Johnson, MD

Determine 30-day all-cause readmissions, 90-day complication rates, and 90-day total cost of care in renal transplant patients against matched controls who underwent TKA.

Poster No. P0105
The Temporal Relationship between Preoperative Clostridium Difficile Infections and Outcomes in Total Knee Arthroplasty

Scott Douglas, MD
Ethan Remily, DO
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Oliver Sax, DO, MS
Aaron J. Johnson, MD
Ronald E. Delanois, MD, FAAOS

Costs, readmissions, revisions, and complications in patients experiencing C.diff infection >6 months prior to TKA, ≤6 months prior to TKA, vs. those not sustaining preoperative C.diff infection.

Poster No. P0106
Outcomes of a First Total Knee Arthroplasty are Associated with Outcomes of the Subsequent Contralateral Total Knee Arthroplasty

Daniel J. Kaplan, MD
Ran Schwarzkopf, MD, FAAOS
Scott Friedlander, MPH
Heather Gold

The purpose was to determine if preoperative characteristics and postoperative outcomes of a first TKA were predictive of characteristics and outcomes of the sequential contralateral TKA.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0107**
Evaluation of Patient-Reported Outcome Measures between High-Dose and Low-Dose Opioid Utilization following Total Knee Arthroplasty

**Giles R. Scuderi, MD, FAAOS**  
Andrew R. Bohm, PhD  
Rebecca Teng  
Sarah M. Ulcoq, OTR/L

Utilizing patient-reported dosage, our goal was to test if patient-reported outcomes differ based on the ASAM threshold of high-dose opioid usage.

**Poster No. P0108**  
Total Knee Arthroplasty Pain Management With HTX-011 as the Foundation of a Multimodal Analgesic Regimen Results in Low Incidence of Severe Pain

**Scott A Hacker, MD, FAAOS**  
Alan J. Rechter, MD, FAAOS  
Richard M. Langford, MBBS  
Peter Gerner, MD  
Jia Hu, PhD

HTX-011, an investigational, non-opioid local anesthetic, as the foundation of a scheduled MMA regimen, limits severe pain, maintains mean pain as mild, and minimizes opioid consumption after TKA.

**Poster No. P0109**  
Staged Bilateral Unicompartmental Knee Arthroplasty: Does History Dictate the Future?

**Graham S. Goh, MD**  
Gerald J. Zeng  
Yongqiang Jerry Chen, FRCS (Ortho), MBBS  
Hee-Nee Pang, MBBS, MRCS  
Darren Tay, MBBS, FRCS (Ortho)  
Shi-Iu Chia, MBBS, FRCS (Ortho)  
Ngai-Nung Lo, MD  
Seng-Jin Yeo, FRCS  
Ming Han Lincoln Liow, FRCS (Ortho), MBBS

Patients can be reassured that clinical outcomes of the second UKA will be similar to the first, alongside a reduced length of stay.

**Poster No. P0110**
Operative Duration and Short-Term Postoperative Complications following Unicompartmental Knee Arthroplasty

**Michael B. Held, MD**  
Venkat Boddapati, MD  
Nana O. Sarpong, MD  
Herbert J. Cooper, MD, FAAOS  
Roshan P. Shah, MD, JD, FAAOS  
Jeffrey A. Geller, MD, FAAOS

Increased operative duration over 2 hours in primary UKA is associated with increased risk of non-home discharge, surgical site infection, reoperation, and blood transfusion.

**Poster No. P0111**
Hypoalbuminemia Predicts Adverse Events following Unicompartmental Knee Arthroplasty

**Edward S. Hur, MD**  
Daniel D. Bohl, MD, MPH  
Craig J. Della Valle, MD, FAAOS  
Felipe Villalobos, BS  
COL. (ret) Tad L. Gerlinger, MD, FAAOS

We study the association between preoperative hypoalbuminemia and adverse events following unicompartmental knee arthroplasty using a national database.

**Poster No. P0112**  
What is the Critical Tibial Resection Depth During Unicompartmental Knee Arthroplasty? A Biomechanical Study of Fracture Risk

**Trevor Tompane, MD**  
Daniel J. Houskamp, MD  
Brian Barlow, MD, FAAOS

In this biomechanical study of resection depth for medial unicompartment arthroplasty, cuts greater than 6mm were associated with significantly lower load to failure and perioperative fracture risk.

**Poster No. P0113**  
Cannabis Use Disorder is Associated with Longer In-Hospital Lengths of Stay and Higher Rates of Complications and Costs of Care following Primary Total Knee Arthroplasty

**Rushabh Vakharia, MD**  
Mitchell K. Ng, MD,  
Keith Diamond, MD  
Andrew R. Horn, MD, MS  
Michael A. Mont, MD, FAAOS  
Jason Wong, MD  
Martin W. Roche, MD, FAAOS

This retrospective study demonstrates cannabis use disorder in patients undergoing primary TKA have longer in-hospital LOS and higher complication rates and costs of care compared to controls.

**Poster No. P0114**
Manipulation Under Anesthesia in Primary Total Knee Arthroplasty? A Match-Cohort Comparison Study

**Peter Shekailo, MD**  
Kyle Kunze, MD  
Tori Edmiston  
Paul M. Courtney, MD, FAAOS  
Craig Della Valle, MD, FAAOS

While patients undergoing MUA did not achieve comparable postoperative flexion or flexion gains comparable to patients without arthrofibrosis, they did achieve motion similar to their preoperative exa...
Poster No. P0115
Do Patients with Paget's Disease have Worse Outcomes following Primary Total Knee Arthroplasty?

Nicholas Hernandez, MD
Rushabh Vakharia, MD
Michael P. Bolognesi, MD, FAAOS
Michael A. Mont, MD, FAAOS
Thorsten M. Seyler, MD, PhD, FAAOS
Martin W. Roche, MD, FAAOS

Paget's Disease was associated with longer in-hospital LOS, in addition to higher rates of complications and costs.

Poster No. P0116
Should Conversion Knee Arthroplasty Have its Own CPT Code?

Samuel Kiernan, MD
Evan M. Schwechter, MD, FAAOS
Zeynep Seref-Ferlengez, PhD
Simon Greenbaum, MD
Evan Mostafa, BS
Bertin Mathai, MD, BS

Conversion total knee arthroplasty is distinct enough from primary total knee arthroplasty to warrant its own CPT code, when looking at blood loss, operating room time, and discharge disposition.

Poster No. P0117
Effect of Marital Status on Outcomes following Total Joint Arthroplasty

David N. Kugelman, MD
Vivek Singh, MD
Katherine A. Lygrisse, MD
Morteza Meftah, MD
Vinay Aggarwal, MD
Ran Schwarzkopf, MD, FAAOS

We study the effect of marital status on outcomes following total joint arthroplasty.

Poster No. P0118
An Academic Orthopaedic Specialty Hospital Provides the Shortest Operative Times within a Single Health System

Jenna A. Bernstein, MD
Stephen Zak, BA
Ran Schwarzkopf, MD, FAAOS
Joshua C. Rozell, MD

An academic orthopaedic specialty hospital had the shortest operative times for both primary and revision total knee arthroplasty in a single health system.

Poster No. P0119
Evolving Outcome Measures in Total Knee Arthroplasty: Trends and Utilization Rates over the Last Fifteen Years

Linsen T. Samuel, MD, MBA
Roy H. Lan
Jack W. Bell
Atul F. Kamath, MD, FAAOS

Outcome metric reporting in TKA has increased over the last 15 years, accompanied by a rise in both aggregate outcomes reporting and in the number of individual instruments used to evaluate TKA.

Poster No. P0120
Peripheral Vascular Disease in the Total Knee Arthroplasty Patient

Benjamin Davis, MD
Nicholas M. Brown, MD, FAAOS

Peripheral vascular disease is an important comorbidity encountered in patients undergoing total joint arthroplasty. Our study explores the potential risks and outcome effect in this population.

Poster No. P0121
Contemporary Distal Femoral Replacements for Supracondylar Femoral Fractures around Primary and Revision Total Knee Arthroplasties

Brian Chalmers, MD
Marie Syku, BA
Elizabeth Gausden, MD
Jason L. Blevins, MD
David J. Mayman, MD, FAAOS
Peter K. Sculco, MD

DFRs with cemented femoral fixation for periprosthetic femur fractures in primary TKAs have an excellent revision-free survival of 97% at 5 years.

Poster No. P0122
Smoking is a Stronger Risk Factor for Aseptic Revision Total Knee Arthroplasty Failure than Diabetes or Morbid Obesity

Michael P. Hagerty, BS
Rafael Walker-Santiago, MD
Jason Tegetheroff
Benjamin M. Stronach, MD, FAAOS
James A. Keeney, MD, FAAOS

Compared with uncomplicated revision TKA patients, diabetics had a higher risk for extensor mechanism complications and patients with a smoking history had higher risk for infection and amputation.

Poster No. P0123
Bifurcation of Leptin Receptor Positive Cells in Response to Implant Instability Induces Fibrotic Osseointegration Failure

Emile-Victor Kuyl, BS
Branden R. Sosa
Vincentius J. Suhardi, MD, PhD
Fei Shu, PhD
Di Qin, MD, PhD
Lionel B. Ivashkiv, MD
Matthew B. Greenblatt, MD, PhD
Mathias P. Bostrom, MD, FAAOS
Xu Yang, MD

Implant instability diverts LEPR+ skeletal progenitor cells into a fibrogenic phenotype, resulting in fibrosis at the bone-implant interface, compromised osseointegration, and implant loosening.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
CX3CR1+ Macrophages are Responsible for the Periimplant Fibrosis Formation after Total Joint Arthroplasty Surgery

Emile-Victor Kuyl, BS  
Fei Shu, PhD  
Branden R. Sosa  
Juan D. Lopez, BS  
Di Qin, MD, PhD  
Matthew B. Greenblatt, MD, PhD  
Lionel B. Ivashkiv, MD  
Mathias P. Bostrom, MD, FAAOS  
Xu Yang, MD

This study identified CX3CR1+ macrophages mediating the conversion of stromal progenitor cells from osteogenesis to fibrogenesis during the formation of periimplant fibrotic tissue after TJR surgery.

In Staged Bilateral Total Knee Arthroplasty, Manipulation Under Anesthesia is Significantly More Common in the First Compared to the Second Total Knee Arthroplasty

Daniel J. Kaplan, MD  
Jonathan D. Haskel, MD  
Oren Feder, MD  
Vinay Aggarwal, MD  
William J. Long, MD, FAAOS  
Ran Schwarzkopf, MD, FAAOS  
Joshua C. Rozell, MD

This study evaluated risk factors for patients that underwent bilateral TKA (simultaneous or sequential) that required manipulation under anesthesia.

Total Knee Arthroplasty Stiffness and Polyethylene Damage: A Biomechanical Investigation

David C. Landy, MD, PhD  
Elexis Baral, BS  
Peter K. Sculco, MD  
Thomas P. Sculco, MD, FAAOS  
Timothy M. Wright, PhD

Polyethylene inserts from TKA patients revised for stiffness do not have disproportion damage to one region but do have decreased total damage compared to patients revised for other etiologies.

Utility and Prognostic Ability of a Diagnostic Injection Prior to Revision Total Knee Arthroplasty

R. Michael Meneghini, MD, FAAOS  
Kevin Sonn, MD  
Evan Deckard  
Abdul Aasar, MD  
Lily Wolf, BS, MS

This study demonstrates that diagnostic injections have prognostic utility in revision TKA.

Are there Avoidable Causes of Early Revision Total Knee Arthroplasty?

Mackenzie A. Roof, BS  
Jason B. Kreinces, BS  
Katherine A. Lygrisse, MD  
Ran Schwarzkopf, MD, FAAOS  
Joshua C. Rozell, MD  
Vinay Aggarwal, MD

These findings indicate that over 30% of rTKA are potentially avoidable. Interventions should focus on addressing these potentially avoidable issues.

Older Patients Have Poorer Functional Outcomes but Similar Rates of Satisfaction after Revision Total Knee Arthroplasty

Graham S. Goh, MD  
Ming Han Lincoln Liow, FRCS (Ortho), MBBS  
Peter K. Sculco, MD  
Darren Tay, MBBS, FRCS (Ortho)  
Ngai-Nung Lo, MD  
Seng-Jin Yeo, FRCS

Older patients undergoing revision TKA had poorer knee function and physical wellbeing compared to their younger counterparts. However, satisfaction rates were similar across different age groups.

Utilizing Artificial Neural Networks for Identifying Total Hip and Knee Arthroplasty Implant Design from Plain Radiographs

Christian Kiemt, PhD  
Young-Min Kwon, MD, PhD, FAAOS  
Venkatsaiakhil Tirumala, BS, MS  
Wayne Cohen-Levy, MD, MS  
Liang Xiong, MD, PhD  
Ingwon Yeo, MD

The validated artificial neural network model that is capable of automatically detecting hip and knee implant design has potential to assist in preoperative planning of revision total joint arthroplasties.

Extensor Mechanism Reconstruction Using Marlex Mesh: Is Postoperative Casting Mandatory?

Leonard T. Buller, MD  
Lucian C. Warth, MD  
Evan Deckard  
R. Michael Meneghini, MD, FAAOS

Extensor mechanism reconstruction using polypropylene mesh is a reproducible strategy providing clinically relevant improvements in knee health. Knee immobilizers result in similar outcomes as casting.
Poster No. P0132
Early Postoperative Straight Leg Raise is Associated with Shorter Length of Stay after Primary Total Knee Arthroplasty

Jimin Suh, MD
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Ming Han Lincoln Liow, FRCS (Ortho), MBBS
Yong-Hao Pua
Eleanor S. Chew, PT
Shi-lu Chia, MBBS, FRCS (Ortho)
Ngai-Nung Lo, MD
Seng-Jin Yeo, FRCS

Early postoperative straight leg raise after total knee arthroplasty is associated with shorter length of stay, time to ambulation, and time to stairs climbing.

Poster No. P0133
A Wide Range of Femoral Axial Rotation is Used to Achieve a Rectangular Flexion Space in Posterior-Stabilized Total Knee Arthroplasty

Jessica Hooper, MD
Kevin Lawson, MD
Derek F. Amanatullah, MD, PhD, FAAOS
Cyril Hamad
Laurent Angibaud, MS
James I. Huddleston, MD, FAAOS

A study of 2,442 TKAs implanted using gap balancing technique and navigation software demonstrated a wide range of femoral rotation used to achieve a balanced flexion gap.

Poster No. P0134
Cruciate Sacrificing Total Knee Replacements with a Contemporary Total Knee System: How do They Compare to a Posterior Stabilized Total Knee at 2 Years?

Thomas K. Stoops, MD
Corey C. Engel, BS
Thomas L. Bernasek, MD, FAAOS

With proper articular conformity and balancing, CR TKR in a PCL-deficient knee (CS TKR) is appropriate.

Poster No. P0135
Evaluating Femorotibial Kinematics for Various Total Knee Arthroplasty Designs for 1,100 Subjects

Michael LaCour, PhD
Milad Khasian
Jason M. Jennings, MD, FAAOS
Douglas A. Dennis, MD, FAAOS
Richard D. Komistek, PhD

This study analyzes over 1,100 TKA subjects and compares range of motion and condylar motion for the 7 different implant types, including fixed bearing, mobile bearing, PCR, BCR, PS, PCR, and more.

Poster No. P0136
Acute Common Peroneal Nerve Decompression following Total Knee Arthroplasty: A Case Series

David B. Johnson, DO
Kojo Marfo, MD
Christopher G. Zochowski, MD
Adolph V. Lombardi, MD, FAAOS
Keith R. Berend, MD, FAAOS

Acute decompression, following diagnosis of acute CPNP after TKA, is a prudent treatment option that provides good functional results and a faster recovery for this unique complication.

Poster No. P0137
Comparison of Infection Eradication Rates in Chronic Prosthetic Knee Infections Treated with Articulating vs. Static Antibiotic Cement Spacers

Jaclyn M. Jankowski, DO
David Keller, DO
Luke G. Menken, DO
Richard S. Yoon, MD, FAAOS
Frank A. Liporace, MD, FAAOS

This study reviews outcomes between use of static and articulating spacers in two-stage revision total knee arthroplasty for periprosthetic joint infection.

Poster No. P0138
Symptomatic Benign Prostatic Hyperplasia Does Not Increase Risk for Periprosthetic Joint Infection following Primary Total Joint Arthroplasty

Amil R. Agarwal, BA
Safa C. Fassihi, MD
Alex Gu, MD
Patawut Bovonratwet, MD
Tom G. Pollard, MD
Joshua Campbell, MD
Savyasachi C. Thakkar, MD
Peter K. Sculco, MD

Symptomatic benign prostatic hyperplasia was not independently associated with increased rates of periprosthetic joint infection at two years postoperatively following primary total joint arthroplasty.

Poster No. P0139
Can Metal Ion Levels Help Identify Mechanical Implant Failure in Contemporary Total Knee Arthroplasty?

Benjamin M. Wooster, MD
Nicholas I. Kennedy, MD
Katherine E. Mallett, MD
Michael J. Taunton, MD, FAAOS
Matthew P. Abdel, MD, FAAOS
Robert T. Trousdale, MD, FAAOS

Perioperative serum metal ion assessment may be helpful in identifying occult mechanical failure or corrosion of contemporary TKA implants.
Poster No. P0140
Perioperative Blood Transfusions are Associated with Increased Thromboembolism Risk following Total Knee Arthroplasty

Nipun Sodhi, MD
Hiba K. Anis, MD
Alexander J. Acuña, BS
Carlos A. Higuera Rueda, MD, FAAOS
Jonathan Danoff, MD, FAAOS

Perioperative transfusions are associated with increased VTE risks. Orthopaedic surgeons should be cautious when ordering transfusions and take a multidisciplinary approach to help mitigate this risk.

Poster No. P0141
Mortality and Conversion Rate to Below Knee or Above Knee Amputation following Transmetatarsal Amputation

Anthony Barcel, MD
Taylor M. Rowe
Susan M. Odum, PhD
Jefferson B. Sabatini, MD
Samuel Ford, MD
John K. Ellington, MD, MS, FAAOS
Carroll P. Jones, MD, FAAOS
W H. Davis, MD, FAAOS
Todd A. Irwin, MD, FAAOS

In our series of patients undergoing TMA, the risks for reoperation included male sex, diabetes, ESRD, and CVD. Risks for mortality included ESRD, diabetes, CVD/PVD, older age, and high A1c.

Poster No. P0142
Fusion Rates of Ankle Arthrodesis with Anterior Plate Fixation Based on Computerized Tomography and Clinical Outcomes

Philip Kaiser, MD
W H. Davis, MD, FAAOS
John K. Ellington, MD, MS, FAAOS
Bruce E. Cohen, MD, FAAOS
Todd A. Irwin, MD, FAAOS
Carroll P. Jones, MD, FAAOS

Tibiotalar arthrodesis utilizing anterior plate fixation is a reliable procedure to achieve ankle fusion, however fusion rates are lower on postoperative CT scans than historic plain films.

Poster No. P0143
Comparison of Intermediate-Term Clinical Outcomes after Total Ankle Arthroplasty between End-Stage Osteoarthritis and Rheumatoid Arthritis

Byung-Ki Cho, MD
Seung Myung Choi
Minyong An, Cheongju-Si
Jae-Hyeon Jeon, MD

Total ankle arthroplasty for patients with end-stage ankle RA demonstrated the intermediate-term clinical outcomes and early postoperative complication rate comparable to the patients with OA, except for the ability related to sports activities.

Poster No. P0144
Biomechanical Comparison of FiberTape Device Repair Techniques of Ligamentous Lisfranc Injury in a Cadaveric Model

Zachary A. Koroneos, BS
Morgan S. Kim
Madelaine W. Fritsche, BS
Trevin Cowman, BSME
Emily Vannatta, BS
Michael C. Aynardi, MD, FAAOS
Gregory S. Lewis, PhD
Allen Kunselman, MS

Biomechanical comparison of Lisfranc ligament repairs including FiberTape and FiberTape with supplemental intercuneiform limb. Diastasis and angular displacement between bones used for evaluation.

Poster No. P0145
Effect of Surgical Reconstruction on Gait Kinematics in Adult-Acquired Flatfoot Deformity via a Robotic Gait Simulator

Jensen Henry, MD
Jeffrey Hoffman, MS
Jaeyoung Kim, MD
Brett D. Steineman, PhD
Daniel R. Sturnick, MS
Constantine A. Demetracopoulos, MD, FAAOS
Jonathan T. Deland, MD, FAAOS
Scott Ellis, MD, FAAOS

Surgical reconstruction of AAFD alters kinematics toward normative kinematics but does not fully restore them.

Poster No. P0146
Influence of Primary Arthrodesis of Tarsometatarsal Joints on Gait Kinematics in Cadaveric Simulation

Jeffrey Hoffman, MS
Jaeyoung Kim, MD
Oliver B. Hansen, BA
Stephanie K. Eble, BA
Jonathan Day, BS, MS
Lauren Roberts, MD
Scott Ellis, MD, FAAOS
Mark C. Drakos, MD, FAAOS

The goal of this study was to determine the influence of TMT primary arthrodesis on ankle and adjacent joint kinematics.

Poster No. P0147
What are the Risk Factors for Infection after Operative Treatment of Subtalar Fracture Dislocations?

Eli Levitt, MS
David A. Patch, MD, MEd
Michael D. Johnson, MD, FAAOS
Ryan McLynn, MD
Henry Debell, MD
James B. Harris
Clay A. Spitler, MD, FAAOS

Risk factors for infection after subtalar fracture dislocation in a retrospective cohort study at a single center include older age, smoking, type 3 open fracture, and freshwater contamination.
Poster No. P0148
Current Concepts in Sinus Tarsi Syndrome: A Scoping Review

Zaki Arshad
Maneesh Bhatia, FRCS

Sinus tarsi syndrome is used by authors to describe various distinct disease processes. The use of subtalar arthroscopy to elicit a more specific diagnosis is not currently justified.

Poster No. P0149
Distal Metatarsal Segmental Shortening for the Treatment of Chronic Metatarsophalangeal Dislocation of Deformed Lesser Toes

Tzu Cheng Yang, MD
Ming Hung A. Teng
Chien-Shun Wang
Chao-Ching Chiang, MD

DMSS is a simple and reliable procedure for the treatment of chronic irreducible dislocated MTP joint of lesser toes. It provides satisfactory surgical outcomes and is associated with a low rate of postoperative complications.

Poster No. P0150
Is there a Difference in PROMIS Outcomes between Patients Who Received K-Wire or Intramedullary Implant Proximal Interphalangeal Arthrodesis for Hammertoe Deformity?

Amanda Holleran, MD
John P. Ketz, MD, FAAOS
Daniel D. Homeier
Judith F. Baumhauer, MD, MPH, FAAOS
Adolph S. Flemister, MD, FAAOS
Benedict F. DiGiovanni, MD, FAAOS
Irvin Oh, MD, FAAOS
Gabriel A. Ramirez, MS
Caroline Thirukumaran, PhD

We retrospectively reviewed prospectively collected patient-reported outcomes for patients who had undergone hammertoe fixation with a K wire compared to intramedullary fixation.

Poster No. P0151
Patient-Reported Outcomes following Lateral Process Talus Fractures

Justin Haller, MD
Hunter Ross, DO
Lucas S. Marchand, MD
Jeffrey J. Cardon, BS
Timothy C. Beals, MD, FAAOS
Alexej Barg, MD
Florian Nickisch, MD, FAAOS

Most patients who sustain a lateral process talus fracture achieve excellent functional outcomes as measured by the PROMIS PF and FAAM questionnaires at medium-term follow-up.

Poster No. P0152
Screws Only Primary Subtalar Arthrodesis for Calcaneus Fractures

Ainsley K. Bloomer, BA, BS
Richard R. McKnight, MD
David Macknet, MD
Nicholas Johnson, MD
Rachel Seymour, PhD
Joseph R. Hsu, MD, FAAOS

After treatment of displaced intraarticular calcaneus fractures with screws only primary subtalar arthrodesis from a sinus tarsi approach, outcomes demonstrate high rates of return to work and fusion.

Poster No. P0153
The Cost of Foot and Ankle Surgery is Widely Variable among Top United States Orthopaedic Hospitals

Jordan R. Pollock, BS
Michael L. Moore, BS
Matthew K. Doan, BS
Justin Makovicka, MD
Jeffrey Hasselbrock, MD
Joshua Bingham, MD
Karan Patel, MD

The published cost of DRG codes in foot and ankle surgery is widely variable among top hospitals, with little to no correlation between DRG cost and median income or cost of living of the area.

Poster No. P0154
The Routine Use and Cost Analysis of Acid-Fast Bacilli and Fungal Cultures in Foot and Ankle Surgery: A Retrospective Study

Zein S. El-Zein, MD
Scott Diamond, MD
Margaret C. Bohr, BS
Erin A. Baker, PhD
Mackenzie M. Fleischer, MS
Corinn Gehrke, MS
Paul T. Fortin, MD, FAAOS
Zachary Vaupel, MD, FAAOS

This study highlighted low rates of positive AFB/fungal cultures in our foot and ankle surgery department and demonstrated that routine use of such cultures poses substantial costs to the hospital.

Poster No. P0155
Does Industry Sponsorship Lead to Greater Output in Foot and Ankle Research?

Prashant Matai, MBBS
Nicholas Frane, DO
Peter B. White, DO, MS
Nicholas Piniella, BS
Sharnjyot Wander, MD
Nicholas R. Sceiz, BA
Larry Lutsky, PhD
Adam Bitterman, DO, FAAOS

Increased industry sponsorship is responsible for greater research output among foot and ankle authors.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0156**

Effect of Metatarsal Pronation on Successful Bunion Surgery

**Monique C. Chambers, MD, MSc**
Dion G. Birhiray, BS
Mina A. Botros, BS
William M. Granberry, MD, FAAOS

Coronal and sagittal plane deformity contribute to HV. Failure to correct MT head pronation may also lead to increased hallux valgus recurrence, despite anatomic sagittal plane correction.

**Poster No. P0157**

First Tarsometatarsal Joint Alignment after First Metatarsophalangeal Joint Arthrodesis for Hallux Valgus

**Christopher Traynor, MD**
James R. Jastifer, MD, FAAOS

Measuring various radiographic parameters preoperatively and postoperatively demonstrates that radiographic alignment of the first TMT joint will reduce with isolated treatment of the first MTP joint.

**Poster No. P0158**

Accuracy of Magnetic Resonance Imaging in Diagnosis of Anterior Ankle Impingement

**Alexandria J. Lichtl, BA**
Christopher S. Lee, MD, FAAOS
Patrick F. Horve, BS
Alex Nhan, BS
William S. Wang, BS
Hardik P. Parikh, MD
Shane M. Davis, MD

This study shows that the use of magnetic resonance imaging for the diagnosis of anterior ankle impingement is inadequate, with an accuracy rate of only 13.95% across 43 cases.

**Poster No. P0159**

Avoiding Fifth Metatarsal Intramedullary Screw Head Cuboid Impingement: A Weight-Bearing Computed Tomography Anatomic Study

**Edgar Garcia-Lopez, MS**
Stephen Marcaccio, MD
Timothy C. Beals, MD, FAAOS
Raymond Y. Hsu, MD, FAAOS

We developed a fifth metatarsal intramedullary screw trajectory model using 3D computed tomography data to assess cuboid impingement based on calculated IM screw position relative to the cuboid.

**Poster No. P0160**

Epidemiology of Insertional Achilles Tendinosis in Patients Requiring Surgical Intervention

**Christopher E. Gross, MD, FAAOS**
Bryce F. Kunkle, BS
Nicholas A. Baxter
Alexander M. Caughman, BS
John Barcel, MD

This study examines epidemiological differences between patients who require surgical intervention for insertional Achilles tendinosis compared to those who benefit from conservative treatment only.

**Hand and Wrist P0161-P0180**

**Poster No. P0161**

The Prevalence of Depression and Posttraumatic Stress Disorder in Adults with Traumatic Upper Extremity Amputations

**Samuel Cohen-Tanugi, MD**
Risa Reid, MD
Bryan J. Loeffler, MD, FAAOS
Raymond G. Gaston, MD, FAAOS

There is a high prevalence of depression and PTSD in traumatic upper extremity amputee patients. There is a need for multidisciplinary treatment in this patient population.

**Poster No. P0162**

Two Sides of the Same Coin: A Systematic Review on the Difference in Outcomes of Radiolunate vs. Radioscapholunate Arthrodesis

**Emily L. Demaio, BSN**
Omolola Fakunle
Corey Spencer, BS
Anjali Kumar, MPH
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD

A systematic review of current literature that aids in the decision-making process of when to choose to perform radiolunate vs. radioscapophalunate fusion.

**Poster No. P0163**

Long-Term Patient-Reported Outcomes following Proximal Row Carpectomy

**Mara Z. Meulendijks, MD**
Jonathan Lans, MD, PhD
Neal C. Chen, MD, FAAOS
Jesse B. Jupiter, MD, FAAOS
Chaitanya S. Mudgal, MD, FAAOS

Proximal row carpectomy results in good long-term functional outcomes and pain control, with dorsal capsule interposition offering reasonable results when chondral loss of the capitate is present.
**Poster No. P0164**  
Improvement of Lunate Perfusion after Radial Closing Wedge Osteotomy in Patients with Kienbock’s Disease  
**Jeong Hyun Lee, MD**  
Ji Sup Hwang  
Kee Jeong Bae, MD  
Jihyeung Kim, MD  
Impact of radial closing wedge osteotomy on lunate was investigated. Results of contrast-enhanced MRI suggested healing of lunate by regenerating perfusion in lunate.

**Poster No. P0165**  
Three-Dimensional Wrist Joint Congruity Evaluation of Wrist Joint Contact Area in Procedures for Kienböck Disease  
**Junki Shiota**  
Daisuke Momma, MD, PhD  
Yuichiro Matsui  
Eiji Kono, MD  
Nozomu Inoue, MD  
Norimasa Iwasaki  
We evaluate the contact area of the wrist joint in Kienbock’s disease using an original tracer program. In radial shortening, the contact area between radius and lunate was decreased.

**Poster No. P0166**  
Anatomical Front and Back Reconstruction for Scapholunate Dissociation: A Single Cohort Study  
**Christopher Defrancesco, MD**  
Christian Victoria, MPH  
Genevieve M. Rambau, MD  
Scott W. Wolfe, MD, FAAOS  
The ANAFAB reconstruction for scapholunate dissociation corrects radiographic deformities of the carpus. This series further showed postoperative improvements in pain and patient-reported outcomes.

**Poster No. P0167**  
Kinematic Analysis of Three Techniques of Scapholunate Ligament Reconstruction: All-Suture Volar-Dorsal, All-Suture Double Dorsal, and Modified Brunelli Technique  
**Seungbum Chae**  
Chungmu Jun, MD  
Kyungtae Kim, MD  
Connor J. Schamblin  
Steven S. Shin, MD, FAAOS  
Michelle H. McGarry, MD  
Thay Q. Lee, PhD  
All-suture volar dorsal SLIL reconstruction restored volar SL distance, double dorsal all-suture reconstruction over-corrected the SLIL distance, and all three reconstructions restore dorsal SL distance.

**Poster No. P0168**  
Scaphoid Nonunion Management with Headless Screw vs. Volar Locking Plate Fixation: A Meta-Analysis  
**Asif M. Ilyas, MD, FAAOS**  
Duncan S. Van Nest, BA  
Clay Townsend, BS  
The results from this meta-analysis support the use of plate fixation for scaphoid nonunion, especially recalcitrant nonunions and those that have failed prior surgical intervention.

**Poster No. P0169**  
Patient Age and Treatment Modality Do Not Correlate with Stiffness in Proximal Phalanx Fractures  
**Subhash Venigalla, BS**  
Farhan Ahmad, BS  
Omkar Baxi, MD  
Ramesh Srinivasan, MD, FAAOS  
This retrospective cohort study on proximal phalanx fractures found no statistically significant difference in total active motion between nonsurgical and operative procedures.

**Poster No. P0170**  
Bone Morphogenic Protein 2 Use for the Surgical Treatment of Acute Scaphoid Fractures and Scaphoid Nonunions  
**Desraj Clark, MD**  
Andres Piscoya, MD  
Marvin Dingle, MD  
John Dunn, MD  
Leon Nesti, MD, PhD  
This is a description of the outcomes and complications experienced when using adjunctive BMP-2 in the surgical treatment of scaphoid fractures at a military medical center.

**Poster No. P0171**  
Does Long-Term Preoperative Use of Nonsteroidal Anti-Inflammatory Drugs Inhibit Bone Healing following Distal Radius Fracture? An Assessment of Postoperative Complications, Function and Radiographic Outcomes  
**Megan R. Donnelly, BS**  
Jeremy Silverman  
Karen J. Noh, BS  
Rebecca B. Blank, MD, PhD  
Jacques H. Hacquebord, MD, FAAOS  
Overall, it appears that long-term NSAID use does not impact healing from distal radius fracture following open reduction-internal fixation.

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*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
Poster No. P0172
Standardizing and Optimizing the Dorsal Tangential View to Prevent Screws Protruding in The Dorsal Compartments: An Experimental Imaging Study on the Influence of Training on Diagnostic Accuracy and Reliability

Job N. Doornberg, MS
Minke Bergsma, MD
Miryam Obdeijn, MD
Stein Jasper Janssen, MD
Gregory I. Bain, MD
Ruurd Jaarsma, FRACS, MD

This study was performed to determine the influence of training on the diagnostic accuracy of the dorsal tangential view (DTV) in a group of observers who both obtain and interpret their own DTV views.

Poster No. P0173
Development of Murine Model of Pyogenic Flexor Tenosynovitis

Bowen Qiu, MD
Justin M. Cobb
Alayna Loiselle, PhD
Constantinos Ketonis, MD, PhD, FAAOS

We show development of a murine model that replicates the infection as well as the sequelae of a pyogenic flexor tenosynovitis.

Poster No. P0174
Predicting Carpal Tunnel Release after Open Reduction Internal Fixation of Distal Radius Fractures

Alyssa Rothman, MD
Aneesh V. Samineni, BA
David Sing, MD
Joanne Y. Zhang, MD
Andrew B. Stein, MD, FAAOS

Rate of CTR at time of DRF ORIF is 4.2%; intra-articular fracture of multiple fragments is a risk factor for CTR at time of DRF ORIF, while being underweight, elderly, and male are protective factors.

Poster No. P0175
Cold Intolerance in Carpal Tunnel Syndrome: A Preliminary Report

Kaoru Tada, MD
Akari Sakaue, MD
Atsuro Murai, MD
Mika Nakada, MD
Masashi Matsuta
Hiroyuki Tsuchiya, MD

In many cases of carpal tunnel syndrome the patients were aware of the cold intolerance and cold intolerance improved over time after carpal tunnel release. The cold intolerance observed in carpal tunnel syndrome may be improved by carpal tunnel release.

Poster No. P0176
Anterior Interosseous Nerve to Ulnar Nerve Transfers: A Systematic Review

Asif M. Ilyas, MD, FAAOS
Melanie D. Luikart, BS
Justin Kistler, MD
Clay Townsend, BS

Both End-To-End and Supercharged Reverse End-To-Side AIN-ulnar nerve transfers produce significant restoration of ulnar nerve motor function for proximal or high ulnar nerve injuries.

Poster No. P0177
Yellow Flags: Defining Psychosocial Factors that Affect Functional Outcomes in Upper Extremity Patients

Maureen A. O'Shaughnessy, MD
Donald G. Pitts, OT
Cole D. Rinehart
Miles C. Thompson
Alec M. Otero
Logan D. Houston
Isaiah Jones
Tim L. Uhl, PhD, ATC

Prospective study of 285 patients found ‘yellow flag’ Pain Catastrophizing Scale significantly correlated with change in DASH score in a moderate size cohort of upper extremity patients treated in an outpatient therapy setting.

Poster No. P0178
Efficacy of a Second Corticosteroid Injection for Trigger Fingers: Analyzing the Likelihood of Success Based on Comorbid Conditions and Timing to Predict Failure

Christine D. Bub, MD
Shaya Shahsavarni
Andrew R. Bohm, PhD
Charles Ekstein, MD
Kate W. Nellans, MD, FAAOS
Lewis B. Lane, MD, FAAOS

Steroid injections for any trigger finger within 3 months increase the risk of failure almost two-and-a-half-fold.

Poster No. P0179
Recurrence Rates of Dorsal Wrist Ganglion Cysts following Arthroscopic vs. Open Surgical Excision: A Retrospective Comparison

Matthew W. Konigsberg, MD
Lian J. Tedesco, MD
John Mueller, MD
Jacob R. Ball, BS
Chia H. Wu, MD, MBA
R. K. Kadiyala, MD, PhD
Robert J. Strauch, MD, FAAOS
Melvin P. Rosenwasser, MD, FAAOS

Open excision of dorsal wrist ganglion cysts leads to lower recurrence rate when compared with arthroscopic excision.
Poster No. P0180
Prospective Evaluation of Open Dorsal Wrist Ganglion Excision in the Active Duty Military Population

Marvin Dingle, MD
Desraj Clark, MD
Sameer Saxena, MD
Theodora C. Dworak, MD
Kyle E. Nappo, MD
George C. Balazs, MD
George P. Nanos, MD, FAAOS
Scott M. Tintle, MD, FAAOS

Open excision of symptomatic dorsal wrist ganglion cysts in an active patient population may provide some functional benefit and significant subjective improvement.

Poster No. P0181
Intravenous Tranexamic Acid Decreases Transfusion Requirements and Does Not Increase Incidence of Thromboembolic Events in Sarcoma Surgery

Matthew C. Hess, MD
Nikhil P. Singh, BS
Brandon Crowley, BS
Herrick Siegel, MD, FAAOS

TXA decreases intraoperative blood loss and transfusion requirements without additional VTE risk in patients with primary bone and soft tissue sarcomas undergoing surgical resection.

Poster No. P0182
Locking Plate Augmentation of Polymethylmethacrylate-Filled Distal Femur Defects

Harrison R. Ferlauto, BS
Bruno Belanger, BSME
Alexander L. Lazarides, MD
Mark M. Cullen, BS
Julia D. Visgauss, MD
Brian E. Brigman, MD, PhD, FAAOS
Will Eward, DVM, MD

Contained medial distal femur defects filled with PMMA do not require the addition of a locking plate.

Poster No. P0183
Targeting Cholesterol Biosynthesis in Enchondroma and Chondrosarcoma

Benjamin Alman, MD, FAAOS
Jay Wunder, MD

This preclinical study investigates mice that develop enchondromas and human chondrosarcoma xenografts. It found that cholesterol blockade decreases chondrosarcoma and enchondroma tumor size.

Poster No. P0184
Adjunct Diagnostic Strategies in Improving Diagnostic Yields in Image-Guided Biopsies of Musculoskeletal Neoplasms – A Cost-Effectiveness Analysis

Dipak B. Ramkumar, MD
Sean Kelly, MD
Niveditta Ramkumar, MPH
Soterios Gyftopoulos, MD
Kevin A. Raskin, MD, FAAOS
Santiago A. Lozano Calderon, MD, PhD
Connie Y. Chang, MD

The use of adjunct frozen pathology is the most cost-effective strategy in improving the diagnostic yield of image guided biopsies for musculoskeletal neoplasms, and should considered for routine use.

Poster No. P0185
Predicting Pathologic Bone Lesions Using Scout Computed Tomography Imaging

Michael J. Colello, MD
Erin R. Pichiotino, MD
Stephanie L. Tanner, MS
Scott E. Porter, MD, MBA, FAAOS
Richard W. Gurich, MD

Scout CT images from routine oncologic surveillance should be reviewed for the identification of pathologic bone lesions which may help expedite early treatment to reduce patient morbidity.

Poster No. P0186
Clinical Outcomes and Prognosis of Patients Undergoing Unplanned Excisions of Malignant Soft Tissue Tumors

Sei Morinaga, MMED
Norio Yamamoto, MD
Katsuhiro Hayashi, MD
Akihiko Takeuchi, MD
Shinji Miwa, MD
Kentarou Igarashi, MD, PhD
Kaoru Tada, MD
Hirota Yonezawa, MMED
Yoshihiro Araki, MD
Yohei Asano, MD
Hiroyuki Tsuchiya, MD

Surgeons should be aware that positive margin at additional wide excision is an independent risk factor for local recurrence.

Poster No. P0187
Osteosarcoma Health Literacy: A Quantitative Assessment of Online Patient Education Material

Trevor Gulbrandsen, MD
Mary K. Skalitzky, BA
Alan G. Shamrock, MD
Burke Gao, MD
Obada H. Hasan, MBBS
Benjamin J. Miller, MD, MS, FAAOS

This is a quantitative evaluation of publicly-available online patient education materials related to osteosarcoma.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0188**
The Number of Osteoclasts in a Biopsy Specimen can Predict the Efficacy of Neoadjuvant Chemotherapy for Primary Osteosarcoma

Yoshihiro Araki, MD  
Norio Yamamoto, MD  
Katsuhiko Hayashi, MD  
Akihiko Takeuchi, MD  
Shinji Miwa, MD  
Kentarou Igarashi, MD, PhD  
Katsuki Higuchi  
Kensaku Abe, MD  
Hirotaka Yonezawa, MMED  
Sei Morinaga, MMED  
Yohei Asano, MD  
Hiroyuki Tsuchiya, MD  
Department of Orthopaedic Surgery Graduate School of Medical Science Kanazawa University

Our study indicates that chemosensitivity to osteosarcoma cells may be better when osteoclast differentiation is retained in the bone microenvironment around the osteosarcoma cells.

**Poster No. P0189**
Pioglitazone, an Agonist of Peroxisome Proliferator-Activated Receptor Gamma, Overcomes Doxorubicin-Resistance in an Osteosarcoma Patient-Derived Orthotopic Xenograft Nude Mouse Model by Modulating P-Glycoprotein

Takashi Higuchi  
Norio Yamamoto, MD  
Katsuhiko Hayashi, MD  
Hirotaki Kimura, MD, PhD  
Akihiko Takeuchi, MD  
Shinji Miwa, MD  
Kentarou Igarashi, MD, PhD  
Robert M. Hoffman, PhD  
Hiroyuki Tsuchiya, MD

This study demonstrated that pioglitazone, an agonist of PPARγ, could modulate P-gp and overcome DOX-resistance in osteosarcoma patient-derived orthotopic xenograft models.

**Poster No. P0190**
Combination Therapy of Mammalian Target of Rapamycin and Vascular Endothelial Growth Factor Receptor Inhibitors Regressed a Doxorubicin-Resistant Osteosarcoma in a Patient-Derived Orthotopic Xenograft Model and Inhibited Angiogenesis in an Angiogenesis Assay Mouse Model

Hiromichi Oshiro, MD  
Yasunori Tome, MD, PhD  
Yusuke Aoki, MD  
Robert M. Hoffman, PhD  
Kotaro Nishida, MD  
Matthew W. Colman, MD, FAAOS

The combination of mTOR-VEGFR showed anti-tumor effect in an osteosarcoma patient derived xenograft mouse model and anti-angiogenesis in angiogenesis assay mouse model using fluorescent imaging system.

**Poster No. P0191**
Natural Language Processing for Automated Quantification of Bone Metastases Reported in Free-Text Bone Scintigraphy Reports

Olivier Q. Groot, BS  
Michiel E. Bongers, MD  
Aditya V. Karhade, MD, MBA  
Neal Kapoor, MS  
Brian P. Fenn, BS  
Jason Kim, BS  
J.J. Verlaan, MD, PhD  
Joseph H. Schwab, MD, FAAOS

The clinical and research relevance of assessing using new artificial techniques like natural language processing (NLP) can propel daily practice and research of orthopaedic oncology.

**Poster No. P0192**
Indication for Proximal Femoral Replacement is Associated with Risk of Failure

Athan G. Zavras, BA  
Navya Dandu, BS  
Michael P. Fice, MD  
Brett R. Levine, MD, MS  
Steven Gitelis, MD, FAAOS  
Alan T. Blank, MD, MS  
Matthew W. Colman, MD, FAAOS

This study evaluated proximal femoral resections with indication of primary or metastatic tumor vs. THA failure and found that indication for PFR was an independent risk factor for failure.

**Poster No. P0193**
Survival in Pediatric, Adolescent, and Young Adult Patients with Sarcoma in the Military Health System: Comparison with the Surveillance, Epidemiology, and End Results Population

Ashley Anderson, MD  
Lauren M. Vasta, MD  
Richard Zanetti, MD, MPH  
Kangmin Zh, PhD  
Benjamin K. Potter, MD, FAAOS  
Amie Park  
Jie Lin, PhD  
Craig Shriver, MD  
Anne Warwick, MD, MPH

These results suggest that universal access to healthcare may improve survival outcomes in soft issue sarcomas in the pediatric and adolescent young adult population.
Poster No. P0194
Defining a Textbook Surgical Outcome for Patients Undergoing Surgical Resection of Intermediate and High-Grade Soft Tissue Sarcomas of the Extremities

Alexander L. Lazarides, MD
Marcelo Cerullo, MD, MPH
Dimitrios Moris, MD, MSc
Brian E. Brigman, MD, PhD, FAAOS
Dan Blazer, MD
Will Eward, DVM, MD

This study defined a TO in intermediate and high-grade STS-E and demonstrated that this outcome measure is associated with overall survival. Facility volume was not associated with a TO.

Poster No. P0195
Aggressive Vertebral Hemangiomas: Results of Surgical Management for Local Recurrence

Makoto Handa
Satoru Demura, MD
Satoshi Kato, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Ryohei Annen
Motoya Kobayashi, MD
Yohei Yamada, MD
Hiroyuki Tsuchiya, MD

The effect of debulking surgery is temporary for aggressive vertebral hemangiomas that develops extraosseous. It should be noted that definitive resection is necessary in the initial surgery.

Poster No. P0196
The Use of Biomarkers in Early Diagnosis of Septic Arthritis and Osteomyelitis

Michelle Mo, MD
Farshid Guilak, PhD
Alexis Elward, MD, MPH
Kimberly Quayle
Dominic M. Thompson, BS, MA
Kirsten Brouillet, BA
Scott J. Luhmann, MD, FAAOS

A novel panel of 6 biomarkers were identified that can differentiate between septic arthritis and osteomyelitis at initial presentation using serum alone.

Poster No. P0197
Opioid Medication Use in Pediatric Orthopaedic Surgery Patients: A Prospective Study

Michael Ewing, MD
Lauren N. Livesay
Emily Leary, PhD
Sumit Gupta, MD, FAAOS

Opioid prescription is common following pediatric orthopaedic surgery. This study seeks to quantify pediatric opioid use following orthopaedic surgeries and determine factors associate with opioid use.

Poster No. P0198
Postoperative Outcomes in Diabetic Pediatric Orthopaedic Surgery Patients: A Retrospective Cohort Review Using the NSQIP-Pediatric Database

Farzam Farahani, BS
Junho Ahn, MD
Paul Nakonezny, PhD
Dane K. Wukich, MD, FAAOS
Robert L. Wimberly, MD, FAAOS
Anthony I. Riccio, MD, FAAOS

Pediatric patients with diabetes mellitus may be at higher risk for non-routine readmissions and longer hospital stays compared to patients without DM undergoing orthopaedic procedures.

Poster No. P0199
Day-Case Pelvic Osteotomy for Developmental Dysplasia of the Hip: A Novel Approach

David M. Moore, BA
Gerard A. Sheridan, FRCS
David Moore, MD

Day-case pelvic osteotomies can significantly reduce the number of inpatient bed days in an elective pediatric orthopaedic setting.

Poster No. P0200
Standardized Order-Set Improves Variability in Opioid Discharge Prescribing Patterns after Closed Reduction Percutaneous Pinning of Supracondylar Humerus Fractures

Brett Goodloe, MD
Evan P. Bailey, BS
Lindsay Luce, MD
Corinne Corrigan
Matthew A. Dow, MD
Robert F. Murphy, MD, FAAOS

We conduct a single institution review of opioid prescribing which identified significant improvements in opioid prescribing following implementation of a standardized order set.

Poster No. P0201
Accessory Cuboid Facet Associated with Calcaneonavicular Coalitions

Daniel J. Scott, MD, MBA
Anthony I. Riccio, MD, FAAOS
Yassine Kanaan, MD
Jacob R. Zide, MD, FAAOS

In total, 75% of children with CN coalitions have an accessory cuboid facet vs. 5% of feet without a coalition. This facet comprises 40% of the cuboid articular surface which may have implications in resection.
Poster No. P0202
Prevalence of Trochlear Dysplasia and Associations with Patellofemoral Pathology
Clarabelle A. Devries, MD
James D. Bomar
Andrew T. Pennock, MD, FAAOS
The prevalence of trochlear dysplasia (TD) in the general population is approximately 6% with significant associations of TD not only with patellar instability but also with patellofemoral pain.

Poster No. P0203
Depression of the Medial Tibial Plateau in Infantile Blount Disease: Guided Growth Treatment Reverses Pathologic Bony Changes
Melinda Sharkey, MD, FAAOS
Regina Hanstein, PhD
Christopher Schneble, MD
Jacob F. Schulz, MD, FAAOS
Adrienne Socci, MD
Guided growth surgery for infantile Blount disease can improve MAD as well as improve or resolve even advanced pathologic bony changes at the proximal tibia in the majority of limbs.

Poster No. P0204
Does the Stabilization of the Calcaneocuboid Joint with a Steinman Pin in Evans Osteotomy Procedures Affect its Incidence of Arthritis?
Brett L. Heldt, BS
Isaiah G. Roepe, BS
Sayed Attia
Vinitha V. Shenava, MD, FAAOS
Jaclyn F. Hill, MD, FAAOS
Prolonged stabilization of the calcaneocuboid joint with a Steinman pin following Evan’s osteotomy is associated with calcaneocuboid arthritis.

Poster No. P0205
Rigid vs. Flexible Intramedullary Treatment for Tibia Fractures in Skeletally Immature Adolescents
Lindsay M. Crawford, MD, FAAOS
Norman H. Ward, MD
Shrina Parikh, MD, BS
Layla A. Haidar, MPH
Brennan P. Roper, MD
Alfred A. Mansour, MD, FAAOS
Shiraz A. Younas, MD, FAAOS
Timothy Borden, MD
Jessica L. Traver, MD
We studied 55 skeletally immature patients, flexible vs. rigid IMN for tibial shaft fractures, no difference in time to union or complications. Rigid IMN decreased time to weight-bearing but increased physeal arrest.

Poster No. P0206
Clinical and Radiographic Differentiation of Pediatric Patellar Sleeve Fractures and Other Inferior Pole Pathologies
Abbie Bennett, MS
Sai Devana, MD
Andromahi Trivellas
Nicholas J. Jackson, MPH, PhD
Jennifer Beck, MD, FAAOS
We reviewed differentiation of pediatric patellar sleeve fractures, inferior pole fractures, and Sinding-Larson-Johansson syndrome using clinical and radiographic features in order to improve diagnostic accuracy.

Poster No. P0207
Differential Diagnosis of Pediatric Lateral Elbow Pain with Ultrasound may Reduce Radiation Exposure
Chun-Ho Chen, MD
Shu-Hsin Yao, MMED
Ting Chien Tsai, MD
Cheng Ying Yen
Chih-Kai Hong, MD
Yu Meng Hsiao
Chang H. Ming, MD
With our ultrasound screening protocol, 62% children with lateral elbow pain may reduce radiation exposure.

Poster No. P0208
Tranexamic Acid Use Decreases Transfusion Rate in Children with Cerebral Palsy Undergoing Proximal Femoral Varus Derotation Osteotomy
Rachel Y. Goldstein, MD, MPH, FAAOS
Edward Compton, BS
Alexander Nazareth, MD
Stephen J. Shymon, MD
Lydia Andras
Robert M. Kay, MD, FAAOS
The use of intraoperative TXA in CP patients undergoing VDRO surgery lowers overall and postoperative transfusion rates.

Poster No. P0209
The Effect of Timing on Nerve Surgery Outcomes for Obstetric Brachial Plexus Palsy
Kevin T. Rezzadeh, BA
Megan R. Donnelly, BS
Karen J. Noh, BS
Themistocles S. Protopsaltis, MD, FAAOS
Andrew E. Price, MD, FAAOS
Jacques H. Hacquebord, MD, FAAOS
Postoperative elbow flexion outcomes after nerve surgery for obstetric brachial plexus injury are better when surgeries occur within the first 6 months of life.
Poster No. P0210
Hip Fracture as a Major Burden for Adults with Cerebral Palsy

Lucas Weiser
Mohammad Diab, MD
Ravinder K. Brar, MD

The most common reason adults with cerebral palsy require orthopaedic surgery is to repair hip fractures, which tend to occur 20-30 years earlier than in the general population.

Poster No. P0211
Anesthesia Choice Affects Length of Stay for Pediatric Acute Correction Patients

Nequesha Mohamed, MD
Ethan Remily, DO
Wayne A. Wilkie, DO
Scott Douglas, MD
Sahir Pervaiz, MD, MS
Oliver Sax, DO, MS
Nancy Campbell, DO
Philip K. McClure, MD, FAAOS
John E. Herzenberg, MD, FAAOS

This study assesses 1) demographics and 2) outcomes in pediatric patients who received general anesthesia, regional block, or epidural anesthesia for acute limb correction.

Poster No. P0212
Deformity Angular Ratio is Associated with Neuromonitoring Changes without a Vertebral Column Resection: Spinal Deformity is More Influential than Type of Surgery

Kenneth D. Illingworth, MD
Ali Siddiqui, MD
Lindsay M. Andras, MD, FAAOS
David L. Skaggs, MD, FAAOS

Patients with sagittal DAR > 7 or total DAR > 27 have a higher risk of IONM loss during pediatric PSF even in the absence of a VCR.

Poster No. P0213
Is there Value in Venous Thromboembolism Chemoprophylaxis after Pediatric Scoliosis Surgery? A 28-Year Single Center Study

R. Justin Mistovich, MD, MBA, FAAOS
Mehmet Erkilinc
Amelia Clarke, BA
Connie Poe-Kochert, NP
George H. Thompson, MD, FAAOS
Christina K. Hardesty, MD, FAAOS
Natasha O’Malley, FRCS (Ortho)

Over nearly 30 years of scoliosis surgery, we report a low incidence of VTE, indicating that routine chemoprophylaxis is not indicated.

Poster No. P0214
Complications of Posterior Spinal Fusion in Adolescent Idiopathic Scoliosis: A Retrospective Cohort Study Using the Modified Clavien-Dindo-Sink System

Lukas Keil, MD
Stephen M. Himmelberg, BS
Ndeye Guisse, BS
Alysa Nash, MD
Nicholas D. Fletcher, MD, FAAOS
Joseph D. Stone, MD

Half of patients experience a complication after PSF for AIS. While most require minimal treatment, this sets expectations and informs negotiations with insurers in the era of bundled payments.

Poster No. P0215
Outcomes of Abnormal Femoral Head Coverage on Infant Hip Ultrasound for Developmental Dysplasia of the Hip

Stephanie D. Goldstein, MD
Scott Hetzel, MS
Pamela Lang, MD

We examine clinical and radiographic outcomes for infants with DDH with abnormal femoral head coverage but normal alpha angles on hip ultrasound.

Poster No. P0216
Prevalence and Clinical Features of Bilateral Osteochondritis Dissecans of the Knee in Pediatric and Adolescent Patients Presenting with Unilateral Symptoms

Robert G. Tysklind, MD
Joseph L. Yellin, MD
Zaamin Hussain, MD, MEd
Evan Zheng, BA
Benton E. Heyworth, MD, FAAOS
Mininder S. Kocher, MD, MPH, FAAOS

In patients presenting with unilateral knee OCD symptoms, our study demonstrates a 15% prevalence of bilateral disease, supporting the recommendation for early bilateral knee radiographic evaluation.

Poster No. P0217
Sports-Related Concussions in High School Females: An Epidemiologic Analysis of Twenty-Year National Trends

Kevin Pirruccio, BA
Robert L. Parisien, MD
John D. Kelly, MD, FAAOS

We study the epidemiology of sports-related concussions and closed head injuries in high school females, both in organized and recreational sports.
Poster No. P0218
Functional Recovery after Revision Anterior Cruciate Ligament Reconstruction with a Second Autograft: A Matched Cohort Analysis in Adolescent Patients

Benjamin Wilson, MD
Benton E. Heyworth, MD, FAAOS
Ryan P. Coene, MS
Dai Sugimoto
Lyle J. Micheli, MD, FAAOS
Mininder S. Kocher, MD, MPH, FAAOS
Melissa A. Christino, MD, FAAOS

After revision ACLR with a second autograft from the same knee, adolescents show similar strength deficits compared to primary ACL patients with corresponding grafts.

Poster No. P0219
Predicting Autologous Hamstring Graft Diameter in the Pediatric Population using Preoperative Magnetic Resonance Imaging and Demographic Data

Matthew Partan, DO
Erik Stapleton, DO, MS
Aaron M. Atlas, BS, MS
Jon-Paul P. DiMauro, MD, FAAOS

Using our novel approach for graft prediction, surgeons can be equipped with supplemental data during operative planning and can thus be prepared for alterations in graft technique if necessary.

Poster No. P0220
Posterior Tibial Slope Angle is Increasing in Osgood-Schlatter Disease in Males, but Not in Females: A Case-Control Study with a New Proposed Mechanism

Hiroshi Watanabe, MD, PhD
Futoshi Ikuta, PhD, PT
Yasushi Oshima, MD, PhD
Norishige Iizawa, MD, PhD
Tokifumi Majima, MD, PhD

The increasing of PTSA and patella alta result in the repetitive shearing strain at the tibial tubercle. The increased PTSA in males with OSD could be the key to elucidate the male propensity for OSD.

Poster No. P0221
Trends in Anterolateral Ligament Reconstruction and Lateral Extra-Articular Tenodesis in Children and Adolescents

Neeraj M. Patel, MD, MPH
Scott D. McKay, MD, FAAOS
Nirav K. Pandya, MD, FAAOS
Theodore J. Ganley, MD, FAAOS

In this study of pediatric sports surgeons, 56% sometimes perform ALLR or LET with primary ACLR and 79% with revision ACLR.

Poster No. P0222
Preoperative Predictors for Open Reduction of Displaced Supracondylar Humerus Fractures

Luke D. Latario, MD
Marc G. Lubitz, MD
Ankur S. Narain, MD
Errol S. Mortimer, MD, FAAOS

Retrospective chart review of displaced pediatric supracondylar humerus fractures showing preoperative coronal plane displacement, flexion-type, and open fracture are predictive of open reduction.

Poster No. P0223
Utility of Serum Biomarkers in Monitoring Response to Treatment for Pediatric Osteoarticular Infections

Nicholas Gajewski, MD
Vivian Hu, BS
Dennis Ruenger, PhD
Sierra M. Pinal, BA
Paul Krogstad, MD
Annabelle De St. Maurice, MD, MPH
Mauricio Silva, MD, FAAOS
Rachel Thompson, MD

The purpose of this study is to define initial lab values and typical responses to medical and surgical management associated with pediatric osteomyelitis, septic arthritis, and combined infections.

Poster No. P0224
Incidence of Open Reduction in Supracondylar Fractures in Children across a Pediatric Hospital System

Brett L. Heldt, BS
Sayed Attia
Tristen N. Taylor, BS
Dallas A. Vanorny, MD, PhD
Brian G. Smith, MD, FAAOS
Vinitha V. Shenava, MD, FAAOS

In light of the new survey question in US News and World Report, supracondylar fractures were checked for complication rates in open versus closed reductions, and opening rates were compared.

Poster No. P0225
Factors Associated with Operative Time in Surgically Treated Supracondylar Fractures

Joseph X. Robin, MD
Siddharth A. Mahure, MD
Charles C. Lin, MD
Noah Kirschner, MD
Pablo Castaneda, MD

For pediatric supracondylar fractures treated with surgical techniques, operation time is associated with age, reoperation rate, readmission rate, total LOS, long LOS, and complication rate.
Poster No. P0226
Access to Care: Do Orthopaedic Surgeons Accommodate Self-Pay Patients?

Michael T. Havig, MD, FAAOS
John Slusar, MBA
Christopher M. Havig

Orthopaedic groups are unprepared for transparent pricing initiatives. To serve the growing number of self-pay patients, orthopaedic groups need to adopt comprehensive transparent pricing strategies.

Poster No. P0227
Perceptions of Belonging and Social Fit in Adult Reconstruction: A Survey of Orthopaedic Surgery Residents

Elizabeth Lieberman, MD
Antonia F. Chen, MD, MBA, FAAOS
Anna Cohen-Rosenblum, MD
Katherine M. Gerull, BA
Cara A. Cipriano, MD, FAAOS

Women and men orthopaedic surgery residents report similar rates of interest in adult reconstruction. However, women may worry about belonging and have lower confidence levels compared to men.

Poster No. P0228
Women in Orthopaedics: How has the Residency Landscape Changed from 2016-2020?

Lauren V. Ready, MPH
Neill Li, MD

Despite women representing more than half of all US medical students, they are still underrepresented in orthopaedics. Here we examine residency programs to better understand the ongoing disparity.

Poster No. P0229
The Critical Importance of the He for She Movement in Orthopaedic Surgery

Caroline J. Granger, BS
Sheila A. Conway, MD, FAAOS

Female students are less likely than males to approach physicians for mentorship and are less likely to receive mentorship in orthopaedic surgery. Mentorship is critical to increase female retention.

Poster No. P0230
Where are All of the Black Applicants? A Cross-Sectional Ranking of Medical School Applicant Diversity Based on the J. Robert Gladden Orthopaedic Society Database

Tyler B. Nsekpong, BS
Erica Taylor, MD, FAAOS
Bonnie Simpson Mason, MD, FAAOS
William A. Ross, MD, FAAOS
Letitia Bradford, MD, FAAOS
Tino Mkorombindo, BS
Alysia Robertson, MD
Eric W. Carson, MD, FAAOS
Jaysson T. Brooks, MD

This is the first study in the literature that identifies and ranks medical schools that have created a pipeline of black applicants who have successfully matched into orthopaedic residency programs.

Poster No. P0231
Where are All the Women? An Honor Roll of Orthopaedic Surgery Residency Programs Ranked by Gender

Ruhi Randhawa, BS, RN
Matthew P. Pinto, BS
Gabriella Ode, MD
Selina Poon, MD, FAAOS
Kanu M. Okike, MD, MPH, FAAOS
Kristinn K. Leitch, FRCSC, FRCSC
Erica Taylor, MD, FAAOS
Dawn LaPorte, MD, FAAOS
Jaysson T. Brooks, MD

The purpose of this study was to create a ranking of the resident and faculty gender diversity in orthopaedic surgery residency programs for the 2018-2019 and 2019-2020 academic years.

Poster No. P0232
Gender and Ethnic Diversity in Orthopaedic Residency in Comparison to Other Surgical Specialties

Max R. Haffner, MD
Joseph B. Wick, MD
Hai Le, MD

This study showed the representation of female and underrepresented minority residents in surgical training programs over the past decade have remained disproportionately low.

Poster No. P0233
Can Virtual Reality Enhance Orthopaedic Training in Total Joint Arthroplasty?

Antonia F. Chen, MD, MBA, FAAOS
Bonnie Chien, MD
Brielle Antonelli, BS
Nathan H. Varady, BS
Pierre-Emmanuel Schwab, MD
Ayesh A. Abdeen, MD, FAAOS

VR simulation can provide detailed feedback for learning and improving performance on TKA and THA by identifying performance trends based on training level. VR can be a valuable educational resource.
A Comparative Study of Outcomes and Pain following Shoulder Surgery Using an Avatar-Based Physical Therapy Monitoring System

Yousef Shishani, MD
Reuben Gobezie, MD, FAAOS
Stacy Jones
Laurence D. Higgins, MD, FAAOS

PTGenie is an avatar-based physical therapy application that helps patients perform home-based exercises properly. Alpha testing data shows increased compliance and decrease in postop pain levels.

Digitizing a Virtual Fracture Clinic Leads to Improved Referral Quality, Faster Assessment, Faster Surgery, and Reduced Unnecessary Appointments

Benjamin Septon, MBCHB
Hannah L. Morley, BS, MBCHB
Piyush Mahapatra, MA, MBBS
Michael Shenouda
Mustafa Al-Yaseen, MBCHB, MRCS
Darryl E. Bernstein, MA, MBBS
George W. Cross, MBBS, MRCS
Daniel Dalili, BS, MBBS
Amrit Gurung, MBBS
Atul A. Kamat, MBBS
Andrew J. Kuc, MBBS
Aisha Rabiu Mohammed, MBBS
Mehreen Paraouty, MBBS
Amsanaa Ponniah, MBBS
Ben Sluckis, MBBS
Krisztian Deierl, FRCS (Ortho)
West Hertfordshire Orthopaedic Research Collaborative

Digitizing a virtual fracture clinic leads to improved referral quality, faster assessment, faster surgery, and reduced unnecessary appointments.

Prevalence of COVID-19 in Asymptomatic Patients Undergoing Orthopaedic Surgery

Michael Gutman, BA
Manan S. Patel, BA
Mark D. Lazarus, MD, FAAOS
Javad Parvizi, MD, FAAOS
Alexander Vaccaro, MD, MBA, PhD, FAAOS
Surena Namdari, MD, MSc, FAAOS

With proper screening of patients, it appears that elective orthopaedic surgery can be safely performed without a substantial risk of disease transmission.

Health Disparities in Utilization of Orthopaedic Care via Telemedicine

Grace Xiong, MD
Natalya Greene, MD
Harry M. Lightsey, MD
Alexander M. Crawford, MD
Brendan Striano, MD
Andrew K. Simpson, MD, MBA
Andrew J. Schoenfeld, MD, FAAOS

We studied new orthopaedic patients seen as an initial telehealth visit for racial disparities when compared with visits conducted in-person.

Digitizing a Virtual Fracture Clinic Leads to Improved Referral Quality, Faster Assessment, Faster Surgery, and Reduced Unnecessary Appointments

Digitizing a virtual fracture clinic leads to improved referral quality, faster assessment, faster surgery, and reduced unnecessary appointments.

Prevalence of COVID-19 in Asymptomatic Patients Undergoing Orthopaedic Surgery

With proper screening of patients, it appears that elective orthopaedic surgery can be safely performed without a substantial risk of disease transmission.

Evidential Effectiveness of the American Society of Anesthesiologists, Charlson, and Elixhauser Scores in Predicting 1-Year Mortality after Orthopaedic Surgery

Nathan Varady, BS
Stephen Gillinov, BA
Caleb Yeung, MD
Antonia F. Chen, MD, MBA, FAAOS

The Charlson and Elixhauser Comorbidity Indices significantly outperform the American Society of Anesthesiologists Score at predicting 1-year mortality after operative treatment of hip fractures.

Efficacy of Surgical Irrigation Solutions against Biofilm: An In Vitro Investigation

Jeongeun Cho, BA
Karan Goswami, MD
Kamolsak Sukhonthamarn, MD
Javad Parvizi, MD, FAAOS
William V. Arnold, MD, FAAOS

A study evaluating the efficacy of various irrigation solutions in eradicating established biofilm in a validated in vitro model.
Elevated Hemoglobin A1c is Associated with Increased Risk of Surgical Site Infection after Elective Hand Surgery
Thompson Zhuang, BA
Lauren M. Shapiro, MD
Nathaniel Fogel, MD
Marc J. Richard, MD, FAAS
Michael J. Gardner, MD, FAAS
Robin N. Kamal, MD, FAAS

Elevated hemoglobin A1c predicts an increased risk for surgical site infection after elective hand surgery. Diabetic patients with elevated HbA1c may benefit from preoperative glycemic interventions.

High Effectiveness and Patient Satisfaction of a Nationwide, Standardized Education and Exercise-Based Hip and Knee Osteoarthritis Treatment Program
Michael G. Zywiel, MD
Antonietta Fazio
Rhona McGlasson, MBA, PT
Kala Sundararajan, MSc
Aileen M. Davis, PhD
Christian Veillette, MD

An evidence-based, standardized national education and exercise program for hip and knee OA demonstrated high patient participation and satisfaction rates, and clinically meaningful patient outcomes.

Opioid Prescriptions after Orthopaedic Surgery are Associated with Opioid Initiation by Opioid-Naive Family Members
Nathan Varady, BS
Antonia F. Chen, MD, MBA, FAAS
Ruijia Niu, MPH
Mei Chung, MPH, PhD
David M. Freccero, MD, FAAS
Eric L. Smith, MD, FAAS

In this study of 140,517 patients undergoing orthopaedic surgery, receipt of surgical opioids was associated with increased risk of the patients’ spouses initiating opioids postoperatively.

Opioid Prescribing Patterns in an Academic Orthopaedic Setting
Tristan Weir, MD
Joshua M. Abzug, MD, FAAS
Francia Y. Fang, BS
Casey M. Codd, BA

A review of academic orthopaedics found that attendings prescribe the greatest MMEs to patients despite only writing 1.2% of all opioid prescriptions, compared to residents/fellows, NPs, and PAs.

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* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off-label use). For full information refer to page 17.
Poster No. P0250
How We Increased Surgical Volume by 11% and Saved $3 Million Annually at a Major Academic Institution

Cody Wyles, MD
Hugh M. Smith, MD, PhD
Adam Amundson, MD
Christopher Duncan, MD
Adam D. Niesen, MD
Michael J. Taunton, MD, FAAOS
Kevin I. Perry, MD, FAAOS
Tad M. Mabry, MD, FAAOS
Matthew P. Abdel, MD, FAAOS

Application of perioperative surgical home tools led to decreased length of stay and discharge to SNFs, with increased patient satisfaction, same day PT, surgical volume, and revenue per surgeon.

Poster No. P0251
Avoiding Avoidable Days: A Review of Preventable Cost in the Healthcare System

Jason R. Coffman, MD
Zbigniew Gugala, MD
Ronald W. Lindsey, MD, FAAOS

A review of all inpatient admissions at a single institution revealed 7,875 potentially avoidable days over the course of fourteen months resulting in $19 million of preventable healthcare costs.

Poster No. P0252
Should Post-Call Surgeons Operate the Next Day?

Eliza C. Anderson, MD
David Sing, MD
Kasey Bramlett, PA-C
Andrew J. Marcantonio, DO, FAAOS
Joshua L. Gary, MD, FAAOS
Scott P. Ryan, MD, FAAOS
Andrew D. Hagar, MD
Aleksey Dvorzhinskiy, MD
William M. Ricci, MD, FAAOS
Dylan Fischer, MD
Brian Mullis, MD, FAAOS
Rashed S. Alqudhaya, MD
Ross K. Leighton, MD
Joanne Fraifogl, BS
Heather A. Vallier, MD, FAAOS
Paul Tornetta III, MD, FAAOS
Guillermo R. Pechero
Orthopaedic Trauma Research Consortium

Our purpose was to evaluate surgeons’ ability to perform a standard operation after being on call.

Poster No. P0253
Musculoskeletal Injuries and Conditions in the Orthopaedic Surgeon: A Survey

Katherine Swank, MD
Jamie Fumess, MD
Erin A. Baker, PhD
Corinn Gehrke, MS
Rachel S. Rohde, MD, FAAOS

Musculoskeletal conditions are common in orthopaedic surgeons and may lead to morbidity and missed work.

Poster No. P0254
The Planning Fallacy: Applicability to the Orthopaedic Operating Room and Surgeon Estimated Operative Times

Fortunato G. Padua, MD
Daniel J. Fletcher, MD, FAAOS
Arjun Saxena, MD, MBA, FAAOS
Daren J. Aita, MD, FAAOS
Brian M. Katt, MD, FAAOS
Joshua S. Hornstein, MD, FAAOS

We assessed orthopaedic surgeons’ ability to accurately plan their operative day and average time required for room turnover, identifying addressable targets for improving operating room efficiency.

Poster No. P0255
Surgical Site Infection Rate: Institution Reported vs. Documented in the Electronic Medical Record

Micheala McCarthy, MD
Deborah C. Bohn, MD, FAAOS

Published rates of surgical site infection (SSI) are inaccurate due to inconsistent methods for determining and reporting rates of SSI.

Poster No. P0256
Orthopaedic Surgery I-PASS Intervention Leads to Sustained Improvement in Quality of Patient Handoffs

Derek S. Stenquist, MD
Caleb Yeung, MD
Laura Rossi, PhD, RN
Antonia F. Chen, MD, MBA, FAAOS
Mitchel B. Harris, MD, FAAOS

This handoff improvement intervention produced long-term results and has the potential to prevent adverse events and reduce medical errors. It is the first example of I-PASS for Orthopaedic Surgery.
Poster No. P0257
COVID-19: Redeployment and Infectivity among Orthopaedic Providers in New York City

Michael J. Sayegh
Cesar R. Iturriaga, DO
Sariah R. Persaud, CCRP
Peter Olivares, BS
Nicholas A. Sgaglione, MD, FAAOS
Jessica Intravia, MD

Redeployment of orthopaedic providers in our large department in the New York City area during the COVID-19 pandemic did not increase infection rates due to proper use of personal protective equipment.

Poster No. P0258
The Effect of Operating Room Size on Orthopaedic Surgical Site Infection Rates

Tyler Tantillo, DO
Erik Stapleton, DO
Nicholas Frane, DO
Brandon Petrone, DO
Prashant Matali, MBBS
Mary Ellen Schilling, RN
Donna Armellino, DNP, RN
Larry Lutsky, PhD
Gus Katsiggiorgis, DO
Adam Bitterman, DO, FAAOS
Plainview Hospital Orthopedic Surgery

OR size plays a role in the development of surgical site infections (SSI) among orthopaedic surgical procedures. The incidence of SSI also depends on various other perioperative parameters.

Poster No. P0259
Is Expired Air Carbon Monoxide Testing Effective for Preoperative Screening of Cigarette Use in Orthopaedic Patients?

Kenneth R. Gundle, MD, FAAOS
Sean Sterrenberg, MD
David Gallacher, BS
John P. Tabb, BS
Lucas Anissian, MD, PhD
Ryan Wallenberg, MD

Exhaled CO testing can differentiate active smoking from NRT use with a high level of specificity, reliability, and almost perfect agreement when compared to serum cotinine testing for cigarette use.

Poster No. P0260
Diabetics Hidden in Plain Sight: Utility of Preoperative Hemoglobin A1c Testing in Elective Orthopaedic Surgery

Brent Sanderson, DO
Joseph Mueller, DO
Alexander Friedman, DO
Ammer Dbeis, DO
Frederick J. Menninger, MD, FAAOS
Dennis Horvath, DO
Stephan J. Sweet, MD, MPH, FAAOS

There is a high prevalence of undiagnosed diabetes and dysglycemia among elective orthopaedic surgery patients. Preoperative hemoglobin A1c can aid in early diagnosis and surgical optimization.

Poster No. P0261
The Association between Orthopaedic Surgeon Characteristics and Medicare Patient Complexity

Michael L. Moore, BS
Gurpaul Sidhu, BS
Jordan R. Pollock, BS
Justin Makovicka, MD
Jeffrey Hassebrock, MD
Joshua Bingham, MD

Physician characteristics such as female gender, early career, urban location, large group practice sizes, and Midwest/South locations are associated with significantly higher patient complexity.

Poster No. P0262
Outpatient Total Shoulder Arthroplasty: A Systematic Review

Tyler E. Calkins, MD
Zachary A. Mosher, MD
Tyler J. Brolin, MD, FAAOS
Thomas W. Throckmorton, MD, FAAOS

Outpatient TSA appears to be a safe and economical alternative to the inpatient setting. Appropriate patient selection can lead to less than 1.5% of patients requiring an unplanned overnight stay.

Poster No. P0263
Enhanced Recovery after Surgery for Total Joint Arthroplasty: An Institutional Database Study

James Satalich, MD
Prayag Pershad, BS
Pranav R. Shah
Laura Lahaye, MD
Gregory Golladay, MD, FAAOS
Nirav K. Patel, MD, FRCS

Following a total hip and knee arthroplasty, when compared to traditional pathways, patients using the ERAS pathway had lower rates of postoperative acute kidney injury and shorter length of stay.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off-label use). For full information refer to page 17.
Poster No. P0264
Radiologist Overreads of Intraoperative Radiographs: Value or Waste?
Matthew Braswell, MD
Keith Fehring, MD
Jeffrey J. Barry, MD
Shaun P. Patel, MD
John R. Martin, MD
Brian M. Curtin, MD, FAAOS
Thomas K. Fehring, MD, FAAOS
Radiologists’ interpretations of intraoperative x-rays are highly costly to the healthcare system and have no effect on patient care.

Poster No. P0265
A Case Complexity Modifier is Warranted for Primary Total Knee Arthroplasty
Sean P. Ryan, MD
Christine J. Wu, BS
Johannes F. Plate, MD, PhD
Michael P. Bolognesi, MD, FAAOS
William A. Jiranek, MD, FAAOS
Thorsten M. Seyler, MD, PhD, FAAOS
Complex primary TKA may be identifiable preoperatively, and warrant reimbursement modifiers to prevent patient selection bias.

Poster No. P0266
Deltoid Fatigue: A Longitudinal Comparison of Anatomic and Reverse Shoulder Arthroplasty Over Time
Bradley S. Schoch, MD
Marie Vigan
Ira M. Parsons, MD, FAAOS
Thomas W. Wright, MD, FAAOS
Joseph J. King, MD, FAAOS
Jean-David Werthel, MD
Loss of motion following TSA was statistically similar to RSA over time, further calling in to question the theory that RSA induced deltid fatigue leads to non-physiologic loss of motion.

Poster No. P0267
Institutional Reductions in Opioid Prescribing Do Not Change Patient Satisfaction on Press-Ganey Surveys after Total Shoulder Arthroplasty
David A. Bloom, BA
Amit K. Manjunath, BS
Matthew Gotlin, MD
Eoghan Hurley, MBCHB
Laith M. Jazrawi, MD, FAAOS
Mandeep Virk, MD, FAAOS
Young W. Kwon, MD, PhD, FAAOS
Joseph D. Zuckerman, MD, FAAOS
The most important finding of this study was that despite substantial reductions in opioid prescription after total shoulder arthroplasty, there was no change in patient satisfaction.

Poster No. P0268
An 80mL Dilution of Liposomal Bupivacaine Offers Superior Pain Control and Lower Opioid Consumption following Shoulder Arthroplasty
Vani J. Sabesan, MD, FAAOS
Kiran Chatha, MD
Ravi Rudraraju, MD
Andres Guerrero, ATC
Christian A. Martinez, BS
Shimron M. Brown, BA
Shawn Hall, ATC
Gregory J. Gilot, MD, FAAOS
If orthopaedic surgeons consider using liposomal bupivacaine to optimize postoperative pain control after shoulder surgery then optimal dilution recommended would be 80 ml based on our results.

Poster No. P0269
What are the Significant Drivers of Cost and Readmission in Outpatient vs. Inpatient Total Shoulder Arthroplasty?
Andrew Carbone, MD
Alexander J. Vervaecke, MD
Ivan Ye
Nicole Zubizarreta, MPH
Jashvant Poeran, MD, PhD
Leesa M. Galatz, MD, FAAOS
Paul J. Cagle, MD, FAAOS
Outpatient TSA/rTSA lowered total 6 month cost in all groups studied; however, when performed in smokers, diabetics, and patients >80, it resulted in increased readmission rates vs. inpatient.

Poster No. P0270
Anatomic Short-Stem Humeral Component in Total Shoulder Arthroplasty: A Retrospective Analysis
Anthony A. Romeo, MD, FAAOS
Christopher J. Hadley, BS
Michael Gutman, BA
Meghan E. Bishop, MD
Surena Namdari, MD, MSc, FAAOS
Brandon Erickson, MD
The use of a short stem in TSA demonstrated no difference in ROM, radiographic outcomes, and ASES, SANE, and SST scores compared to the traditional stem.
Iron Deficiency Anemia is Associated with Increased Medical and Implant-Related Complications, Length of Stay, and Costs for Patients Undergoing Total Shoulder Arthroplasty

Teja S. Polisetty, BS
Rushabh Vakharia, MD
Andrew Ardeljan, BS
Gagan Grewal, MD, MS
Ajit Vakharia, MD
Jonathan C. Levy, MD, FAAOS

Patients with iron-deficiency anemia undergoing primary TSA have significantly longer hospital LOS, medical and implant-related complications (blood transfusions, joint infections), and costs of care.

Inclination Correction is Associated with Improved Clinical Outcomes in Anatomic Total Shoulder Arthroplasty

Justin W. Griffin, MD, FAAOS
Anthony A. Romeo, MD, FAAOS
Evan S. Lederman, MD, FAAOS
Reuben Gobezie, MD, FAAOS
Patrick J. Denard, MD, FAAOS
Brian C. Werner, MD, FAAOS

Preoperative inclination over 10 degrees does not appear to significantly influence postoperative outcome when appropriately corrected.

Temporal and Geographic Trends in Medicare Reimbursement of Primary and Revision Shoulder Arthroplasty: 2000 to 2020

Jack Haglin, BS
Edward Testa, MD
Michael L. Moore, BS
Neill Li, MD
Joseph A. Gil, MD
Alan H. Daniels, MD, FAAOS
E. Scott Paxton, MD, FAAOS

Medicare reimbursement for shoulder arthroplasty procedures has decreased from 2000 to 2020, with revision procedures experiencing the greatest decrease in reimbursement.

Does Computerized CT-Based 3D Planning of the Humeral Head Cut Help to Restore the Anatomy of the Proximal Humerus after Stemless Total Shoulder Arthroplasty?

Florian Grubhofer
Lukas Ernstbrunner, MD
Mark D. Price, MD, FAAOS
Andres R. Muniz-Martinez, MD
Jon J. Warner, MD, FAAOS

Preoperative CT-based 3D planning without intraoperative guidance does not improve the restoration of the proximal humeral anatomy.

Inferior Glenoid Inclination is Associated with Early Glenoid Component Osteolysis after Primary Anatomic Total Shoulder Arthroplasty for Glenohumeral Osteoarthritis

Vahid Entezari, MD
Lauren E. Grobaty, BA
Michael H. Amin, MD, FAAOS
Jason Ho, MD
Yuxuan Jin
Bong-Jae Jun, PhD
Peter B. Imrey, PhD
Joseph P. Iannotti, MD, PhD, FAAOS
Eric T. Ricchetti, MD, FAAOS

Preoperative inferior glenoid inclination was an independent predictor of the center peg osteolysis 12-24 month following primary anatomic total shoulder arthroplasty for glenohumeral arthritis.

Current Comparative Use of Anatomic and Reverse Arthroplasty in the United States According to the American Academy of Orthopaedic Surgeons Shoulder and Elbow Registry

Joaquin Sanchez-Sotelo, MD, FAAOS
Grant E. Garrigues, MD, FAAOS
Stephen C. Weber, MD, FAAOS
Patrick St Pierre, MD, FAAOS
Stephen F. Brockmeier, MD, FAAOS
Ronald A. Navarro, MD, FAAOS
John E. Kuhn, MD, FAAOS
Gerald R. Williams, MD, FAAOS

The purpose of this study was to analyze TSA and RSA procedures reported to the AAOS Shoulder and Elbow Registry (SER) over the last five years.

Early Radiographic Changes and Stress Shielding after Total Shoulder Arthroplasty Utilizing Various Stem Designs

Ryan M. Cox, MD
Arjun Singh, BS
Joseph A. Abboud, MD, FAAOS
Mark D. Lazarus, MD, FAAOS
Matthew L. Ramsey, MD, FAAOS
Gerald R. Williams, MD, FAAOS
John G. Horneff, MD, FAAOS

This study examines early radiographic findings of stemless anatomic shoulder arthroplasty compared to short and standard length stem implants. No significant difference in stress shielding is noted.
Type II Diabetes and Functional Recovery after Total Shoulder Arthroplasty: A Matched Cohort Analysis

Gregory P. Nicholson, MD, FAAOS
Jourdan M. Cancienne, MD
Kassandra N. Blanchard, MA
Amanda J. Naylor, MA
Anthony A. Romeo, MD, FAAOS
Grant E. Garrigues, MD, FAAOS

In RTSA, DM patients were found to have similar final ranges of motion (ROM) compared to non-DM patients, while in TSA, non-DM patients were found to have greater final ROM compared to DM patients.

Relative Value Units May Not Account for the Increased Operative Duration and Complications associated with Revision Total Shoulder Arthroplasty

Justin Makovicka, MD
Matthew K. Doan, BS
Jeffrey Hassebrock, MD
Michael L. Moore, BS
Karan Patel, MD

This is an analysis of the reimbursement rates for primary vs. revision total shoulder arthroplasty based on relative value units.

Exploring Alternative Sites for Glenoid Component Fixation through Three-Dimensional Digitization of the Glenoid Vault: An Anatomic Analysis

Philip Ghobrial, BS
Rahul Burra
Douglas A. Evans, MD, FAAOS
Steven C. Chudik, MD, FAAOS

This study’s computer-aided design and analysis of glenoid anatomy provides insights that further our understanding of glenoid morphology and create a foundation for innovation in prosthesis design.

Critical Shoulder Angle is Correlated to Failure of Anatomic Total Shoulder Arthroplasty

Eloy T. Alvarez, MD
Priscilla H. Chan, MS
Heather A. Prentice, PhD
Bill E. Burfeind, MS
Mark T. Dillon, MD, FAAOS
Karimdad A. Otarodifard, MD
Anshuman Singh, MD, FAAOS

Individuals who were revised for aseptic glenoid loosening and superior cuff failure had a higher CSA compared to non-revised controls.

Rapid Improvers and Resistant Responders after Shoulder Arthroplasty: Analysis of Patient Recovery Trajectories using Latent Class Growth Modeling

William Rubenstein, MD
Mya Sandi Aung, BA
Alan Zhang, MD, FAAOS
Brian T. Feeley, MD, FAAOS
ChunBong B. Ma, MD, FAAOS
Drew Lansdown, MD, FAAOS

Patients recover in a heterogeneous manner following total shoulder arthroplasty. Through latent class growth analysis we identified four specific recovery trajectory patterns.

Glenoid Retroversion Associates with Deltoid Muscle Asymmetry in Walch B-Type Glenohumeral Osteoarthritis

Dillon C. O’Neill, MD
Garrett V. Christensen, BS
Bradley S. Hillyard, BA
Jun Kawakami, PhD
Robert Z. Tashjian, MD, FAAOS
Peter N. Chalmers, MD, FAAOS

CT analysis demonstrated no difference in anterior and posterior deltoid area between control and GHOA shoulders. Retroversion associated with normalized posterior deltoid area in Walch B-type GHOA.

Analysis of B2 Glenoid Erosion Pattern in Primary Osteoarthritis

Michael S. Khazzam, MD, FAAOS
Jean Chaoui, MBA, MSc
Manuel Urvoy, MSc
Gilles Walch, MD

We found the direction and orientation of bone erosion to be more commonly posterosuperior in B2 glenoids.

Rapid Destructive Arthrosis Due to Subchondral Insufficiency Fracture of the Shoulder: Clinical Characteristics, Radiographic Appearances, Treatments, and Outcomes

Chul-Hyun Cho, MD, PhD
Byung-Woo Min, MD
Ki-Cheor Bae, MD
Kyung-Jae Lee, MD
Si Wook Lee, MD
Beom-Soo Kim, MD
Du Han Kim, PhD

RDA due to SIF of the shoulder, presenting with short-term severe pain and functional disability, commonly occurred in elderly women with bone fragility. MRI revealed bone marrow edema, extensive joint effusion, and synovitis as well as a diversity of types of head destruction with subchondral fracture. The results presented here indicate that SIF should be included in the differential diagnosis of acute onset shoulder pain in elderly patients.
Is Medicare Reimbursement Declining for Degenerative and Traumatic Shoulder Pathology?

*Suresh K. Nayar, MD*
Randall T. Kreulen, MD
Keith Aziz, MD
Matthew J. Best, MD
Neal C. Chen, MD, FAAOS
Umasuthan Srikumaran, MD, MBA, FAAOS

This paper investigates temporal trends in reimbursement for shoulder reconstruction and open reduction internal fixation for traumatic and degenerative shoulder pathology.

Minimum Two-Year Outcomes of Reverse Total Shoulder Arthroplasty for Fracture: How Does Acute Arthroplasty Compare to Salvage?

*Peter J. Ostergaard, MD*
Matthew Hall, MD
Monica Shoji, MD
Dafang Zhang, MD
Brandon E. Earp, MD, FAAOS

Patients who undergo initial periods of nonsurgical management have worse functional outcomes and higher complication rates than those who undergo acute rTSA for proximal humerus fractures.

Proximal Humerus Fractures Treated with Primary Reverse Shoulder Arthroplasty (RSA) Have Better Outcomes than Hemiarthroplasty and Subsequent Revision RSA

*Mihir M. Sheth, MD*
Brett L. Heldt, BS
Mitzi S. Laughlin, PhD, ATC
Brent J. Morris, MD, FAAOS
Hussein A. Elkousy, MD, FAAOS
Thomas B. Edwards, MD, FAAOS

The purpose of this study is to compare the outcomes of primary RSA for PHF to revision RSA after HA for PHF.

The Conversion Rate of Proximal Humerus Fractures to Shoulder Arthroplasty

*Sarah Bhattacharjee*
Henry Seidel, BS
Sean C. Pirkle, BA
Lewis L. Shi, MD, FAAOS
Michael J. Lee, MD, FAAOS
Jason Strelzow, MD, FAAOS

The overall long-term rate of conversion to shoulder arthroplasty in patients with proximal humeral fractures is relatively low, even when stratified by initial nonsurgical and operative management.

Does Open Reduction and Internal Fixation of Multifragmentary Fractures of the Radial Head Lead to Poor Outcomes?

*Phillip McKegg, MS*
Genaro Deleon, MS
Nathan N. O’Hara, MHA
Zachary D. Hannan, BS
Qasim Ghulam, MS
Raymond A. Pensy, MD, FAAOS
Robert V. O’Toole, MD, FAAOS
Christopher Langhammer, MD
Lucas S. Marchand, MD
Gerard Slobogean, MD, MPH, FAAOS
W. Andrew Eglseder, MD, FAAOS

University of Maryland Department of Orthopaedics

Does ORIF of multifragmentary fracture of the radial head lead to poor outcomes? A retrospective cohort study of 300 patients.

Posteriorly Displaced Radial Head Fractures May Represent the Footprint of an Elbow Dislocation or Subluxation

*Monica Shoji, MD*
Magdalena Hartwich, MD
Alberto A. Fernandez
Jesse B. Jupiter, MD, FAAOS

Recognition of a posteriorly displaced radial head fracture is essential, as it may be an indirect sign of elbow instability. This instability should be addressed during surgical intervention.

Outcomes of Radial Head Replacement for Comminuted Radial Head Fractures: An Analysis of 405 Cases

*Raffy Mirzayan, MD, FAAOS*
Nikko Lowe, BS, MS
Bryan Lin, MS
Daniel C. Acevedo, MD, FAAOS
Anshuman Singh, MD, FAAOS

We present the outcomes of the largest series of radial head arthroplasty for comminuted radial head fractures within an integrated healthcare delivery system.

Comparing Complications between Anatomic and Reverse Total Shoulder Arthroplasty

*Richard J. Friedman, MD, FAAOS*
Stephen A. Parada, MD, FAAOS
Joseph D. Zuckerman, MD, FAAOS
Thomas W. Wright, MD, FAAOS
Pierre-Henri Flurin, MD
Christopher Roche, MS, MBA

aTSA and rTSA complication rates were 11% and 9%, and the revision rates were 6% and 3%, respectively. Complication types were similar between aTSA and rTSA, but their relative rates were different.
Poster No. P0294
The Influence of Over-Reaming on Stem Stability in Reverse Shoulder Arthroplasty

Brendan Patterson, MD, MPH, FAAOS
Jeffrey Bishoff, PhD
Olivia O’Reilly, MD
James V. Nepola, MD, FAAOS

Over-reaming of the humeral canal in cementless reverse shoulder arthroplasty results in increased micromotion and decreased primary stability of the humeral stem.

Poster No. P0295
Reliable Correction of Beta-Angle with Augmented Glenoid Baseplates in Reverse Total Shoulder Arthroplasty

Gregory P. Nicholson, MD, FAAOS
Michael D. Charles, MD
Amanda J. Naylor, MA
William Chan, MA
Gregory L. Cvetanovich, MD

RTSA that utilized an augmented glenoid baseplate was found to successfully address a variety of glenoid wear patterns and reliably correct glenoid position and inclination.

Poster No. P0296
Risk Factors and Clinical Effects of Preoperative Opioid Use and Chronic Postoperative Dependence after Reverse Total Shoulder Arthroplasty

Alexander Bitzer, MD
Randall T. Kreulen, MD
Umasuthan Srikumaran, MD, MBA, FAAOS
Stephen C. Weber, MD, FAAOS
Edward G. McFarland, MD, FAAOS

We found that chronic preoperative and postoperative opioid use negatively affects clinical outcomes after RTSA. Younger age is the largest risk factor for chronic opioid dependency after RTSA.

Poster No. P0297
Prevalence of Shoulder Arthroplasty in the United States and the Increasing Burden of Revision Shoulder Arthroplasty

Kevin X. Farley, BA
Jacob M. Wilson, MD
Michael B. Gottschalk, MD, FAAOS
Charles A. Daly, MD
Joaquin Sanchez-Sotelo, MD, FAAOS
Eric R. Wagner, MD

The prevalence of shoulder arthroplasty in the United States has markedly increased over time.

Poster No. P0298
Shoulder Arthroplasty in Patients with Rheumatoid Arthritis: A Retrospective Analysis

Gregory P. Nicholson, MD, FAAOS
Amanda J. Naylor, MA
R. Stephen Otte, MD
William Chan, MA
Kassandra N. Blanchard, MA
Anthony A. Romeo, MD, FAAOS
Grant E. Garrigues, MD, FAAOS

A retrospective review revealed significant improvement in active ROM and PRO survey scores, suggesting that RTSA can be a viable arthroplasty option for patients with rheumatoid arthritis.

Poster No. P0299
Surface Electromyography Reveals Middle Deltoid as the Functionally Dominant Shoulder Muscle after Reverse Total Shoulder Arthroplasty

Emily N. Lau
Alexander Pietroski, BS, MSc
Sreten Franovic, BS, MS
Yang Zhou, BS
Noah A. Kuhlmann, BS, MS
Chaoyang Chen, MD, PhD
Stephanie J. Muh, MD, FAAOS

Electromyographic activity of the deltoid and surrounding muscles was quantified in shoulder motion to evaluate muscle activation change after reverse total shoulder arthroplasty.

Poster No. P0300
Investigating the Impact of Rotator Cuff Repair Surgery Prior to Reverse Total Shoulder Arthroplasty on Revision and Complication Rates in Rotator Cuff Injury Patients

Henry Seidel, BS
Sarah Bhattacharjee
Eugenia Lee
Jason L. Koh, MD, MBA, FAAOS
Jason Strelzow, MD, FAAOS
Lewis L. Shi, MD, FAAOS

In patients with rotator cuff injury, previous treatment with rotator cuff repair is associated with higher rates of revision and complication following reverse total shoulder arthroplasty.

Poster No. P0301
Grade 1 and 2 Notching Comprise a Large Range of Pathology and Include the Majority of the Scapular Neck: A Move for Quantitative Analysis of Notching

David H. Campbell
Michael H. Amini, MD, FAAOS
John R. Martin, MD
Midhat Patel, MD

Grade 1 notching comprises the largest range of pathology, and Grade 1 and 2 notching comprise the majority of the distance toward the center peg. We recommend reporting notching quantitatively in mm.
Poster No. P0302
Scapular Neck Anatomy is the Most Important Predictor of Notching: Introduction of the β-Neck Angle

David H. Campbell
John R. Martin, MD
Midhat Patel, MD
Renan R. Fernandes, MD
Michael H. Amini, MD, FAAOS

Scapular neck length and the angle of the scapular neck are the two most important predictors of notching. The beta-neck angle is a new important measure in patients undergoing RSA.

Poster No. P0303
Fibroadipogenic Progenitor Cell Response Peaks Prior to Progressive Fatty Infiltration after Rotator Cuff Tendon Tear

Amil Sahai
Derek L. Jones, BS
Marcus Hughes, BS
Alex Pu, BS, Potomac, MD
Katrina M. Williams, PhD
Chozha Rathinam, MSc, PhD
Derik L. Davis, MD
Richard M. Lovering, PhD, PT
Mohit Gilotra, MD, FAAOS

FAP cell response may predate degenerative changes and early targeting of FAP cells prior to adipocyte maturation could blunt fatty infiltration after rotator cuff tendon tear.

Poster No. P0304
Characterizing Opioid Consumption in the 30-Day Postoperative Period following Shoulder Surgery: Are We Over-Prescribing?

Manan S. Patel, BA
Gary F. Updegrove, MD
Arjun Singh, BS
Grant Jamgochian
Deborah Lobiondo, BSN, RN
Joseph A. Abboud, MD, FAAOS
Matthew L. Ramsey, MD, FAAOS
Mark D. Lazarus, MD, FAAOS

Opioid consumption varies based on type of shoulder surgery, particularly with rotator cuff repair patients requiring more narcotics in comparison to shoulder arthroplasty patients.

Poster No. P0305
Does Early Repair Improve Outcomes in Traumatic Rotator Cuff Tears?

Michael Gutman, BA
Christopher Joyce, MD
Manan S. Patel, BA
Jacob Kirsch, MD
Brian Gutman, BA
Joseph A. Abboud, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
Matthew L. Ramsey, MD, FAAOS

Earlier time to surgery has a positive effect on functional outcomes. This is particularly true in patients treated within one month of injury, as this group had the best functional outcomes.

Poster No. P0306
Gender-Based Differences In Mid-Term Clinical Outcomes and Attainment of Patient Acceptable Symptomatic State Thresholds after Arthroscopic Rotator Cuff Repair: Minimum 2-Year Follow Up

Gerald J. Zeng
Ying Hao, PhD
Denny T. Lie, FRCS

Women experience more pain and poorer shoulder function preoperatively, with poorer mid-term outcomes after arthroscopic cuff repair, and lower potential to achieve patient acceptable symptom state thresholds postoperatively.

Poster No. P0307
Relevance of the Association between the Change of Cuff Integrity and the Clinical Outcome from 1 to 2 Years Postoperatively

Koji Akimoto
Nobuyasu Ochiai, MD, PhD
Eiko Hashimoto
Naoya Hirosawa, MD, PhD
Daisuke Kajiwara, MD
Yohei Shimada
Shohei Ise, MD

Retear rate of cuff integrity of Sugaya’s type 3 especially increased from 1 to 2 years postoperatively and those cases had poorer clinical outcome than successful repaired cases.

Poster No. P0308
Minimum 10-Year Outcomes of Primary Arthroscopic Transosseous-Equivalent Double Row Rotator Cuff Repairs

Justin W. Arner, MD
Adam Johannsen, MD
Bryant P. Elrick, MS
Philip-Christian Nolte, MA, MD
Marilee P. Horan, MPH
Peter J. Millett, MD, MSc, FAAOS

Arthroscopic transosseous-equivalent rotator cuff repair demonstrates durable patient satisfaction and 95.4% survivorship at minimum 10-year follow up.

Poster No. P0309
Are Suture Tape Knots as Secure as Standard Suture? A Biomechanical Study

Brett P. Wiater, MD, FAAOS
Catherine M. Rapp, MD, MBA, FAAOS
Denise Koueiter
Jeremy Kalma, MD
J. Michael Wiater, MD, FAAOS

The strength of suture tape is tape-dependent and it cannot be assumed that any suture tape knot has superior biomechanical properties to a standard round-braided suture.
Poster No. P0310
Part 1: Rotator Cuff Healing – True Tendon Healing or Fibrogenesis? An Animal Study

Sung-Min Rhee, MD
Seung-Min Youn, FRACS, MBCHB
Youngwan Ko
Tae Yoon Kwon, MD
Yong-Girl Rhee, MD

In the rotator cuff repair of rabbit model, the healing resulted in the area of tissue continuity despite the medial retraction of tendon end; this area consisted of immature fibrous tissue.

Poster No. P0311
Bone Marrow Stimulation in Arthroscopic Repair for Large to Massive Rotator Cuff Tears with Incomplete Footprint Coverage

Tae-Hwan Yoon
Sung-Jae Kim, MD
Chul Kim
Yong-Min Chun, MD, PhD

While bone marrow stimulation showed functional improvement after single-row repair with <50% footprint coverage in massive rotator cuff tears, it did not produce better clinical outcomes.

Poster No. P0312
Repair of High-Grade Partial Thickness Supraspinatus Tears after Surgical Completion of the Tear Have a Lower Retear Rate when Compared to Full Thickness Tear Repair

Jonathan D. Hughes, MD
Christopher M. Gibbs, MD
Emily Whicker, MD
Rajiv P. Reddy, BS
Ravi S. Vaswani, MD
Spencer Taliento, BS
Adam Popchak, DPT, PhD
Bryson P. Lesniak, MD, FAAOS
Albert Lin, MD, FAAOS

Patients with partial thickness supraspinatus tears can have excellent outcomes, equivalent to full thickness tears, after completion of the tear and subsequent repair with low retear rates.

Poster No. P0313
The Effect of Critical Shoulder Angle on Functional Compensation in the Setting of Cuff Tear Arthropathy

Jeffrey Lu
Manan S. Patel, BA
Joseph A. Abboud, MD, FAAOS
John G. Horneff, MD, FAAOS

The critical shoulder angle may influence the ability of a patient to maintain forward elevation in the setting of cuff tear arthropathy despite rotator cuff tearing.

Poster No. P0314
Chronic Preoperative Selective Serotonin Reuptake Inhibitors are Associated with Increased Rates of Revision in Rotator Cuff Repair Patients

Sarah Bhattacharjee
Sean C. Pirkle, BA
Michael J. Lee, MD, FAAOS
Jason Strelzow, MD, FAAOS
Lewis L. Shi, MD, FAAOS

Chronic preoperative SSRI prescriptions appear to be associated with increased revision after RCR. Closer follow up with patients utilizing SSRIs may be warranted.

Poster No. P0315
Comparison of Hospitalization Costs and Improvements in Joint-Specific and General Health Measures in the Treatment of Cuff Tear Arthropathy with Reverse Shoulder Arthroplasty and Hemiarthroplasty

Sagar S. Chawla, MD
Corey J. Schiffman, MD
Anastasia Whitson, BS
Frederick A. Matsen, MD, FAAOS
Jason Hsu, MD, FAAOS

CTA hemiarthroplasty provided similar improvements in joint-specific and general health measures to reverse shoulder arthroplasty but at a significantly lower overall cost.

Poster No. P0316
The Influence of Acromial Slope on the Location of Acromial Fractures

Georges Haidamous, MD
Stephanie Merimee, MD
Peter Simon, PhD
Patrick J. Denard, MD, FAAOS
Alexandre Ladermann, MD
Mark A. Migelli, MD, FAAOS
Richard A. Gorman, MD
Mark A. Frankle, MD, FAAOS

The difference in acromial fracture patterns (coronal vs. sagittal) following RSA may be influenced by a variable pull of the deltoid on the acromion depending on its slope.

Poster No. P0317
Risk Factors for Enlargement of Glenoid and Humeral Head Bone Defect Volume and for Increased Instability Episodes in Patients with Anterior Glenohumeral Instability

Noboru Matsumura, MD
Satoshi Oki
Hideyuki Shirasawa, MD, PhD
Yuhei Takada, MD
Taku Suzuki
Takuji Iwamoto, MD, Masaya Nakamura, MD
Morio Matsumoto, MD
Takeo Nagura, MD

Risk factors for enlargement of bipolar lesions and for increased instability episodes were evaluated. Bipolar bone lesions are not always created simultaneously by the same mechanism.
The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.

Poster No. P0318
The Change of the Anchor Hole Diameters after Arthroscopic Bankart Repair and its Impact on the Clinical Outcome

Yusuke Kawamura, PhD
Hideki Hiraiwa, MD, PhD
Shinya Ishizuka, MD
Satoshi Yamashita, MD
Hiroki Oba, Nagoya
Takefutakefumi Sakaguchi, MD
Masaru Idota, MD
Tadahiro Sakai, MD, PhD
Shiro Imagama, MD, PhD

The diameters of anchor holes after arthroscopic Bankart repair tended to increase at postoperative 6 months and then decreased over time. However, these changes did not affect the clinical outcome.

Poster No. P0319
Reliability of a Three-Dimensional Evaluation of Bipolar Bone Defects in Anterior Glenohumeral Instability

Maristella F. Saccomanno, MD, PhD
Alessandra Scaini, MD
Giuseppe Sircana, MD
Piermarco Messinese, MD
Andrea S. Monteleone, MD
Andrea G. Salvi
Giuseppe Bertoni, MD
Giacomo Marchi, MD
Giuseppe Milano, MD

3D evaluation of bipolar bone defects volume in anterior shoulder instability showed high reliability, thus allowing surgeons to clearly visualize the pathology and perfectly shape the bone grafts.

Poster No. P0320
Clinical Outcomes after Superior Capsule Reconstruction May Be Influenced by Mechanisms other than Restoration of In Vivo Kinematics

Albert Lin, MD, FAOOS
Gillian E. Kane, BS
Clarissa Levasseur, MS
Jonathan D. Hughes, MD
Alexandra S. Gabrielli, MD
Adam Popchak, DPT, PhD
James J. Irrgang, PhD
William Anderst, PhD

The effect of SCR on in vivo kinematics is unknown. This data will help us identify relationships between in vivo shoulder kinematics and patient-reported outcomes.

Poster No. P0321
Concomitant Biceps Tenodesis Improves Outcomes for Superior Labrum Anterior to Posterior (SLAP) Repair: Minimum 2-Year Clinical Outcomes after SLAP II-IV Repair vs. Tenodesis vs. Both

Taylor J. Ridley, MD
Marilee P. Horan, MPH
Philip-Christian Nolte, MA, MD
Bryant P. Elrick, MS
Peter J. Millett, MD, MSc, FAAOS

Patients have improved outcomes for treatment of SLAP II-IV tears with combination of biceps tenodesis (BT) and SLAP repair. Concomitant BT should be considered when performing repair of SLAP II-IV tears.

Poster No. P0322
Biceps Tenotomy Using In-Office Small Needle Arthroscopy for Patients with Unremitting Shoulder Pain and Comorbidities: A Cadaver Analysis to Verify Safe Passage

Kevin D. Plancher, MD, MPH, FAOOS
Joseph M. Ajdinovich, MD
Stephanie C. Petterson, MPT, PhD

Intra-articular, minimally invasive LHBT tenotomy through a single anterior portal using a portable arthroscopy device may be a safe, effective alternative to operating room arthroscopic tenotomy.

Poster No. P0323
Radial Head Prosthetic Replacement in Adolescents: A Report of Five Cases

Dani Rotman, DMed
Jorge L. Rojas Lievano
Jaeman Kwak
Shawn W. O’Driscoll, MD, FAOOS

Radial head replacement appears successful in improving pain and forearm stability in this very small series of adolescent patients with complex RC conditions in the short to mid-term follow up.

Poster No. P0324
Time Course of Elbow Motion Recovery after Arthroscopic Osteocapsular Arthroplasty for Contracture

Jorge L. Rojas Lievano
Dani Rotman, DMed
Jaeman Kwak
Jennifer Tangtiphaiboontana, MD
Shawn W. O’Driscoll, MD, FAOOS

Patients undergoing OCA for elbow contractures can expect on average a 50% improvement in their preoperative motion deficit and a functional or near-functional arc of motion in 90% of the cases.
Poster No. P0325
Development of a Small Animal Model for Elbow Ulnar Collateral Ligament Injuries

Jordan Gruskay, MD
James B. Carr, MD
Alexander N. Piacentini, MS
Jonathan S. Yu
Christopher L. Mendias, PhD, ATC
Joshua S. Dines, MD, FAAOS

The current study developed a small animal model for UCL injuries through comparison of the gross anatomy, histology, and micro-computed tomography (micro-CT) between human and rat UCLs.

Poster No. P0806
Trends in Shoulder Arthroplasty for Primary Osteoarthritis with Intact Rotator Cuff, 2007 to 2018: Have We Changed Our Surgical Indications? A Multicenter Retrospective Study

Yoav Rosenthal, MD
Samantha A. Rettig, BS
Joseph D. Zuckerman, MD, FAAOS

Reverse total shoulder arthroplasty is being performed more commonly for primary shoulder osteoarthritis with intact rotator cuff. The threshold for performing shoulder arthroplasty is decreasing.

Poster No. P0326
Bone Morphogenetic Protein Usage Decreases the Risk of Reoperations after Anterior Cervical Discectomy and Fusion: A 5-Year Survivorship Analysis

Peter G. Passias, MD, FAAOS
Waleed Ahmad, MS
Joshua Bell, MD
Katherine E. Pierce, BS
Sara Naessig, BS
Frank A. Segreto, BS
Lara Passfall, BS
Oscar Krol
Bassel Diebo, MD

Our results demonstrate that use of bone morphogenetic protein (BMP) can decrease the incidence of reoperation over a 5-year period.

Poster No. P0327
Defining Spino-Pelvic Alignment Goals for Adult Spinal Deformity Surgery that Optimize Outcomes by Incorporating Age and Frailty Status

Peter G. Passias, MD, FAAOS
Katherine E. Pierce, BS
Sara Naessig, BS
Waleed Ahmad, MS
Lara Passfall, BS
Oscar Krol, BA
Bassel Diebo, MD
Renaud Lafage, MS
Virginie Lafage, PhD

Incorporating frailty into alignment goals is more sensitive to response to surgery than age and contributes to superior clinical and complication outcomes.

Poster No. P0328
When Can We Expect Global Sagittal Alignment to Reach a Stable Value following Cervical Deformity Surgery?

Renaud Lafage, MS
Justin S. Smith, MD
Christopher Ames, MD
Peter G. Passias, MD, FAAOS
Christopher I. Shaffrey, MD, FAAOS
Gregory M. Mundis, MD, FAAOS
Themistocles S. Protopsaltis, MD, FAAOS
Munish C. Gupta, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
Jonathan C. Elysee
Han Jo Kim, MD, FAAOS
Robert S. Bess, MD, FAAOS
Frank J. Schwab, MD
Virginie Lafage, PhD
HSS ISSG Spine

Following cervical deformity surgery, thoraco-lumbar relaxation is achieved by 3-month follow up, and remains stable at 1-year follow up. Subanalysis with 2-year data supports this finding.
Cost-Utility Analysis of a Combined Approach for Surgical Correction of Adult Spinal Deformity

Peter G. Passias, MD, FAAOS
Waleed Ahmad, MS
Jordan Lebovic, MD, MBA
Sara Naessig, BS
Katherine E. Pierce, BS
Renaud Lafage, MS
Virginie Lafage, PhD
Khaled M. Kebaish, MD, FAAOS
Michael P. Kelly, MD, FAAOS
Jeffrey Gum, MD, FAAOS
Breton G. Line, BS
Robert A. Hart, MD, FAAOS
Douglas C. Burton, MD, FAAOS
Justin S. Smith, MD
Christopher Ames, MD
Christopher I. Shaffrey, MD, FAAOS
Frank J. Schwab, MD
Richard A. Hostin, MD, FAAOS
Robert S. Bess, MD, FAAOS
International Spine Study Group

Improvement after surgical intervention was similar between the two approaches. Greater cost per QALY of posterior-only approach was driven by increased operative complications and revision rates.

Overcorrection of the Upper Instrumented Vertebra Relative to the Center of the Femoral Heads is Associated with Proximal Junctional Kyphosis

Hao-Hua Wu, MD
Dean Chou, MD
Kevork Hindoyan, MD
Jeremy M. Guinn, BA, BS
Joshua Rivera
Bo Li, MD
Andrew S. Lee, MD
Shane Burch, MD, FAAOS
Praveen V. Mummaneni
Sigurd H. Berven, MD, FAAOS

The more posterior the UIV is from the femoral head center after lower thoracic to pelvis surgical correction for ASD, the more patients are at risk for PJK.

Can We Predict the Cone of Economy Measurement using Only a Force Plate?

Addison R. Wood, MD
Ram Haddas, MSc, PhD
Isador H. Lieberman, MD, MBA, FAAOS
Peter Derman, MD, MBA
UCSF PJK Spine Study Group

Cone of economy was successfully predicted from force plate data using center of pressure with high correlation without the use of motion capture in healthy controls and spine patients.

Association between Prescribed Opioid Dose and Patient-Reported Pain Scores in the Early Post-Discharge Period following Spine Surgery

Comron Saifi, MD, FAAOS
Sarthak Mohanty, BS
Max Shin, BA
David Casper, MD

Prescriptions of lower dosage opioids following spine surgery, greater than or equal to 7.5 MME/dose, is sufficient to manage pain in the early, postoperative period by patient-reported pain scores.

A Nationwide Analysis of Geriatric Odontoid Fracture Incidence, Complications, Mortality, and Cost

Ram Alluri, MD
Gabriel J. Bouz, MD
Samantha Solaru, BS
Hyunwoo P. Kang, MD
Jeffrey C. Wang, MD, FAAOS
Raymond J. Hah, MD, FAAOS

This study demonstrates a clear national paradigm shift in the management of geriatric odontoid fractures, wherein operative management nearly doubled from 46% in 2003 to 86% in 2017.

Biomechanical Analysis of Gait and Stability in Preoperative Cervical Spondylotic Myelopathy Patients

Pramod Kamalapathy, BA
Joshua Bell, MD
Emily Dooley, BS
Lawal A. Labaran, MD
Varun Puvanesarajah, MD
Francis H. Shen, MD, FAAOS
Shawn Russell, PhD
Hamid Hassanzadeh, MD, FAAOS

Preoperative CSM patients showed significant alterations in gait. AM analysis showed increase in frontal plane indicative of patients’ wide waddling gait and compensatory sagittal and transverse shift.

Translational Challenges of Fluorescence Image-Guided Surgical Debridement in a Mouse Model of Spine Implant Infection

Peter P. Hsiue, MD
Chad Ishmael, MD
Kel lyn Hori, BS
Clark J. Chen, BS
Cristina Villalpando
Stephen D. Zoller, MD
Kevin P. Francis
Nicholas M. Bernthal, MD, FAAOS

This observational study using an established murine model of spine implant infection and an antibody-linked to a fluorescent probe demonstrated accurate colocalization with Staphylococcal infection.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0336**
High Volume Surgeons Have Better Surgical Outcomes and Lower Costs

*Vishal Sarwahi, MD, FAAOS*
Sayyida Hasan, BS
Jesse M. Galina, BS
Aaron M. Atlas, BS, MS
Thomas J. Dowling, MD
Yungtai Lo, PhD
Terry D. Amaral, MD, FAAOS

High volume surgeons have better surgical outcomes and lower costs than low volume surgeons.

**Poster No. P0337**
Comorbidity Influence on Postoperative Outcomes following Minimally Invasive Anterior Cervical Discectomy and Fusion

*James M. Parrish, MPH*
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Eliot Cha, MSc
Michael T. Nolte, MD
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Kern Singh, MD, FAAOS

This study aims to detail the association between comorbidity burden and achievement of minimum clinically important difference in various patient-reported outcome measures following ACDF.

**Poster No. P0338**
Higher Doses of Liposomal Bupivacaine Result in Lower Opioid Consumption but Increased Frequency of Adverse Events

*Robert T. Ballock, MD, FAAOS*
Brittany Patterson, BS, MS
Yuxuan Jin
Ryan C. Goodwin, MD, FAAOS
David P. Gurd, MD, FAAOS
Thomas E. Kuivila, MD
Ernest Young, MD
John Seif, MD
CCF Peds Ortho

Studies of liposomal bupivacaine (LB) in pediatric spine surgery have demonstrated conflicting results regarding the efficacy of LB in reducing postoperative opioid consumption. One possible reason for this discrepancy is the dose of LB may be an important factor in producing postoperative analgesia. The purpose of this study was to determine if LB dose affects postoperative opioid consumption and adverse events in pediatric patients undergoing spinal deformity correction surgery.

**Poster No. P0339**
Repeating Lumbosacral MRI Scan – When is it Necessary?

*Sohail Nisar, MBBS, MRes*
Muhammad A. Noor, BS
Mohammad Al-Ashqar, MBCHB, MRCS
Peter R. Loughenbury, FRCS, MBCHB
Graham S. Radcliffe, FRCS (Ortho), MA

For patients with degenerative disc disease, repeating MRI within 12-months is unlikely to show radiological change of clinical value unless patients present with features of caudal equina syndrome.

**Poster No. P0340**
The Influence of Comorbidity on Postoperative Outcomes following Lumbar Decompression

*Nathaniel W. Jenkins, BS, MS*
Conor P. Lynch, MS
Eliot Cha, MSc
James M. Parrish, MPH
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Kern Singh, MD, FAAOS

This study determines the burden of comorbidities and their effect on achieving a minimally clinically important difference in patient-reported outcomes after undergoing lumbar decompression surgery.

**Poster No. P0341**
Comparison of the Effects of Corticosteroid and Hyaluronic Acid-Carboxymethylcellulose (HA-CMC) Solution on Selective Nerve Root Block for Lumbar Radiculopathy: A Prospective, Double-Blind, Randomized Controlled Clinical Trial

*Sang-Bong Ko, MD*
Kyungtae Kim, MD
Chungmu Jun, MD
Suk-Kyoon Song, MD

Can HA-CMC solution replace corticosteroid in SNRB?

**Poster No. P0342**
An Anatomic Study Exploring Differences in Pars Interarticularis Distance and Spinal Canal Width between Lumbar Levels and its Effect on Lumbar Decompression

*Christina Cheng, MD*
Amelia Clarke, BA
Joshua Y. Park, BA

This is an anatomic study looking at differences in pars interarticularis width between lumbar levels relative to spinal canal width and its effect on lumbar decompression and spinal column stability.
Poster No. P0343
Risk for Complications after Elective Lumbar Spinal Fusion Surgery for Octogenarians Compared with Younger Patients

Kathryn E. Royse, MPH, MSPH
T. Kent Ganocy, MD, MBA, FAAOS
Heather A. Prentice, PhD
Jessica Harris, MS
Calvin Kuo, MD, FAAOS

In a cohort of over 8,000 elective lumbar fusion patients, we failed to observe a difference in risk of reoperation, infection, or DVT when comparing octogenarians to their younger counterparts. However, the higher risk of intraoperative durotomy, 90-day PE, and 90-day readmission suggests closer intra- and postoperative surveillance may be warranted for these older patients.

Poster No. P0344
Respiratory Compromise after Anterior Cervical Spine Surgery: Incidence, Subsequent Complications, and Independent Predictors

Venkat Boddapati, MD
Nathan J. Lee, MD
Justin Mathew, MD
Cesar D. Lopez, BS
Joseph Lombardi, MD
Marc D. Dyrszka, MD
Zeeshan Sardar, MD
Ronald A. Lehman, MD, FAAOS
K. Daniel Riew, MD, FAAOS

Respiratory compromise is an extremely rare complication after anterior cervical spine surgery (0.57%); patients who develop this have extremely high short-term morbidity and mortality.

Poster No. P0345
Comparison of Outcomes following Primary vs. Revision Minimally Invasive Lumbar Decompression

Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliott Cha, MSc
James M. Parrish, MPH
Shruti Mohan, BS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Kern Singh, MD, FAAOS

This study assessed differences between primary and revision procedures in postoperative patient-reported outcomes following minimally invasive lumbar decompression.

Poster No. P0346
Depressive Symptom Severity among Primary and Revision Lumbar Spine Procedures

James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliott Cha, MSc
Michael T. Nolte, MD
Caroline N. Jadczak, BS
Shruti Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS

This study evaluated differences in baseline patient-reported outcomes, including pain, disability, and depressive symptoms among patients undergoing either primary or revision lumbar spine surgery.

Poster No. P0347
The Surgical Treatment of Cervical Myelopathy in Patients who Ambulate Independently, Ambulate with Assistive Devices, or are Wheelchair Bound: A Michigan Spine Surgery Improvement Collaborative Study

Rafid Kasir, MD
Lonni Schultz, PhD
Richard W. Easton, MD, FAAOS
Victor Chang, MD
Jad Khalil, MD, FAAOS

We examine whether wheelchair bound patients undergoing cervical spine surgery for cervical myelopathy have improvement in patient-reported outcome measures.

Poster No. P0348
Long-Term Validation of Patient-Reported Outcome Measurement Information System Physical Function following Anterior Lumbar Interbody Fusion

James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliott Cha, MSc
Shruti Mohan, BS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Kern Singh, MD, FAAOS

This study aimed to determine the validity of PROMIS-PF as a long-term measure for physical function in ALIF patients.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0349
The Influence of Glycemic Control as Measured by Hemoglobin A1C Levels on Complications following Elective Lumbar Spinal Fusion

Daniel Kiridly, MD
Peter Olivaures, BS
Jesse M. Galina, BS
Cesar R. Iturriaga, DO
Jeffrey Goldstein, MD
Alexander Satin, MD
Rohit Verma, MD, FAAOS
Jeff S. Silber, MD, FAAOS
David Essig, MD, FAAOS

We sought in this study to examine the relationship between perioperative glycemic control (as measured by HbA1C) and complications within 30 days following elective lumbar spinal fusion.

Poster No. P0350
Evaluating the Concurrent Validity of Patient-Reported Outcomes Measurement Information System Physical Function, Pain Interference, and Depression Domains with the Spine Oncology Study Group-Outcomes Questionnaire in Metastatic Spine Tumor Patients

Michelle Richardson, BS
David Bernstein, MD, MBA
Addisu Mesfin, MD, FAAOS

PROMIS PI, PF, and Depression demonstrate concurrent validity with the SOSG-OQ, a PROM designed specifically for metastatic spine tumor patients.

Poster No. P0351
Intraoperative and Postoperative Management of Incidental Durotomies during Open Degenerative Lumbar Spine Surgery: A Systematic Review

Arya Ahmady, MD
Bilal Butt, MD
Stefano Muscatelli, MD
Ilyas Aleem, MD, FAAOS

This study is a systematic review to identify intraoperative repair techniques and postoperative protocols for the management of incidental durotomies during open degenerative lumbar procedures.

Poster No. P0352
Variation in 90-Day Neurological Complications across Increasing Fusion Levels for Posterior Cervical Fusion: A Five-Year Analysis

Neil V. Shah, MD, MS
Ishaan Jain, BS
George A. Beyer, MD, MS
Peter G. Passias, MD, FAAOS
Nicolas Lonjon
Nicholas H. Post, MD
Carl B. Paulino, MD, FAAOS
Vincent Challier, MD
Bassel Diebo, MD

Compared to 2-3-level procedures, longer posterior cervical fusions had higher total, medical, and C5-C7 nerve palsy rates, as well as increased odds of sustaining ≥1 neurological complications.

Poster No. P0353
Gender Differences for Patient Health Questionnaire-9 among Patients Undergoing Cervical Surgery

Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Kern Singh, MD, FAAOS

This study investigated gender differences in depressive symptom severity, measured by PHQ-9, in patients following anterior cervical disectomy and fusion or total cervical disc replacement.

Poster No. P0354
Outcomes following Anterior Cervical Discectomy and Fusion in Patients with Predominantly Neck Pain Complaints vs. Radiculopathic Arm Pain

Ryan Lee, MBA
Avani Vaishnav, MBBS
Hikari Urakawa, MD
Kosuke Sato, MD
Chirag B. Chaudhary, MS
Russel C. Huang, MD, FAAOS
Todd J. Albert, MD, FAAOS
Sheeraz Qureshi, MD, FAAOS

Patients with predominantly neck pain complaints see similar improvements following ACDF as those with radiculopathic arm pain.

Poster No. P0355
Risk Factors for Early Postoperative Reintubation following Anterior Cervical Spine Surgery: A Machine Learning Approach

Eren O. Kuris, MD
Ashwin Veeramani
Kevin DiSilvestro, MD
Christopher McDonald, MD
Andrew S. Zhang, MD
Shyam A. Patel, MD
Eric M. Cohen, MD
Alan H. Daniels, MD, FAAOS

Machine learning models can help identify patients who are at risk for reintubation after anterior cervical spine surgery.

Poster No. P0356
Analysis of Scoliosis-Specific Information on Social Media: Is Social Media the New Source of Online Medical Information and Support?

Eeric Truumees, MD, FAAOS
Eeric Truumees, MD, FAAOS
Ashley T. Duncan, MBA, RN
Devender Singh, PhD
Matthew J. Geck, MD

Social media can be a powerful tool to disseminate information and create supportive communities for patients with chronic conditions.
Poster No. P0357
Relative Value Units Do Not Account for the Increased Operative Time and Length of Stay Associated with Revision Single-Level Lumbar Fusion

Jeffrey Hassebrock, MD
Matthew K. Doan, BS
Andrew S. Chung, DO
Justin Makovicka, MD
Michael S. Chang, MD, FAAOS
Karan Patel, MD

This study compares the reimbursement of primary and revision single-level lumbar fusions based on relative value units.

Poster No. P0358
Postoperative Readmission: What Role do Socioeconomic and Community Factors Play?

Comron Saifi, MD, FAAOS
Sarthak Mohanty, BS
Neil P. Sheth, MD, FAAOS
Vincent Arlet, MD
David Casper, MD

Lower access to primary care, lower neighborhood household value, higher neighborhood income inequality, and low income were independently associated with higher risk of readmission at POD 30.

Poster No. P0359
Performance of a Novel Cervical Virtual Spine Examination during the COVID-19 Pandemic

Scott Wagner, MD
Rakesh Patel, MD, FAAOS
Ilyas Aleem, MD, FAAOS
Donald Fredericks, MD
Sandra Hobson, MD
Paul A. Anderson, MD, FAAOS
Brett Freedman, MD, FAAOS
Arjun Sebastian, MD, FAAOS
Melvin D. Helgeson, MD, FAAOS

We found that a standardized telehealth spine examination performed similarly across multiple domains compared to an in-person examination.

Poster No. P0360
Public Insurance is a Risk Factor for 30- and 90-Day Unplanned Readmission following Posterior Lumbar Fusion

Jonathan Yun, BA
Andrew Golz, MD
Mitchell J. Hughes, MD
Bartosz Wojewnik, MD, FAAOS
Cara Joyce, PhD

Patients with Medicare and Medicaid insurance are at increased risk for both 30-day and 90-day readmission following posterior lumbar fusion.

Poster No. P0361
National Variation in Spinal Fusion Procedure Rates: A Comparison of Publicly Available Pricing Information from the Top US Orthopaedic Hospitals

Jeffrey Hassebrock, MD
Justin Makovicka, MD
Jordan R. Pollock, BS
Michael L. Moore, BS
Matthew K. Doan, BS
Nicole De La Pena
Karan Patel, MD

This is a study comparing the Chargemaster pricing information for common spinal fusion procedures at the top US orthopaedic hospitals.

Poster No. P0362
Physical Examination of the Spine Using Telemedicine: A Systematic Review

Joshua Piche, MD
Bilal Butt, MD
Arya Ahmady, MD
Rakesh Patel, MD, FAAOS
Ilyas Aleem, MD, FAAOS

This systematic review sought to assess the reliability and satisfaction with the virtual spine physical exam. Further research is needed to validate a virtual spine physical examination.

Poster No. P0363
Reducing Bioburden in the Operating Room: Comparing Pulsed-Xenon Ultraviolet Disinfection Effectiveness between Cases and at Terminal Cleaning

Ashley E. Xiong, BS
Taylor Jackson, MD
Arjun Sebastian, MD, FAAOS
Brett Freedman, MD, FAAOS

Pulsed-Xenon Ultraviolet disinfection effectiveness, as measured by colony forming units, is explored in both between case and terminal cleaning protocols.

Poster No. P0364
Combined Motor and Sensory Neuromonitoring for Cervical Spondylotic Myelopathy Surgery Causes Confusion: A Level-1 Diagnostic Study

Kristen Charles Rezk Combs, MD
Adam J. Taylor, MD
Jason A. Bryman, MD
Robert D. Kay, MD
Erik Y. Tye, MD
Kevin W. Rolfe, MD, FAAOS

Combined motor and sensory neuromonitoring for cervical spondylotic myelopathy added set-up time and cost, but no patient benefit for the avoidance of neurologic decline.
**Poster No. P0365**

**Balance Effort, Cone of Economy, and Dynamic Compensatory Mechanisms in Common Degenerative Spinal Pathologies**

*Isador H. Lieberman, MD, MBA, FAAOS*
*Ram Haddas, MSc, PhD*
*Thomas Kosztowski, ACNP-BC, ATC*
*Damon Mar*
*Akwasi O. Boah, MD*

Patients with degenerative spinal pathologies exhibit markedly diminished balance and compensatory mechanisms as indicated by increased sway and larger joint excursion on a Romberg test and larger CoE.

**Poster No. P0366**

**Osteoporosis is Undertreated following Low-Energy Vertebral Compression Fractures**

*Max R. Haffner, MD*
*Connor M. Delman, MD*
*Joseph B. Wick, MD*
*Gloria Han, BS*
*Yashar Javidan, MD, FAAOS*
*Eric O. Klineberg, MD, FAAOS*
*Rolando F. Roberto, MD, FAAOS*
*Hai Le, MD*

Our study demonstrates the need for improved osteoporosis work-up and intervention among patients who have sustained a vertebral compression fragility fracture.

**Poster No. P0367**

**The Effect of Preoperative Education in Elective Spine Procedures**

*George Gorgy, MD*
*Jamie Grossman, MD*
*Robert Dolitsky, MD*
*Gregory Parker, MD*
*Jason D. Cohen, MD, FAAOS*

This is a prospective study evaluating the relationship between preoperative educational class attendance and patient outcomes in elective spine surgery.

**Poster No. P0368**

**Increased Industry Funding Leads to Greater Research Output in Orthopaedic Spine Literature**

*Brandon Petrone, DO*
*Nicholas Frane, DO*
*Peter B. White, DO, MS*
*Adam Bitterman, DO, FAAOS*
*Prashant Matai, MBBS*
*Kenneth Choy, BA*
*Courtney Aronica, BA*

Surgeon academic status is significantly correlated with research productivity.

**Poster No. P0369**

**Proof of Concept: Artificial Intelligence-Based Estimation of Skeletal Maturity from Biplanar Slot Scan Scoliosis Imaging**

*John S. Vorhies, MD, FAAOS*
*Audrey Ha*
*Bao H. Do, MD*
*Joanna L. Langner, MS, BS*
*Andrew Campion*
*Charles X. Fang, MD*
*Micahel L Fadell, MD*
*Safwan Halabi, MD*
*Japsimran Kaur, BS*

We demonstrated a proof of concept that an automated image processing algorithm can reliably and simultaneously classify ossification about the shoulder and hip using established staging systems.

**Poster No. P0370**

**Pseudoarthrosis following Long Segment Anterior Cervical Discectomy and Fusion: Incidence, Risk Factors, and Associated Clinical Outcomes**

*Pramod Kamalapathy, BA*
*Joshua Bell, MD*
*Varun Puvanesarajah, MD*
*Amit Jain, MD*
*Adam L. Shimer, MD, FAAOS*
*Francis H. Shen, MD, FAAOS*
*Hamid Hassanzadeh, MD, FAAOS*
*Ryan Aschenbrener, MD*

One-third of patients undergoing 3-or-more level ACDF went on to develop PA. Despite initially superior PROMs among control patients, 1- and 2-year outcomes were similar between the two populations.

**Poster No. P0371**

**Low Hounsfield Units Measured at the Upper Instrumented Vertebra are an Independent Risk Factor for Density Related Complications in Adult Spinal Fusion Procedures**

*Travis Philipp, MD*
*Zoe Norris*
*William Schreiber-Stainthorp, BS*
*Gregory Chang, MD*
*Themistocles S. Protopsaltis, MD, FAAOS*

This study found that for every 10 Hounsfield Unit decrease, as measured at the UIV on standard computed tomography scans, the odds of a postoperative density related complication rose by 6%.

**Poster No. P0372**

**Relationship between Pelvic Tilt due to Spinal Realignment Surgery and Safe Zone of Cup Alignment after Total Hip Arthroplasty**

*Yukihide Minoda, MD*
*Ryo Sugama, MD*
*Yoichi Ohta*
*Susumu Takemura, MD*
*Nobuo Yamamoto, MD*
*Hiroaki Nakamura, MD*

When the pelvis tilt 10˚ anteriorly due to spinal realignment surgery, 42% of cases become outlier of cup alignment, even though the cup alignment was in the safe zone before spinal surgery.
**Poster No. P0373**

Prevalence of Isthmic and Degenerative Lumbar Spondylolisthesis: Analysis of 882 CT Scans

Andrew Liu, MD
Sherif M. Sherif
Serena Liu, MD
Peter Joo, MPH
Emmanuel N. Menga, MD, FAAOS
Addisu Mesfin, MD, FAAOS

This study represents the largest series to date evaluating the prevalence of degenerative and isthmic spondylolisthesis using CT scans.

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**Poster No. P0374**

CT Scans of Lumbar Fusion Patients: A Potentially Missed Opportunity to Detect Osteoporosis

Jonathan N. Grauer, MD, FAAOS
Patrick J. Burroughs, BS
Harold G. Moore, BS
Elisa Berson, BS
David S. Kirwin, BS
Mursal Gardezi, BS
Scott Halperin, BS
Josiah J. Sherman
Kelsey A. Rankin, BA
Matthew J. Sabatino, MD
Jonathan Grauer, MD Research Group

In a study of 741 lumbar fusion patients, the use of a validated CT-based bone quality assessment identified 141 osteoporotic patients who were previously unidentified by DXA scan or problem list.

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**Poster No. P0375**

Malposition Rates of Subaxial Cervical Pedicle Screws Placed Using Intraoperative CT (O-arm) Based 3D Navigation

Jonathan N. Sembrano, MD, FAAOS
Michael Brush, BS
Kenneth J. Holton, MD
Christopher T. Martin, MD
Matthew Hunt, MD, MHA
Ann M. Parr, FAANS, FRCS
Kristen E. Jones, MD
David W. Polly, MD, FAAOS
Robert A. Morgan, MD, FAAOS

Cervical pedicle screws (CPS) are superior to other spinal fixation anchors. With limited studies on use of navigation for placing CPS, we report accuracy rates of computer navigated CPS placement.

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**Poster No. P0376**

Sacral (SI) Joint-Specific Disability Questionnaire: The Denver SI Joint Questionnaire Initial Validation

Vikas V. Patel, MD, BSME, FAAOS
Emily M. Lindley, PhD
Claire Cofer, BS
Paul Mintken
Eric Sawyer, DPT, PT
Lori A. Michener, ATC, PhD

Initial validation results from this study suggest the Denver SI Joint Questionnaire (DSIJQ) can be used to evaluate SI joint disability and detect changes in disability after treatment.

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**Poster No. P0377**

Sensory Sparing Does Not Change Long-Term Outcomes in Motor Complete Spinal Cord Injuries: The Case for Misclassification Bias from the Results of the Spinal Cord Injury Model Systems Database

Liam R. Harris, MD
Kody K. Barrett, MD
Kevin W. Rolfe, MD, FAAOS

When compared to AIS A patients, sensory sparing among AIS B patients offers minimal protective advantage in physical, mental, and social outcome measures in long-term follow up.

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**Poster No. P0378**

The Association of Preoperative Tumor Necrosis Factor-Alpha Inhibitor Use and Reoperation Rates in Spinal Fusion Surgery

Michael Gaudiani, BA
Pavitra Ravishankar
Robert Winkelman
Valerie Carbajal, MD
Thomas E. Mroz, MD, FAAOS
Daniel Coughlin, MD

Patients taking TNF-AIs prior to surgery were found to have a significantly higher rate of reoperation in the 1 year following surgery compared to propensity matched controls.

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**Poster No. P0379**

High Incidence Rate of Lumbar Spinal Findings among Child and Adolescent Weightlifting Athletes: A Prospective Five-Year Cohort Study

Rikuto Yoshimizu, MD
Junsuke Nakase, MD
Katsuhiro Yoshioka, MD
Kazuki Asai, MD
Mitsuhiko Kimura, MD
Katsuhiko Kitaoka, MD
Hiroyuki Tsuchiya, MD

A prospective five-year cohort study involving child and adolescent weightlifting athletes showed that disc degeneration occurs in over 90%, based on MRI findings.
TUESDAY - WEDNESDAY

Poster No. P0380
Early Postoperative Anticoagulation in Spinal Fractures is Associated with Improved Outcomes

Khaled Taghlabi, MBBS
Douglas C. Burton, MD, FAAOS
Robert S. Jackson, MD, FAAOS
Joshua T. Bunch, MD
Brandon Carlson, MD, MPH
Robert D. Winfield, FACS, MD

Anticoagulation at 72 hours after operative treatment of spinal fractures led to decreased VTE and no increase in bleeding complications compared to initiation at 10-14 days after surgery.

Poster No. P0381
Evaluation of Interrater Agreement of Novel Hands-Free Lumbar Spine Virtual Physical Examination During the COVID-19 Pandemic

Donald Fredericks, MD
Brett Freedman, MD, FAAOS
Ilyas Aleem, MD, FAAOS
Rakesh Patel, MD, FAAOS
Paul A. Anderson, MD, FAAOS
Arjun Sebastian, MD, FAAOS
Sandra Hobson, MD
Scott Wagner, MD
Melvin D. Helgeson, MD, FAAOS

The purpose of this study was to assess and determine interrater reliability of a novel virtual spine physical exam following rapid conversion from traditional in-office to telehealth visits for spine surgery.

Poster No. P0382
Lowest Instrumented Vertebra (LIV) Selection in Posterior Cervical Fusion: Does Cervicothoracic Junction LIV Predict Mechanical Failure?

Joseph T. Labrum IV, MD
Inamullah Khan, MD, MBBS
Kristin Archer, PhD
Amir Abtahi, MD
Byron F. Stephens, MD

A retrospective spine registry study illustrates a significant effect of cervicothoracic PCF LIV selection on the development of mechanical complication and revision surgery.

Poster No. P0383
Prevalence of Cutibacterium acnes in Excised Intervertebral Disc of Degenerative Cervical Spine Patients Undergoing Anterior Cervical Discectomy and Fusion

Wasaphon Suphakitchanusan, MD
Surachai Sae-Jung, MD
Kitti Jirarattanaphochai, MD, PhD
Kriangkrai Wittayapairoj, MD

The degenerative intervertebral disc in the cervical spine and low-virulent bacterial were a demonstrated association from our cohort. This finding correlated with other locations of the spine.

Poster No. P0384
Fusion Rate for Combined Anteroposterior vs. Anterior Fixation with Allograft for 3- and 4-Level Cervical Spine Pathology

Ekamjeet Dhillon, MD
Celeste Tavolaro, MD
Carlo Bellabarba, MD, FAAOS
Richard J. Bransford, MD, FAAOS

Combined anterior/posterior approach is associated with a higher rate of interbody fusion and lower rate of pseudoarthrosis compared to an anterior-only approach for 3 or more vertebral levels.

Poster No. P0385
Clinical and Radiographic Outcomes after 3- and 4-Level Anterior Cervical Discectomy and Fusion Surgery

Paul D. Minetos, MD, MBA
Jose Antonio Canseco, MD, PhD
Brian A. Karamian, MD
Stephen Dimaria
Bryce A. Basques, MD
Taylor Paziuk, MD
Jennifer Mao, MBA
Hannah Levy, BS
Parthik Patel, MD
Ariana Reyes, MD
Tyler Timmins, BS
Haydn Hallman
Nicholas C. Semenza, BS
Francis J. Sirch, BS
Mark F. Kurd, MD
D G. Anderson, MD
Alan S. Hilibrand, MD, MBA, FAAOS
Christopher Kepler, MD
Alexander Vaccaro, MD, MBA, PhD, FAAOS
Joseph K. Lee, MD
Gregory D. Schroeder, MD
Rothman Orthopaedic Institute - Spine

Both 3- and 4-level ACDF procedures demonstrate significant clinical and radiographic improvements postoperatively without significant difference noted between the two interventions.

SPORTS MEDICINE

Poster No. P0386
Single-Shot Liposomal Bupivacaine Reduces Postoperative Narcotic Use following Outpatient Rotator Cuff Surgery: A Prospective Double-Blinded Randomized Controlled Trial

Brian L. Badman, MD, FAAOS
Aaron M. Baessler, MD
David J. Conrad, MD
James J. Creighton, MD
Molly Moor

Among patients undergoing outpatient arthroscopic rotator cuff repair, the addition of LB to standard bupivacaine in interscalene nerve blocks appears effective in controlling postoperative pain. Since LB with and without dexamethasone decrease postoperative narcotic use, it should be considered for use in preoperative interscalene nerve blocks to reduce the reliance on narcotics for pain management.
OCA dowels harvested from female and/or older donors exhibit inferior shear mechanical properties making them prone to failure and pre-cut OCA dowels fail more often at the bone-cartilage interface.

An unloading anteromedialization TTO provides significantly better pain relief and restoration of function compared to nonsurgical management in the treatment of symptomatic PFOA.

Patients undergoing APM without unstable chondral lesions had better outcomes than patients with unstable chondral lesions at 5 years after surgery.

ACL deficient tibiofemoral cartilage exhibits increased strain in response to treadmill walking, suggesting altered mechanical loading may contribute to the early degenerative cycle of osteoarthritis.

Football was the sport with the highest number of concussion events. Water polo had the second highest number of concussion events followed by women’s volleyball.

Acute, post-injury peripheral blood mobilization therapy with a CXCR4 antagonist improved bone tunnel healing and graft integration following ACL reconstruction surgery in a rat model.
Poster No. P0393

In Vitro Effects of Bupivacaine on the Viability and Mechanics of Native and Engineered Cartilage Grafts

Sarah Oyadomari, BS
Wendy E. Brown
Heenam Kwon, PhD
Gaston A. Otarola
Jarrett M. Link, PhD, MS
Kyriacos A. Athanasiou, PhD
Dean Wang, MD

Single bupivacaine exposure was chondrotoxic in both native explants and self-assembled neocartilage and resulted in significant weakening of mechanical properties in neocartilage only.

Poster No. P0394

Outcomes, Safety, and Complications with the use Tranexamic Acid in Arthroscopy: A Systematic Review

John W. Belk
Eric C. McCarty, MD, FAAOS
Jason L. Dragoo, MD, FAAOS
Felix H. Savoie, MD, FAAOS
Stephen Thon, MD

Patients undergoing arthroscopy with TXA can be expected to experience improved outcomes and less hemarthrosis-related complications in the early postoperative period when compared to non-TXA patients.

Poster No. P0395

Differential Articular Cartilage Gene Expression in Progressive Osteoarthritis from Femoroacetabular Impingement to End-Stage Hip Osteoarthritis

Benjamin Kuhns, MD
John Reuter, MS
Gillian Soles, MD, FAAOS
Jennifer H. Jonason, PhD
Brian D. Giordano, MD, FAAOS
Cheryl L. Ackert-Bicknell, PhD

We report on differential gene expression discovered by RNA sequencing of articular cartilage obtained from patients with femoro-acetabular impingement and end-stage osteoarthritis.

Poster No. P0396

Predictors of Pain, Function, and Health-Related Quality of Life Outcomes following Arthroscopic Management of Femoroacetabular Impingement

Jeffrey Kay, MD
Nicole Simunovic, MSc
Diane Heels-Ansdell, MSc
Mohit Bhandari, MD, FRCS
Olufemi R. Ayeni, MD

This study identifies several factors that are predictive of improved pain and health utility scores following arthroscopic management of FAI at 1-year postoperative.

Poster No. P0397

The Timing and Quantity of Corticosteroid Injections Prior to Total Hip Arthroplasty Impacts the Risk of Surgical Site Infection

Enrico Forlenza, BS
Robert A. Burnett, MD
Brian Forsythe, MD, FAAOS
Craig J. Della Valle, MD, FAAOS

Retrospective study aiming to elucidate the temporal and dose-dependent relationship between corticosteroid injections and the risk of surgical site infection (SSI) following THA.

Poster No. P0398


Adam M. Gordon, BS
David C. Flanigan, MD, FAAOS
Azeem T. Malik, MBBS
William K. Vasilieff, MD, FAAOS

This study analyzes the trends and variability in total procedural volume and hip arthroscopy of orthopaedic surgery sports medicine fellows from 2011-2016.

Poster No. P0399

The Relationship between Early and Mid-Term Hip Arthroscopy Outcomes: Employing 3-Month Follow Up to Predict Mid-Term Results

Mario Hevesi, MD, PhD
Ajay Lall, MS
David E. Hartigan, MD
Bruce A. Levy, MD, FAAOS
Benjamin G. Domb, MD, FAAOS
Aaron J. Krych, MD, FAAOS

At 3 month follow up after hip arthroscopy, patient reported VAS, mHHS, and HOS-SSS scores substantially predict future mid-term reoperation risk.

Poster No. P0400

Predicting Clinically Significant Outcomes in Patients Undergoing Hip Arthroscopy for the Treatment of Femoroacetabular Impingement Syndrome: A Large Cohort Analysis

Daniel M. Wichman, BS
Stephanie E. Wong, MD
Ian Clapp, MS
Philip Malloy, MPT, PhD
Shane J. Nho, MD, FAAOS

In a large cohort of primary hip arthroscopy patients, 87.9% of patients achieved any MCID, 74.4% achieved any PASS, 67.4% achieved any SCB at a minimum of 2-year follow up.
Poster No. P0401
Intraoperative Scrub Nurse Handoffs Increase Operative Times for Lower Extremity Orthopaedic Sports Procedures

Austin C. Kaidi, MSc
Bradley Hammoo, BS, MS
Connor Crutchfield, BA
Thomas R. Hickernell, MD
Christopher S. Ahmad, MD, FAAOS
William N. Levine, MD, FAAOS
Thomas S. Lynch, MD, FAAOS

An analysis of the effect of intraoperative scrub nurse handoffs on ACL reconstructions and hip arthroscopies. Scrub nurse handoffs significantly increase operative times in both procedure types.

Poster No. P0402
Arthroscopic Hip Surgery in a Military Population: Patient-Reported Outcomes Improve over the First Six Months

Brian Barlow, MD, FAAOS
Richard J. Robins, MD, FAAOS
Christopher J. Tucker, MD, FAAOS
William R. Volk, MD, FAAOS
Andrew S. Bernhardt, MD
Andrew P. Hurvitz, MD, FAAOS
Matthew Bradley
Timothy C. Mauntel, ATC, PhD
Jonathan F. Dickens, MD, FAAOS
MOTION Collaborative

A clinically relevant improvement was observed in a large cohort of US military patients undergoing hip arthroscopy. The improvement occurred in the first 6 months.

Poster No. P0403
Joint Venting Prior to Hip Distraction Minimizes Traction Forces during Hip Arthroscopy

Dillon C. O’Neill, MD
Alexander J. Mortensen, MD
Suzanna M. Ohlsen, BS
Temitope Adeyemi, MPH
Travis G. Maak, MD, FAAOS
Stephen K. Aoki, MD, FAAOS

Venting the hip prior to application of traction could serve to reduce the maximal amount of traction required to safely instrument the hip arthroscopically.

Poster No. P0404
Preoperative Symptom Severity Predicts 5-Year Hip Arthroscopy Outcomes

Berkcan Akpinar, MD
Lawrence J. Lin
David A. Bloom, BA
Thomas Youm, MD, FAAOS

FAI patients with high versus low preoperative symptom severity undergoing hip arthroscopy have inferior outcomes at 5-year follow up.

Poster No. P0405
Can We Eliminate Opioids after Anterior Cruciate Ligament Reconstruction? A Prospective, Randomized, Controlled Trial

Toufic R. Jildeh, MD
Kelechi Okoroha, MD
Noah A. Kuhlmann, BS, MS
Austin G. Cross, BS
Joseph S. Tramer, MD
Fabien Meta, MD
Vasilios Moutzouros, MD, FAAOS

A multimodal non-opioid pain protocol provides at least equivalent pain control compared to traditional opioid analgesics in patients undergoing ACL reconstruction without the risk of addiction.

Poster No. P0406
Opioid Use Disorder Is Associated with Increased Complications and Ninety-Day Costs of Care following Knee Arthroscopy: An Analysis of a Nationwide Private Insurance Database

David Richardson, MD
Angelo Mannino, MD
Andrew Ryan Horn, MD
Joseph Ehiorobo, MD
Rushabh Vakharia, MD
Michael A. Mont, MD, FAAOS
Orry Erez, MD, FAAOS
Martin W. Roche, MD, FAAOS

This retrospective case control series compares outcomes of opioid use disorder patients following primary arthroscopic knee surgery compared to a control cohort.

Poster No. P0407
Cost and Diagnostic Utility of Visits to the Emergency Department for Anterior Cruciate Ligament Injuries

Lambert Li, BA
Carlin C. Chuck, BS
Steven Bokshan, MD
Brett D. Owens, MD, FAAOS

Patients of low socioeconomic status and with Medicaid have greater utilization of the ED for ACL injuries. These episodes of care averaged $4,587 in costs yet have low levels of diagnostic utility.

Poster No. P0408
Rates of Secondary Surgery following Anterior Cruciate Ligament Repair with Suture Tape Augmentation are Comparable to Anterior Cruciate Ligament Reconstruction

Graeme P. Hopper, MD, MSc
William T. Wilson, MBCHB, MRCSED
Lucas O’Donnell, MBCHB
Christopher A. Hamilton, MBCHB, MSc
Mark J. Blyth, FRCS
Gordon MacKay, FRCS

Secondary surgery rates following ACL repair with suture tape augmentation are comparable to ACL reconstruction therefore should be considered a safe and reliable alternative for acute proximal tears.
Poster No. P0409
Quick Recovery and No Arthrofibrosis in Acute Anterior Cruciate Ligament Reconstruction: A Prospective Trial of Early vs. Delayed Reconstruction

Edoardo Monaco, MD
Ferdinando Iannotti, MD
Pier Francesco Indelli, MD, PhD
Alessandro Carrozzo, MD
Alessandro Annibaldi
Andrea Ferretti, MD

Acute ACL reconstruction, followed by an accelerated rehabilitation protocol, can be performed safely with no risk of arthrofibrosis and with clinical outcomes comparable to delayed ACLR.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure

Poster No. P0410
Standardization of Opioid Prescribing after Anterior Cruciate Ligament Reconstruction

Tyler Williamson, MD
Jeremiah Atkinson, BS
Natalie A. Scholz, MPH
Megan T. Reams, OTR/L
Bradley J. Nelson, MD, FAAOS
Deborah C. Bohn, MD, FAAOS

Standardization of opioid prescribing following ACL reconstruction reduced the number of opioid pills and MME prescribed by 25% without negatively impacting patient satisfaction or pain management.

Poster No. P0411
Incidence and Risk Factors for Symptomatic Venous Thromboembolism following Anterior Cruciate Ligament Reconstruction

Enrico Forlenza, BS
Kevin C. Parvaresh, MD
Matthew R. Cohn, MD
Ophelie Lavoie-Gagne
Zain M. Khazi, BS
Yining Lu, MD
Brian Forsythe, MD, FAAOS

This is a retrospective database review of patients with previous anterior cruciate ligament (ACL) reconstruction to determine the incidence and risk factors of symptomatic venous thromboembolism (VTE).

Poster No. P0412
Patient Factors Leading to Disparities in Adult Anterior Cruciate Ligament Reconstruction Surgery

Jacob Modest, MD
Edward Testa, MD
Nicholas Lemme, MD
Peter G. Brodeur, MA
Aristides I. Cruz, MD, FAAOS
Joseph A. Gill, MD

There are important social and patient-related disparities observed in adult patients undergoing ACL reconstruction after obtaining a diagnosis of an ACL injury.

Poster No. P0413
Non-Anatomic Femoral Tunnel Position in Anterior Cruciate Ligament Reconstruction Increases Risk for Postoperative Meniscus Tears

Alexandra S. Gabrielli, MD
Benjamin T. Raines, MD, ATC
Jonathan D. Hughes, MD
Volker Musahl, MD, FAAOS
Bryson P. Lesniak, MD, FAAOS

Correct femoral tunnel position is key for successful anatomic ACL reconstruction, and is essential not only for preservation of the ACL graft itself but for prevention of subsequent meniscus tears.

Poster No. P0414
The Impact of Socioeconomic Factors on Outcomes following Anterior Cruciate Ligament Reconstruction

Matthew T. Kingery, MD
Samuel Baron
Daniel J. Kaplan, MD
Sehar Resad, MS
Eric J. Strauss, MD, FAAOS
Guillem Gonzalez-Lomas, MD, FAAOS
Kirk A. Campbell, MD, FAAOS

In the setting of ACL injury, Medicaid patients presented significantly later after initial injury compared to non-Medicaid carriers, and had worse outcomes compared to their non-Medicaid peers.

Poster No. P0415
The Prevalence of Pathologic Posterior Tibial Slope in Revision Anterior Cruciate Ligament Reconstruction

Andrew J. Lopez, MD
Steven Wilding, MD
Brian J. Mannino, MD, FAAOS
David Thoma, DO
Kenneth Lindell, MD
Christian Cruz, MD
Craig R. Bottoni, MD, FAAOS

A review of 233 patients undergoing revision ACLR over a 10-year period demonstrated a 33% rate of pathologic posterior tibial slope that should warrant consideration of a slope correcting osteotomy.
Use of Liposomal Bupivacaine Adductor Canal Block to Reduce Postoperative Pain and Opioid Consumption after Anterior Cruciate Ligament Reconstruction

Emily L. Demaio, BSN
Jennifer Hunnicutt, ATC, PhD
Rebecca Haley, BA
Ehab Nazzal
Ajay Premkumar, MD, MPH
Heather Samady, MD
Michael B. Gottschalk, MD, FAAOS
John W. Xerogeanes, MD, FAAOS

This is a retrospective analysis of liposomal bupivacaine versus plain ropivacaine for adductor canal blocks in anterior cruciate ligament reconstruction to minimize postoperative pain and opioid consumption.

Does the Anterior Cruciate Ligament Reconstruction Affect Professional Soccer Player Performance and Career?

Daniele Mazza, MD
Carlo Massafra, MD
Fabio Marzilli, MD
Edoardo Viglietta
Giorgio Princi, MD
Edoardo Monaco, MD
Andrea Ferretti, MD

ACL tear should be seen as a potentially harmful injury for the career of these athletes.

Multimodal Analgesia Plus Intraoperative Hamstring Sheath Injection for Anterior Cruciate Ligament Reconstruction Reduces Postoperative Posterior Knee Pain but Does Not Reduce Postoperative Narcotic Use: A Double-Blind Randomized Control Trial

Brian Walczak, DO, FAAOS
Eamon D. Bernardoni, MD
Quinn Steiner, BS
Geoffrey S. Baer, MD, FAAOS
John A. Shepler, MD

Multimodal analgesia plus intraoperative hamstring sheath injection reduces postoperative posterior knee, but does not reduce postoperative narcotic needs in hamstring autograft ACL reconstruction.

A Comprehensive Description of the Lateral Patellofemoral Complex: Anatomy and Anisometry

Jorge A. Chahla, MD, PhD
Hailey Huddleston, BS
Brady T. Williams, MD
Philip Malloy, MPT, PhD
Neal B. Naveen, BS,
Brian J. Cole, MD, MBA, FAAOS
Adam B. Yanke, MD, PhD, FAAOS

This study describes the correlative anatomy of three distinct lateral patellar ligaments (LPFL, LPTL, and LPML) and their anisometry through flexion.

Hemoglobin A1c levels >= 6.7 Associated with Complications after Anterior Cruciate Ligament Reconstruction in Diabetic Patients

Miho J. Tanaka, MD, FAAOS
Mark D. Price, MD, FAAOS
Luke S. Oh, MD, FAAOS
Eric M. Berkson, MD, FAAOS

Diabetic patients undergoing ACL reconstruction w HbA1c >=6.7 were 25 times more likely to develop a surgical complication than those who had lower HbA1c levels, with the most common complication being the development of a cyclops lesion.

Patient Satisfaction is Equivalent Using Telemedicine vs. Traditional Office-Based Follow Up after Shoulder Arthroscopy

Danielle H. Markus, BA
Daniel J. Kaplan, MD
Christopher Colasanti, MD
Amit K. Manjunath, BS
Michael J. Alaia, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Kirk A. Campbell, MD, FAAOS

This trial compares metrics of office-based visits with virtual telemedicine visits for the second postoperative appointment after shoulder arthroscopy.

Opioid Overprescription in Adolescents and Young Adults Undergoing Hip Arthroscopy

Zaamin Hussain, MD, MEd
Mahad Hassan, MD
Omar F. Rahman, MD, MBA
Stephanie Burgess, PA-C
Yi-Meng Yen, MD, PhD
Mininder S. Kocher, MD, MPH, FAAOS

Like adults undergoing hip arthroscopy, adolescents undergoing hip arthroscopy consume a small percentage of the opioids they are prescribed postoperatively.

Increased External Tibial Rotation is Related to Trochlear Dysplasia in the Setting of Patellar Instability

James L. Pace, MD, FAAOS
David Chiu, BA, BS
Christopher Cheng, MD, MBA
Andrew Cohen, MS
Jeffrey J. Nepple, MD, FAAOS
Michael Brimacombe, PhD

External tibial rotation is correlated with trochlear dysplasia as measured by the lateral trochlear inclination angle and lateral patellar tilt in the setting of patellar instability.
Poster No. P0424
High Rate of Return to Sport following Medial Patellofemoral Ligament Reconstruction with or without Osteotomy

Austin V. Stone, MD, PhD
Brooks Platt, MD
Lucy C. Bowers, BS
Justin A. Magnuson, BA
Sean Marx, MD
Joseph N. Liu, MD
Jack Farr, MD, FAApollo

Our meta-analysis showed that athletes undergoing MPFL reconstruction return to sport at a high rate with or without an additional osteotomy.

Poster No. P0425
Anterior Cruciate Ligament Reconstruction in Adolescents: A Retrospective Evaluation of the Effect of the Extra-Articular Reconstruction in a Group of 93 Cases

Edoardo Monaco, MD
Alessandro Carrozzi, MD
Marta Minucci, MD
Fabio Marzilli, MD
Alessandro Annibaldi
Barbara Maestri, MD
Luca Labianca, MD
Andrea Ferretti, MD

Comparing the clinical results and the failure rate in pediatric patients who underwent ACL reconstruction, it was found that the association of LET significantly reduces failure rate.

Poster No. P0426
Acute Workload is Highly Correlated with Significant Injuries among National Basketball Association Players

Nirav K. Pandya, MD, FAApollo
Matthew Orringer, BA

Among 34 NBA players who sustained major in-game injuries, there was a strong correlation between injury risk and average minutes played per game in the games immediately preceding injury.

Poster No. P0427
Return to Sport and Subsequent Anterior Cruciate Ligament (ACL) Injury in Adolescents after ACL Reconstruction with Contralateral Patellar Tendon Graft

Sarah A. Eaton, ATC, DPT
K. Donald Shelbourne, MD, FAApollo
Rodney W. Benner, MD, FAApollo
Tinker Gray, MA, ELS

Of 618 adolescent patients after ACL reconstruction, 88% returned to pre-surgery sport level and the rate or time of subsequent ACL injury was not different or correlated to the time of return.

Poster No. P0428
Oral Ketorolac as an Adjuvant Agent for Postoperative Pain Control following Anterior Cruciate Ligament Reconstruction: A Prospective, Randomized, Controlled Study

John T. Strony, BS
Sunita Mengers, BA
Lakshmanan Sivasundaram, MD
Donald B. Goodfellow, MD, FAApollo
Brian N. Victoroff, MD, FAApollo
Michael J. Salata, MD
Robert J. Gillespie, MD, FAApollo
James E. Voos, MD, FAApollo
Michael Karns, MD

The use of adjunctive intravenous and short-term oral ketorolac substantially reduces narcotic utilization following ACL reconstruction.

Poster No. P0429
Quadriceps Strength in Adolescent Patients Undergoing Anterior Cruciate Ligament Reconstruction Utilizing Autologous Hamstrings after Femoral Nerve Block vs. Adductor Canal Block

Paul R. Fleissner, MD, FAApollo
Kodi Veale, PA-C

Adductor canal block does not provide persistent quadriceps motor strength benefit over femoral nerve block after anterior cruciate ligament reconstruction utilizing autologous hamstrings.

Poster No. P0430
Evidence-Based Opioid Prescribing Guidelines following Arthroscopic Knee Surgery

Nicole B. Liddy
Christopher L. Antonacci, BA, MS
Parth M. Kamdar, BS
Katherine B. Vadasdi, MD, FAApollo
James G. Cunningham, MD, FAApollo
Marc S. Kowalsky, MD, MBA, FAApollo
Demetris Delos, MD, FAApollo
Francis G. Alberta, MD, FAApollo
Paul Sethi, MD, FAApollo

Prescribing 5 oxycodone 5 mg pills (37.5 MME) may serve as a useful guideline for patients undergoing knee arthroscopy to reduce the number of pills prescribed and reduce the risk for opioid misuse.
Poster No. P0431
Oral Ketorolac as an Adjuvant Agent for Postoperative Pain Control following Arthroscopic Rotator Cuff Repair: A Prospective, Randomized, Controlled Study
Sunita Mengers, BA
Lakshmanan Sivasundaram, MD
Nikunj Trivedi, MD
Joseph Tenenbaum, MD, PhD
Michael J. Salata, MD
James E. Voos, MD, FAAOS
Brian N. Victoroff, MD, FAAOS
Michael Karns, MD
Robert J. Gillespie, MD, FAAOS
In a prospective, randomized, controlled study, the use of adjunctive intravenous and short-term oral ketorolac substantially reduced narcotic utilization following arthroscopic rotator cuff repair.

Poster No. P0432
Return to Sport following Latarjet Glenoid Reconstruction for Anterior Shoulder Instability
Anirudh K. Gowd, MD
Joseph N. Liu, MD
Evan M. Polce, BS
Avinesh Agarwalla, MD
Grant Garcia, MD
Gregory P. Nicholson, MD, FAAOS
Brian J. Cole MD, MBA, FAAOS
Nikhil N. Verma, MD, FAAOS
Anthony A. Romeo, MD, FAAOS
While a majority of patients are able to return to sport following Latarjet, patients experienced some limitation with throwing and return to sport at preinjury level.

Poster No. P0433
Arthroscopic Bankart Repair vs. the Open Latarjet Procedure for Recurrent Shoulder Instability in Athletes
Eoghan Hurley, MBCHB
Martin Davey, MD, MRCS
Ross O’Doherty
Mohamed Elmutgiba G. Osman
Leo Pauzenberger, MD
Hannan Mullett, FRCS (Ortho)
ABR results in excellent clinical outcomes with similar recurrence rates for those undergoing surgery for primary shoulder instability or recurrent instability.

Poster No. P0434
Short-term Complications following Latarjet-Bristow Procedure versus Arthroscopic Bankart Repair for Anterior Shoulder Instability: A Propensity Score Matched Analysis
Conor O’Neill, MD
Anirudh K. Gowd, MD
Michael P. Campbell, MD
Brian R. Waterman, MD, FAAOS
Seth A. Cheatham, MD, FAAOS
Alexander R. Vap, MD, FAAOS
A propensity score matched cohort analysis of short-term complications following arthroscopic Bankart versus Latarjet procedures, demonstrating increased rates of revision surgery after Latarjet.

Poster No. P0435
Arthroscopic Bankart Repair in Athletes with Primary Instability vs. Recurrent Instability vs. Failed Prior Surgery
Martin Davey, MD, MRCS
Eoghan Hurley, MBCHB
Mohamed Elmutgiba G. Osman
Leo Pauzenberger, MD
Hannan Mullett, FRCS (Ortho)
ABR results in excellent clinical outcomes with similar recurrence rates for those undergoing surgery for primary shoulder instability or recurrent instability.

Poster No. P0436
Sidelined due to COVID-19: Youth Athletes Sleep More, Practice Less, and May Lose Interest in Playing Sports due to Social Distancing Mandates
Henry B. Ellis, MD, FAAOS
Sophia M. Ulman, PhD
K. John Wagner, BS
Connor M. Carpenter
Emily B. Gale, PhD
Kevin G. Shea, MD, FAAOS
Philip L. Wilson, MD, FAAOS
In-person sport participation was suspended across the United States in the spring of 2020 in an effort to slow the spread of the novel coronavirus (COVID-19).

Poster No. P0437
Sport Specialization, Athletic Identity, and Coping Strategies in Young Athletes
Melissa A. Christina, MD, FAAOS
Ryan P. Coene, MS
Madeline K. O’Neil, BS
Mary Daley, MD
Kathryn A. Williams, MS
Kathryn E. Ackerman
Dennis E. Kramer, MD, FAAOS
Andrea Stracciolini, MD
Athletic identity was higher in athletes who were more specialized. Greater sport specialization may confer some advantages in developing coping strategies, but specialized athletes may worry more.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0438
The Relationship between Vitamin D Status and Postoperative Events after Anterior Cruciate Ligament Reconstruction

Miho J. Tanaka, MD, FAAOS
Eric M. Berkson, MD, FAAOS
Austin K. Collins, BA
Peter D. Asnis, MD
Mark D. Price, MD, FAAOS

Vitamin D insufficient patients were more likely than patients with normal vitamin D levels to return to the OR for ipsilateral surgery within 1 year after ACL reconstruction.

Poster No. P0439
The 5-Factor Modified Frailty Index is a Predictor of Postoperative Complications and Readmission in Geriatric Patients Undergoing Elective Rotator Cuff Repair

Neil V. Shah, MD, MS
Louis Day, MD
David J. Kim
Akini Moses, BS, BSN
Vidushan Nadarajah, MD
Salem Najar, BA
Qais Naziri, MD, MBA
William P. Urban, MD, FAAOS
Bashir A. Zikria, MD, MSc

Geriatric patients are more likely to develop postoperative complications, both major and minor, and be readmitted in the 30-day follow-up period after an elective rotator cuff repair.

Poster No. P0440
Complex Surgical Sports Medicine Procedures are Undervalued: An In-Depth Analysis

Randall T. Kreulen, MD
Micheal Raad, MD
Farah Musharbash, MD
Suress K. Nayar, MD
Matthew J. Best, MD
Varun Puvanesarajah, MD
Majd Marrache, MD
Umasuthan Srikumaran, MD, MBA, FAAOS
John H. Wilckens, MD

Surgical sports medicine procedures generate RVUs/hour at different rates. The rate is associated with patient characteristics. Case complexity was not associated with increased RVU/hour.

Poster No. P0441
Evaluating the Early Impact of the COVID-19 Pandemic on Sports Surgery Fellowship Education

Bejan Alvandi, MD
Peter Swiatek, MD
Joseph A. Weiner, MD
Daniel J. Johnson, MD
Bennet Butler, MD
Vehniah K. Tjong, MD, FAAOS
Michael A. Terry, MD, FAAOS

This study evaluates the impact of the COVID-19 pandemic on orthopaedic sports surgery fellows, their education and training, and their readiness for practice.
Poster No. P0445
Return to Play in Adolescent Baseball Players after Superior Labrum from Anterior to Posterior Repair

Somnath Rao, BA
Hareindra R. Jeyamohan
Robert A. Jack, MD
Pankti Acharya, MPH
Steven B. Cohen, MD, FAANS
Christopher Dodson, MD, FAANS
Michael G. Ciccotti, MD, FAANS

The purpose of this study is to evaluate adolescent baseball athletes who undergo SLAP repair in order to determine their progression of play, surgical outcomes, and overall satisfaction with surgery.

Poster No. P0446
Timing for Initial Postoperative Enoxaparin Administration after Acetabular Fracture Repair: Implications for Venous Thromboembolism and Wound Complications

Kyle Cichos, BS
Elie S. Ghanem, MD, FAANS
Gerald McGwin, MS, PhD
Clay A. Spitzer, MD, FAANS

Postop LMWH after acetabular fracture surgery given within 6 hours of surgery increased the rate of SSI, but there was no increased risk of VTE with LMWH given 6-24 hrs vs. <6 hrs.

Poster No. P0447
Does Use of a Quadrilateral Surface Plate Improve Outcome in Elderly Acetabular Fractures?

Graeme M. Nicol, FRCS (Ortho), MBCHB
Ethan Sanders, BS
Steven R. Papp, MD
Allan Liew, FRCSC, MD
Geoffrey P. Wilkin, MD, FRCSC
Wade T. Goffon, BSCH, MD
George A. Grammatopoulos, MRCS

In elderly patients there is high incidence of quadrilateral plate involvement and surgeons should consider a QSP as both fracture reduction is improved as is the need for further intervention.

Poster No. P0448
Recovery Position vs. Prone Position in the Surgical Treatment of Trimalleolar Ankle Fractures Using Posterolateral and Medial Approaches

Sebastián Drago, MD
Patricio Zagal, MD
Martín A. Contreras Olivares, MD
Marcelo F. Concha, MD
Juan Pedro Bergeret Valladares, MD
Gonzalo F. Bastias, MD

This retrospective analytic study compared the results of recovery position and prone position for the treatment of trimalleolar ankle fractures.

Poster No. P0449
Tightrope vs. Suture-Post Technique for Ankle Syndesmosis Injuries: A Biomechanical Comparison

Paulo Castaneda, MD
Pierce Johnson, MD
Robert Walker, MD
J. Tracy Watson, MD, FAAMS
Tony K. Nguyen, MD, FAANS

Our novel suture-post construct for ankle syndesmosis injuries provides stable yet flexible fixation that is biomechanically comparable to the Tightrope device at a much lower price point.

Poster No. P0450
An Analysis of Traumatic Ankle Fracture Patients: Does Income Status Influence Access to Acute Orthopaedic Surgical Care?

Travis S. Bullock, BS
Case W. Martin, MD
Gautham Prabhakar, MD
John Cabot
Farhan Ahmad, BS
Luis M. Salazar
Leah P. Griffin, MS
Gustavo J. Almeida, PhD, PT
Boris A. Zelle, MD, FAANS

Lower-income patients with ankle fractures are more susceptible to multiple time sensitive delays in care, more likely to be uninsured, and more likely to struggle with postoperative instructions.

Poster No. P0451
Does Origin Matter? Neural Crest-Derived Mesenchymal Stem Cells Enhance Allograft Integration Better than Bone-Marrow-Derived Mesenchymal Stem Cells

Evan Nigh, MD
Juliane D. Glaeser, PhD
Phillip H. Behrens, MD
Tina Stefanovic, BS
Khosrowdad Salehi, BS
Angeliki Papalamprou, PhD
Wafa Tawackoli, BS, PhD
Melodie Metzger, PhD
Samuel Eberlein
Trevor Nelson, BS
Robert Baloh, MD, PhD
Shiran Ben-David, BS
Yasaman Arabi, BS, MS
Doron Cohn-Schwartz, PhD
Robert C. Ryu, MD
Hyun W. Bae, MD
Zulma Gazit, PhD
Dmitriy Sheyn, PhD
Orthopaedic Stem Cell Research Laboratory

Seeding of decellularized allografts with MSCs derived from induced neural crest cells enhances allograft integration into host bone compared to allografts seeded with bone marrow-derived MSCs.

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**Poster No. P0452**
The Effect of Time of Debridment on Open Fracture Infection Rates: A Trauma Quality Improvement Program Analysis

*Kevin T. Rezzadeh, BA*
*Kenneth A. Egol, MD, FAAMOS*
*Jacques H. Hacquebord, MD, FAAMOS*

Early intervention (IV antibiotics, debridement) yields better results in open fracture management.

**Poster No. P0453**
Low Adherence to Recommended Guidelines for Open Fracture Antibiotic Prophylaxis

*Carol Lin, MD, MA, FAAAMOS*
*Nathan N. O’Hara, MHA*
*Sheila Sprague, PhD*
*Robert V. O’Toole, MD, FAAAMOS*
*Manjari Joshi*
*Anthony Harris, MD*
*Stephen J. Warner, MD, PhD, FAAAMOS*
*Herman Johal, MD*
*Roman Natoli, MD, PhD*
*Jennifer E. Hagen, MD, FAAAMOS*
*Kyle J. Jeray, MD, FAAAMOS*
*Justin T. Fowler, MD, FAAAMOS*
*Kevin D. Phelps, MD*
*Holly T. Pilson, MD, FAAAMOS*
*Ida L. Gitajn, MD*
*Mohit Bhandari, MD, FRCSC*
*Gerard Slobogean, MD, MPH, FAAAMOS*
*PREP-IT Investigators*

We evaluated variations in antibiotic prescribing practices at 24 centers in the US and Canada. We hypothesized that there would be low adherence to recommended guidelines.

**Poster No. P0454**
Malpractice Lawsuits in Orthopaedic Trauma: A Critical Analysis of the Recent Literature

*Ahmed Thabet Hagag, MD*
*Rami Khalifa, MD, PhD*
*John J. Pisquiy, MD, MHA*
*Loc-Uyen Vo, MD*
*Amr A. Abdelgawad, MD, PhD, FAAAMOS*
*Thomas A. DeCoste, MD, FAAAMOS*

Malpractice lawsuits in orthopaedic trauma surgery pose professional and monetary risk to surgeons. This review studied common causes, settings, and financial outcomes of previous litigation cases.

**Poster No. P0455**
Does Implementation of a Multimodal Pain Protocol Reduce Opioid Consumption after Outpatient Orthopaedic Trauma Surgeries?

*Matthew Siow, MBA, MD*
*Brendon Mitchell, MD*
*Carrie Vuong, MD*
*Audrey Zanzucchi*
*John J. Finneran, MD*
*Paul J. Girard, MD, FAAAMOS*
*Alexandra K. Schwartz, MD, FAAAMOS*
*William T. Kent, MD*

A multimodal pain protocol after trauma surgery reduced opioids taken by 59% in the first four days postoperatively. We recommend prescribing <15 MME, sufficient for >90% of patients.

**Poster No. P0456**
Empiric High Dose Vitamin D Therapy in Orthopaedic Trauma: An Analysis of Safety and Cost-Effectiveness

*Sandip P. Tarpada, MD*
*Milan K. Sen, MD, FAAAMOS*
*Mani D. Kahn, MD, FAAAMOS*

In orthopaedic trauma patients, empiric high dose vitamin D therapy is associated with a 360% reduction in cost when compared to individualized 25 (OH) vitamin D level testing and supplementation.

**Poster No. P0457**
High Rates of Surprise Bills for Orthopaedic Patients Seeking Emergency Hip Fracture Care

*Nathan Varady, BS*
*Troy B. Amen, BA*
*Ahab Chopra*
*David M. Freccero, MD, FAAAMOS*
*Eric L. Smith, MD, FAAAMOS*
*Antonia F. Chen, MD, MBA, FAAAMOS*

In this study of 23,261 patients seeking emergency hip fracture care, over 35% of patients received surprise medical bills with a median amount owed of $1,817.

**Poster No. P0458**
Early Identification of Posttraumatic Stress Disorder in Trauma Patients: Development of a Multivariable Risk Prediction Model (Traumatic Injury PTSD Prediction Score (TIPPS))

*Mara L. Schenker, MD, FAAAMOS*
*Victoria G. Kravets, BS*
*Joel Derosa, BS*
*Alexandra C. Ernst, MPH*
*William M. Reisman, MD, FAAAMOS*
*Ruth Parker*
*Dorian A. Lamis, PhD*
*Abigail P. Lott, PhD*

The purpose of this study was to build a risk prediction model to identify trauma patients at the time of injury who are at high risk for PTSD one year later, to allow real-time diagnosis and referral.
Poster No. P0459
Masquelet Technique for the Tibia: A Systematic Review and Meta-Analysis of Contemporary Outcomes
Arun Aneja, MD, PhD
Boshen Liu, MD
Jarod T. Teasdall, MD
Jae-Woo Cho
Ida L. Gitajn, MD
Jong-Keon Oh, MD, PhD
Arjun Srinath, MD, FAAOS
The Masquelet Technique is shown to be a viable treatment option in tibial bone defects up to 7 cm in the adult population.

Poster No. P0460
Bias in Care? Emergent Orthopaedic Surgery Not Impacted by Ethnicity
Sarah R. Blumenthal, MD
George W. Fryhofer, MD
Sarah Pierrie, MD
Samir Mehta, MD, FAAOS
This study evaluates disparities in timing between admission and surgery for emergent procedures and finds ethnicity-based differences in General and Vascular Surgery but not Orthopaedic Surgery.

Poster No. P0461
Get Out Your Wallet: Costs Associated with Gunshot Wounds at an Urban Public Trauma Center
Natasha Simske, BS
Trenton W. Rivera, BA
Mai P. Nguyen, MD, FAAOS
Heather A. Vallier, MD, FAAOS
The cost of 946 GSWs was $18.1 million, an average of $671,541 per month. In total, 55% had Medicaid, and 33% were uninsured, resulting in substantial uncompensated expenses for the trauma center.

Poster No. P0462
Conditionally Essential Amino Acid Supplementation Reduces Postoperative Complications and Muscle Wasting in Orthopaedic Trauma Patients
John Davison, MPH
Nathan Hendrickson, MD
Erin S. Wilson, MD
Aspen Miller, BS
Natalie A. Glass, PhD
J. Lawrence Marsh, MD, FAAOS
Michael C. Willey, MD, FAAOS
We demonstrated conditionally essential amino acid supplementation is potentially a low cost intervention to reduce complications and muscle wasting after acute orthopaedic trauma and fixation.

Poster No. P0463
The Rise of Scooter Rideshares: An Unsafe Practice with a National Epidemic of Musculoskeletal Injuries
Kevin X. Farley, BA
Matthew Alizpuru, MD
Jacob M. Wilson, MD
John W. Xerogeanes, MD, FAAOS
Charles A. Daly, MD
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD
The ESTIMATED incidence of electric scooter injuries treated in US EDs nearly doubled between 2018 and 2019, despite various regulatory efforts and evidence highlighting this issue.

Poster No. P0464
Short Cephalomedullary Nail vs. Dynamic Hip Screw for the Fixation of Unstable Pertrochanteric Fractures: A Feasibility Randomized Trial including Patients with Cognitive Impairment
George Kleftouris, MD, MSc
Theodoros Tosounidis, MD, PhD
Michalis Panteli, MD
Nikolaos K. Kanakaris, MD, PhD
Peter Giannoudis, MD, FACS
This study provides evidence that it is plausible to conduct an RCT on hip fractures including patients with dementia; a full-scale trial is required to reveal a difference between the 2 implants.

Poster No. P0465
A Comparison of Surgical Approaches to the Hip: Is there a Difference for Hemiarthroplasty in the Treatment of Displaced Femoral Neck Fractures?
Lydia Parzych, MD
John T. Gorczyca, MD, FAAOS
Gillian Soles, MD, FAAOS
Catherine A. Humphrey, MD, MBA
John P. Ketz, MD, FAAOS
Alexander Greenstein, MD
Kyle T. Judd, MD, FAAOS
Hemiarthroplasty for treatment of femoral neck fractures is likely best carried out through either the direct anterior approach or laterally based approach given current trends identified.

Poster No. P0466
Operative Management of Hip Fractures within 24 Hours of Admission in the Elderly is Achievable and Associated with Reduced Opiate Use and Shorter Hospital Length of Stay
Sachin Allahabadi, MD
Mohammad Roostan
Stephanie Rogers, MD, MPH
Derek Ward, MD
Candace J. Kim, MD
Operative treatment of geriatric hip fractures within 24 hours of admission is associated with shorter length of stay and less narcotic pain medication use. Delays beyond 24 hours may be preventable.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Are Certain Comorbidities More Predictive of Early Mortality than Others in Geriatric Hip Fracture Patients?

Michael Mchugh, MD
Nathaniel Schaffer, MD, PhD
Jenna Wilson, MD
Max Davis, MD
Aaron M. Perdue, MD, FAAOS
Mark Hake, MD, FAAOS

This retrospective study of 2,300 patients found that diabetes and cognitive impairment in geriatric hip fracture patients increased their mortality, while COPD led to an increase in adverse events.

Hip Arthroplasty Outcomes for Femoral Neck Fractures in Transplant Patients

Peter P. Hsiue, MD
Clark J. Chen, BS
Justo A. Caballero, BS
Amir Khoshbin, MD
Danielle Y. Ponzo, MD
Alexandra Stavrakis, MD

This retrospective cohort study found that transplant patients who undergo hip arthroplasty for femoral neck fractures are at an increased risk for surgical site infections and renal complications.

Comparison of Short, Intermediate, and Long Cephalomedullary Nail Length Outcomes in Intertrochanteric Femur Fractures

Tanner Womble, BS
Andrew Kirk, BS
Maxwell S. Boyle
Shea Comadoll, MD
Leon Su, BS
Raymond D. Wright, MD, FAAOS
Paul E. Matuszewski, MD, FAAOS
Arun Aneja, MD, PhD

While there is extensive literature comparing long and short length CMN, to our knowledge this is the first study to address intermediate length CMN outcomes.

Evaluating the Effectiveness of the Imperial Femoral Intramedullary Nailing Cognitive Task Analysis Tool in a Real-Time Simulation Setting: A Randomized Controlled Trial

Rahul Bhattacharyya
Bilal Al-Obaidi, FRCS (Ortho)
Kapil Sugand, MBBS
Rajarshi Bhattacharya, MBA, MSc
Chinmay Gupte, PhD, FRCS

A novel femoral nailing Cognitive Task Analysis tool has shown objective benefits in the enhancement of practical skills in a real time simulation setting (Distributed Interactive Simulation).

Operatively Treated Fragility Fractures of the Acetabulum Have a Lower 1-Year Mortality Rate Compared to Proximal Femoral Fractures: A Comparative Analysis of 486 Patients

Vera M. Stetzelberger, MD
Iris F. Brouze, MD
Simon D Steppacher, MD
Johannes D. Bastian, MD
Moritz Tannast, MD

Although they presented significantly more perioperative complications, elderly patients with acetabular fractures had a lower one-year mortality than patients with proximal femoral fractures.

Fascia Iliaca Block Decreases Hip Fracture Postoperative Opioid Consumption: A Prospective Randomized Controlled Trial

Mitchell Long, DO
Jeffrey Thompson, DO
David Galos, MD, FAAOS
Charles J. Ruotolo, MD, FAAOS
Rhyne C. Dengenis, DO

Preoperative FICB significantly decreases postoperative opioid consumption; we recommend the integration of this modality in hip fracture management as an adjunctive pain control strategy.


Troy B. Amen, BA
Nathan Varady, BS
Ahab Chopra
Sean Rajaee, MD
Antonia F. Chen, MD, MBA, FAAOS

In this nationwide study investigating patients undergoing hip fracture surgery, we found improving racial disparities in perioperative care between Black, Asian, Hispanic, and white patients.

Efficacy of Tranexamic Acid Use in the Fixation of Intertrochanteric Femur Fractures

Itay Ashkenazi, MD
Or Shaked, MD, MPH
Ittai Shichman, MD
Ely L. Steinberg, MD

In a retrospective study, intraoperative use of tranexamic acid in patients undergoing proximal femoral nail fixation did not show significant reduction in mortality or perioperative blood loss.
Poster No. P0475
Risk of Iatrogenic Radial Nerve Palsy Associated with Operative Fixation of Humeral Shaft Fractures

Sarah Stroud, MD
Utku Kandemir, MD, FAAOS

In the hands of trained trauma surgeons, surgical approach and surgical technique are not associated with iatrogenic radial nerve palsy after operative fixation of humeral shaft fractures.

Poster No. P0476
Short Cephalomedullary Nails Decrease True Blood Loss Compared to Long Nails: A Multicenter Retrospective Review

Manak Singh, BS
Nathaniel Schaffer, MD, PhD
Michael McHugh, MD
Max Davis, MD
Aaron M. Perdue, MD, FAAOS
Mark Hake, MD, FAAOS

A measure more accurate than estimated blood loss demonstrates that short cephalomedullary nails reduce blood loss in hip fracture surgery with decreased operative time and no additional risks.

Poster No. P0477
Impact of Risk Factors on Postoperative Outcomes in Patients with Acute Long Bone Osteomyelitis

Qais Naziri, MD, MBA
Ryan Kong, BS
Frank A. Segreto, BS
Evan Horowitz, MD
Nicholas Stekas, MD
Nishant Suneja, MD

Risk factors for adverse postoperative outcomes in patients with acute long bone osteomyelitis include open wounds and hypoalbuminemia.

Poster No. P0478
Rapid Visualization and Analysis of Fluorescently Conjugated Antibodies as Ex-Vivo Markers for Bacterial Presence on Orthopaedic Explants, Tissue, and Synovial Fluid

Ellis Berns, BS
Dioscaris R. Garcia, PhD
Caitlin Barrett
Carole Spake, MS
Jillian Glasser, BA
Adrian Turcu, BA
Valentin Antoci, MD, PhD, FAAOS
Christopher T. Born, MD, FAAOS

The development of a rapid visualization assay using fluorescently conjugated antibodies provides surgeons with a low cost, accurate diagnostic test for the presence of infection.

Poster No. P0479
Nailing with Three-Component Antibacterial Coating Consisting of a Polymer, Silver Salt Nanoparticles, and Antibiotic in Infected Fractures and Nonunions of Tibia and Femur

Pavel Volotovski
Alexandre A. Sitnik, MD, PhD
Mikhail Herasimenka

Intramedullary nailing with novel three-component antibacterial coating allows surgeons to eradicate the infection and achieve bone healing in patients with infected fractures and nonunions of tibia and femur.

Poster No. P0480
Rate of Reoperation and Readmission after Operative Management of Midshaft Clavicle Fractures in Adolescents

Ishaan Swarup, MD
Laura A. Carrillo, BA
Hao-Hua Wu, MD
Aman Chopra, BA
Matthew K. Callahan, MSBA

The purpose of this study was to determine the rate of reoperation and readmission after operative management of midshaft clavicle fractures in adolescents.

Poster No. P0481
Transverse Posterior Wall Fractures are at High Risk for Early Conversion Total Hip Arthroplasty after Acetabular Fracture Fixation

Kyle Cichos, BS
Clay A. Spitler, MD, FAAOS
Jonathan H. Quade, MD, FAAOS
Gerald McGwin, MS, PhD
Elie S. Ghanem, MD, FAAOS

Transverse posterior wall fractures have a high risk of early conversion THA compared to other acetabular fracture patterns.

Poster No. P0482
Risk Factors for Complications and In-Hospital Mortality: An Analysis of 19,834 Open Pelvic Ring Fractures

Peter Regala, MD
Nicholas Frane, DO
Cesar R. Iturriaga, DO
Christine D. Bub, MD
Gus Katsigiorgis, DO
Michael S. Linn, MD, FAAOS

Morbidity and mortality remain high following open pelvic fractures. The most predictive risk factors that appear to influence outcomes include GCS, ISS, and hemodynamic stability on arrival.
Poster No. P0483
Outcome of Total Hip Arthroplasty following Acetabular Open Reduction Internal Fixation in the Elderly: Acute vs. Delayed THA

Graeme M. Nicol, FRCS (Ortho), MBCHB
Ethan Sanders, BS
Paul R. Kim, FRCS
Wade T. Gofton, BSCH, MD
Paul E. Beaulie, MD, FAAOS
George A. Grammatopoulos, MRCS

In elderly patients whom a THA is likely to be required following acetabulum ORIF, this should be performed acutely as this is likely to result in improved PROMs and reduced burden to the patient.

Poster No. P0484
Venous Thromboembolism after Surgery of Pelvic and Lower-Extremity Fractures: What Plasma Marker is the Best for Predicting?

Sang Y. Lee, MD
Takahiro Niikura, MD, PhD
Ryosuke Kuroda, MD
Katsunori Inagaki

In 105 patients with pelvic and/or lower extremity fractures, SFMC tests measured 7 days after surgery have excellent diagnostic power for predicting postoperative VTE.

Poster No. P0485
Postoperative Urinary Tract Infection and Hospital Readmission: Modifiable Risk Factor for Geriatric Patients Undergoing Major Hip Surgery

Eli Levitt, MS
Vivian Wong
Elias Atri
Fong Nham, BS
Irfan A. Khan, ATC
Pura Rodriguez De La Vega, MPH
Grettel Castro, MPH
Samuel Swiggett, MD
Noel C. Barengo, MD, MPH

Geriatric patients with a postop UTI have a significantly higher risk of readmission to the hospital following major hip surgery. Further study to optimize modifiable risk factors is needed.

Poster No. P0486
Comparable Outcomes of In-Cement Revision and Uncemented Modular Stem Revision for Vancouver B2 Periprosthetic Femoral Fracture at 5 Years

Antonio Klasan, MD
James Millar, MBCHB
Jonathan Quayle, FRCS
Bill Farrington, FRACS, FRCS
Peter Misur, FRACS

In-cement revision is a valid treatment option for Vancouver B2 fractures, comparable to uncemented stem revision.

Poster No. P0487
Operative vs. Nonsurgical Treatment of Acute Unstable Chest Wall Injuries: A Multicenter Randomized Controlled Trial

Niloofer Dehghan, MD, MSc, FAAOS
Aaron Nauth, MD
Emil H. Schemitsch, MD, FAAOS
Milena Vicente, RN
Richard Jenkinson, MD
Hans J. Kreder, MD, MPH, FAAOS
Michael D. McKee, MD, FAAOS
Cots Canadian Orthopaedic Trauma Society

This is the largest randomized controlled trial to date comparing surgical fixation to nonsurgical treatment of unstable chest wall and flail chest injuries.

Poster No. P0488
General Health Outcomes for Operative vs. Nonsurgical Treatment of Acute Unstable Chest Wall Injuries: Results from a Previous Randomized Controlled Trial

Christine Schemitsch, BS
Michael D. McKee, MD, FAAOS
Aaron Nauth, MD
Emil H. Schemitsch, MD, FAAOS
Milena Vicente, RN
Richard Jenkinson, MD
Hans J. Kreder, MD, MPH, FAAOS
Niloofer Dehghan, MD, MSc, FAAOS

The purpose of this study was to analyze general health outcomes in patients who were randomized to surgical fixation or nonsurgical management for acute, unstable chest wall injuries.

Poster No. P0489
Quantitative Differences in Embolic Load between Femoral and Tibial Shaft Fractures Treated with Reamed Intramedullary Fixation

Christopher Lee, MD
Aresh Sepehri, MD
Nathan N. O’Hara, MHA
Daniel Connelly, BS
Mitchell Baker, BS
Bianca Conti, MD
Mary Hyde
Andrew N. Pollak, MD, FAAOS
Robert V. O’Toole, MD, FAAOS

Femoral shaft IMN fixation led to a 269% increase in embolic load in comparison to tibial shaft IMN fixation, with the greatest quantitative load during the reaming stage.
Poster No. P0490
Comparison of Three C-Arm Draping Techniques to Prevent Far Side Contamination

David M. Romano, MD, FAAOS
Gavin Santini Hautala, MD
Eric Abbenhaus, MD
Arun Aneja, MD, PhD
Eric S. Moghadamian, MD, FAAOS
Raymond D. Wright, MD, FAAOS
Marcus F. Sciadini, MD, FAAOS
Paul E. Matuszewski, MD, FAAOS

“Far side” contamination can be reduced during lateral imaging by utilizing one of two methods: A proprietary close-fitting C-Arm drape or a split-drape placed to “seal off” contaminants.

Poster No. P0491
Haptic Feedback during Virtual Reality Training Significantly Improves First-Year Orthopaedic Resident Performance of Drilling the Tibia

Ajay C. Kanakamedala, MD
John F. Dankert, MD
Rown Parola
Sophia J. Warren
Kenneth A. Egol, MD, FAAOS
Vinay Aggarwal, MD
Claudette M. Lajam, MD, FAAOS

Haptic feedback during virtual reality (VR) simulation significantly improves resident performance at tibia drilling compared to VR without haptic training.

Poster No. P0492
When and How Do We Identify Smokers Most Likely to Quit with Our Help?: A Secondary Analysis of the STOP Trial

Paul E. Matuszewski, MD, FAAOS
Katherine M. Joseph, MPH
Robert V. O’Toole, MD, FAAOS

As part of a randomized trial we identified characteristics associated with quitting smoking. These are highest at index hospitalization, suggesting that this is the best time to initiate cessation.

Poster No. P0493
Developmental Patella Baja Status Post Intramedullary Tibial Nail Placement

Ryan M. Sutton, MD
Taylor Paziuk, MD
James C. Krieg, MD, FAAOS

This study demonstrates developmental patella baja as a complication of intramedullary tibial nail placement for tibial shaft fractures.

Poster No. P0494
Randomized Controlled Trial Comparing Open Reduction vs. Ilizarov in the Management of AO Type C Pilon Fractures

Muhammad Tahir
Ahmad Faraz, MBBS
Ghulam Mahboob, FCPS
Nadeem Ahmed
Shoaib Khan

To conclude, neither open reduction internal fixation nor Ilizarov method of skeletal stabilization determined superior outcomes in terms of disability status, clinical and health-related outcomes at 12 months.

Poster No. P0495
The Use of Computed Tomographic Angiography to Predict Complications in Tibial Fractures

Clay A. Spitler, MD, FAAOS
John C. Prather, MD
Brent Cone, MD
Jonathan H. Quade, MD, FAAOS
Kenneth J. Fellows
Thomas L. Devine
Gerald McGwin, MS, PhD

Tibial shaft or pilon fractures with two vessel injury identified on CTA leads to higher rates of deep infection, nonunion, and unplanned reoperation than 0 or 1 vessel injuries.

Poster No. P0496
Comparison of Ballistic Tibia Fractures with both Open and Closed Tibia Fractures sustained by Blunt Mechanisms

Clay A. Spitler, MD, FAAOS
John C. Prather, MD
Tyler P. Montgomery, BS
Brent Cone, MD
Jonathan H. Quade, MD, FAAOS
Kenneth J. Fellows
Thomas L. Devine

Ballistic tibial shaft fractures have high rates of compartment syndrome and soft tissue coverage compared to closed fractures and have similar nonunion and infection rates to low grade open fractures.

Poster No. P0497
Does Every Trimalleolar Ankle Fracture Need a CT, or are X-rays Good Enough?

Ayush Thomas, BS
Ryan Fredette
George J. Han, BA
Eric F. Swart, MD, FAAOS

Plain radiographs are both sensitive and specific for determining the need for posterior malleolus fixation, and CT should be reserved for preoperative planning for those with >25% width on x-ray.
Poster No. P0498
Computed Tomography Defined Soft Tissue Zone of Injury is a Novel Predictor of Nonunion in Open Pilon Fractures

Richard Wawrose, MD
Malcolm Dombrowski, MD
Humza Shaikh, MD
Margaret Hankins, MD
Ivan S. Tarkin, MD, FAAOS

This retrospective study defined a novel predictor of nonunion in open pilon fractures based upon the proximal extent of gas on initial imaging.

Poster No. P0499
No Difference in Deep Infection or Revision Surgery Rates with Single vs. Dual Incision Approach for Dual Plating of Bicondylar Tibial Plateau Fractures

Theodore Guild, MD
Derek S. Stenquist, MD
Caleb Yeung, MD
Mitchel B. Harris, MD, FAAOS
Arvind G. Von Keudell, MD
Raymond M. Smith, MD

There is no difference in deep infection or revision surgery rates with single vs. dual incision approach for dual plating of bicondylar tibial plateau fractures.

Poster No. P0500
Recognizing Intimate Partner Violence: Never Neglect a “Nightstick” Fracture

David Sing, MD
Bharti Khurana, MD
Mitchel B. Harris, MD, FAAOS
Paul Tornetta III, MD, FAAOS

Up to one-third of adult women sustaining nightstick fractures may be caused by IPV. Orthopaedic surgeons are in a position to help patients get help in this dangerous circumstance.
POSTER SESSION II

Two Poster Sessions offer twice as many presentations. Discover new advances and observe more than 1,000 visual presentations of the latest medical, clinical, or scientific orthopaedic research.

Session I: Tuesday – Wednesday
Session II: Thursday – Friday

POSTER SESSION 2

ADULT RECONSTRUCTION HIP

Poster No. P0501
International Organism Profile of Periprosthetic Total Hip and Knee Infections

Jesus M. Villa, MD
Tejbir S. Pannu, MD, MS
Ibrahim Theeb, MD
Martin Buttaro, MD
Jose I. Oñativia, MD
Nikolai N. Kornilov, MD, PhD
Nemandra A. Sandiford, MSc, FRCS
Nicolas S. Piuzzi, MD
Carlos A. Higuera Rueda, MD, FAAOS
Daniel Kendoff, MD
PANGEA Research Group

We sought to describe and compare causative organisms of hip/knee PJI, rates of resistant organisms, and frequencies of polymicrobial infections at 7 institutions located in North/South America/Europe.

Poster No. P0502
External Validation of a Preoperative Prognostic Calculator for Periprosthetic Joint Infection

Hannah J. Szapary, BS
Michael M. Kheir, MD
Andrew Figoni, MD
Ruben Monarrez, MD
Mitchell Maltenfort
Erik N. Hansen, MD, FAAOS
Antonia F. Chen, MD, MBA, FAAOS

A prognostic model for PJI treatment failure was externally validated at Institution 1, with excellent performance. For Institution 2, treatment failure was less predictable due to a healthier cohort.

Poster No. P0503
Gender Disparities in Arthroplasty Literature and Academic Leadership

Raylin F. Xu, BA
Nathan H. Varady, BS
Antonia F. Chen, MD, MBA, FAAOS

Despite progress toward gender parity in orthopaedics from 2002-2019, women continue to remain underrepresented in arthroplasty literature and at the highest levels of academic and department ranks.

Poster No. P0504
Accuracy of Patient Classification following the Removal of Total Hip Arthroplasty from the Center for Medicare and Medicaid Services Inpatient-Only List

Vivek Singh, MD
Mohamad Sharan, MD
Alexander Gaukhman, MD
Lorraine Hutzler, MHA
James D. Slover, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS

This study is on accuracy of patient classification following the removal of total hip arthroplasty from the Center for Medicare and Medicaid Services inpatient-only list.

Poster No. P0505
Total Joints in a Time of Crisis

Lauren E. Dittman, MD
Joshua Johnson, MD
Robert T. Trousdale, MD, FAAOS

This survey explores patient perspectives regarding primary total joint arthroplasty during the ongoing COVID-19 pandemic.

Poster No. P0506
Safer and Risk Area for Proximity of the Femoral Nerve and Anterior Acetabulum: A Cadaveric Anatomical Study

Kensuke Yoshino, MD
Junichi Nakamura, MD
Shigeo Hagiwara, PhD
Yuya Kawarai, MD
Kenta Konno, MD
Satoshi Yoh, PhD
Keihiro Kanno, DM
Sei Yano

It is relatively safe for the femoral nerve to avoid the anterior acetabulum from 60 to 120 degrees area in insertion and placement of retractors.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0507
Reassessing the Acetabular Safe Zone: A Multivariable Case-Controlled Study

Mario Hevesi, MD, PhD
Cody Wyles, MD
David V. Ivanov, MD
Daniel J. Berry, MD, FAAOS
David G. Lewallen, MD, FAAOS
Rafael J. Sierra, MD, FAAOS
Michael J. Taunton, MD, FAAOS
Robert T. Trousdale, MD, FAAOS

The ideal safe zone for THA is different from that proposed by Lewinnek and colleagues. For intraoperative decision making, slightly higher anteversion is better tolerated.

Poster No. P0508
Dislocation Rates in Total Hip Arthroplasty Performed Prior to or Following Lumbar Fusion

Gerald Andah, MD
Eric L. Hume, MD, FAAOS
Charles L. Nelson, MD, FAAOS
Gwo-Chin Lee, MD, FAAOS

This is an analysis of factors affecting dislocation rates in total hip arthroplasty performed prior to or following lumbar spinal fusion.

Poster No. P0509
Cemented Femoral Stems Reduce Risk of Early Periprosthetic Fracture in High Risk Total Hip Arthroplasty Cohort

Luke G. Menken, DO
Zachary Berliner, MD
Herbert J. Cooper, MD, FAAOS
Jose A. Rodriguez, MD, FAAOS

Use of cemented primary stem in a high-risk demographic group, significantly lowered the incidence of periprosthetic fracture in these patients.

Poster No. P0510
Is American Society of Anesthesiologists Classification the Best Predictor of Morbidity following Primary Joint Arthroplasty? Validation and Application of the Modified McPherson Grade

Christopher N. Carender, MD
David DeMik, MD
Natalie A. Glass, PhD
Timothy S. Brown, MD, FAAOS
Nicholas Bedard, MD

A modified McPherson grade is a valid measure of comorbidity in NSQIP. The modified McPherson grade will be useful for NSQIP studies analyzing PJI outcomes following TJA.

Poster No. P0511
Femoral Nerve Comes Closer to the Anterior Acetabulum in Hip Osteoarthritis: A Comparative Study using Magnetic Resonance Imaging Improving Nerve Visualization

Kensuke Yoshino, MD
Shigeo Hagiwara, PhD
Junichi Nakamura, MD
Yuya Kawarai, MD
Kenta Konno, MD
Satoshi Yoh, PhD
Keijiro Kanno, DMed
Sei Yano

The femoral nerve comes closer to the acetabulum when the iliopsoas muscle in the OA hip atrophy at the bottom part of the AIIS by the average of 5.8 mm.

Poster No. P0512
Gastrointestinal Complications after Total Joint Arthroplasty are Rare but Have Severe Consequences

Joseph E. Massaglia, DO
Michael Yayac, BA
Andrew M. Star, MD, FAAOS
Gregory K. Deirmengian, MD, FAAOS
Paul M. Courtney, MD, FAAOS
Arjun Saxena, MD, MBA, FAAOS

Despite their rare occurrence, gastrointestinal complications following primary hip and knee replacement increase patient morbidity and mortality, especially when surgical treatment is required.

Poster No. P0513
High Preoperative Post Void Residual Volume May Predict Straight Catheterization following Total Hip Arthroplasty

Sara E. Strecker, PhD
Robert J. Carangelo, MD, FAAOS
Robert J. Magaldi, BS
Tracy Gonzalez, BSN, RN
Daniel Beaupre, BSN

THA patients who had a preoperative post void residual volume greater than 50 mL had a higher likelihood of developing POUR and receiving a straight catheter after surgery.

Poster No. P0514
Time to Conversion Total Hip Arthroplasty following Acetabular Fracture Operative Fixation and Associated Costs and Complication Rates

Karim G. Sabeh, MD
Rushabh Vakharia, MD
Spencer Summers, MD
Leonard T. Buller, MD
Hany S. Bedair, MD
Martin W. Roche, MD, FAAOS

This retrospective study compares outcomes of acute versus delayed primary total hip arthroplasty for the treatment of acetabular fractures.
Poster No. P0515
Correlation between Femoral Version and Severity of Hip Dysplasia in Patients with Advanced Osteoarthritis Prior to Total Hip Arthroplasty

Nicolas A. Rojas Veloso, MD
Cristian Contreras, MD
Tomas Amenabar, MD
Jonathan Torres, MD
Denis J. Jorge, PhD
Daniel D. Pastrian, MD
Felipe Silva, MD
David Seguel, MD

A significant increase in femoral version related to severity of DDH, a positive correlation between these two features, and a significant decrease in CCD between mild and severe groups were revealed.

Poster No. P0516
Femoroacetabular Osteoplasty in Patients 40 and Older

Steven J. Yacovelli
Ryan M. Sutton, MD,
Hamed Vahedi Kafshgari, MD
Javad Parvizi, MD, FAAOS

This is a study examining the outcomes of femoroacetabular osteoplasty in patients age 40 and older.

Poster No. P0517
Longer Symptom Duration in Femoroacetabular Impingement is Associated with Increased Acetabular Cartilage Damage and Poorer Patient-Reported Outcomes

Jeffrey J. Nepple, MD, FAAOS
Rafael J. Sierra, MD, FAAOS
Cecilia Pascual-Garrido, MD, PhD
Paul E. Beaule, MD, FAAOS
Etienne Belzile, MD
Asheesh Bedi, MD, FAAOS
John C. Clohisy, MD, FAAOS
ANCHOR Study Group

Early intervention in setting of FAI prior to chronic symptoms beyond 3 years may play a role in optimizing outcomes and avoiding progression of acetabular cartilage damage.

Poster No. P0518
Effectiveness of Arthroscopic Surgery for Treating Femoroacetabular Impingement: A Systematic Review and Meta-Analysis

Fatema Dhaif, BS
Imran Ahmed, MBBS
Peter D. Wall, PhD, FRCS (Ortho)

This meta-analysis shows arthroscopic surgery is more effective than physical therapy at improving hip related quality of life in patients with FAI syndrome at 8-12 months.

Poster No. P0519
Computer-Aided 3D Therapy Planning Based on Conventional 2D Radiographs

Hans Lamecker, PhD
Moritz F. Ehike, MSc
Stefan Zachow, PhD
Torsten Diekhoff, MD
Matthias Pumberger, MD

3D pose (e.g., tilting angles) and shape of the hip anatomy can be accurately estimated from 2D radiographs; to resolve perspective distortions and overlapping structures in conventional templating.

Poster No. P0520
Low Dose CT Scan following Periacetabular Osteotomy: Assessment of Reduction and Correlation with Radiographic Measures

Jeffrey J. Nepple, MD, FAAOS
Clarabelle A. Devries, MD
Lucas M. Fowler, BS
Sean M. Akers
Gail Pashos
Michael D. Harris, PhD
John C. Clohisy, MD, FAAOS

Despite PAO becoming a favored treatment for symptomatic acetabular dysplasia, parameters for optimal correction to avoid residual instability or iatrogenic impingement have yet to be defined.

Poster No. P0521
How do Dual Mobility Liners Compare to Other Liner Options with respect to Edge Loading Mechanics?

Michael LaCour, PhD
Jarrod Nachtrab, MS
John J. Callaghan, MD, FAAOS
Steven J. MacDonald, MD
Richard D. Komistek, PhD

This study uses modeling to assess postoperative stability for neutral, augmented lipped, and dual mobility systems; the augmented liner improved stability for gait and leg crossing.

Poster No. P0522
Stress Concentration to Lateral Pillar and Primary Compression Trabeculae Predicts Collapse in Early Stage Osteonecrosis of the Femoral Head: A Finite Element Analysis Study

Ji Hoon Bahk
Young Wook Lim, MD
Yong Sik Kim, MD
Soon Yong Kwon, MD
Joo-Hyon Song, MD, PhD
Se Won Lee, MD, PhD
Woo Lam Jo
Seung Chan Kim, PhD
Keun Young Choi, MD

As a result of finite element analysis, the stress concentration to the lateral pillar and the primary compression trabeculae might predict the collapse progression in early stage ONFH.
**Poster No. P0523**
**Femoral Head Collapse after Hip Intra-Articular Corticosteroid Injection: An Institutional Response to Improve Practice and Increase Patient Safety**

*Brandon Kelly, MD*
*Benjamin Williams, MD*
*Amy Gravely, MA*
*Kersten Schwanz, MD*
*Vernon F. Sechriest, MD, FAAOS*

Femoral head collapse after hip intra-articular corticosteroid injection was identified at a high rate in a United States veteran population. Findings and quality improvement initiatives are described.

**Poster No. P0524**
**Comparing Early and Mid-Term Outcomes between Robotic-Arm Assisted and Manual Total Hip Arthroplasty: A Systematic Review**

*Alexander J. Acuña, BS*
*Linski T. Samuel, MD, MBA*
*Bilal Mahmood, MD*
*Ahmed Emara, MD*
*Atul F. Kamath, MD, FAAOS*

The present analysis demonstrates a temporary advantage in favor of RA-THA in the short-term functional outcomes. However, no significant long-term differences in functional outcomes were noted.

**Poster No. P0525**
**Preoperative Patient-Reported Outcome Measures Predict Postoperative Dissatisfaction: Validated Truth or Fictional Ceiling?**

*David C. Landy, MD, PhD*
*Amethia D. Joseph, MHA*
*Johnny M. Chan*
*Douglas E. Padgett, MD, FAAOS*
*Stephen Lyman, PhD*

Preoperative patient-reported outcome measures predict the magnitude of improvement in the same measure after total hip arthroplasty but not patient satisfaction due to ceiling effects.

**Poster No. P0526**
**Post-Reconstruction Total Hip Arthroplasty Anatomy Affects 90-Day Periprosthetic Fracture Risk: A Case-Control Study**

*Daniel Mandell, MD*
*Joseph H. Dannenbaum, MD, FAAOS*
*Andrew J. Braziel, MD*
*Carl T. Talmo, MD, FAAOS*
*Samuel W. Golenbock, MSc*

Risk of early PPFx after THA is increased when more of the femoral neck is resected, even after adjusting for sex and native neck length. Increased reconstructed offset may be protective in males.

**Poster No. P0527**
**Do the Reasons for Ceramic-on-Ceramic Revisions Differ between Forte- and Delta-Bearing in Total Hip Arthroplasty?**

*Sang Min Kim, MD*
*Seung B. Han, MD*
*Hak Jun Kim, MD*
*Young Hwan Park, MD*
*Jungwoo Choi*
*Hyun Woo Cho, MD*

Main reasons to revision were directly related to ceramic use in Forte-bearing THAs whereas were not specific to ceramic use in Delta-bearing THAs.

**Poster No. P0528**
**The Relationship of Common Patient-Reported Outcomes and Passively Collected Outcome Measures in the Adult Reconstruction**

*David A. Crawford, MD, FAAOS*
*Jared R. Foran, MD, FAAOS*
*Paul J. Duwelius, MD, FAAOS*
*Adolph V. Lombardi, MD, FAAOS*
*Keith R. Berend, MD, FAAOS*

This study demonstrates that passively collected objective measures may provide a unique opportunity to use physical activity parameters to guide rehabilitation pathways after arthroplasty.

**Poster No. P0529**
**A Matched-Control Analysis on the Effects of Cannabis Use Disorder on In-Hospital Lengths of Stay, Complications, and Costs following Primary Total Hip Arthroplasty**

*Asad Ashraf, MD*
*Ivan Golub, MD*
*Samuel Swiggett, MD*
*Rushabh Vakharia, MD*
*Martin W. Roche, MD, FAAOS*
*Michael A. Mont, MD, FAAOS*
*Jason Wong, MD*

This retrospective study compares in-hospital LOS, medical complications, and costs of care among cannabis use disorder patients undergoing primary THA.

**Poster No. P0530**
**Are there Different Spinopelvic Characteristics between Patients with Hip Osteoarthritis and Asymptomatic Controls?**

*Paul E. Beaule, MD, FAAOS*
*Mortiz Innmann, MD*
*Christian Merle, MD*
*George A. Grammatopoulos, MRCS*

Spinopelvic mobility differs between hip osteoarthritis patients and asymptomatic controls.
**Poster No. P0531**  
**Asymptomatic Gluteal Tendinopathies Negatively Impact Outcomes of Total Hip Arthroplasty: A Propensity-Score Matched Study**  
*Benjamin G. Domb, MD, FAAOS*  
*Philip Rosinsky, MD*  
*Rishika Bheem, BA*  
*Marshall Haden, MD*  
*David R. Maldonado, MD*  
*Jackob Shapira, MD*  
*Mitchell Meghpara, MD*  

In patients undergoing THA for OA, those with asymptomatic GMM pathology experience inferior two-year postoperative PROs compared to a matched group.

**Poster No. P0532**  
**Moving Past Procedure-Specific Assessments: The O-SCORE – Generic, Empowering, Valid, and Twice as Fast**  
*Kartik Logishetty, BS, MBBS*  
*Jennifer R. Oluku, MBBS, MSc*  
*Wade T. Gofton, BSCH, MD*  
*Thomas C. Edwards, BS, MBBS*  
*Justin P. Cobb, MD, FRCS*  

The O-SCORE is a valid, fast, and learner-centric tool to reliably assess resident competency in managing end-stage arthritis, including patient communication and technical skills in performing THR.

**Poster No. P0533**  
**The Effect of Clostridium Difficile Infections on Costs and Outcomes in Hip Arthroplasty Procedures**  
*Ethan Remily, DO*  
*Scott Douglas, MD*  
*Wayne A. Wilkie, DO*  
*Nequesha Mohamed, MD*  
*Sahir Pervaiz, MD, MS*  
*Oliver Sax, DO, MS*  
*Drew M. Saltzman*  
*James Nace, DO, PT*  
*Ronald E. Delanois, MD, FAAOS*  

This study performed an analysis of costs and complication rates in C. Diff infected patients who were propensity matched with non-C. Diff infected patients undergoing hip arthroplasty procedures.

**Poster No. P0534**  
**Iliopsoas Impingement after Anterior Hip Arthroplasty; Epidemiology, Risk Factors and Treatments**  
*Leonard T. Buller, MD*  
*Luke G. Menken, DO*  
*Evan J. Hawkins, MD*  
*Marcel A. Bas, MD*  
*Gilbert Roc, MD, BS*  
*Herbert J. Cooper, MD, FAAOS*  
*Jose A. Rodriguez, MD, FAAOS*  

Anterior iliopsoas impingement is a cause of groin pain after anterior approach total hip arthroplasty that often improves with conservative measures and is associated with distinct technical factors.

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*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
**Poster No. P0540**
Predictive Factors of Pain and Functional Outcome after Total Hip Arthroplasty in the FORCE-TJR Registry

Mohamed A. Yousef, MD, PhD
Patricia Franklin, MD, MBA
Hua Zheng, PhD
David C. Ayers, MD, FAAOS

This study supports the use of preoperative patient optimization programs to improve identified modifiable risk factors prior to elective THA to improve outcomes and patient satisfaction.

**Poster No. P0541**
Polished Tapered Cemented Stem for Total Hip Arthroplasty in a North American Population Provides Excellent Results

Elizabeth Gausden, MD
Matthew P. Abdel, MD, FAAOS
Tad M. Maby, MD, FAAOS
Daniel J. Berry, MD, FAAOS
Robert T. Trousdale, MD, FAAOS
Rafael J. Sierra, MD, FAAOS

In the largest North American series to date, selective use of a cemented collarless polished tapered stem resulted in a low incidence of revision that was mostly due to periprosthetic fracture.

**Poster No. P0542**
The Recovery Curve for Physical Activity following Primary Total Hip Arthroplasty Using Average Daily Step Counts Measured with a Smartphone Based Case Platform and Smart Watch

Paul J. Duwelius, MD, FAAOS
Adolph V. Lombardi, MD, FAAOS
Keith R. Berend, MD, FAAOS
James I. Huddleston, MD, FAAOS
Christopher L. Peters, MD, FAAOS
Alexander DeHaan, MD, FAAOS
Richard D. Southgate, MD
David A. Crawford, MD, FAAOS

The purpose of this study was to characterize the recovery of physical activity following THA by means of step counts and flight counts (flights of stairs) measured using a smart watch and its associated smartphone based care platform.

**Poster No. P0543**
The Effect of Hepatitis C Virus Treatment on Outcomes in Primary Total Hip Arthroplasty

Oliver Sax, DO, MS
Scott Douglas, MD
Ethan Remily, DO
Nequesha Mohamed, MD
Wayne A. Wilkie, DO
Sahir Pervaiz, MD, MS
Wallis O. Edwards
Ronald E. Delanois, MD, FAAOS
Aaron J. Johnson, MD

This study examined length of stay, costs, readmissions, revisions, and complications in matched total hip arthroplasty patients dependent upon treatment status for their Hepatitis C infection.

**Poster No. P0544**
Quantitative Analysis of YouTube Video Reliability, Quality, and Content as Patient Information Source for Total Hip Arthroplasty

Mitchell K. Ng, MD
Ahmed Emara, MD
Alison K. Klika, MS
Robert M. Molloy, MD
Michael R. Bloomfield, MD, FAAOS
Jonathan L. Schaffer, MD, FAAOS
Viktor Erik Krebs, MD, FAAOS
Nicolas S. Pizzuti, MD

Physician and academic YouTube videos discussing total hip arthroplasty are of higher quality compared to their non-academic counterparts.

**Poster No. P0545**
The Survival Analysis in Third-Generation Ceramic-on-Ceramic Total Hip Arthroplasty

Kyung-Soon Park, MD
Taek-Rim Yoon, PhD

This study reports the high incidence of ceramic fracture, especially in one manufacturer’s cup and third-generation ceramic head and liner.

**Poster No. P0546**
Spinopelvic Characteristics in Asymptomatic Patients and in those with Young Adult Hip Disorders: Are Different Pathologies Associated with Different Characteristics?

Paul E. Beaule, MD, FAAOS
Zachary W. Devries, BS
Brook Biniam, BS
Kawan S. Rakha, MD
Andrew Speirs, PhD
Johanna Dobransky, MA
George A. Grammatopoulos, MRCS

Spinopelvic parameters are important for the development and management of young adult hip disorders. In this study, we define the spinopelvic parameters in young adult hips and compare to controls.

**Poster No. P0547**
Clinical and Radiographic Outcomes in Primary Total Hip Arthroplasty Utilizing a Porous Acetabular Shell Developed with Additive Manufacturing

Geoffrey H. Westrich, MD, FAAOS
Benjamin G. Domb, MD, FAAOS
Jillian Mohn, BS
Alice M. Cruz, BS

This study confirmed that additive manufacturing in acetabular arthroplasty yields early implant fixation with encouraging clinical and radiographic outcomes.
Poster No. P0548
Artificial Intelligence More Accurately Measures Acetabular Component Orientation than Hand Measurements

Michael Murphy, MD
Amir M. Boubekri, MD
Sara R. Winfrey, BA
William J. Hopkinson, MD, FAAOS
Karen Wu, MD, FAAOS
Nicholas M. Brown, MD, FAAOS

Artificial intelligence algorithm accurately and quickly measures acetabular component orientation from x-ray; more accurate than hand measurements.

Poster No. P0549
Is there a Problem with Modular Dual Mobility Acetabular Components in Revision Total Hip Arthroplasty at Mid-Term Follow Up?

Nicholas Hernandez, MD
Zoe W. Hinton, BS
Christine J. Wu, BS
Paul F. Lachiewicz, MD, FAAOS
Sean P. Ryan, MD
Samuel S. Wellman, MD, FAAOS

Using this MDM component in revision THA, at mean follow-up time of 5.5 years, there was a higher rate of dislocation (11%) than previously reported. Outer bearing size was related to the risk of dislocation.

Poster No. P0550
Long-Term Survival of Focally Constrained Liners in Revision Hip Arthroplasty

Tomas Zamora, MD
Lisa Howard, FRCSC, MSc
Nelson V. Greidanus, MD, MPH, FAAOS
Bassam A. Masri, MD, FAAOS
Clive P. Duncan, MD, MSc, FAAOS
Donald S. Garbuz, MD, FAAOS

Focally constrained liners are a durable alternative to prevent instability after a revision hip replacement.

Poster No. P0551
Lumbar Spine Fusion prior to revision total hip arthroplasty is associated with increased dislocation rates

Christian Klemt, PhD
Young-Min Kwon, MD, PhD, FAAOS
Anand Padmanabha, MD
Venkatsaiakhil Tirumala, BS, MS
Paul Walker, BS
Evan Smith, MD

This study demonstrates that patients who underwent revision THA with prior LSF demonstrated significantly higher dislocation rates and re-revision rates.

Poster No. P0552
Decreasing Trend in Mortality Rates of Aseptic vs. Septic Revision Total Hip Arthroplasty: An Analysis of 681,034 Cases

Ahmed Emara, MD
Mitchell K. Ng, MD
Siran Koroukian, PhD
Alison K. Klika, MS
Guangjin Zhou
Robert M. Molloy, MD
Viktor Erik Krebs, MD, FAAOS
Carlos A. Higuera Rueda, MD, FAAOS
Nicolas S. Piuzzi, MD

Septic revision total hip arthroplasty associated with an over three-fold likelihood of in-hospital mortality compared to aseptic revisions with overall rates demonstrating diminishing trends.

Poster No. P0553
Preoperative Hypoalbuminemia is Associated with Early Morbidity and Mortality after Revision Total Hip Arthroplasty

Raj Amin, MD
Micheal Raad, MD
Sandesh Rao, MD
Ryan Guibault, MD
Matthew J. Best, MD
Derek F. Amanatullah, MD, PhD, FAAOS

This is a retrospective cohort study focusing on how hypoalbuminemia is associated with early morbidity and mortality in revision total knee arthroplasty using the NSQIP database.

Poster No. P0554
Does Resident Involvement during Revision Total Hip Arthroplasty Increase 30-Day Postoperative Complications?

Trevor Gulbrandsen, MD
Zain M. Khazi, BS
Alan G. Shamrock, MD
Jacob Elkins, PhD
Nicholas Bedard, MD
Timothy S. Brown, MD, FAAOS

Resident involvement in rTHA is associated with longer operative times but is not a risk factor for 30-day complications.

Poster No. P0555
Machine Learning Model for the Prediction of 90-Day Unplanned Readmissions after Revision Total Joint Arthroplasty

Christian Klemt, PhD
Young-Min Kwon, MD, PhD, FAAOS
Ruben V. Oganesyan, MD
Venkatsaiakhil Tirumala, BS, MS
Ingwon Yeo, MD
Vincent G. Sollitto
Abdulmalik A. Tahili
Paul Walker, BS

This study validated a novel machine learning model for the prediction of 90-day unplanned readmissions following revision total joint arthroplasty.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0556**
Are We Hurting our Patients by Neglecting Intraoperative Volume Overload in Revision Total Hip Arthroplasty?

*Yehuda E. Kerbel, MD*
Ariana T. Meltzer-Bruhn, BA
Nicolas Pascual-Leone, BA
Kevin Pirruccio, BA,
Neil P. Sheth, MD, FAAOS

In a retrospective review of revision total hips, intraoperative volume overload led to postoperative fluid complications, including a higher rate of vascular and pulmonary events and transfusions.

**Poster No. P0557**
Indications for Revision Total Hip Arthroplasty: Increased Procedure Complexity is Associated with External Referral Status

*Kevin Pirruccio, BA*
Brian D. Cortese, BS
Nicolas A. Selomen, BA
Brian Perez, MD
Aaron Gebrelul, MD
Neil P. Sheth, MD, FAAOS

Current bundled payment reimbursement models disincentivize caring for resource-intensive, high-complexity rTHA patients.

**Poster No. P0558**
Opioid Use in Revision Total Hip Arthroplasty

*Christopher T. Holland, MD*
Daniel T. O’Connor, MD
Arta Gharib Parsa, BS
AnaLucia Barragan Trejo, BS
Jeannie Y. Park, BA
John P. Meehan, MD, FAAOS
Zachary Lum, DO

The purpose of this study was to analyze preoperative, perioperative, and postoperative opioid use during revision total hip arthroplasty, and report on its clinical implications.

**Poster No. P0559**
Revision Total Hip Arthroplasty Outcomes in Solid Organ Transplant Patients

*Alexander Upfill-Brown, MD, MSc*
Peter P. Hsuie, MD
Clark J. Chen, BS
Troy Sekimura, BS
Fiachra Rowan, MD
Amir Khoshbin, MD
Alexandra Stavrakis, MD

Solid organ transplant patients are at an increased risk of complications after primary total hip arthroplasty. This study aimed to see if similar results were seen in revision total hip arthroplasty.

**Poster No. P0560**
External Rotator Preservation Reduces Dislocation Risk Compared with Standard Soft-Tissue Repair following Posterior Approach Total Hip Arthroplasty in High-Risk Patients: A Matched-Pair Analysis

*Seung Chan Kim, PhD*
Young Wook Lim, MD
Woo Lam Jo
Se Won Lee, MD, PhD
Yong Sik Kim, MD
Soon Yong Kwon, MD

Preservation of external rotator muscles in posterior approach THA significantly reduces overall dislocation rates for patients at risk of instability compared with the standard soft-tissue repair.

**Poster No. P0561**
Postoperative Hip Precautions Do Not Prevent Early Hip Dislocation

*Yusuf H. Mirza, MuDr*
Vikram K. Kandhari, MBBS
Khitish Mohanty, MD, FRCS (Ortho)

The use of precautions does not prevent hip dislocation, regardless of surgical approach.

**Poster No. P0562**
The Fate of Periprosthetic Joint Infection with Corynebacterium Striatum: A Rare but Catastrophic Causative Organism

*Tejbir S. Pannu, MD, MS*
Jesus M. Villa, MD
Jorge Manrique, MD
Carlos A. Higuera Rueda, MD, FAAOS
Nicolas S. Piuzzi, MD
Aldo M. Riesgo, MD

Corynebacterium striatum periprosthetic joint infection has a high rate of treatment failure which is comparable to the outcomes in case of most resistant organisms, such as MRSA.

**Poster No. P0563**
Fate of Two-Stage Reimplantation after Failed Irrigation and Debridement for Prosthetic Hip Infection

*Nima Eftekhary, MD*
Joseph Kavolus, MD
Daniel J. Cunningham, MD
Nicholas Ting, MD
William L. Griffin, MD, FAAOS
Thorsten M. Seyler, MD, PhD, FAAOS
Thomas K. Fehring, MD, FAAOS

If irrigation and debridement fails to treat acute prosthetic hip infection, subsequent attempts at two-stage reimplantation may be compromised.
Poster No. P0564
Does Surgical Approach for Primary Total Hip Arthroplasty Affect Incidence and Characteristics of Periprosthetic Femur Fractures?

Katherine A. Lygrisse, MD
Alexander Gaukhman, MD
Greg Teo, MD
Stephen Zak, BA
Vivek Singh, MD
Ran Schwarzkopf, MD, FAAOS
William J. Long, MD, FAAOS
Vinay Aggarwal, MD

The study evaluated the effect of surgical approach during primary THA on periprosthetic femur fractures with respect to fracture incidence, radiographic parameters, and surgery-related factors.

Poster No. P0565
Preoperative Albumin, Transferrin, and Total Lymphocyte Count as Risk Markers for Postoperative Complications following Total Joint Arthroplasty: A Systematic Review

Chukwuemeka Mbagwu, MD
Matthew Sloan, MD
Alexander L. Neuwirth, MD
Ryan S. Charette, DO
Keith D. Baldwin, MD, FAAOS
Atul F. Kamath, MD, FAAOS
Charles L. Nelson, MD, FAAOS
Bonnie Simpson Mason, MD, FAAOS

Operating on elective TJAs with low albumin is associated with a 93% increase in all measured complications. This data should be used to consent of the increased risk to patients undergoing TJAs.

Poster No. P0566
Transitioning to Outpatient Total Hip Arthroplasty: Worse Outcomes at One Year?

Nequesha Mohamed, MD
Sahir Pervaiz, MD, MS
Scott Douglas, MD
Oliver Sax, DO, MS
Ethan Remily, DO
Wayne A. Wilkie, DO
Johannes F. Plate, MD, PhD
Qais Naziri, MD, MBA
Ronald E. Delanois, MD, FAAOS

We report on one-year outcomes of matched inpatient and 1-day stay outpatient total hip arthroplasty recipients

Poster No. P0567
Telehealth during the COVID-19 Pandemic: Early Lessons Learned from New York City

Drake Lebrun, MD, MPH
Christina J. Maier, BA
Mallory K. Wilson, BS, MSPH
Victoria X. Wang, MSc
David J. Mayman, MD, FAAOS
Michael B. Cross, MD, FAAOS
Michael M. Alexiades, MD, FAAOS
Jonathan M. Vigdorchik, MD, FAAOS
Michael P. Ast, MD, FAAOS

Patients were satisfied with their telehealth experience during the COVID-19 pandemic; however, we identified several areas amenable to improvement relative to standard in-patient care.

Poster No. P0568
Same Day Discharge Requirement for Total Hip Arthroplasty: Impact on Health Disparities

Jessica Morton, MD
Lauren E. Grobaty, BA
Adam Driesman, MD
Lorraine Hutzler, MHA
Claudette M. Lajam, MD, FAAOS

As SDD for TJAs grows more frequent, it is important that we protect patients from racial and socioeconomic bias in selection.

Poster No. P0569
Aspirin Use for Venous Thromboembolism Prevention is Safe and Effective in Overweight and Obese Patients Undergoing Revision Total Hip and Knee Arthroplasty

Alex Tang, BS
Stephen Zak, BA
Vivek Singh, MD
Katherine A. Lygrisse, MD
Joshua C. Rozell, MD
Ran Schwarzkopf, MD, FAAOS
William J. Long, MD, FAAOS

With no current universal standard of care for VTE prophylaxis in obese patients, we sought to determine whether aspirin is safe in patients with high body mass index (BMI) undergoing rTHA or rTKA.
Poster No. P0570
Discontinued Use of Outpatient Intermittent Pneumatic Compression Devices Does Not Increase Risk of Venous Thromboembolism in Patients Undergoing Primary Total Hip Arthroplasty Using Low Dose Aspirin: A Retrospective Cohort Study

Alex Tang, BS
Katherine A. Lygrisse, MD
Stephen Zak, BA
Daniel Waren, MSPH
Lorraine Hutzler, MHA
Ran Schwarzkopf, MD, FAAOS
William B. Macaulay, MD, FAAOS

At our institution, both 81mg aspirin BID and portable IPCDs were prescribed to patients as standard risk for VTE. We studied the safety of discontinued outpatient IPCD use in patients undergoing THA.

Poster No. P0571
Predictors of Mortality following Prosthetic Joint Infection

Curtis W. Hartman, MD, FAAOS
Eric Daubach, BA
Brian Richard, MD
Elizabeth Lyden, MS
Hani Haider, PhD
Beau J. Kildow, MD
Beau S. Konigsberg, MD, FAAOS
Kevin L. Garvin, MD, FAAOS

Inflammatory arthritis, Enterococcus associated infections, and increasing ASA score were strongly associated with mortality in patients with a PJI.

Poster No. P0572
Outcome of Cemented Total Knee Arthroplasty for Secondary Osteonecrosis of the Knee

Stuart B. Goodman, MD, PhD, FAAOS
Krit Boontanapibul, MD
Derek F. Amanatullah, MD, PhD, FAAOS
James I. Huddleston, MD, FAAOS
William J. Maloney, MD, FAAOS

We report outcome of cemented total knee arthroplasty for secondary osteonecrosis of the knee.

Poster No. P0573
Allergy Testing has No Correlation with Intraoperative Histopathology in Suspected Implant-Related Metal Allergy

Michael A. Malahias, MD
Thomas W. Bauer, MD, PhD
Philip P. Manolopoulos, MD
Peter K. Sculco, MD
Geoffrey H. Westrich, MD, FAAOS

In this cohort of TKA patients with suspected nickel allergy based on LTT positive results and clinical symptoms, intraoperatively obtained histopathology was essentially normal.

Poster No. P0574
Skiving or Diving: A Mechanical Study on the Sagittal Saw Blade during Total Knee Arthroplasty Using a Tibial Bone Model

Jonathan H. Shaw, MD
Erickson G. Andrews, MD
Patrick J. Buckley, BS
Trevor R. Banka, MD, FAAOS
Wayne T. North, MD
Jason J. Davis, MD, FAAOS
Craig Silverton, DO, FAAOS

This is a biomechanical study that describes how sclerosis affects skiving and diving of the sagittal sawblade during resection of the proximal tibia in total knee arthroplasty.

Poster No. P0575
Increased Complication Rates in Octogenarians undergoing Same-Day Discharge following Total Knee Arthroplasty: A Matched Cohort Analysis

Peter Z. Berger
Safa C. Fassihi, MD
Alex Gu, MD
Patawat Bovonratwet, MD
Seth Stake, MD
Joshua Campbell, MD
Savvasachki C. Thakkar, MD
Gregory Golladay, MD, FAAOS

Relative to matched controls, octogenarians were at significantly increased risk of numerous 90-day medical complications following same-day primary total knee arthroplasty.

Poster No. P0576
Aspirin is Effective in Preventing Propagation of Infrapopliteal Deep Venous Thrombosis following Total Knee Arthroplasty

Gregg R. Klein, MD, FAAOS
Bertrand W. Parcells, MD
Mark A. Hartzband, MD, FAAOS
Javad Parvizi, MD, FAAOS
Harlan B. Levine, MD, FAAOS

Infrapopliteal DVTs are effectively treated with aspirin, showing low risk for propagation or worsening symptoms in patients following TKA.

Poster No. P0577
Aspirin was Ineffective for Prevention of Venous Thromboembolism in High Body Mass Index Females undergoing Total Knee Arthroplasty

Koh Shimizu, MD
Sara Shimizu, MD
Koji Akimoto
Seiji Kimura, PhD

Among the various risk factors of DVT, surgical procedure, BMI, and gender correlated with occurrence of DVT by multivariate analysis, and aspirin was insufficient in TKA cases of overweight females.
Poster No. P0578
Simultaneous Bilateral Primary Total Knee Arthroplasty with tranexamic Acid and Restrictive Transfusion Protocols: Still a 1 in 5 Risk of Allogeneic Transfusion

Brian Chalmers, MD
Mithun D. Mishu, BA
Yu-Fen Chiu, MS
Peter K. Sculco, MD
Friedrich Boettner, MD
Fred D. Cushner, MD, FAAOS
Geoffrey H. Westrich, MD, FAAOS

Patients undergoing SBTKA with TXA and contemporary blood management still have a 1 in 5 rate of blood transfusion. Preoperative Hgb <12.5 is the greatest risk for transfusion (OR=4.0, p<0.001).

Poster No. P0579
Postoperative Hemoglobin Measurement May Not be Necessary following Primary Total Knee Arthroplasty

Rodney W. Benner, MD, FAAOS
Stephen Shively, DO

Postoperative TKA patients with Hgb >12.0 have low transfusion rates and may not require routine Hgb monitoring, resulting in significant cost savings and low risk of morbidity.

Poster No. P0580
A 20-Year Analysis of Geographic Variability in Medicare Physician Reimbursement for Total Hip and Knee Arthroplasty

Jack Haglin, BS
David V. Ivanov, MD
Derek F. Amanatullah, MD, PhD, FAAOS

This study demonstrates large variations in Medicare reimbursement to orthopaedic surgeons depending on location for primary total hip and knee arthroplasty.

Poster No. P0581
Metal Backed Tibial Components Provide Minimal Mid-Term Survivorship Benefits Despite Increased Cost and Frequency of Use: A Retrospective Review of the American Joint Replacement Registry Database

Benjamin Kelley, MD
Kyle Mullen, MPH
Ayushmita De
Adam A. Sassoon, MD, FAAOS

An AJRR database review demonstrated that all-polyethylene tibial component utilization sharply declined from 2012-2019 despite major potential cost savings and near equivalent survivorship.

Poster No. P0582
Correlation of Tibial Component Size and Rotation with Outcomes after Total Knee Arthroplasty

Antonio Klasan, MD
Joshua Twiggs
Brett Fritsch, MD
Brad P. Miles, PhD
Thomas J. Heyse, PhD
Michael Solomon, MD
David Parker, MD, FRACS

Upsizing to the point of overhang with rotational tolerance of 7° internal and 3° external to Insall’s axis demonstrates best patient-reported outcomes.

Poster No. P0583
The Interconnected Ancestral Network of Knee Arthroplasty Device Approval

Andrew Zhu, BS
Xiaohan Ying, BS
Ajay Premkumar, MD, MPH
Christian A. Pean, MD
Neil P. Sheth, MD, FAAOS
Michael B. Cross, MD, FAAOS
Alejandro Gonzalez Delia Valle, MD, FAAOS

There exist currently approved knee arthroplasty devices that claim substantial equivalence to previous products that have been subsequently recalled for inadequacies in implant design.

Poster No. P0584
Does a History of Gout Impact Rates of Infection or Revision following Primary Total Knee Arthroplasty?

Alexander T. Bradley, MD
Connor A. King, MD
Anna Cohen-Rosenblum, MD
Peter K. Sculco, MD
David C. Landy, MD, PhD

Despite the inflammatory intra-articular nature of gout, there does not appear to be an increased risk of periprosthetic joint infection for patients undergoing total knee arthroplasty.

Poster No. P0585
Two-Year Patient-Reported Outcomes following 2-Stage Revision for Prosthetic Joint Infection

Tracy M. Borsinger, MD
Daniel A. Pierce, MD, MS
Adriana P. Lucas, MS
Alexander Orem, MD, FAAOS
Wayne E. Moschetti, MD, MS

Retrospective review assessing 2-year PROs following explant for PJI in patients with successful 2-stage revision compared to treatment failure based on MSIS ORT criteria.

• The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Temporal, Seasonal, and Monthly Effects on Total Knee Arthroplasty Surgical Site Infection Rates

Mackenzie A. Roof, BS
Lorraine Hutzler, MHA
Anna Stachel, MPH
Scott Friedlander, MPH,
Michael Phillips, MD
Joseph A. Bosco, MD, FAAOS

Although non-significant, this analysis found a decreasing rate of deep surgical site infections (dSSI) after TKA over a nearly 10-year period and no evidence of the July effect with respect to dSSI.

Diagnosing Total Joint Arthroplasty-Associated Periprosthetic Joint Infections in Immunocompromised Patient Populations

Philip Zakko, MD
Erin A. Baker, PhD
Christian M. Huber
Corinn Gehrke, MS
Brett J. Friedman, MPH
Michael A. Flierl, MD, FAAOS

The 2018 ICM/MSIS classification system was used to assess PJI diagnosis in immunocompromised vs. non-immunocompromised patient populations to determine applicability of the scoring criteria.

Knee Arthrodesis is a Durable Option for the Salvage of Infected Total Knee Arthroplasty

Caleb Yeung, MD
Paul Lichstein, MD
Nathan Varady, BS
James H. Maguire, MD
Antonia F. Chen, MD, MBA, FAAOS
Daniel M. Estok, MD, FAAOS

Patients undergoing knee arthrodesis for TKA PJI had high rates of infection control and preservation of ambulatory status, with low rates of progression to above-knee amputation in our study.

Intraoperative Variables Associated with Long-Term Success of Two-Stage Exchange for Periprosthetic Joint Infection after Primary Total Knee Arthroplasty

Scott Nodzo, MD, FAAOS
K. Keely Boyle, MD
Ilan Fleisher, BS
Allina A. Nocen, MPH, PhD
Michael Henry, MD
Andy Miller, MD
Geoffrey H. Westrich, MD, FAAOS

2SE for TKA PJI continues to provide acceptable long-term (10-yr) success rates. Total Vancomycin used in the spacer construct was significantly higher in patients who had a successful 2SE.

The Utility of Leukocyte Esterase Test in Diagnosing Culture Negative Periprosthetic Joint Infections

Alisina Shahi, MD, PhD
Vishavpreet Singh, MD
Ali R. Oliashirazi, MD, FAAOS
Jack Shilling, MD, FAAOS
Alec S. Kelish, BS
Lawrence S. Miller, MD, FAAOS
Javad Parvizi, MD, FAAOS

In this study we investigated the role of LE strip test in ruling out infection in patients with negatives to detect culture negative PJIs.

Does the Organism Profile of Periprosthetic Joint Infections Change with a Topical Vancomycin Powder and Dilute Povidone-Iodine Lavage Protocol?

Daniel B. Buchalter, MD
Greg Teo, MD
David Kirby, MD
Ran Schwarzkopf, MD, FAAOS
Vinay Aggarwal, MD
William J. Long, MD, FAAOS

Vancomycin powder and dilute povidone-iodine lavage is associated with fewer coagulase-negative staphylococcal TJA PJIs, fewer MRSA TKA PJIs, and a strong trend towards fewer gram-negative TKA PJIs.

Sequencing of Microbial Cell-Free DNA from the Blood Enhances Current Pathogen Identification Criteria for Prosthetic Joint Infections

Adriana P. Echeverria Gonzalez, BS
Ian Cohn
Alberto V. Carli, MD, MSc
Peter K. Sculco, MD
Christine Mironenko, NP
Susan Goodman, MD
Geoffrey H. Westrich, MD, FAAOS
Lionel B. Ivashkiv, MD
Mathias P. Bostrom, MD, FAAOS
Matthew S. Hepinstall, MD, FAAOS
Barry D. Brause, MD
Michael Henry, MD
Andy Miller, MD
Asim A. Ahmed, MD
Michael B. Cross, MD, FAAOS
Laura T. Donlin, PhD
PJI 2021

Cell-free DNA sequencing from blood complements current diagnostic criteria, allowing for increased identification of causative PJI pathogens.
**Poster No. P0593**

**Measurements of Intraoperative Load Sensor May Not Provide the Useful Information During Total Knee Arthroplasty**

**Jong Keun Kim, MD**
**Duhyun Ro, MD**
**Jae-Young Park, MD**
**Su Keon A. Lee, MD**
**Hyuk Soo Han, MD**
**Myung C. Lee, DMD**

Significant variations between the trial and final implant measurements were found when the sensor was used during TKA. This could lead to unexpected and altered balancing after final cementation.

**Poster No. P0594**

**Formal Physical Therapy May Not Be Necessary after Total Knee Replacement**

**Valentin Antoci, MD, PhD, FAAOS**
**Jillian Glasser, BA**
**Alexander Orfano, MD**
**Ilyse N. Blazar, BS, MS**
**Dioscaris R. Garcia, PhD**
**Thomas Barrett, MD**

Formal physical therapy may not be necessary if patients are progressing appropriately after surgery, with no change in functional outcomes at 1 year.

**Poster No. P0595**

**Experience, Motivations, and Expectations of Adult Reconstruction Fellowship Applicants**

**Christine J. Wu, BS**
**Zoe W. Hinton, BS**
**Nima Kabirian, MD**
**Nicholas Hernandez, MD**
**David E. Attarian, MD, FAAOS**
**Samuel S. Wellman, MD, FAAOS**
**Michael P. Bolognesi, MD, FAAOS**
**Thorsten M. Seyler, MD, PhD, FAAOS**

Fellowship applicants reported that exposure to revision TJA was the highest priority in pursuing and ranking of fellowships programs.

**Poster No. P0596**

**Use of Cannabis Does Not Decrease Opioid Consumption in Patients after Total Joint Arthroplasty**

**Jason M. Jennings, MD, FAAOS**
**David C. McNabb, MD, FAAOS**
**Anna C. Brady, CRA**
**Christian Thurstone, MD**
**Raymond H. Kim, MD, FAAOS**
**Douglas A. Dennis, MD, FAAOS**

The primary purpose of this study was to determine if self-reported cannabis use decreases narcotic consumption in patients undergoing total joint arthroplasty (TJA).

**Poster No. P0597**

**Total Knee Arthroplasty Patients with Higher Self-Reported Alcohol Use have Lower Reported Preoperative Pain, Similar Arthritis Grades, and Similar Postoperative Range of Motion: A Retrospective Study**

**Samir A. Baig, BS**
**Zachary Warheit, BS**
**Christopher Ruland, MD**
**David E. Komatsu, PhD**
**James J. Nicholson, MD, FAAOS**

Total knee arthroplasty patients with higher self-reported alcohol use have lower reported preoperative pain, similar arthritis grades, and similar postoperative range of motion.

**Poster No. P0598**

**Arthrofibrosis after Total Knee Arthroplasty: Incidence, Results, and Risk Factors over 25 Years**

**Aaron Owen**
**Meagan E. Tibbo, MD**
**Andre J. Van Wijnen**
**Mark W. Pagnano, MD, FAAOS**
**Daniel J. Berry, MD, FAAOS**
**Matthew P. Abdul, MD, FAAOS**

The incidence of arthrofibrosis (5%) and MUA (3%) have remained unchanged over 3 decades, but younger age, BMI<30, longer operative times, and diabetes were associated with increased risk.

**Poster No. P0599**

**Does Aseptic Revision Risk Differ for Total Knee Arthroplasty Patients with and without a Prior Arthroplasty?**

**Heather A. Prentice, PhD**
**Priscilla H. Chan, MS**
**Robert S. Namba, MD, FAAOS**
**Ronald A. Navarro, MD, FAAOS**
**Nithin C. Reddy, MD, FAAOS**
**Mark T. Dillon, MD, FAAOS**
**Liz Paxton, PhD, MA**

Total knee patients who had a prior arthroplasty of a major joint had a lower aseptic knee revision risk. However, patients who had a history of aseptic revision history had a higher risk of knee revision.

**Poster No. P0600**

**Manipulation after Total Knee Arthroplasty: Does Timing Matter?**

**Ross K. Leighton, MD**
**Catherine O’Connor, BA**
**Kelly Trask, MSc**
**Shelley Macdonald**

Early knee manipulation, within 12 weeks of TKA, results in a greater gain in flexion and a shorter overall recovery time than late manipulation.
Poster No. P0601
Meloxicam has Equivalent Safety Profile as Celecoxib, but is Less Costly, for Postoperative Analgesia after Total Knee Arthroplasty

Amer Haffar, BS
Leigham S. Breckenridge
D’Andrew Gursay, BS
Jess H. Lonner, MD, FAAOS

This is a study comparing complications in patients taking meloxicam vs. celecoxib after total knee arthroplasty.

Poster No. P0602
Generalized Anxiety Disorder: A Modifiable Risk Factor for Pain Catastrophizing after Total Joint Arthroplasty

Thomas M. Hanson, MD
Yale Fillingham, MD
Kathleen A. Leinweber, MD
Adriana P. Lucas, MS
David S. Jevsevar, MD, MBA, FAAOS

Prospectively collected anxiety screening scores impact postoperative pain catastrophizing scores of 218 total joint patients at a tertiary referral center.

Poster No. P0603
Tibial Stems Reduce Rates of Aseptic Loosening in Patients with Significant Varus Deformity Undergoing Total Knee Arthroplasty

Vishal Hegde, MD
Daniel Bracey, MD, PhD
Anna C. Brady, CRA
Lindsay T. Kleeman-Forsthuber, MD
Douglas A. Dennis, MD, FAAOS
Jason M. Jennings, MD, FAAOS

This study analyzes the effect of an extended tibial stem on the rate of aseptic loosening in patients with an excessive preoperative varus deformity.

Poster No. P0604
Correlation between Patient-Reported “Happiness” with Knee Range of Motion and Objective Measurements in Primary Knee Arthroplasty

David A. Crawford, MD, FAAOS
Ian J. McElroy, BS
Joanne B. Adams, MD
Michael J. Morris, MD, FAAOS
Jason M. Hurst, MD, FAAOS
Keith R. Berend, MD, FAAOS
Adolph V. Lombardi, MD, FAAOS

Objective knee ROM was correlated with patient happiness with ROM, however, many patients had worsening or no change in ROM but improved happiness with their ROM.

Poster No. P0605
Drains are Associated with Greater Opioid Consumption after Primary Total Knee Arthroplasty

R. Michael Meneghini, MD, FAAOS
Casey Beleckas, MD, MSc
Mary Ziemba-Davis

The use of drains following TKA was associated with an increased use of opioids the first 24 hours after surgery as well as a greater drop in hemoglobin.

Poster No. P0606
Do Pinhole Locations in Medial Unicompartmental Knee Arthroplasty Impact the Risk of Tibial Periprosthetic Fractures?

Christine Mueri, MSc
Philippe Favre, MSc, PhD
Adam H. Sanford
Nick Drury, MS
Craig J. Della Valle, MD, FAAOS
Jeffrey Bischoff, PhD
John P. Mueller, PhD

The presence and relative location of multiple pinholes, and their proximity to the cut corner, may influence the risk for periprosthetic fractures after UKA.

Poster No. P0607
Predictors of Clinically Meaningful Improvement at Ten Years following Unicompartmental Knee Arthroplasty

Graham S. Goh, MD
Ming Han Lincoln Liow, FRCS (Ortho), MBBS
Yongqiang Jerry Chen, FRCS (Ortho), MBBS
Hee-Nee Pang, MBBS, MRCs
Darren Tay, MBBS, FRCS (Ortho)
Shi-Lu Chia, MBBS, FRCS (Ortho)
Ngai-Nung Lo, MD
Seng-Jin Yeo, FRCS

Women and patients with greater knee ROM were less likely to experience an improvement in function after UKA. Patients with lower preoperative OKS were less likely to experience an improvement in QoL.

Poster No. P0608
Outcomes of Debridement, Antibiotics, and Implant Retention for Infected Unicompartmental Knee Arthroplasty

Abtin Alvand, FRCS (Ortho), MBBS
Saeed Asadollahi, MD
Thomas Hamilton, MBChB, BSc (Hons)
Shiraz Sabah, MD
Matthew Scarborough
William Jackson, FRCS
Andrew J. Price, FRCS
Max Gibbons, FRCS
David W. Murray, FRCS (Ortho)

DAIR is successful in around half of patients with early acute UKA PJI and is associated with low morbidity and, when successful, excellent functional outcomes.
Poster No. P0609
Smoking Increases Risk for Infection and Readmission following Unicompartmental Knee Arthroplasty
Edward S. Hur, MD
Joseph Serino, MD
Daniel D. Bohl, MD, MPH
COL. (ret.) Tad L. Gerlinger, MD, FAAOS

We review the association between smoking and short-term adverse events following unicompartmental knee arthroplasty using a national patient database.

Poster No. P0610
Patients Requiring Manipulation under Anesthesia after Total Knee Arthroplasty have Higher Rates of Preoperative Depression
Sean Rajaei, MD
Randon A. Zahlout, BS
Landon Polakof, MD
Eytan Debbi, MD, PhD
Guy D. Paiement, MD, FAAOS

Patients requiring a manipulation under anesthesia for arthrofibrosis after primary TKA had higher rates of depression preoperatively on PROMIS questionnaires.

Poster No. P0611
A 2-Octyl Cyanoacrylate Topical Adhesive as a Substitute for Subcuticular Suture for Skin Closure after Total Knee Arthroplasty: A Randomized Controlled Trial in the Same Patients
Keun Young Choi, MD
Chulkyu Kim
Mansoo Kim, PhD
In Jun Koh, MD, PhD
Yong In, MD

Appliance of 2-octyl cyanoacrylate topical adhesive and flexible self-adhesive polyester mesh for TKA could be a reasonable substitute for subcuticular suture.

Poster No. P0612
The Biggest Losers: Morbidly Obese Patients with Successful Weight Loss Before and After Primary Total Hip and Knee Arthroplasty
Colleen Balkam, MD
Daniel Marchwiani, MD
Joshua Shapiro, MD
Kevin X. Huang, MD
Patrick R. Taylor
Christopher W. Olcott, MD, FAAOS
Daniel J. Del Gaizo, MD, FAAOS

This study is a cross-sectional observational study that investigates morbidly obese patients who achieve clinically significant weight loss before and/or after joint replacement surgery.

Poster No. P0613
Incidence and Predictive Risk Factors of Postoperative Urinary Retention after Primary Total Knee Arthroplasty
Daniel Bracey, MD, PhD
Vishal Hegde, MD
Aviva Pollet, BS
Roseann M. Johnson, BA
Jason M. Jennings, MD, FAAOS
Todd Miner, MD, FAAOS

This study measures the incidence of postoperative urinary retention and identifies predictive risk factors.

Poster No. P0614
Identification of Clinical and Biological Risk Factors for Persistent Postoperative Pain after Total Knee Arthroplasty for Osteoarthritis
Michael A. Malahias, MD
George Birch, BS
Haoyan Zhong, MA
Alexandra Sideris, MSc, PhD
Valeria Rotundo, BA
Peter K. Sculco, MD
Meghan Kirksey, MD, PhD

These results support the growing evidence that patient pain profiles as well as a patient-specific biologic response to surgery may influence longer-term clinical outcomes after TKA.

Poster No. P0615
Intraosseous Vancomycin Infusion Reduces Periprosthetic Joint Infection in Primary Total Knee Replacement
Kwan Park, MD
Terry A. Clyburn, MD, FAAOS
Thomas C. Sullivan, BS
Julien Chapleau, MD, FRCSC
Stephen J. Incavo, MD, FAAOS

Intraosseous vancomycin infusion reduces periprosthetic joint infection in primary total knee arthroplasty.

*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
Poster No. P0616
General Anesthesia is Associated with Shorter First Ambulation Distances following Total Knee Arthroplasty Compared to Spinal Anesthesia

**Nipun Sodhi, MD**
Luke Garbarino, MD
Peter A. Gold, MD
Hiba K. Anis, MD
Max Willinger, MD
Jamie Heimroth, MD
Jonathan Danoff, MD, FAAOS
Sreevthsara Boraiah, MD
Jonathan L. Schaffer, MD, FAAOS
Robert M. Molloy, MD
Carlos A. Higuera Rueda, MD, FAAOS
Stanley E. Asnis, MD, FAAOS
Vijay J. Rasquinha, MD
Michael A. Mont, MD, FAAOS
Northwell Health Arthroplasty

The anesthesia delivered can affect postoperative outcomes. Using an institutional database, this study aimed to determine the association between anesthesia type and ambulation after TKA.

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Poster No. P0619
Effect of Commonly Used Lavage Solutions on the Polymerization of Bone Cement

**Mark Wu, MD**
Jeffrey A. O'Donnell, MD
Niall H. Cochrane, MD
Sean P. Ryan, MD
Matthew Myntti
Thorsten M. Seyler, MD, PhD, FAAOS

Bone cement exposed to commonly used lavage solutions during the cement mixing-phase demonstrated accelerated set-times and decreased compressive strength.

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Poster No. P0620
Risk of Infection after Traumatic Wound Dehiscence following Primary Total Knee Arthroplasty

**Elizabeth Gausden, MD**
Matthew Shirley, MD
Matthew P. Abdel, MD, FAAOS
Rafael J. Sierra, MD, FAAOS

An acute, traumatic wound dehiscence with in the first 30 days after primary TKA results in a 11% risk of infection at 2 years.

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Poster No. P0621
Neural Network Prediction of Same-Day Discharge following Primary Total Knee Arthroplasty Based on Pre-Inclusion Variables

**Chapman Wei, BS**
Alex Gu, MD
Safa C. Fassihi, MD
Theodore Quan, BS
Cynthia A. Kahlenberg, MD
Liabin Liu, MD, PhD
Savyasachi C. Thakkar, MD
Alejandro Gonzalez Della Valle, MD, FAAOS
Peter K. Sculco, MD

Both neural network and decision tree analysis revealed similar factors in predicting patients who undergo outpatient TKA, including BMI, INR, operative time, anesthesia type, and preop. hematocrit.

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Poster No. P0622
Risk Factors for Adverse Outcomes following Outpatient Total Knee Arthroplasty: An Analysis from ACS-NSQIP 2013-2018

**Albert T. Anastasio, MD**
Elshaday S. Belay, MD
Mark Wu, MD
Niall H. Cochrane, MD
William A. Jiranek, MD, FAAOS
Michael P. Bolognesi, MD, FAAOS
Thorsten M. Seyler, MD, PhD, FAAOS

The purpose of this study is to understand risk factors for delayed discharge, defined greater than 24hrs, readmission, and reoperation after outpatient TKA.
Poster No. P0623
In-Hospital Mortality after Septic Revision Total Knee Arthroplasty; Analysis of the New York and Florida State Inpatient Databases

Nicholas S. Piuzzi, MD
Linsen T. Samuel, MD, MBA
Assem A. Sultan, MD
Guangjin Zhou
Suparna Navale, MPH, MS
Atul F. Kamath, MD, FAAOS
Alison K. Klika, MS
Siran Koroukian, PhD
Carlos A. Higuera Rueda, MD, FAAOS

Age >81 and higher comorbidity burden were found to contribute to increased risk of 2-year postoperative mortality after septic rTKA.

Poster No. P0624
Getting Rotational Alignment Right in Distal Femur Replacement: Can the Linea Aspera be a Guide?
Naeeem Jagani
Gunasekaran Kumar, FRCS, FRCS (Ortho)

Assessment of angle between linea aspera and interepicondylar line helps identify the rotational alignment for distal femoral replacement.

Poster No. P0625
High Failure Rate Associated with Arthroscopic Lysis of Adhesions for Arthrofibrosis Treatment following Total Knee Arthroplasty
Nathan P. Thomas, MD
Christina Liu, MD
Nathan H. Varady, BS
Pierre-Emmanuel Schwab, MD
Yhan E. Colon Iban, BA
Antonia F. Chen, MD, MBA, FAAOS

ROM outcomes are equivalent between ALA, MUA, and delayed MUA for arthrofibrosis; however, there is a significantly higher rate of SSIs and complications following ALA.

Poster No. P0626
Infection and Periprosthetic Fracture are the Leading Causes of Failure after Aseptic Revision Total Knee Arthroplasty
Mark Zhu
Juliette Meyer
Alana Cavadino, MSc, PhD
Brendan Coleman, MD
Jacob Munro, MD
Simon Young, MD, FRACS

PJI and periprosthetic fracture are the leading causes of rerevision surgery following aseptic RTKA. Efforts to improve outcomes of aseptic RTKA should focus on these areas, particularly prevention of PJI.

Poster No. P0627
Are Tibial Constructs with Cones in Revision Total Knee Arthroplasty Durable at Mid-Term Follow Up?
Nicholas Hernandez, MD
Zoe W. Hinton, BS
Christine J. Wu, BS
Sean P. Ryan, MD
Michael P. Bolognesi, MD, FAAOS

Revision TKA with tibial cones had good survival to revision for tibial construct aseptic loosening, 96% at 6 years.

Poster No. P0628
The Stiff Patient: What Can Range of Motion Trajectories Tell Us?
Ioannis Gkiatas, PhD
Allina A. Nocon, MPH, PhD
Kathleen W. Tam, MPH
Alejandro Gonzalez Delia Valle, MD, FAAOS
David J. Mayman, MD, FAAOS
Russell E. Windsor, MD, FAAOS
Thomas P. Sculco, MD, FAAOS
Peter K. Sculco, MD

This study assesses the range of motion trajectory of stiff patients after revision total knee arthroplasty.

Poster No. P0629
Aseptic Revision Total Knee Arthroplasty in Patients Less than 55 Years of Age: Risk Factors for Rerevision
Brian Chalmers, MD
Marie Syku, BA
Amethia D. Joseph, MHA
David J. Mayman, MD, FAAOS
Steven B. Haas, MD, FAAOS
Jason L. Blevins, MD

Patients less than 55 years undergoing revision TKA have a modest 5-year revision-free survival of 80%. Isolated polyrevisions are not benign, with 1 in 4 patients undergoing rerevision.

Poster No. P0630
Does Range of Motion Improve in Revision Total Knee Arthroplasty?
Katherine A. Lygrisse, MD
Mackenzie A. Roof, BS
Mohamad Sharan, MD
Greg Teo, MD
William J. Long, MD, FAAOS
Ran Schwarzkopf, MD, FAAOS

Component revision cases have significantly improved ΔROM when compared to liner only revision. Implant type is not significantly associated with changes in ROM in either liner or component revision.
Poster No. P0631
Outcome of Two-Stage Revision Total Hip and Knee Arthroplasty as a Salvage Procedure for Deep Infection of Peri-Articular Fracture Fixation: Propensity Score-Matched Study

Christian Klemt, PhD  
Young-Min Kwon, MD, PhD, FAAOS  
Janna Van Den Kieboom, MD  
Ruben V. Oganesyan, MD  
Venkatsaiakhil Tirumala, BS, MS  
Liang Xiong, MD, PhD

Salvage two-stage revision arthroplasty for infected ORIF of peri-articular fractures was associated with poor outcome, with reinfection rates as high as 35%.

Poster No. P0632
High Volume Revision Surgeons Have Better Outcomes following Revision Total Knee Arthroplasty

Mackenzie A. Roof, BS  
Mohamad Sharan, MD  
James Feng, MD, MS  
David B. Merkow, MD  
William J. Long, MD, FAAOS  
Ran Schwarzkopf, MD, FAAOS

Patients of high volume revision surgeons have shorter hospital stays, shorter surgical times, and lower rerevision rates following full rTKA as compared to patients of low volume surgeons.

Poster No. P0633
Early Aseptic Revision Total Knee Arthroplasty within 90 Days: Causes and Complications

Tony S. Shen, MD  
Alex Gu, MD  
Patawut Bovonratwet, MD  
Nathaniel Ondeck, MD  
Peter K. Sculco, MD  
Edwin P. Su, MD, FAAOS

Early aseptic revision TKA within 90 days carries a high risk of rerevision at two years, a high risk of infection, and a high rate of postoperative complications.

Poster No. P0634
Underweight Patients Undergoing Total Knee Arthroplasty: An Analysis of Functional Outcomes, Complications, and Survivorship

Graham S. Goh, MD  
Gerald J. Zeng  
Yongqiang Jerry Chen, FRCS (Ortho), MBBS  
Hee-Nee Pang, MBBS, MRCS  
Darren Tay, MBBS, FRCS (Ortho)  
Shi-Iu Chia, MBBS, FRCS (Ortho)  
Ngai-Nung Lo, MD  
Seng-Jin Yeo, FRCS  
Ming Han Lincoln Liow, FRCS (Ortho), MBBS

Despite poorer functional outcomes following TKA, underweight patients attained similar levels of satisfaction as compared to controls. Perioperative outcomes and survivorship were similar.

Poster No. P0635
Contemporary Primary Total Knee Arthroplasty is Durable in Patients with Ankylosing Spondylitis

Aaron Owen  
James R. Markos, BA, BS  
Tad M. Mabry, MD, FAAOS  
Michael J. Taunton, MD, FAAOS  
Daniel J. Berry, MD, FAAOS  
Matthew P. Abdel, MD, FAAOS

Patients with ankylosing spondylitis represent a complex patient population; however, excellent implant survivorship and range of motion is expected with contemporary medical and surgical management.

Poster No. P0636
Can Patients with Parkinson's Disease Achieve Similar Patient-Reported Outcomes and Satisfaction after Total Knee Arthroplasty? A Propensity Score-Matched Study

Graham S. Goh, MD  
Gerald J. Zeng  
Yongqiang Jerry Chen, FRCS (Ortho), MBBS  
Hee-Nee Pang, MBBS, MRCS  
Darren Tay, MBBS, FRCS (Ortho)  
Shi-Iu Chia, MBBS, FRCS (Ortho)  
Ngai-Nung Lo, MD  
Seng-Jin Yeo, FRCS  
Ming Han Lincoln Liow, FRCS (Ortho), MBBS

Although patients with PD had relatively poorer knee function and quality of life, these patients still experienced significant functional gains compared to their preoperative status.

Poster No. P0637
Two-Year Clinical Outcomes of Patients Undergoing 2-Stage Revision for Hip and Knee Prosthetic Joint Infection – We’re Not as Good as We Think: A Comparison of Current Outcome Measurement Methods

Tracy M. Borsinger, MD  
Daniel A. Pierce, MD, MS  
Adriana P. Lucas, MS  
Alexander Orem, MD, FAAOS  
Wayne E. Moschetti, MD, MS, FAAOS

This is a retrospective review assessing 2-year clinical outcomes of 108 patients undergoing explant for TKA or THA PJI utilizing three outcome reporting methods.

Poster No. P0638
Clinical Effectiveness of Serum D-Dimer in Evaluating Periprosthetic Joint Infections

Charles A. Engh, BS, MS  
Alex J. Sadauskas, MD  
Faisal Akram, MD  
Brett R. Levine, MD, MS

This retrospective review of prospectively collected data discovered that in conjunction with CRP and ESR, D-dimer, did not confer increased sensitivity to PJI and contributed to unnecessary testing.
Intra-arterial administration of 1g vancomycin and 600mg tobramycin achieves supratherapeutic intra-articular concentrations over the first 8 to 24 hours postop and does not reach toxic systemic levels.

In revision arthroplasty, more aggressive VTE prophylaxis strategies were associated with higher rates of bleeding and thrombotic complications; less aggressive strategies had lower complications.

Preoperative infection was a significant risk factor for non-union only in the arthroscopic group. Internal fixation techniques were superior at achieving bony fusion compared to external fixation.

Combined TAA was performed ankle OA with severe talus deformity and limited motion but achieved comparable clinical scores to standard TAA for those without talus or subtalar problems.

At long-term follow up after TAA, patients had sustained improvement in multiple, objective parameters of gait compared to their preoperative function.
**Poster No. P0647**
**Comparison of Various Suture Tape and Suture Button Constructs for Fixation of the Unstable Syndesmosis**

*Haggai Schermann, MD*
*Takahisa Ogawa, MD, MPH*
*William R. Taylor, BS*
*Bart Lubberts, MD, PhD*
*Daniel Guss, MD, MBA*
*Gregory R. Waryasz, MD*
*Amai Khoury, MD*
*Christopher W. DiGiovanni, MD, FAAOS*

Comparison of several methods of fixation of completely unstable syndesmosis model, including suture tape, suture tape with a suture button, suture tape with two suture buttons.

**Poster No. P0648**
**Outcomes following Subchondroplasty in the First Metatarsal Head**

*Akhil Sharma, BS*
*Craig C. Akoh, MD*
*Selene G. Parekh, MD, MBA, FAAOS*

While subchondroplasty has been used with varying success in the knee, its application to the first metatarsal head has been shown to be associated with symptomatic avascular necrosis.

**Poster No. P0649**
**Paradoxical Shifts in the Stress Distribution Patterns of the Ankle Joint after High Tibial Osteotomy**

*Shinji Matsubara, MD, PhD*
*Tomohiro Onodera, MD, PhD*
*Koji Iwasaki, MD, PhD*
*Ryosuke Hishimura, PhD*
*Masatake Matsuoka, PhD*
*Eiji Kondo, MD*
*Norimasa Iwasaki*

The present study demonstrated that the stress distribution pattern on the ankle joint surface shifted from lateral to medial as the limb alignment changed from varus to valgus.

**Poster No. P0650**
**Hindfoot Varus Deformity: An Essential but Easily Neglected Pathological Change in Müller-Weiss Disease**

*Shuyuan Li*
*Mark S. Myerson, MD, FAAOS*
*Mingzhu Zhang, MD, PhD*
*Cesar De Cesar Netto, MD, PhD*

This study used weight-bearing CT to demonstrate that hindfoot varus and peritalar subluxation are typical features of MWD, which are totally different from the characteristics of a flatfoot deformity.

**Poster No. P0651**
**Patient Perceptions of Patient-Reported Outcome Measures in Orthopaedic Surgery: A Snapshot of Data for Foot and Ankle Patients**

*Kempland C. Walley, MD*
*Emily Yannatta, BS*
*Christopher M. Stauch, BS*
*Madeleine W. Frietsch, BS*
*Mark L. Dunleavy, MD*
*Paul J. Juliano, MD, FAAOS*
*Michael C. Aynardi, MD, FAAOS*

Patients perceive patient-reported outcome measures as effective measurements for assessing their pain and function in a foot and ankle surgery clinic.

**Poster No. P0652**
**Preoperative Radiographic Parameters of Arch Collapse Do Not Predict Future Treatment Failure in Patients with Stage Iib Pes Planus**

*Kempland C. Walley, MD*
*Christopher M. Stauch, BS*
*Jeremy Silver, MD, MS*
*Patrick M. Wise, MD*
*Christopher Ehret, BS*
*Thomas Harper, MD*
*Mark L. Dunleavy, MD*
*Paul J. Juliano, MD, FAAOS*
*Michael C. Aynardi, MD, FAAOS*

There is no significant difference in severity of preoperative radiographic deformity between patients who experienced failure vs. non-failure following surgical flatfoot correction.

**Poster No. P0653**
**First Tarsometatarsal Joint Loading after Sequential Correction of Hallux Valgus Using a Proximal Opening Wedge Metatarsal Osteotomy and Distal Soft Tissue Procedure**

*Michael J. Ziegele, MD*
*Jonathan C. Kraus, MD, FAAOS*
*Glenn G. Shi, MD, FAAOS*
*Brian C. Law, MD, FAAOS*
*Mei Wang, PhD*

The proximal metatarsal osteotomy is effective for hallux valgus correction, but at the cost of increased pressure observed in the first TMT joint. Large correction can lead to chondrotoxic effects.

**Poster No. P0654**
**A Case Study on Weight-Bearing vs. Non-Weight-Bearing Computed Tomography for the Assessment of Hindfoot Fusion**

*Elizabeth Friedmann, MD*
*Garnett A. Murphy, MD, FAAOS*
*David R. Richardson, MD, FAAOS*
*Benjamin J. Grear, MD, FAAOS*
*Clayton C. Bettin, MD, FAAOS*

This case study reviews two patient cases of hindfoot arthrodesis with postoperative weight-bearing CT which was indicative of successful fusion and non-weight-bearing CT which demonstrated nonunion.
Poster No. P0655
Middle Facet Subluxation of the Hindfoot Objectively Confirmed as Optimal Early Sign of Peritalar Subluxation and Progressive Flatfoot Deformity Using 3D Distance Mapping

Kevin Dibbern, MS, PhD
Shuyuan Li, MD, PhD
Victoria Y. Vvtcharenko, BA
Elijah C. Auch, BS, MS
Francois Lintz, MD
Scott Ellis, MD, FAAOS
John E. Femino, MD, FAAOS
Cesar De Cesar Netto, MD, PhD

Objective quantification of peritalar subluxation on weight-bearing CT using novel 3D distance mapping techniques identified the middle facet as the best marker of adult acquired flatfoot deformity.

Poster No. P0656
Impact of Coleman Block Test on Adult Hindfoot Alignment Assessed by Clinical Exam, X-Ray, and Weight-Bearing CT

Ian Foran, MD
Nasima Mehraban, MD
Stephen Jacobsen, MD
Daniel D. Bohl, MD, MPH
Johnny L. Lin, MD, FAAOS
Kamran S. Hamid, MD, MPH
Simon Lee, MD, FAAOS

Clinical exam and WBCT Coleman block testing are highly correlated and demonstrate only partial improvement of deformity in adults.

Poster No. P0657
Bulk Osteochondral Allograft for Osteochondral Lesions of the Talus: A Systematic Review

Martin Davey, MD, MRCS
Eoghan Hurley, MBCHB
Christopher Colasanti, MD
Nathaniel Mercer, BA, MS
Yoshiharu Shimozono, MD
John G. Kennedy, MD

The purpose of this study was to systematically review the literature to ascertain the outcomes of bulk OCA for OLT.

Poster No. P0658
Performance following High Ankle Sprain in National Football League Players from 2009-2010 to 2019-2020

Steven Defroda, MD
Davis Hartnett, BS
Daniel Yang, BS
John D. Milner, BA
Henry T. Shu, BS
Blake Bodendorfer, MD

Our study indicates that with regard to performance, players sustaining high ankle sprain return to their pre-injury levels. However linemen play a smaller proportion of games following injury.

Poster No. P0659
Platelet-Rich Fibrin Accelerates the Healing of Achilles Tendon Defect by Promoting the Proliferation and Activation of Tenocytes

Yoshiyuki Senga, MD
Akinobu Nishimura, MD, PhD
Akihiro Sudo, MD

Platelet-rich fibrin accelerates the healing of Achilles tendon defect by promoting the proliferation and activation of tenocytes.

Poster No. P0660
Treatment of Ankle Fractures: Does Time Matter?

Ashish Shah, MD, FAAOS
Jacob K. Hawkins, MD
Bradley Alexander, BS
Nicholas A. Andrews, BS
Abhinav Agarwal, MD
Benjamin B. Cage, BS
Elise M. Greco
Hannah M. Barranco
Akshar Patel, BS

Early surgical intervention did not significantly increase time to union or wound complications.

HAND AND WRIST P0661-P0680

Poster No. P0661
Obtaining the Requisite Signals to Allow Independent Digital Control of a Myoelectric Prosthesis with the Starfish Procedure

Casey Sabbag, MD
Raymond G. Gaston, MD, FAAOS
Bryan J. Loeffler, MD, FAAOS

Patients undergoing the Starfish procedure report adequate daily prosthetic use with improvements in DASH scores postoperatively with the use of a prosthesis.

Poster No. P0662
Carpometacarpal Loading Effects Before and After Metacarpophalangeal Joint Fusion: A Cadaver Investigation

Mia M. McNulty, MD
Christopher Chen, MD
Weston Ryan, BS,
Todd H. Baldini
Andy E. Lalka, BS, MPH
Frank A. Scott

In a biomechanical analysis of CMC forces in both tip and key pinch, there were no significant differences in contact force, contact area, or contact pressure with MP fusion.
Poster No. P0663
Operating Room Costs and Revenues for Proximal Row Carpectomy and Limited Wrist Fusion and Corresponding PROMIS Physical Function and Pain Interference Outcomes

Matthew J. St John, MD
Warren C. Hammert, MD
Kathleen Fear, PhD

We studied OR costs and revenues and associated PROMIS physical function and pain interference for proximal row carpectomy and limited wrist arthrodesis.

Poster No. P0664
Does Preoperative Opioid Use Increase Revision Surgery and Complications following Carpometacarpal Arthroplasty?

Omolola Fakunle
Kevin X. Farley, BA
Corey Spencer, BS
Charles A. Daly, MD
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD

This is a database study examining the impacts of preoperative opioid use on the outcomes of CMC arthroplasty.

Poster No. P0665
The Influence of Modifiable and Nonmodifiable Variables on Carpometacarpal Arthroplasty Complications

Alexander M. Dawes, BS
Corey Spencer, BS
Beau McGinley, BA
Emily L. Demiao, BSN
Charles A. Daly, MD
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD

The purpose of this study was to examine nonmodifiable and potentially modifiable risk factors associated with postoperative complications following CMC arthroplasty for thumb arthritis.

Poster No. P0666
Biomechanical Study of Proximal Hamate Autograft in Scaphoid Nonunion

Catphuong L. Vu, MD
Jerry I. Huang, MD, FAAOS
Scott Telfer, PhD

Biomechanical study of proximal hamate autograft for scaphoid nonunion demonstrates minimal change in contact pressure and area and presents viable option for reconstruction.

Poster No. P0667
Limited Fasciectomy vs. Collagenase Clostridium Histolyticum for Dupuytren Contracture: A Propensity Score Matched Study of Single Digit Treatment with Minimum Five-Year Follow-Up

Dafang Zhang, MD
Jillian Gruber, MD
Stein Jasper Janssen, MD
Philip E. Blazar, MD, FAAOS
Jesse B. Jupiter, MD, FAAOS
Brandon E. Earp, MD, FAAOS

Long-term satisfaction is higher with surgical fasciectomy than collagenase treatment. Collagenase treatment has approximately 3 times the reintervention rate compared with fasciectomy after 5 years.

Poster No. P0668
Perioperative Use of Disease-Modifying Antirheumatic Drugs: Complications and Outcomes following Surgical Intervention for Distal Radius Fracture

Megan R. Donnelly, BS
Jeremy Silverman
Karen J. Noh, BS
Rebecca B. Blank, MD, PhD
Jacques H. Hacquebord, MD, FAAOS

Perioperative conventional DMARD therapy does not appear to adversely affect outcomes following ORIF for DRF.

Poster No. P0669
Performance and Return to Sport following Excision of the Hook of the Hamate in Professional Baseball Players

Brandon Erickson, MD
Kathryn McElheny
Peter N. Chalmers, MD, FAAOS
James B. Carr, MD
John D’Angelo, BA
Dana Rowe
Gary M. Lourie, MD, FAAOS
Michelle G. Carlson, MD, FAAOS

Following surgical excision for hook of hamate fractures in professional baseball players, 84% were able to RTS, with 81% returning to the same or higher level.

Poster No. P0670
Sociodemographic Disparities in the Management of Distal Radius Fractures in the Elderly

Khang H. Dang, MD
Riikka E. Koso, MD
Boris A. Zelle, MD, FAAOS

Using the National Inpatient Sample (NIS) dataset, our study demonstrated significant racial and social disparities regarding utilization of operative fixation of distal radius fractures in the elderly.
Poster No. P0671
Prospective Randomized Trial Studying the Effects of Preoperative Opioid Education on Postoperative Opioid Consumption after Outpatient Upper Extremity Surgery

Asif M. Ilyas, MD, FAOSS
Michael J. Reynolds, BS
Clay Townsend, BS

Preoperative counseling significantly reduced the number of pills consumed by patients undergoing outpatient upper extremity orthopaedic surgery.

Poster No. P0672
Parallax and Assessment of Upper Extremity Joint Position via Telemedicine: Are Standardized Protocols Necessary?

Justin J. Koh, MD
William Melton, MD
Brian Clair, MD
Alice A. Hunter, MD, FAOSS
Eric T. Toto, MD, FAOSS

This was an evaluation of the effects of telemedicine modalities (device, camera position, and patient position) on effective and reliable assessment of joint position for the upper extremity.

Poster No. P0673
Postoperative Satisfaction with Pain Control Does Not Correlate with Postoperative Opioid Prescribing following Outpatient Carpal Tunnel and Trigger Release Surgery

Amit K. Manjunath, BS
David A. Bloom, BA
Devon J. Ryan, MD
Matthew Duenes
Michael J. Alaia, MD, FAOSS
Jacques H. Hacquebord, MD, FAOSS
Nader Paksima, DO, FAOSS

Opioid-sparse postoperative pain regimens are successful in reducing opioids following carpal tunnel and trigger release surgery while maintaining high patient satisfaction related to pain control.

Poster No. P0674
Hypothyroidism and Carpal Tunnel Syndrome

Devan Patel, MD
Kalpit N. Shah, MD
Wesley M. Durand, BS
Alan H. Daniels, MD, FAOSS
Arnold-Peter C. Weiss, MD, FAOSS

Using a large national database, we found patients with hypothyroidism have a higher prevalence of CTS and CTR compared to the general population, with no difference in surgical complication rate.

Poster No. P0675
Peripheral Nerve Regeneration Using an Adipose-Derived Stem Cell Sheet

Atsuro Murai, MD
Kaoru Tada, MD
Mika Nakada, MD
Masashi Matsuta
Katsuhiro Hayashi, MD
Hiroyuki Tsuchiya, MD

The ADSC sheet, which can hold numerous cells locally, is useful not only for artificial nerve grafts and processed nerve allografts that have no cellular components, but also for nerve autografts that contain Schwann cells.

Poster No. P0676
Peripheral Nerve Repair Performed with an Autograft vs. Allograft: Systematic Review and Meta-Analysis

Asif M. Ilyas, MD, FAOSS
Zachary Herman, BS
Clay Townsend, BS

Based on our systematic review and meta-analysis, processed nerve allograft repair statistically outperformed autograft repair in peripheral nerve repairs of the upper extremity.

Poster No. P0677
Neuroma Resection and Nerve Allograft Reconstruction for Management of Postoperative Painful Neuromas of Upper and Lower Extremities

Sofia Bougioukli, MD
Landon Cohen, MS
Mathew Schur, MD
Rachel Lefebvre, MD
Milan V. Stevanovic, PhD

We describe the successful use of a novel technique that involves neuroma resection and nerve allograft reconstruction in a series of patients with postoperative painful neuromas of the extremities.

Poster No. P0678
Biomechanical Comparison of Three Thumb Ulnar Collateral Ligament Reconstruction Methods

Neil V. Shah, MD, MS
Alba Avoricani, BA
Qurratul-Ain Dar, BS
Kenneth H. Levy
Westley Hayes, MS
Steven M. Koehler, MD, FAOSS

Suture tape anchor augmentation repair of the thumb UCL greater recapitulates native joint congruity compared to repair with suture anchors or UCL reconstruction with palmaris longus graft.
Poster No. P0679  
The Impact of Previously Treated Trigger Fingers on Success of Steroid Injections in Subsequent Triggers  
Shaya Shahsavaran  
Christine D. Bub, MD  
Andrew R. Bohm, PhD  
Charles Ekstein, MD  
Kate W. Nellans, MD, FAAOS  
Lewis B. Lane, MD, FAAOS  
Patients presenting with three or more symptomatic fingers were 75% more likely to go on to surgical release.

Poster No. P0680  
Ex Situ vs. In Situ Flexor Tendon Repairs in a Cadaveric Model: Ex Situ Models Do Not Tell the Whole Story  
Christopher P. Lindsay, MD  
John M. Yanik, MD  
Nicole Watson, PhD  
Natalie A. Glass, PhD  
Timothy P Fowler, MD, FAAOS  
While strength of repair was not significantly different, bulk and time of repair were significantly greater for in situ repairs compared to ex situ repairs of human FDP tendons in a cadaveric model.

Poster No. P0681  
Comparison of Publicly Available Hospital List Prices for Orthopaedic Oncology Procedures through Chargemasters of the Top US Orthopaedic Hospitals  
Justin Makovicka, MD  
Michael L. Moore, BS  
Jordan R. Pollock, BS  
Matthew K. Doan, BS  
Jeffrey Hassebrock, MD  
Karan Patel, MD  
This study compares the Chargemaster pricing information for common orthopaedic oncology procedures at the top US orthopaedic hospitals.

Poster No. P0682  
Thromboelastography-Derived Coagulation Profile of the Musculoskeletal Oncology Patient: Early Findings of a Pilot Study  
Samir Sabharwal, MD, MPH  
Raj Amin, MD  
Adam S. Levin, MD, FAAOS  
Carol D. Morris, MD, MS, FAAOS  
We sought to collect and analyze preoperative TEG data in order to establish a coagulation profile of musculoskeletal oncology patients. We found a majority are hypercoaguable at baseline.

Poster No. P0683  
Metabolic Characterization of Indeterminate Lipomatous Tumors with 1H Magnetic Resonance Spectroscopy  
Brett A. Shannon, MD  
Santosh Bharti, PhD  
Raj Kumar I. Sharma  
Adam S. Levin, MD, FAAOS  
Carol D. Morris, MD, MS, FAAOS  
Zaver Bhujwalla, PhD  
Laura Fayad, MD  
Lipomas, atypical lipomatous tumors, and liposarcomas have distinct metabolic profiles, and magnetic resonance spectroscopy is a potential diagnostic tool for radiologically-indeterminate tumors.

Poster No. P0684  
Telemedicine in Orthopaedic Oncology during the COVID-19 Pandemic: An Assessment of Patient Satisfaction  
Joshua Lawrenz, MD  
Jeffrey C. Krout, BS  
Ashley K. Ready, PA-C  
Cullen Moran  
Jennifer L. Halpern, MD, FAAOS  
Herbert S. Schwartz, MD, FAAOS  
Ginger E. Holt, MD, FAAOS  
A telephone survey demonstrated favorable patient satisfaction using telemedicine for outpatient clinic visits in an orthopaedic oncology practice during the COVID-19 pandemic.

Poster No. P0685  
Correlation between Musculoskeletal Anatomy Changes and Ambulatory Function Improvement after Internal Hemipelvectomy without Reconstruction  
Yuhui Zhu, BS  
Nicholas Dunbar, PhD  
John E. Madewell, MD  
Alexander N. Penny, DPT  
Benjamin J. Fregly, PhD  
Valerae O. Lewis, MD, FAAOS  
Anatomical changes in the psoas muscle after type-II internal hemipelvectomy without reconstruction are correlated with improvements in ambulatory function.
Poster No. P0686
A Cross-Species Osteosarcoma Organoid System for Profiling Functional Intratumoral Heterogeneity in Proliferation and Therapy Response

Etienne Flamant, BS
Mark M. Cullen, BS
Sarah M. Hoskinson, BS
Beatrice C. Thomas, BS
Sehwa Oh, MS
Gabrielle H. Rupprecht
Joanne Tuohy, DVM, PhD
David Hsu, MD, PhD
Will Eward, DVM, MD
Jason Somarelli
Duke University’s Comparative Oncology Group

Patient-derived 3D organoids created from distinct regions of the same canine osteosarcoma tumor mass expressed functional heterogeneity in proliferation and resistance to doxorubicin.

Poster No. P0687
Female Presenting Trends in Oncology Orthopaedics: An Analysis of the Past 5 Years

Ana C. Belzarena Genovese, MD
Roselle C. Okubo, MBA, MSN
Sarah N. Joseph, MD, MSc

Even though females are underrepresented in oncology orthopaedics (6-6.7%) they attain higher percentage of representation in conference leadership positions.

Poster No. P0688
Improved Patient Survival, Ambulation, and Pain Relief after Arthroplasty for Proximal Femoral Metastasis

Robert S. Runyon, MD
Rayhan Saiani, MD
Kelsey Young, MD
Lee K. Rhea, PhD
Cara A. Cipriano, MD, FAAOS
Joseph M. Lane, MD, FAAOS
John H. Healey, MD, FAAOS

After 164 hip arthroplasties for metastasis, median survival was 6.7 m, 94% were ambulatory, and 50% had pain control. Cancer type, spinal metastasis, and biologic therapy strongly influence outcomes.

Poster No. P0689
The Use of Carbon Fiber Implants for Impending or Existing Pathological Fractures

Leah Herzog, MD
Sophia Traven, MD
Zeke Walton, MD, FAAOS
Lee R. Leddy, MD, FAAOS

This is a retrospective comparison of stabilization of pathological fractures with carbon fiber implants versus titanium implants.

Poster No. P0690
No Survival Benefit for Patients with Metastatic Disease of Bone Treated in High-Volume Centers

Benjamin J. Miller, MD, MS, FAAOS
Emma L. Herbach, MS
Bradley D. McDowell, PhD

A review of the SEER-Medicare combined database demonstrated that there was no survival advantage in patients with extremity metastatic disease of bone treated in high volume centers.

Poster No. P0691
Biomechanical Evaluation of Minimally Invasive Stabilization of Pelvis with Periacetabular Lesion

David M. King, MD, FAAOS
John C. Neilson, MD, FAAOS
William Lea, MD
Sean Tutton, MD
Naif H. Alsaiakhan, MD
Sebastian Schafer, PhD
Mei Wang, PhD

This study compared the biomechanical effectiveness of three minimally invasive stabilization options in restoring strength of the pelvic weight-bearing region for metastatic periacetabular lesion.

Poster No. P0692
Is Mohs Micrographic Surgery Really Superior to Wide Local Excision? A Multicenter International Study

Matthew T. Houdek, MD
Matthew R. Claxton, BS
Anthony M. Griffin, MSc
Peter S. Rose, MD, FAAOS
Jay Wunder, MD
Peter Ferguson, MD

Contrary to previous series, there was no difference in oncologic outcome comparing Mohs or wide local excision for primary dermatofibrosarcoma protuberans.

Poster No. P0693
Postoperative Functional Outcomes after Total En Bloc Spondylectomy for the Spinal Tumors in Patients with No Neurological Symptoms

Yuki Kurokawa, MS, PT
Satoru Demura, MD
Satoshi Kato, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Makoto Handa
Ryohei Annen
Yuki Kurokawa, MS, PT
Hiroyuki Tsuchiya, MD

The incidence of neurological deficit after TES in patients with no neurological symptoms was 31.0%. However, 88.1% of patients could walk indoors independently one month after TES.
Poster No. P0694
What is the Value of Undergoing Surgery for Spinal Metastases at Dedicated Cancer Centers?

Azeem T. Malik, MBBS
Safdar N. Khan, MD, FAAOS
Ryan T. Voskuil, MD
John H. Alexander, MD
Joseph Drain, MD
Thomas J. Scharschmidt, MD, FAAOS

Dedicated cancer centers offer high-value care, as evidenced by lower complication rates and reduced costs, following surgery for spinal metastases.

Poster No. P0695
A Novel Technique for the Treatment of Periacetabular Metastatic Lesions: The Use of Pelvic Osseous Fixation Pathways for Percutaneous Acetabular Reinforcement of a Cemented Total Hip Arthroplasty in a Single Stage

Taylor Paziuk, MD
Gerard Chang, MD
James C. Krieg, MD, FAAOS
Scot Brown, MD, FAAOS

A safe and effective strategy for treating of periacetabular metastatic lesions in a single stage using pelvic stabilization via osseous fixation pathways and cemented acetabular hip arthroplasty.

Poster No. P0696
Effectiveness of Various Cast Covers in the Pediatric Population

Amit D. Parekh, MD
John Moon, MD
David W. Roberts, MD, FAAOS
Verena M. Schreiber, MD, FAAOS

In a study comparing home-made and commercial cast covers in the pediatric population, a single plastic bag with duct tape was both effective and cost efficient across all age groups.

Poster No. P0697
Does Surgical Experience Decrease Radiation Exposure in the Operating Room?

Apurva Shah, MD, MBA, FAAOS
Lacey Magee, BA
Alexa J. Karkenny, MD
Jie Nguyen, MD, MS
Faris Fazal, BS
Divya Talwar, MPH, PhD
Xiaowei Zhu, MS

Radiation exposure in the operating room is decreased with surgical experience.

Poster No. P0698
Patient Factors and Small Area Variations Impact Opioid Prescription after Surgical Treatment of Pediatric Supracondylar Humerus Fractures

Sachin Gupta, MD
Nathan D. Markiewitz, MA
Divya Talwar, MPH, PhD
Apurva Shah, MD, MBA
Jack M. Flynn, MD, FAAOS

Our study found tremendous variation in opioid prescription rates across US children’s hospitals and unexplained variation by race and ethnicity, suggestive of a lack of consensus on postop analgesia.

Poster No. P0699
The Accuracy of New Deep Learning Model-Based Segmentation and Key-Point Multi-Detection Type for Developmental Dysplasia of the Hip Screening Using Ultrasonogram

Si Wook Lee, MD
Kyung-Jae Lee, MD
Ki-Cheor Bae, MD
Si Wook Lee, MD

Hip joint ultrasonogram (USG) for infants is the gold standard for developmental dysplasia of the hip (DDH) screening. The aim of this study is to evaluate a new deep learning model-based segmentation.

Poster No. P0700
Descriptive Epidemiology Study of the Justifying Patellar Instability Treatment by Early Results (JUPITER) Cohort

Shital N. Parikh, MD, FAAOS
Meghan E. Bishop, MD
Jacqueline M. Brady, MD, FAAOS
Simone Gruber, BA
Matthew W. Veerkamp, BA
Joseph Nguyen, MPH
Daniel W. Green, MD, FAAOS
Eric J. Wall, MD, FAAOS
Beth E. Shubin Stein, MD, FAAOS
JUPITER Study Group

This is a preliminary descriptive analysis of patient demographics and clinical features of JUPITER study participants.

Poster No. P0701
Predictions of the Amount of Growth Remaining in the Lower Limb

Kyung Rae Ko
Jong Sup Shim, MD
Jaesung Park

The amount of observed growth in the lower limb was significantly less than calculated values. A novel approach in a patient-specific fashion should be studied.
Poster No. P0702
Effect of Foot Abduction Brace Type on Brace-Wear Compliance in Idiopathic Clubfoot

Michael R. Stevens, MD
Vincent W Prusick, MD
Cale Jacobs, PhD
Ryan D. Muchow, MD, FAAOS
Henry J. Iwinski, MD, FAAOS
Janet L. Walker, MD, FAAOS
Vishwas R. Talwalkar, MD, FAAOS
Elizabeth W. Hubbard, MD, FAAOS

Parents overestimate rigid FAO brace-time following casting of clubfoot deformity. Dynamic FAOs have improved brace-time at 3-months. Further study is needed to determine if this effects recurrence.

Poster No. P0703
Complications Requiring Readmission following Lower Limb Lengthening: A 10-Year US Database Study

Ashish Mittal, MD
Rishab Jayaram
Sachin Allahabadi, MD
Matthew K. Callahan, MSBA
Sanjeev Sabharwal, MD, MPH

There is a higher rate of readmission for patients undergoing tibial compared to femoral lengthening. Internal lengthening of the femur has a lower readmission rate than alternative techniques.

Poster No. P0704
Low Body Mass Index (<10th percentile) Increases Complications and Readmissions after Posterior Spinal Fusion in Adolescent Idiopathic Scoliosis

Farzam Farahani, BS
Brandon A. Ramo, MD, FAAOS

The effect of low BMI on postoperative outcomes have not been investigated in the AIS population. We found that BMI <10th %ile is a predictor of more % blood loss, pneumonia, and readmissions.

Poster No. P0705
Automating Assessment of Proximal Humerus Stage on Radiographs Using a Neural Network

Alana Munger, MD
Don Li, MS
Joseph B. Kahan, MD, MPH
Eric Li
Jonathan Cui, MD
Brett L. Heldt, BS
Daniel R. Cooperman, MD, FAAOS
Brian G. Smith, MD, FAAOS

We present a proof of concept study that shows the potential power of image classification algorithms in facilitating the use of novel radiographic systems such as proximal humerus ossification.

Poster No. P0706
Multimodal Treatment for Severe Spinal Deformity in Osteogenesis Imperfecta: Rationale, Outcomes, and Complications

Tyler C. McDonald, MD
Alexander Kuzma, MD
Yushane C. Shih, MD
Kenneth J. Rogers, PhD
Petya Yorgova, MS
Richard W. Kruse, DO, FAAOS
Jeanne M. Franzone, MD, FAAOS
Sukun A. Shah, MD, FAAOS

We report the outcomes of 28 patients with OI and scoliosis treated with a contemporary multimodal surgical approach to address their spinal deformity, with low complications and rates of failure.

Poster No. P0707

Keith D. Baldwin, MD, FAAOS
Manasa L. Kadiyala
Divya Talwar, MPH, PhD
Jack M. Flynn, MD, FAAOS
Wuddhav N. Sankar, MD, FAAOS
Jason B. Anari, MD

CTNAV results improved accuracy of placing pedicle screws; safer and more optimally placed pedicle screws in pediatric patients when compared with FREE.

Poster No. P0708
Scoliosis Surgery Normalizes Cardiac Function in Adolescent Idiopathic Scoliosis Patients

Vishal Sarwahi, MD, FAAOS
Rachel C. Gecelter, BS
Jesse M. Galina, BS
Aaron M. Atlas, BS, MS
Sayyida Hasan, BS
Yungtai Lo, PhD
Terry D. Amaral, MD, FAAOS

Patients with scoliosis may have a higher incidence of pulmonary hypertension and cardiac disease.

Poster No. P0709
Pediatric Cervical Spine Fusions: Opportunity for Improvement

Stephen Stephan, MD
Edward Compton, BS
Kenneth D. Illingworth, MD
David L. Skaggs, MD, FAAOS
Lindsay M. Andras, MD, FAAOS

The nonunion rate in pediatric cervical spine fusions remained high despite frequent use of halo immobilization and autograft. Patients with uninstrumented occipitocervical fusions are at particularly high risk with more than 1 in 4 developing a nonunion.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0710
How Low Can You Go? Evaluation of Implant Density in Growing Construct Conversion to Posterior Spinal Fusion for Early Onset Scoliosis

Lindsay M. Andras, MD, FAAOS
Edward Compton, BS
Purnendu Gupta, MD, FAAOS
Jaime A. Gomez, MD
Kenneth D. Illingworth, MD
David L. Skaggs, MD, FAAOS
Paul D. Sponseller, MD, FAAOS
Amer Samdani, MD
Steven W. Hwang, MD
Matthew Oetgen, MD, FAAOS
Jennifer Schottler, MPT
George H. Thompson, MD, FAAOS
Michael G. Vitale, MD, MPH, FAAOS
John T. Smith, MD, FAAOS
Pediatric Spine Study Group

While length gain and curve correction were similar at all implant densities, more revisions occurred in ultra-low implant densities (<1.3 anchors/vertebrae) in growing rod conversions.

Poster No. P0711
Pills at Home: Teenagers Report Pain and Opioid Usage following Posterior Spinal Fusion in Adolescent Idiopathic Scoliosis Using Text Messaging

Nishank Mehta, BA
Jack M. Flynn, MD, FAAOS
Daniel J. Miller, MD
Wudbhav N. Sankar, MD, FAAOS
Patrick J. Cahill, MD, FAAOS
Faris Fazal, BS
Divya Talwar, MPH, PhD
Apurva Shah, MD, MBA

Improved opioid stewardship is feasible without compromising postoperative pain control for PSF in patients with AIS.

Poster No. P0712
Dural Tears in Pediatric Posterior Spinal Fusions

Stephen Stephan, MD
Edward Compton, BS
Kenneth D. Illingworth, MD
Lindsay M. Andras, MD, FAAOS
Jason K. Chu, MD, MSc
David L. Skaggs, MD, FAAOS

Dural tears are relatively common occurrences during pediatric PSFs. Intraoperative dural repair was 96% successful.

Poster No. P0713
Anterior Cruciate Ligament Tear following Operative Treatment of Pediatric Tibial Eminence Fractures in a Multicenter Cohort

Ryan O'Donnell, MD
Steven Bokshan, MD
Kelsey E. Brown, BA
Julien Aoyama, BA
Henry B. Ellis, MD, FAAOS
Peter D. Fabricant, MD, MPH, FAAOS
Theodore J. Ganley, MD, FAAOS
Daniel W. Green, MD, FAAOS
Scott D. McKay, MD, FAAOS
R. Justin Mistovich, MD, MBA, FAAOS
Jason T. Rhodes, MD, FAAOS
Brant C. Sachleben, MD, FAAOS
M C. Sargent, MD, FAAOS
Gregory A. Schmale, MD, FAAOS
Yi-Meng Yen, MD, PhD
Neeraj M. Patel, MD, MPH
Indranil Kushare, MD
Rushyuan J. Lee, MD, FAAOS
Aristides I. Cruz, MD, FAAOS
Tibial Spine Research Interest Group

Subsequent ACL tears following operatively treated pediatric tibial eminence fractures were found in 21.7% of patients. Significant risk factors were fracture displacement and older age.

Poster No. P0714
Opioid Represcriptions after Anterior Cruciate Ligament Reconstruction in Adolescents are Associated with Subsequent Opiate Use Disorders

John S. Vorhies, MD, FAAOS
Eli Cahan, BA
Nicole A. Segovia, BS
Kristin C. Halvorsen
Japsimran Kaur, BS
Charles M. Chan, MD, FAAOS

Patients receiving an opioid represcription more than 6 weeks postoperatively following an anterior cruciate ligament reconstruction are at an elevated risk for developing opioid use disorders.

Poster No. P0715
Does a Continuous Peripheral Nerve Block Reduce Home Opioid Use in Children and Adolescents following Anterior Cruciate Ligament Reconstruction? The Envelope Please.

John Schlechter, DO, FAAOS
Tanner Harrah, DO
Bryn R. Gornick, BS
Benjamin Sherman, DO

Home narcotic use can be negated in 70% of children and adolescents following ACLR regardless of duration of peripheral nerve block.
Poster No. P0716
Parents and Athletes Perceive Pain and Peer Relationships Differently: Early Results of a PROMIS Dyad Study
Corinna C. Franklin, MD, FAAOS
Kevin Moran, BS
Parents rate athletes with sports injuries as having more pain and worse/more affected peer relationships than do the athletes themselves.

Poster No. P0717
Delay to Anterior Cruciate Ligament Reconstruction in Pediatric and Adolescent Patients is Associated with a Linear Increase in the Risk of Medial Meniscal Tears
David A. Kolin, BA, MSc
Brody Dawkins, BA
Joshua Y. Park, BA
Peter D. Fabricant, MD, MPH, FAAOS
Allison Gilmore, MD, FAAOS
Mark Sealey, MD, FAAOS
R. Justin Mistovich, MD, MBA, FAAOS
The risk of medial meniscal injury increases by 2% each week from ACL tear to surgery in pediatric patients.

Poster No. P0718
The Utility of Routine Radiographic Monitoring in Pediatric Osteoarticular Infections
Christopher R. Gajewski, MD
Nicholas Gajewski, MD
Alexander Upfill-Brown, MD, MSc
Mauricio Silva, MD, FAAOS
Rachel Thompson, MD
Following acute musculoskeletal infection, patients are often monitored with serial radiographs and inflammatory markers despite limited data supporting their ability to guide clinical management.

Poster No. P0719
Variability in Antibiotic Treatment of Pediatric Surgical Site Infection after Spinal Fusion
Lara L. Cohen, MPH, BS
Craig M. Birch, MD
Daniel J. Hedquist, MD, FAAOS
Lawrence L. Karlin, MD, FAAOS
John B. Emans, MD, FAAOS
Michael T. Hresko, MD, FAAOS
Brian D. Snyder, MD, PhD, FAAOS
Michael P. Glotzbecker, MD, FAAOS
Empiric to tailored antibiotic therapy was superior to tailored treatment alone in lowering infection markers to baseline levels.

Poster No. P0720
Comparative Mid-Term Outcomes of Pediatric Community Acquired Methicillin-Resistant Staphylococcus aureus and Methicillin-Susceptible Staphylococcus aureus Acute Hematogenous Osteomyelitis
Ian Singleton
Tiana M. Blank, MD
Jessica D. Burns, MD
M’Hamed Temkit
Mohan V. Belthur, MD
Although osteomyelitis caused by CA-MRSA with associated bacteremia has a higher risk of reoccurrence, complications and outcomes between CA-MRSA and CA-MSSA osteomyelitis are comparable.

Poster No. P0721
Assessment of Lateral Rotation Percentage and Rotational Deformity of the Elbow in Type 3 Supracondylar Humerus Fractures: A Biomechanical Study
Matthew Hooper, MD
Galen Berdis, MD
Vishwas R. Talwalkar, MD, FAAOS
Ryan D. Muchow, MD, FAAOS
Janet L. Walker, MD, FAAOS
Scott A. Riley, MD, FAAOS
Henry J. Iwinski, MD, FAAOS
Vincent W Prusick, MD
This study demonstrates a baseline measurement for rotational deformity based on lateral rotational percentage.

Poster No. P0722
Open Reduction of Pediatric Lateral Condyle Fractures: A Systematic Review
Michael Eckhoff, MD
Joshua Tadlock, MD
E’Stephan J. Garcia, MD, FAAOS
Open treatment of pediatric lateral condyle fractures is best when unburied K-wires are used for fixation due to equivalent union rates, better range of motion, and reduced need for secondary surgery.

Poster No. P0723
A Novel ‘Starfish’ Flap for Syndactyly Release: Technique and Early Results
Rameez A. Qudsi, MD
Kevin J. Little, MD, FAAOS
We present here a novel ‘starfish’ flap for syndactyly release in children, designed to avoid skin grafting proximally in the lateral commissure, with good early outcomes.
Poster No. P0724
Patient-Reported Outcomes and Retrospective Review of Midshaft Clavicle Fractures in Adolescents

Sarah E. Sibbel, MD, FAAOS
Tyler Tetreault, MD
Elia R. Rieder
Andy E. Lalka, BS, MPH
Jennifer Nance, DNP

Return to sport was similar between operative and nonsurgical groups despite greater fracture severity in operative patients. Patient-reported outcomes scores were better in nonsurgical patients.

Poster No. P0725
Pediatric Proximal Phalanx Base Fractures in Fingers: Identifying the Need for Surgical Management

Sarah E. Sibbel, MD, FAAOS
Nicole E. Look, MD
Gabriela Cleary, MS, BA
Johanna C. Hild, BA, BS
Andy E. Lalka, BS, MPH
Micah K. Sinclair, MD, FAAOS
Hannah Korrell, BA
Jennifer Nance, DNP
Frank A. Scott

Pediatric proximal phalanx base fractures have a relatively rare malrotation prevalence of 0.93% and most can be treated nonsurgically with minimal angular deformity at final follow up.

Poster No. P0726
Predictors of Successful Early Discharge for Total Hip and Knee Arthroplasty in Octogenarians

Courtney D. Bell, MD
Alvin C. Ong, MD, FAAOS
Zachary D. Post, MD, FAAOS
Danielle Y. Ponzio, MD
Andres F. Duque, MD, MSc
Fabio Orozco, MD, FAAOS

This is an evaluation of preoperative factors that correlate with discharge on postoperative day 1 vs. longer hospital stays in octogenarians after total joint arthroplasty.

Poster No. P0727
Declining Reimbursement or Runaway Charges? Medicare Payment for Distal Radius Fixation

Suresh K. Nayar, MD
Adi Wollstein, MD
Majd Marrache, MD
Matthew J. Best, MD
Keith Aziz, MD
Aviram Giladi, MD, MS
Dawn LaPorte, MD, FAAOS

For distal radius fixation, declines in reimbursement may be more closely tied to an increase in submitted charges as opposed to actual decreases in surgeon payment.

Poster No. P0728
Prior Authorizations in Total Joint Arthroplasty: Reducing Costs using Artificial Intelligence Software

Christopher Fang, MD
Yiding YU, MD
Jonathan Shaker, MS
Andrew Jawa, MD, FAAOS
Carl T. Talmo, MD, FAAOS
Daniel M. Ward, MD, FAAOS
David A. Mattingly, MD, FAAOS
Eric L. Smith, MD, FAAOS

Our artificial intelligence prior authorization software was significantly helpful in diminishing the financial strain of denials, improving reimbursement on our institution’s total joint service line.

Poster No. P0729
Despite Equivalent Medicare Outpatient Reimbursement, Facility Costs for Total Knee Arthroplasty are Higher than Unicompartmental Knee Arthroplasty

Emanuele Chisari, MD
Michael Yayac, BA
Chad A. Krueger, MD, FAAOS
Jess H. Lonner, MD, FAAOS
Paul M. Courtney, MD, FAAOS

This is a study comparing true facility costs of patients undergoing TKA with those undergoing UKA.

Poster No. P0730
Does Fellowship Training Impact Complication, Readmission, and Reoperation Trends following Primary and Revision Total Hip Arthroplasty: An Analysis of Orthopaedic Surgeons who Take the American Board of Orthopaedics Part II Examination

Neil V. Shah, MD, MS
Jared Newman, MD
Marc El Beaino, MD, MSc
Bassel Diebo, MD
Qais Naziri, MD, MBA
Aditya V. Maheshwari, MD, FAAOS

Continued training and education that occur within adult reconstruction fellowship training improve patient outcomes after total hip arthroplasty procedures.

Poster No. P0731
A Nationwide Analysis of Demographic Profiles of Orthopaedic Surgery Residency Program Directors

Ajit Vakharia, MD
Naveen Jasty
James E. Voos, MD, FAAOS
Robert J. Gillespie, MD, FAAOS

This is a demographic analysis of the orthopaedic surgery residency program directors nationwide.
Poster No. P0732
Diversity Trends in Promotion to Full Professorship at a Major Academic Institution

Emmanuel McNeely, MHA, MS
Julius K. Oni, MD, FAAOS
Dawn LaPorte, MD, FAAOS
James R. Ficke, MD, FAAOS
Khaled M. Kebaish, MD, FAAOS

Though modest, there has been an increase in the number of women surgeons; however, there remains a strong need for improvements in diversity for full professors in orthopaedics.

Poster No. P0733
Cost Analysis of Medical Students Applying to Orthopaedic Surgery Residency: Implications for the 2020-2021 Application Cycle

Adam M. Gordon, BS
Azeem T. Malik, MBBS
Thomas J. Scharschmidt, MD, FAAOS
Kanu S. Goyal, MD, FAAOS

This is a cost analysis of medical students applying to orthopaedic surgery residency and implications for the 2020-2021 application cycle.

Poster No. P0734
Women in Academic Surgery Over the Last Four Decades: Slow Rate of Change in Orthopaedic Surgery

Laura J. Linscheid, MD
Awad Ahmed, MD
Jeremy S. Somerson, MD, FAAOS
Summer E. Hanson, MD, PhD
Curtland Deville
Emma B. Holliday, MD

Over the last 40 years, the rate of change for representation of female academic faculty in orthopaedic surgery has been slower than in other surgical specialties.

Poster No. P0735
Sexual Harassment of Women Orthopaedic Trainees: The Results of a Survey of Women Orthopaedic Surgeons

Emily Whicker, MD
Christine Williams, MMED, MS
Gregory J. Kirchner, MD, MPH
Amrit S. Khalsa, MD, FAAOS
Mary K. Mulcahey, MD, FAAOS

This study reports the results of a survey sent to women orthopaedic surgeons regarding sexual harassment during their residency training.

Poster No. P0736
The Gladden Society Honor Roll: A Ranking of Orthopaedic Surgery Residency Programs by Percentage of Black Residents

Matthew P. Pinto, BS
Ruhi Randhawa, BS, RN
Addisu Mesfin, MD, FAAOS
Tino Mkorombindo, BS
Tonya Dixon, MD, MPH
Surajudeen A. Bolarinwa, MD
Kevin F. Purcell, MD
Gary W. Stewart, MD, FAAOS
Jaysson T. Brooks, MD

In the current 2020-2021 academic year, 60% of orthopaedic residencies have no black residents. This is the first study to rank orthopaedic programs based on the percentage of their black residents.

Poster No. P0737
Empathy among Orthopaedic Surgery Trainees

Samir Sabharwal, MD, MPH
Dawn LaPorte, MD, FAAOS

We sought to assess the empathy of orthopaedic surgery trainees over the course of residency.

Poster No. P0738
Trends and Characteristics of Orthopaedic Department Chairs

Sean C. Clark, MS
Symone Brown, BS, MBA
Mary K. Mulcahey, MD, FAAOS

Trends and characteristics of orthopaedic department chairs for US ACGME residency programs were examined. Extended time spent at an institution may increase chances of being named department chair.

Poster No. P0739
Economic Implications of Revisiting Disability Status after Joint Arthroplasty

Samuel Rosas, MD, MBA
Shane Tipton, MD
Tianyi D. Luo, MD
Amy P. Trammell, MD
Johannes F. Plate, MD, PhD
Cynthia L. Emory, MD, MBA, FAAOS

Societal financial implications of retaining joint arthroplasty patients on a permanent disability list may have an inadvertent effect on national productivity.

*The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.*
Poster No. P0740
Total Joint Arthroplasty in Free-Standing Ambulatory Surgical Centers vs. Hospital-Owned Outpatient Departments – An Analysis of 90-Day Complications and Costs
Azeem T. Malik, MBBS
Adam M. Gordon, BS
Daniel Li, MD
Mengnai Li, MD, PhD
Ryan T. Voskuil, MD
Safdar N. Khan, MD, FAAOS
Thomas J. Scharschmidt, MD, FAAOS
Performing elective TJAs at a free-standing ASC, versus a HOPD, is associated largely with similar outcomes and approximately $5,000-$8,000 cost-savings per case.

Poster No. P0741
Limited Industry Payments among Appropriate Use Criteria (AUC) Voting Panels: An Open Payments Analysis
Alexander J. Acuña, BS
Taru Jella, MPH
Edward M. Barksdale
Linsen T. Samuel, MD, MBA
Atul F. Kamath, MD, FAAOS
Our analysis demonstrated that authors on current AAOS appropriate use criteria voting panels collectively received low amounts of industry payments.

Poster No. P0742
A Plausible Pipeline to Diversifying Orthopaedics: Premedical Programming
Megan Coffin, BS
Sara Gould, MD, MPH
Aseel Dib, BS
Christine S. Collins, BA, MEd
Candice N. Dubose, MD, FAAOS
Educational project focused on evaluating the factors and perceptions of female high school and medical students toward orthopaedic surgery before and after a hands-on workshop and lecture event.

Poster No. P0743
Gender Disparity among NBA and WNBA Team Physicians
Andrew Hinkle, BS
Symone Brown, BS, MBA
Mary K. Mulcahey, MD, FAAOS
In this study, we show a substantial difference in the number of female team physicians in the National Basketball Association and Women’s National Basketball Association compared to male physicians.

Poster No. P0744
COVID-19 Screening and the Impact on Postsurgical Transmission during Resumption of Elective Orthopaedic Surgery
Travis Scudday, MD
Robert S. Gorab, MD, FAAOS
Steven L. Barnett, MD, FAAOS
Jay J. Patel, MD, FAAOS
Philip A. Robinson, MD
COVID-19 screening and the impact on postsurgical transmission during resumption of elective orthopaedic surgery is studied.

Poster No. P0745
Early vs. Delayed Debridement of Simple Triangular Fibrocartilage Complex Tears: A Cost-Effectiveness Analysis
Thompson Zhuang, BA
Seul Ku
Lauren M. Shapiro, MD
Robin N. Kamal, MD, FAAOS
Both early and late debridement strategies exist for the treatment of TFCC tears. Splinting for 6 weeks and reserving arthroscopic debridement for cases where splinting fails is most cost effective.

Poster No. P0746
Emergency Department Observation vs. Readmission following Total Joint Arthroplasty: Avoiding the Bundle Buster
Katherine A. Lygrisse, MD
Stephen Zak, BA
Alex Tang, BS
Vivek Singh, MD
Joshua C. Rozell, MD
Ran Schwarzkopf, MD, FAAOS
The implementation of an observation stay can help decrease cost and readmission rates after total joint arthroplasty.

Poster No. P0747
High Pressure Closed Incision Negative-Pressure Therapy Significantly Reduces the Surgical Site Complications following Total Hip and Knee Arthroplasties: Stratified Meta-Analysis of Randomized Controlled Trials
Kareem G. Elhage, BA
Mohamed E. Awad, MD, MBA
Morgan Frechie, DO
Yeni Nieves, MS
Ahmad I. Hasan
Khaled J. Saleh, MD, MPH, FAAOS
ciNPT reduced the rate of wound complications in patients at risk for SSCs undergoing primary or revision hip and knee surgery.
**Poster No. P0748**
The Accuracy of Self-Reported Opioid Use in Orthopaedic Trauma Patients  
**Fady Y. Hijji, MD**  
Tyler Senda, BS  
Scott W. Huff, MD  
Andrew Froehle, PhD  
Joseph D. Henningsen, MD  
Andrew D. Schneider, BA, MD  
Jennifer Jerele, MD, FAAOS  
Indresh Venkataryappa, MD, FAAOS  

A majority of new patients presenting to an orthopaedic trauma clinic will accurately report their opioid usage, contrary to common belief.

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**Poster No. P0749**
Orthopaedic Post-Surgical Opioid Prescribing Guidelines: Short-Term Success  
**Connor B. Venrick, MD**  
Ryan J. Bickley, MD  
Christopher M. Belyea, MD, MBA  
Paul M. Ryan, MD, FAAOS  
Craig R. Bottoni, MD, FAAOS  
Kevin Krul, MD  

Implementation of opioid prescribing guidelines has resulted in decreased department wide narcotic prescription.

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**Poster No. P0750**
Perioperative Counseling Reduces Opioid Use following Primary Total Joint Arthroplasty  
**Christopher N. Carender, MD**  
Christopher Anthony, MD  
Edward Rojas, MD  
Nicolas O. Noiseux, MD, MS, FAAOS  
Nicholas Bedard, MD  
Timothy S. Brown, MD, FAAOS  

Perioperative counseling significantly reduces quantity and duration of opioid consumption at 2- and 6-weeks following primary TJA.

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**Poster No. P0751**
Orthopaedic Surgeon Time Allocation during the Clinical Encounter  
**Andrew D. Wohler, MD**  
Virginia F. Casey, MD, FAAOS  
Susan M. Odum, PhD  
Michael D. Paloski, DO, FAAOS  

In total, 30-46% of the orthopaedic surgeon’s time per clinical encounter is spent performing administrative tasks with only 56-70% devoted to direct patient care.

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**Poster No. P0752**
Effect of Mental Health Disorders on Healthcare Utilization and Opioid Consumption following Anterior Cruciate Ligament Reconstruction  
**Kevin X. Farley, BA**  
Emily L. Demaio, BSN  
Elab Nazzal  
Albert T. Anastasio, MD  
Michael B. Gottschalk, MD, FAAOS  
John W. Xerogeanes, MD, FAAOS  

This is a database study investigating the influence of preexisting mental health disorders and their effect upon healthcare utilization and opioid consumption after anterior cruciate ligament reconstruction.

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**Poster No. P0753**
Thirty-Day Outcome after Orthopaedic Surgery in SARS-CoV-2 Negative Patients during the COVID-19 Pandemic Peak in the UK  
**Andrew J. Price, FRCS**  
Alexander D. Shearman, FRCS (Ortho)  
Thomas Hamilton, MBChB, BSc (Hons)  
Abtin Alvand, FRCS (Ortho), MBBS  
Benjamin J. Kendrick, FRCS (Ortho), MBBS  
Thomas Hamilton  

Orthopaedic surgery in SARS-CoV-2 negative patients who transition to positive within 30 days of surgery carries a significant risk of mortality.

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**Poster No. P0754**
The Impact of Confirmed COVID-19 Infection on Ambulatory Procedures and Associated Delays in Care for Asymptomatic Patients  
**Christopher Larsen, MD**  
Christine D. Bub, MD  
Benjamin Schaffler, BS  
Timothy Walden, MD  
Jessica Intravia, MD  

In total, 1.05% of asymptomatic patients tested positive for COVID-19, resulting in a nearly 28 day delay for ambulatory procedures. A prior positive test was not predictive of complications after procedures.

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**Poster No. P0755**
Appropriateness of Operative Indications during the Height of the COVID-19 Pandemic in New York City: An Assessment of Orthopaedic Procedures  
**Kevin S. Batti, BS**  
Zachary Sharfman, MD, MS  
Apostolos Dimitroulias, MD  
Milan K. Sen, MD, FAAOS  

This is an analysis of the appropriateness of surgical interventions, resources allocated to patients, and impact of COVID-19 on trauma patient outcomes during the COVID-19 pandemic in New York City.

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**Poster No. P0756**  
How We Saved $5 Million Annually and Cut Readmissions in Half at a Major Academic Institution  

*Cody Wyles, MD*  
Matthew P. Abdel, MD, FAAOS  
Adam Amundson, MD  
Christopher Duncan, MD  
Stephen K. Smith  
Kathryn W. Zavaleta, MHA  
Michael J. Taunton, MD, FAAOS  
Kevin I. Perry, MD, FAAOS  
Hugh M. Smith, MD, PhD  

Application of perioperative surgical home tools led to decreased LOS and 90-day readmission, with increased patient satisfaction, same day PT, surgical volume, and revenue per surgeon.

**Poster No. P0757**  
Hand and Upper Extremity Procedures Performed with Minor Field Sterility are Associated with Low Infection Rates  

*Steven M. Koehler, MD, FAAOS*  
Alba Avoricani, BA  
Qurratul-Ain Dar, BS  
Kenneth H. Levy  

Low 14- and 30-day postoperative infection rates establish the safety of performing WALANT hand procedures under minor field sterility.

**Poster No. P0758**  
Choosing the Optimal Wound Dressing for Bathing after Total Knee Arthroplasty  

*Richard M. Michelin, DO*  
Eli S. Ahdoot, DO  
Mitchell McDowell  
Michael H. French, DO  

This is a comparison study of commercially used surgical dressings based on cost, comfort, and their ability to prevent water penetration while bathing.

**Poster No. P0759**  
Using Triggers to Detect Adverse Events following Outpatient Orthopaedic Surgery at a Single Ambulatory Surgery Center  

*Daniel Calem, BA*  
Asif M. Ilyas, MD, FAAOS  

Adverse events after outpatient orthopaedic surgery are frequently missed. EHR-based triggers have the potential to detect adverse events in this setting and lead to decreased postoperative morbidity.

**Poster No. P0760**  
Subtherapeutic Levels of Vancomycin Promotes Staphylococcus Aureus Biofilm Formation, Pathogenesis, and Infection  

*Kenneth Urish, MD, PhD, FAAOS*  
Dongzhu Ma, MD, PhD  
Masashi Taguchi, MD  
Dongzhu Ma, MD, PhD  
Lance R. Thurlow, PhD  

Antibiotic stewardship has obvious public health advantages, but can also decrease infection rates.

**Poster No. P0761**  
Ensemble Machine Learning to Identify Patients Requiring Hospital Admission following Unicompartmental Knee Arthroplasty  

*Yining Lu, MD*  
Ophelie Lavioie-Gagne  
William M. Cregar, MD  
Ryan R. Wilbur  
COL. (ret) Tad L. Gerlinger, MD, FAAOS  
Brian Forsythe, MD, FAAOS  

A machine learning model was developed to reliably predict overnight admission following unicompartmental knee arthroplasty. The most important feature was operative time.

**Poster No. P0762**  
Hospital Acquired Conditions; Critical Review of Classical and Novel Risk Factors following Common Orthopaedic Procedures during Inpatient Stays  

*Ahmad I. Hasan*  
Zachary M. Crespi, BS  
Aya A. Ismail  
Mohamed E. Awad, MD, MBA  
Mouhanad M. El-Othmani, MD  
Khaleed J. Saleh, MD, MPH, FAAOS  

There are several patient-, surgery-, and hospital-related risk factors of HACs in addition to the novel risk factors such as delirium, genetic profile, and preoperative laboratory values.

**Poster No. P0763**  
Orthopaedic Surgeons Report a High Prevalence of Work-Related Pain and a Low Prevalence of Ergonomic Awareness  

*Vincent Buddle, DO*  
Robert Nugent, DO  
Robert A. Jack, MD  
Sultan Khawam, DO  
Peter F. DeLuca, MD, FAAOS  

This study examines the prevalence of work-related injury, as well as the lack of both occupational health awareness and clinic/operating room ergonomics among practicing orthopaedic surgeons.
**Poster No. P0764**
The Impact of Targeted Nurse Navigator Intervention on Outcomes in High-Risk Patients Undergoing Total Joint Arthroplasty: A Pilot Study

*Mckayla Kelly, BS*
Justin Turcotte, MBA, PhD
Steffanie S. Dolle, BSN
Jacob M. Aja, Crofton, MD
James H. MacDonald, MD, FAAOS
Paul J. King, MD, FAAOS

NN face-to-face intervention in the PAT center may be effective at facilitating lengths of stay and rates of discharge to SNF and ED returns that are similar to the broader, lower risk population.

**Poster No. P0765**
Use of a Smartphone-Based Care Platform after Primary Joint Arthroplasty: A Prospective Randomized Trial

*David A. Crawford, MD, FAAOS*
Paul J. Duwelius, MD, FAAOS
Michael J. Morris, MD, FAAOS
Jason M. Hurst, MD, FAAOS
Keith R. Berend, MD, FAAOS
Adolph V. Lombardi, MD, FAAOS

This trial demonstrated non-inferiority of the mymobility platform on early clinical outcomes, readmissions, ED and UC visits in patients undergoing primary hip and knee arthroplasty.

**Poster No. P0766**
Reduction of Blood Flow in Severe Frozen Shoulder after Manipulation under Ultrasound-Guided Cervical Nerve Root Block: Quantitative Analysis using Dynamic MRI

*Yuki Iijima, MD*
Hideyuki Sasanuma, MD
Tomohiro Saito
Katsushi Takeshita, MD, PhD

We could quantitatively evaluate reduction of abnormal blood flow in severe frozen shoulder by dynamic MRI after manipulation under ultrasound-guided cervical nerve root block.

**Poster No. P0767**
Comparison of Postoperative Outcomes for Frozen Shoulder: Manipulation under Interscalene Block vs. Arthroscopic Capsular Release

*Matsubara Norimasa*
Shin Yokoya, MD
Katsunori Shiraishi
Yohei Harada, MD, PhD
Yasuhiko Sumimoto
Nobuo Adachi, MD

In this study, the clinical results at the final observation were comparably acceptable. The MIB showed better improvement in range of motion from the early postoperative period than the ACR. However, pain was still experienced in the MIB group during the early postoperative period compared with the ACR group. There are various reports on the merits and demerits of both procedures. MIB has the demerit of requiring greater skill to administer, but it has the merit of not having any of the complications associated with general anesthesia and hospitalization, unlike ACR. Thus, the first-choice treatment for FS should be MIB. However, if pain persists after MIB, then ACR should be performed.

**Poster No. P0768**
Trends in the Treatment of Biceps Pathology: An Analysis of the American Board of Orthopaedic Surgery Database

*John W. Belk*
Steven D. Jones, MD
Stephen Thon, MD
Rachel M. Frank, MD, FAAOS

In the last decade, proximal biceps tenodesis has increased significantly in frequency, whereas proximal biceps tenotomy has decreased significantly in frequency.

**Poster No. P0769**
Higher Failure Rate of Suture Anchors in Partial Distal Biceps Tendon Ruptures in Comparison to Endobutton Fixation

*Lisa Worner, MD*
Koen Koenraadt, PhD
Iris V. Oost, MSc
Denise Eygendaal
Bertram The

A higher failure rate was seen using fixation with suture anchors in partial distal biceps tendon ruptures in comparison to endobutton fixation.

**Poster No. P0770**
Ultrasonographic Measurement of Elbow Varus Laxity in a Model of Sequential Injury Model to the Lateral Collateral Ligament-Capsule Complex

*Jorge L. Rajas Lievano*
Jaeman Kwak
Dani Rotman, DMed
Shawn W. O’Driscoll, MD, FAAOS

Elbow varus laxity under gravity stress can be reliably assessed by ultrasound by measuring the RC joint space.

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THURSDAY - FRIDAY

Poster No. P0771
Liposomal Bupivacaine is No Better than Standard Bupivacaine in Interscalene Nerve Block for Shoulder Arthroplasty: A Double-Blinded Prospective Randomized Controlled Trial

Steven J. Hattrup, MD, FAAOS
Andrew S. Chung, DO
David Rosenfeld, MD
Lopa Misra
Veerandra Koyyalamudi, MBBS
Matthew L. Ritz, MD
John M. Tokish, MD, FAAOS

Liposomal bupivacaine is of no benefit compared to standard bupivacaine when used for ISB after shoulder replacement.

Poster No. P0772
Orthopaedic Sleep and Novel Analgesic Pathway: A Prospective Randomized Controlled Trial to Advance Recovery after Shoulder Arthroplasty

Jonathan Cheah, MD
Ryan Freshman, MD
Mya Sandi Aung, BA
Hamzah M. Yusuf, BS
Sakura Kinjo
Drew Lansdown, MD, FAAOS
Brian T. Feeley, MD, FAAOS
Alan Zhang, MD, FAAOS
ChunBong B. Ma, MD, FAAOS

The use of interventional sleep pathway can be safe and beneficial with improved analgesia, reduced opioid usage, extended sleep periods, and improved reported sleep quality.

Poster No. P0773
The Relationship of Bilateral Shoulder Arthroplasty Timing and Postoperative Complications

Brian C. Werner, MD, FAAOS
Jordan D. Walters, MD
Patrick J. Denard, MD, FAAOS
Stephen F. Brockmeier, MD, FAAOS

Patients with staged bilateral TSA who have the second TSA within 3 months have significantly higher rates of revision surgery, loosening/lysis, periprosthetic fracture, VTE, and blood transfusions.

Poster No. P0774
Does the Sequence and Timing of Total Shoulder Arthroplasty Relative to Lower Extremity Arthroplasty Influence Postoperative Complications?

Jourdan M. Cancienne, MD
Patrick J. Denard, MD, FAAOS
Brian C. Werner, MD, FAAOS

TSA should be performed greater than 3 months before lower extremity TJA or at any point following lower extremity TJA to avoid the increased risk of revision surgery.

Poster No. P0775
Prosthetic Humeral Head Center of Rotation Shift from Ideal is Associated with Inferior Clinical Outcomes after Anatomic Total Shoulder Arthroplasty

Brian C. Werner, MD, FAAOS
Robert A. Creighton, MD, FAAOS
Patrick J. Denard, MD, FAAOS
Evan S. Lederman, MD, FAAOS
Anthony A. Romeo, MD, FAAOS
Justin W. Griffin, MD, FAAOS

Accurate restoration of humeral COR during anatomic TSA is challenging and significant shifts are common. A prosthetic COR greater than 2.7 mm is associated with worse outcomes following anatomic TSA.

Poster No. P0776
Predicting Elbow Motion following Arthroscopic Osteocapsular Arthroplasty

Jorge L. Rojas Lievano
Dani Rotman, DMed
Jaeman Kwak
Jennifer Tangtphiaboontana, MD
Shawn W. O'Driscoll, MD, FAAOS

Preoperative motion is the strongest predictor of final postoperative ROM after OCA. Reference curves based on preoperative motion may be used by surgeons as a powerful predictive and assessment tool.

Poster No. P0777
The Microbiome of Aseptic Shoulders – Are We Truly Living Alone?

Karan Goswami, MD
Thema A. Nicholson, MSc
Mark D. Lazarus, MD, FAAOS
Matthew L. Ramsey, MD, FAAOS
Gerald R. Williams, MD, FAAOS
Joseph A. Abboud, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS

Our findings identified the presence of distinct microbial community profiles between osteoarthritic, rotator cuff, aseptic revision, and septic revision patients.

Poster No. P0778
Development and Validation of a Predictive Model for Outcomes in Shoulder Arthroplasty: A Multicenter Analysis of Over 2,000 Patients

Thomas W. Throckmorton, MD, FAAOS
Tyler J. Brolin, MD, FAAOS
Saunak Sen
Lawrence V. Gulotta, MD, FAAOS
Surena Namdari, MD, MSc, FAAOS
Howard D. Routman, DO, FAAOS
Frederick M. Azar, MD, FAAOS

Using a total of 1,947 patients from 3 high-volume shoulder arthroplasty institutions, we were able to develop and validate a model to predict the 2-year ASES score following shoulder arthroplasty within 13 points. Overall, the model was accurate within MCID in 85% of patients.
Does Metal Artifact Reduction Sequence Magnetic Resonance Imaging Help in the Diagnosis of Periprosthetic Shoulder Infection?

Prashant S. Meshram, MS (ORTH), MBBS
Edward G. McFarland, MD, FAAOS
Jacob Joseph, BA, Lutherville, MD
Benjamin Fritz, MD
Umasuthan Srikumaran, MD, MBA, FAAOS
Stephen C. Weber, MD, FAAOS
Jan Fritz, MD

MARS-MRI has a high accuracy of 96% to diagnose periprosthetic shoulder infection. For 3 positive findings on MARS MRI, the sensitivity was 95% and specificity was 86% to diagnose PSI.

Factors Associated with Culture-Positive Revision after Primary Shoulder Arthroplasty

Ekamjeet Dhillon, BS, MD
Kevin Jurgensmeier, BS
Jie Yao, DMed
Anastasia Whitson, BS
Frederick A. Matsen, MD, FAAOS
Jason Hsu, MD, FAAOS

We studied the impact of various perioperative prophylactic interventions on infection risk after shoulder arthroplasty.

Surgical Anatomy of the Axillary Artery: Clinical Implications for Open Shoulder Surgery

Michael Stone, MD
Hansel Ihn, MD
Aaron Gipsman, MD
Brenda Iglesias, BA
Michael Minneti, BS
Ali Noorzad, MD
Reza Omid, MD, FAAOS

Axillary artery injury can be devastating. Our cadaveric study of 18 shoulders revealed the artery travels 1-1.7cm from the inferior glenoid and significantly closer during humeral external rotation.

Accuracy of the International Consensus Scoring System for Diagnosis of Shoulder Arthroplasty Periprosthetic Joint Infection

Seth R. Cope, MD
Tyler J. Brolin, MD, FAAOS
David Bernholt, MD
Frederick M. Azar, MD, FAAOS
Thomas W. Throckmorton, MD, FAAOS

We sought to determine the accuracy of the International Consensus Scoring System for diagnosis of shoulder arthroplasty periprosthetic joint infection.

Application of the International Consensus Meeting Diagnostic Criteria for Shoulder Periprosthetic Joint Infection

Elshaday S. Belay, MD
Colleen Wixted, BS
Daniel E. Goltz, MD
Christopher Klišto, MD
Oke A. Anakwenze, MD, MBA

The purpose of this study was to apply the ICM diagnosis criteria in a cohort of suspected shoulder PJI cases and assess their treatment course.

Comparison of Ribosomal-RNA Polymerase Chain Reaction and Conventional Culture in Detection of C. Acnes in Clinical Glenohumeral Joint Samples from a Series of 100 Consecutive Patients

Margaret Hankins, MD
Gillian E. Kane, BS
Dongzhu Ma, MD, PhD
Peter G. Alexander, PhD
Kenneth Urish, MD, PhD, FAAOS
Albert Lin, MD, FAAOS

Evaluation of shoulder synovial fluid and tissue from 100 patients demonstrated that qRT-PCR for C. acnes identifies the organism more frequently than conventional culture.

Vancomycin Powder is Effective in Preventing C. Acnes Growth in a Shoulder Arthroplasty Memetic: A Comparative In Vitro Study

Joan Miquel
Tony Huang
Ken Faber, MD, FRCSC
George S. Athwal, MD
David B. O’Gorman, MSc, PhD

Vancomycin powder effectively prevents C acnes growth in a shoulder-joint implant mimetic, supporting the hypothesis that prophylactic application of vancomycin may prevent C acnes infection.

Comparison of Latarjet after Failed Arthroscopic Bankart with Primary Latarjet

Mandeep Virk, MD, FAAOS
Yaniv Pines
Dan Gordon
Erel Ben Ari, MD
Soterios Gyftopoulos, MD
Andrew S. Rokito, MD, FAAOS

The Latarjet procedure after failed arthroscopic Bankart repair showed no difference in outcomes and complications compared with primary open Latarjet procedure.
Poster No. P0787
The Effect of Shoulder Position on Capsular Measurements with Magnetic Resonance Arthrogram
Josef K. Eichinger, MD, FAAOS
Charles Cody White, MD
Venkatraman Kothandaraman, BS
Jackie J. Lin, BS
Meghana V. Rao, BS
Alyssa Greenhouse, BA
William R. Barfield, PhD
Harris Slone, MD, FAAOS
Richard J. Friedman, MD, FAAOS
Variance in humeral rotation between internal rotation and external rotation views during shoulder MRA significantly affects capsular measurements.

Poster No. P0788
Intraoperative Nerve Monitoring in Open Latarjet Coracoid Transfer Procedure
Manan S. Patel, BA
William B. Wilent, PhD
Michael Gutman, BA
Joseph A. Abboud, MD, FAAOS
In this study, we show, through 17 Latarjet surgeries performed, that the use of continuous intraoperative nerve monitoring can help surgeons minimize rates of minor and major nerve injuries.

Poster No. P0789
Characterization of Hill-Sachs Lesions Based on Location, Orientation, and Volume: A 3-Dimensional Modeling Study of 100 Anterior Shoulder Instability Patients
Liam Peebles, BA
Petar Golijanin, BS
Brenton W. Douglass, BA
Kaare S. Midggaard, MD
Justin W. Arner, MD
Giovanni Di Giacomo, MD
Matthew T. Provencher, MD, FAAOS
Although more medialized lesions may cause earlier engagement and have been shown to portend inferior clinical outcomes, they do not represent wider, deeper, or larger HSLs.

Poster No. P0790
Prolonged Opioid Use following Shoulder Instability Surgery: Are there any Modifiable Risk Factors?
Corey Spencer, BS
Sage H. Duddleston, BS
Alexander M. Dawes, BS
Spero G. Karas, MD, FAAOS
John W. Xerogeanes, MD, FAAOS
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD
The aim of this database study was to investigate variables that increase opioid naive patient risk for continued opioid use following shoulder instability surgery.

Poster No. P0791
Outcomes of Arthroscopic Latarjet as a Revision Procedure for Treatment of Recurrent Anterior Shoulder Instability after Failed Arthroscopic Bankart Repair. A Case Series
Lika Dzidzishvili, MD
Claudio Calvo, MD
Javier Calvo, MD
Emilio Calvo, MBA, MD
Arthroscopic Latarjet procedure after failed arthroscopic Bankart repair provides good to excellent clinical outcomes as a revision surgery.

Poster No. P0792
The Functional Shoulder Range of Motion in Middle-Aged to Elderly Populations
Tyler Sargent, BS
Justin T. Smith, MD
Christie B. Smith, PT
John Krauss, PhD, PT
Charlette M. Spicuzzi, DPT
Molly A. Bambach, DPT
Jason P. Thomas, DPT, PT
Amanda J. Davis Berres, DPT
J. Michael Wiater, MD, FAAOS
Ongoing study aiming to define shoulder functional range of motion (ROM) using common outcome measures and active ROM values in middle-aged to elderly populations to better guide surgical intervention.
Poster No. P0795
Long Head of Biceps Tenotomy vs. Tenodesis: A Meta-Analysis of Randomized Controlled Trials
Abdulaziz F. Ahmed, MD
Ammar Toubasi, MBBS
Shady A. Mahmoud, MD
Ghalib Ahmed, FRCS (Ortho), MBCHB
Mohammed Aldosari, MD
Bashir A. Zikria, MD, MSc
This meta-analysis on the long head of biceps with tenotomy or tenodesis compares both techniques in terms of shoulder function, pain, elbow flexion, supination strength, and complications.

Poster No. P0796
Intraneural Microvasculature of the Ulnar Nerve Using Contrast-Enhanced Ultrasonography in Patients with Cubital Tunnel Syndrome
Yuichiro Matsui
Tatsunori Horie
Daisuke Kawamura, MD, PhD
Mutsumi Nishida Norimasa Iwasaki
The present findings suggest that increased elbow flexion in patients with cubital tunnel syndrome influences the intraneural blood flow of the ulnar nerve, and that surgery for cubital tunnel syndrome alters the intraneural blood flow.

Poster No. P0797
Spatial Anatomy of the Radial Nerve in the Extended Deltopectoral Approach
Aaron Gipsman, MD
Hansel Ihn, MD
Brenda Iglesias, BA
Ali Azad, MD
Michael Stone, MD
Reza Omid, MD, FAAOS
The spatial anatomy of the radial nerve in the extended deltopectoral approach was studied on 20 upper extremities. Cerclage wiring proximal to the proximal aspect of the deltoid insertion is safe.

Poster No. P0798
Hardware Complications following Plate Fixation of the Olecranon
Charles Bouchard, MD
Troy Bornes, MD, PhD
Lauren A. Beaupre, PhD
Anelise Silveira, PT
Riley Hemstock, MD
Robert K. Chan, MD
This study demonstrated patients with olecranon fractures treated with low-profile precontoured plates had a hardware removal rate of 15.6% related to implant irritation. This rate appears to be reduced relative to previous literature and may have resulted from the use of low-profile precontoured plates that are better tolerated than previous generation implants.

Poster No. P0799
Comparison of Mini-Fragment to Precontoured Plate Fixation for Olecranon Fractures
Zachary A. Rockov, MD
Sohal Z. Hashmi, MD
Amit Pujari
Samuel Stephenson, MD
John Garlich, MD
Charles Moon, MD, FAAOS
Carol Lin, MD, MA
Michael Stone, MD
Milton T. Little, MD, FAAOS
This is the largest comparison of mini-fragment plating vs. anatomic precontoured plate fixation. Study found no significant differences and suggest mini-fragment fixation is clinically effective.

Poster No. P0800
Rotator Cable Injury Does Not Reduce Abduction Strength
Christopher C. Schmidt, MD, FAAOS
Michael P. Smolinski, BS
Christopher S. Spicer, BS
Thomas Zink, DO
Dimitrios V. Papadopoulos, MD
Ryan J. Blake, BS
Anthony J. Davidson, BS
Mark C. Miller, PhD
Patrick J. Smolinski
This is a biomechanical study investigating the impact of rotator cable tears on abduction strength. Results showed that releases of both insertions caused a significant increase in abduction strength.

Poster No. P0801
Parachute-Induced Pectoralis Major Tears in the Military: Is the Functional Recovery the Same?
Colleen M. Moreland, DO
Kenneth A. Shaw, DO
Scott M. Brown, DO
Ivan J. Antosh, MD, FAAOS
Stephen A. Parada, MD, FAAOS
Operative repair of parachute-induced pectoralis major tears within 5 weeks of injury provides superior functional and strength recovery when compared to delayed surgical repair.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0802
Anatomic Total Shoulder Arthroplasty for Primary Glenohumeral Osteoarthritis is Associated with Excellent Outcomes and Low Revision Rates in the Elderly

Andrew Jensen, MD
Jennifer Tangtiphaiboontana, MD
Erick Marigi, MD
Katherine E. Mallett, MD
John W. Sperling, MD, MBA, FAAOS
Joaquin Sanchez-Sotelo, MD, FAAOS

Elderly patients with GHOA and an intact rotator cuff have excellent outcomes following anatomic TSA with high implant survival rates. Secondary cuff dysfunction is rare. Age greater than 70 should not be considered an indication for RSA over TSA.

Poster No. P0803
Single-Shot Interscalene Nerve Block with Liposomal Bupivacaine Provides Equivalent Pain Relief and Improved Cost Compared to Continuous Catheter Interscalene Nerve Block in Total Shoulder Arthroplasty

Matthew D. Budge, MD, FAAOS
Nathan Orvets, MD, FAAOS
Eric Shields, MD

Single-shot interscalene nerve block with liposomal bupivacaine provides equivalent pain relief compared to continuous catheter interscalene nerve block in total shoulder arthroplasty.

Poster No. P0804
Low-Dose Aspirin and the Rate of Symptomatic Venous Thromboembolic Complications following Primary Shoulder Arthroplasty

Surena Namdari, MD, MSc, FAAOS
Jacob Kirsch, MD
Michael Gutman, BA
Manan S. Patel, BA
Alexander Rondon, MD
Matthew L. Ramsey, MD, FAAOS
Joseph A. Abboud, MD, FAAOS
Gerald R. Williams, MD, FAAOS

Routine use of low-dose ASA results in very low risk of VTE events and medication associated complications following primary shoulder arthroplasty.

Poster No. P0805
Survivorship and Patient-Reported Outcomes after Comprehensive Arthroscopic Management of Glenohumeral Osteoarthritis: Minimum 10-Year Follow Up

Justin W. Arner, MD
Bryant P. Elrick, MS
Philip-Christian Nolte, MA, MD
Daniel Haber, MD
Marilee P. Horan, MPH
Peter J. Millett, MD, MSc, FAAOS

Significant improvement in patient-reported outcomes were sustained at minimum 10-year follow up in young patients with shoulder arthritis who underwent an arthroscopic CAM procedure.

Poster No. P0807
More for Less: Defining a Value in Anatomic Total Shoulder Arthroplasty using American Shoulder and Elbow Surgeons Score and Time-Driven Activity-Based Cost Accounting

Aaron M. Chamberlain, MD, FAAOS
Robert D. Wojahn, MD
Leesa M. Galatz, MD, FAAOS
Ken Yamaguchi, MD, FAAOS
Jay D. Keener, MD, FAAOS
Robert S. Runyon, MD

Procedure value index (outcome/cost) of TSA as measured by ASES score per cost of episode of care measured by time-driven activity-based cost analysis is described as are patient-related value drivers.

Poster No. P0808
Opioid Use following Total Shoulder Arthroplasty: Who Requires Refills and for How Long?

Corey Spencer, BS
Jeremiah A. Pflederer, MD
Alexander M. Dawes, BS
Michael B. Gottschalk, MD, FAAOS
Eric R. Wagner, MD

The purpose of this database study was to assess the patient risk factors associated with the need for additional opioid refills following total shoulder arthroplasty.

Poster No. P0809
3D MRI vs. 3D CT for Evaluation of Glenoid Wear

Mandeep Virk, MD, FAAOS
Yaov Rosenthal, MD
Mohammad Samim, MD
Oluwadamilola Kolade, MD
Niloy Ghosh, MD
Soterios Gyftopoulos, MD
Young W. Kwon, MD, PhD, FAAOS
Joseph D. Zuckerman, MD, FAAOS

3D MR is comparable to 3D CT for morphometric evaluation of glenoid deformity in patients with shoulder arthritis and can be used as an alternative imaging modality for preoperative glenoid assessment.

Poster No. P0810
Machine Learning can Predict Level of Improvement in Shoulder Arthroplasty

Paul McLendon, MD
Kaitlyn N. Christmas, BS, CCRP
Peter Simon, PhD
Otho R. Plummer, PhD
Audrey L. Hunt
Adii Ahmed, MD
Mark A. Migelli, MD, FAAOS
Mark A. Franklin, MD, FAAOS

Machine learning can accurately predict level of improvement after shoulder arthroplasty for GH OA.
Medicaid Patients Undergoing Total Shoulder Arthroplasty have Worse 90-Day Outcomes and Inferior 5-Year Implant Survival

Harold G. Moore, BS
Joseph B. Kahan, MD, MPH
Patrick J. Burroughs, BS
Kenneth W. Donohue, MD, FAAOS
Jonathan N. Grauer, MD, FAAOS

Medicaid-insured patients undergoing elective shoulder replacement had increased odds of 90-day postoperative adverse events and worse 5-year implant survival compared to privately insured patients.

Arthroscopic Debridement of Primary Elbow Osteoarthritis: 5-Year Outcomes

Dennis Debernardis, DO
Adam Santoro, DO
Jacob Kirsch, MD
Quincy T. Cheeseman, DO
Christopher L. Antonacci, BA, MS
Francis G. Alberta, MD, FAAOS
Luke S. Austin, MD, FAAOS

Arthroscopic debridement of primary elbow osteoarthritis results in satisfactory elbow function and improvement in pain with little chance of reoperation within 5 years following surgery.

Total Shoulder Arthroplasty in Patients with Cerebral Palsy: A Matched Comparison of 90-Day Adverse Events and 5-Year Implant Survival

Harold G. Moore, BS
Joseph B. Kahan, MD, MPH
Patrick J. Burroughs, BS
David B. Frumberg, MD
Kenneth W. Donohue, MD, FAAOS
Jonathan N. Grauer, MD, FAAOS

Patients with cerebral palsy undergoing total shoulder arthroplasty have increased odds of postoperative complications but have comparable implant survival at five years compared to matched controls.

Defining Deformity Thresholds for the Use of Augmented Glenoids in Arthritic Shoulders with Posterior Glenoid Bone Loss

Benjamin Zmistowski, MD
Daniel P. Carpenter, MD
Alexander W. Aleem, MD, FAAOS
Aaron M. Chamberlain, MD, FAAOS
Jay D. Keener, MD, FAAOS

When correcting version to neutral and 10 degrees retroversion, a posterior half-wedge augment may be useful for retroversion deformities greater than 22 and 27 degrees, respectively.

Trends in Arthroplasty for the Treatment of Glenohumeral Arthritis: An American Board of Orthopaedic Surgery Part II Database Study

Olivia O'Reilly, MD
Molly Day, MD, ATC
Trevor Gulbrandsen, MD
Mary K. Skalitzky, BA
Brendan Patterson, MD, MPH, FAAOS

We review current trends in volume and proportion of reverse shoulder arthroplasty, total shoulder arthroplasty, and hemiarthroplasty for treatment of glenohumeral arthritis in ABOS Part II examinees, 2008-2019.

Dynamics of Cutibacterium Reconstitution on the Skin Surface of the Shoulder after Chlorhexidine Application

Jason Hsu, MD, FAAOS
Anastasia Whitson, BS
Rufus Van Dyke, MD
John C. Wu, MD
Frederick A. Matsen, MD, FAAOS
Dustin R. Long, MD

The majority of Cutibacterium reconstitution onto the skin surface of the shoulder occurs by 1 hour after chlorhexidine application.

Impact of High Cutibacterium Loads at the Time of Revision Shoulder Arthroplasty on Patient-Reported Outcomes and Revision Rates

Jason Hsu, MD, FAAOS
Jie Yao, DMed
Kevin Jurgensmeier, BS
Davin C. Gong
Anastasia Whitson, BS
Frederick A. Matsen, MD, FAAOS

In male patients treated with complete single stage exchange with postoperative antibiotic therapy, those with high bacterial loads had similar outcomes to those without minimal to no bacterial load.

Preoperative Cultures of the Skin Surface Obtained in the Clinic are Predictive of Culture-Positive Cutibacterium Periprosthetic Infections in Revised Shoulder Arthroplasties

Jason Hsu, MD, FAAOS
Frederick A. Matsen, MD, FAAOS
Anastasia Whitson, BS

A simple culture of the unprepared skin surface obtained in clinic prior to revision shoulder arthroplasty may provide valuable assistance to surgeons planning a revision arthroplasty.
Poster No. P0819
The Effect of Antimicrobial Photodynamic Therapy on Periprosthetic Joint Infection Isolates

Thomas Listopadzki, BA, BS
Scott Nodzo, MD, FAAOS
John K. Crane, MD, PhD
Thomas R. Duquin, MD, FAAOS
K. Keely Boyle, MD
Cutibacterium acnes shoulder PJI isolates and staphylococcal hip and knee PJI isolates were tested for susceptibility to eradication by antimicrobial photodynamic therapy in vitro.

Poster No. P0820
The Optimal Antibiotic Cement Combination for the Management of Cutibacterium Acnes-Related Prosthetic Shoulder Infection

Amrit Vinod, MD
Thomas Listopadzki, BA, BS
John K. Crane, MD, PhD
Thomas R. Duquin, MD, FAAOS
Sonja Pavlesen
Matthew J. DiPaola, MD, FAAOS
When treating Cutibacterium acnes related prosthetic shoulder infection, relying on prefabricated spacers is insufficient. Vancomycin or other antibiotic targeting gram positive organisms is required.

Poster No. P0821
Modified Frailty Index Predicts Total Complication Rate after Proximal Humerus Open Reduction and Internal Fixation

Ankur S. Narain, MD
Wayne Chan, MD, PhD
Daniel L. Aaron, MD
Increased frailty is associated with increased rates of overall complications, hematologic complications, and discharge to a non-home facility after proximal humerus ORIF procedures.

Poster No. P0822
Outcomes of Acute but Not Delayed Reverse Total Shoulder Arthroplasty for Proximal Humerus Fracture are Equal to those for Rotator Cuff Arthropathy

Erika Roddy, MD
Gabrielle Ma
Alan Zhang, MD, FAAOS
Brian T. Feeley, MD, FAAOS
ChunBong B. Ma, MD, FAAOS
Drew Lansdown, MD, FAAOS
We found no difference in outcomes of RTSA for acute fracture versus cuff tear arthropathy. Outcomes of delayed RTSA for fracture were significantly worse than those for acute treatment.

Poster No. P0823
No Change in Outcome Ten Years following Locking Plate Repair of Displaced Proximal Humerus Fractures

Rachel Ranson, MS
Rachel Roller
Nicket Dedhia, BA
Sanjit R. Konda, MD, FAAOS
Joseph D. Zuckerman, MD, FAAOS
Kenneth A. Egol, MD, FAAOS
At a mean 10 years follow up, patient-reported functional outcome scores and shoulder range of motion are stable compared to one year following proximal humerus fracture fixation with locking plates.

Poster No. P0824
Simple Decompression vs. Anterior Transposition of the Ulnar Nerve: 2-Year Follow Up of a Randomized Trial

Emil H. Schemitsch, MD, FAAOS
Gurrattan Chandhoke
Christine Schemitsch, BS
Niloofar Dehghan, MD, MSc, FAAOS
Milena Vicente, RN
Aaron Nauth, MD
Jeremy Hall, MD, FRCS (ORTHO)
Michael D. McKeel, MD, FAAOS
Cots Canadian Orthopaedic Trauma Society, MD
We present here the 2-year follow-up results of a randomized trial comparing ulnar nerve simple decompression to anterior transposition after plate fixation of acute distal humeral fractures.

Poster No. P0825
Radial Head Lag: A Possible Biomechanical Mechanism for Osteochondritis Dissecans of the Capitellum in Baseball Players

Dani Rotman, DMed
Jaeman Kwak
Jorge L. Rojas Lievano
Alexander W. Hooke, MA
James S. Fitzsimmons, BS
Shawn W. O’Driscoll, MD, FAAOS
We propose a biomechanical explanation for OCD of the capitellum in baseball players: radial head lag.
Growing Racial Disparities in Utilization of Adult Spinal Deformity Surgery Despite Minimal Racial Differences in Complication Rates and Prolonged Hospital Stay: An Analysis of Trends from 2004 to 2014

Kevin Wang, BA
Varun Puvanesarajah, MD
Amy L. Xu, BS
Bo Zhang, MD
Micheal Raad, MD
Khaled M. Kebaish, MD, FAAOS

There is a growing disparity in utilization of ASD surgery between white and black patients from 2004 to 2014 in the United States, even without differences in complications and length of stay.

The Additional Economic Burden of Frailty in Adult Spinal Deformity Patients Undergoing Surgical Intervention

Peter G. Passias, MD, FAAOS
Waleed Ahmad, MS
Katherine E. Pierce, BS
Sara Naessig, BS
Douglas C. Burton, MD, FAAOS
Alan H. Daniels, MD, FAAOS
Jeffrey Gum, MD, FAAOS
Robert A. Hart, MD, FAAOS
Eric O. Klineberg, MD, FAAOS
Alexandra Soroceanu, MD
Renaud Lafage, MS
Virginie Lafage, PhD
Robert S. Bess, MD, FAAOS
Richard A. Hostin, MD, FAAOS
Frank J. Schwab, MD
Justin S. Smith, MD
Christopher I. Shaffrey, MD, FAAOS
International Spine Study Group

Results demonstrated that despite initial higher costs associated with surgical intervention in frail patients, the cost per QALY become comparable if utility gained is sustained to life expectancy.

Hospital Mark-Up and Outcomes following Lumbar Fusions – Moving Toward the Era of Transparency in Prices

Azeem T. Malik, MBBS
Joseph Drain, MD
Saifdar N. Khan, MD, FAAOS
Jeffery D. Kim, MD
Elizabeth M. Yu, MD, FAAOS

Higher hospital mark-up does not seem to be associated with better quality of care following lumbar fusions.

Persistent Racial Disparities in Utilization, Complication Rates, and Prolonged Hospital Stay following Spinal Surgery: An Analysis of Trends from 2004 to 2014

Kevin Wang, BA
Varun Puvanesarajah, MD
Nicholas S. Andrade, BS
Micheal Raad, MD
Andrew Harris, MD
Khaled M. Kebaish, MD, FAAOS

There were persistent, and in some cases worsening, racial disparities in utilization rates, major postoperative complications, and length of stay for ACDF and PLF, from 2004 to 2014.

Understanding the Macroeconomics of Spinal Fusion Utilization Rates in the United States from 2015 to 2040

Piyush Kalakoti, MBBS, MD
Karthikeyan Chinnakkannu, MD
Ashley J. Bell, BS
Kanika Sharma, MD
Dachepalli S. Sreekar
Joshua Eisenberg, MD
Christopher P. Lindsay, MD
Nathan Hendrickson, MD
Andrew J. Pugely, MD

The study provides national forecasting for spinal arthrodesis utilization rates and macro-economics until 2040 using ARIMA modeling technique, often used by financial analysts for stock prediction.

Off-Label Usage of rhBMP-2 in Posterior Cervical Fusion is Not Associated with Early Increased Complication Rate and has Similar Clinical outcomes

Douglas S. Weinberg, MD
Jae-Hyung Eoh
Wesley J. Manz, BA, MS
Omolola Fakunle
Alexander M. Dawes, BS
John J. Rhee, MD, FAAOS

Patients undergoing posterior cervical fusion with off-label use of BMP had similar complication rates and clinical outcomes as those fused without.

Osteoinductive Biomimetic Collagen-Based Trizonal Membrane for Bone Formation and Sustained Release of Vancomycin

Takashi Hirase, MD, MPH
Eliana Stetco, MS
Stefano Serpelloni
Ava A. Brozovich, MPH
Francesca Taraballi, BS, MSc
Bradley K. Weiner, MD, FAAOS

We investigate a vancomycin-loaded collagen-based trizonal membrane to be used as an adjunctive material in spine surgery for promoting bony formation and achieving sustained local vancomycin release.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0833
Preclinical Safety and Efficacy Evaluation of a 3D-Printed Hydroxyapatite-Demineralized Bone Matrix Composite Scaffold Relative to rhBMP-2 in the Setting of Spine Fusion

Eileen N. Phan, BA
James Foley, MD
Elianna J. Fred
Allison J. Wintring, BS
Mark A. Plantz, BS
Joseph Lyons, BS
Tejas Nandurkar, MS
Jonathan Paul, BS, MPH
Parker J. Marsh, BS
Marcus S. Rossi
Soyeon Jeong, MS
Chawon Yun, PhD
Silvia Minardi, MSc, PhD
Ramille N. Shah
Adam E. Jakus, PhD
Kenneth R. Blank, PhD, MHA
Robert Havey
Muturi Muriuki, PhD
Avinash G. Patwardhan, PhD
Stuart R. Stock, PhD
Wellington K. Hsu, MD, FAAOS
Erin L. Hsu, PhD
Hsu Lab

This study evaluates a novel 3D-printed ceramic-DBM composite scaffold against the industry standard rhBMP-2 for efficacy for spine fusion and evaluation of the host inflammatory response.

Poster No. P0834
Does Conflict of Interest Affect the Reported Fusion Rates of Bone Graft Substitutes and Extenders?

Garwin Chin, MD
Yu-Po Lee, MD, FAAOS
Charles D. Rosen, MD
Nitin N. Bhatia, MD, FAAOS
P. Douglas Kiester

Does conflict of interest affect the reported fusion rates of bone graft substitutes and extenders?

Poster No. P0835
Cervical Spine CT Scans Can Miss Fractures when Football Protective Equipment is in Place

Amit S. Piple, BS
Jonathan J. Carmouche, MD, FAAOS
Kelley Whitmer, MD
Carol A. Bernier, DO, MEd
David C. Keyes, MD
Anmol Bansal

This study investigates whether football players can be imaged using CT without removal of their protective equipment in the setting of a suspected spine injury.

Poster No. P0836
Tandem Stenosis Patients Undergoing Primary Cervical Operations are at an Increased Risk for Poor Perioperative Outcomes

Peter G. Passias, MD, FAAOS
Katherine E. Pierce, BS
Sara Naessig, BS
Waleed Ahmad, MS
Oscar Krol, BA
Lavrill A. Fernandez, MD
Bassel Diebo, MD
Aaron J. Buckland, FRACS, MBBS

Cervical surgeons should be wary of patients who present with concomitant stenosis of the lumbar and cervical spine in preoperative planning.

Poster No. P0837
Hybrid Anterior Cervical Discectomy and Fusion and Cervical Disc Arthroplasty: An Analysis of Short-Term Complications, Reoperations, and Readmissions

Venkat Boddapati, MD
Nathan J. Lee, MD
Justin Mathew, MD
Joseph Lombardi, MD
Meghana Vulapalli, BS
Marc D. Dyrszka, MD
Zeeshan Sardar, MD
Ronald A. Lehman, MD, FAAOS
K. Daniel Riew, MD, FAAOS

Patients undergoing hybrid cervical spine surgery are not at increased risk of perioperative complications relative to a two-level ACDF, and may benefit from shorter LOS.

Poster No. P0838
Is it Safe to Stop at C7 during Multilevel Posterior Cervical Decompression and Fusion? Multicenter Analysis

Eeric Truumees, MD, FAAOS
Devender Singh, PhD
William F. Lavelle, MD, FAAOS
Ron Riesenburger
Matthew J. Geck, MD
Swamy Kurra, MBBS
Daniel Grits
Robert Winkelman
Thomas E. Mroz, MD, FAAOS

Extension of posterior cervical fusions into the thoracic spine may be recommended for higher risk patients with limitations to strong C7 bone anchorage. In others, it is safe to stop at C7.
Poster No. P0839
Recovery of Physical Function Based on Body Mass Index following Anterior Cervical Discectomy and Fusion
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Kern Singh, MD, FAAOS
This study aims to detail the association between BMI and postoperative improvement in patient-reported physical function, measured by PROMIS-PF, following anterior cervical discectomy and fusion.

Poster No. P0840
The Associations of Spine Surgeon Training, Office Wait Times, and Social Media Presence with Reviews on Physician Rating Websites
Andrew Sama, BA
Nicholas C. Schiller, MSc
Johnathon R. McCormick, MD
Kevin Bondar
Deborah Li, MD, MPH
Jose Antonio Canseco, MD, PhD
Chester J. Donnally, MD
This study aimed to evaluate the impact of demographics and social media presence on physician review website ratings for spine surgeons.

Poster No. P0841
The Association of Obesity with Postoperative Outcomes following Anterior Cervical Discectomy and Fusion
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliot Cha, MSc
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS
This study evaluates the relationship of obesity with the rate of achieving a minimally clinically important difference in patient-reported outcome measures among patients undergoing ACDF.

Poster No. P0842
Long-Term Outcomes following Surgical Site Infections in Early Onset Scoliosis Patients: A 15-Year Retrospective Review
R. Justin Mistovich, MD, MBA
Anne Dumaine, MD
James Yu, BS
Connie Poe-Kochert, NP
George H. Thompson, MD, FAAOS
Most patients who develop SSIs during growing spine treatment are able to retain instrumentation. Risk factors associated with developing multiple SSIs include infection earlier in the course of growing spine surgery and a resultant higher number of procedures following an index infection and having a positive nasal screen on the day of surgery.

Poster No. P0843
Preoperative Prone Radiographs can Reliably Determine Spinal Curve Flexibility in Adolescent Idiopathic Scoliosis (AIS): Review of 350+ AIS Patients
Jacob F. Schulz, MD, FAAOS
Tej Joshi, MD
Daniel Berman, MD,
Evan Mostafa, BS
Jaime A. Gomez, MD
Regina Hanstein, PhD
Prone positioning radiographs demonstrated a moderate to strong correlation with bending radiographs for determining the degree of spinal flexibility. A single prone position radiograph may be used as a proxy for determining spinal flexibility.

Poster No. P0844
Correlation Analysis between Cervicothoracic Vertebral Tilt and Shoulder Balance in Adolescent Idiopathic Scoliosis Patients Receiving Posterior Spinal Fusion: Can C7 Tilt Be Used as an Intraoperative Proxy to Determine and to Quantify Shoulder Balance?
Jui-Yo Hsu, MD
Yuan-Fuu Lee, MD
Kuang-Ping Peng
Wen-Tung Hsieh
Chih-Wei Chen, MD
Ming-Hsiao Hu, MD, PhD
Shu-Hua Yang, MD, PhD
C7 coronal tilt may serve as an intraoperative reference determining shoulder balance in adolescent idiopathic scoliosis patients receiving posterior spinal fusion.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off-label use). For full information refer to page 17.
Poster No. P0845
Surgeon Performance and Patient Outcome Improvement through Multiyear Dashboard Reporting: Tracking and Sustaining Change
Michelle Marks, PT, MA
Maty Petcharaporn, BS
Monica Lee
Mary Dalupang
Ronald A. Lehman, MD, FAAOS
Harry L. Shufflebarger, MD, FAAOS
Vidyadhar V. Upasani, MD, FAAOS
Lawrence G. Lenke, MD, FAAOS
Suken A. Shah, MD, FAAOS
Tracey Bastrom, MA
Burt Yaszay, MD, FAAOS
Paul D. Sponseller, MD, FAAOS
Firoz Miyanji, MD
Amer Samdani, MD
Baron Lonner, MD, FAAOS
Jack M. Flynn, MD, FAAOS
Peter O. Newton, MD, FAAOS
Harms Study Group
Implementation of a dashboard reporting quality improvement program resulted in statistically significant improvements in patient outcomes and improved standardization of care.

Poster No. P0846
Novel Inflammation-Preserving Treatment for Symptomatic Lumbar Disc Herniation: A Prospective Imaging and Clinical Outcomes Study
Michael T. Nolte, MD
Alexander Tkachev, MD
Garrett Harada, MD
Arash J. Sayari, MD
Dino Samartzis, PhD
Hanne Albert, MPH, PhD
Basic science research has suggested that anti-inflammatory medications may inhibit resorption of herniated discs. In this study, we report our experience with an inflammatory-preserving protocol.

Poster No. P0847
Higher Rates of Medical Complications and Costs of Care following Delayed Surgical Intervention for Cauda Equina Syndrome: A Matched-Control Analysis
Ajit Vakharia, MD
Naveen Jasty
Walter Klyce, MD
Yazdan Raji, MD
Jerry Y. Du, MD
Nicholas U. Ahn, MD
Time to intervention (acute vs. delayed) for individuals with cauda equina syndrome was compared. In-hospital length of stay, medical complications, readmission rates and costs of care were compared.

Poster No. P0848
A Novel Mouse Model of Lumbar Discogenic Paraspinal Muscle Degeneration
Michael Davies, MD
Gurbani Kaur, BS
Xuhui Liu, MD
Mengyao Liu
Agustin Diaz, BA
Hubert T. Kim, MD, PhD, FAAOS
Jeffrey C. Lotz, PhD
Jeannie F. Bailey, PhD
Brian T. Feeley, MD, FAAOS
We have developed a novel mouse model of intervertebral disc injury that results in reproducible paraspinal muscle atrophy, fibrosis, and fatty infiltration distal to the level of disc injury.

Poster No. P0849
Do Routine Nutrition Consults for Neuromuscular Scoliosis Help the Patient or Just the Rankings?
Stephen Stephan, MD
David L. Skaggs, MD, FAAOS
Kavish Gupta
Kenneth D. Illingworth, MD
Lindsay M. Andras, MD, FAAOS
In this study of 243 neuromuscular scoliosis patients, a preoperative nutrition consult offered no benefit in weight gain or postoperative complications.

Poster No. P0850
Validation of Patient-Reported Outcomes Measurement Information System Physical Function in Anterior Cervical Discectomy and Fusion: 2-Year Long-Term Follow Up
Conor P. Lynch, MS
Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Caroline N. Jadczak, BS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS
This study aims to investigate validate PROMIS PF scoring by comparison with legacy patient-reported outcome measures among patients undergoing anterior cervical discectomy and fusion.

Poster No. P0851
Racial Disparities in Readmission Rates following Anterior Cervical Discectomy and Fusion Surgery at a Tertiary Care Center
Comron Saifi, MD, FAAOS
Thaddeus Woodard, BS
Brian D. Cortese, BS
Sachin Gupta, MD
Sarthak Mohanty, BS
Rohan Palanki
David Casper, MD
This retrospective review found black patients have higher rates of readmission than white patients at 30 days and 90 days following anterior cervical discectomy and fusion (ACDF) surgery.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
Poster No. P0852  
Preoperative Regional Erector Spinae Plane Blocks Reduce Opioid Use, Increase Mobilization, and Reduce Length of Stay following Lumbar Spine Fusion  
Robert Owen, MD  
Noah J. Quinlan, MD  
Darrel S. Brodke, MD, FAAOS  
William R. Spiker, MD, FAAOS  
Nicholas Spina, MD  
Brandon D. Lawrence, MD, FAAOS

Erector spinae plane blocks significantly reduce postop opioid use, improve mobilization, and reduce length of stay following lumbar spine fusion.

Poster No. P0853  
Does a Reported Penicillin Allergy Affect Outcomes following Elective Posterior Lumbar Fusions?  
Austin J. Roebke, MD  
Azeem T. Malik, MBBS  
Elizabeth M. Yu, MD, FAAOS

Patients with reported penicillin-allergy experienced significantly higher rates of SSIs, AKIs, UTIs, sepsis, readmissions, and cost following an elective posterior lumbar fusion.

Poster No. P0854  
Lumbar Facet Cysts: Fusion and Decompression vs. Decompression Only  
Jarren A. Section, MD  
Noorulah Maqsoodi, BS  
Addisu Mesfin, MD, FAAOS

Decompression only for lumbar synovial cysts was associated with significantly lower rates of reoperation (6.1%) as compared to decompression and fusion (19.2%).

Poster No. P0855  
Five-Year Reoperation Rates after Anterior Cervical Discectomy and Fusion or Posterior Cervical Foraminotomy for Cervical Radiculopathy: Results Vary between Different Patient Populations  
Andre Samuel, MD  
Philip Louie, MD  
Michael Steinhaus, MD  
Mark Langhans, MD, PhD  
Avani Vaishnav, MBBS  
Srawish Iyer, MD  
Sheeraz Qureshi, MD, FAAOS

For cervical radiculopathy, PCF was associated with fewer reoperations at 5 years in the Medicare population, while ACDF was associated with fewer in the younger commercial insurance population.

Poster No. P0856  
Preoperative Pain Management Prior to Posterior Lumbar Fusion: Is Tramadol a Safe Alternative to Traditional Opioids?  
Daniel C. Lewis, BA  
Joshua Bell, MD  
Alyssa D. Althoff, MD  
Sean Sequeira, BS  
Dennis Q. Chen, MD  
Manminder Bhatia, DO  
Hamid Hassanzadeh, MD, FAAOS

The current study evaluates the association between tramadol use and outcomes. Tramadol has a lower risk of prolonged postoperative opioid use compared to traditional opioids.

Poster No. P0857  
Two-Year Postoperative Validation of PROMIS Physical Function following Lumbar Decompression  
James M. Parrish, MPH  
Nathaniel W. Jenkins, BS, MS  
Conor P. Lynch, MS  
Elliot Cha, MSc  
Dustin H. Massel, MD  
Augustus Rush, MD  
Cara E. Geoghegan, BS  
Caroline N. Jadczak, BS  
Kern Singh, MD, FAAOS

This study validated PROMIS PF scores through comparison to legacy patient-reported outcome measures for patients undergoing lumbar decompression.

Poster No. P0858  
Is there a Difference in the Magnitude of Pain Intensity Reduction for Patients undergoing Lumbar Interbody Fusion via a Minimally Invasive vs. an Open Approach?  
Jack R. Zhong, BA  
Uchechi Iweala, MD, MBA  
Caroline A. Varlotta, DO  
Nicholas A. O’Malley, BS  
Eman Balouch, MD, PhD  
Carolyn Stickley, BS  
Constance Maglara, PhD  
Brooke K. O’Connell  
Themistocles S. Protopsaltis, MD, FAAOS  
Aaron J. Buckland, FRACS, MBBS  
Charla R. Fischer, MD, FAAOS  
NYU Spine

MIS and open approaches to lumbar interbody fusion demonstrated no difference in the magnitude of pain intensity reduction at 3-mo, 6-mo, 1-yr, or 2-yr.
Poster No. P0859
Preoperative PROMIS Physical Function Association with Mental Health Improvement after Anterior Cervical Discectomy and Fusion

James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Elliot Cha, MSc
Connor P. Lynch, MS
Michael T. Nolte, MD
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Caroline N. Jadczak, BS
Kern Singh, MD, FAAOS

This study investigates the influence of preoperative physical function as determined by PROMIS-PF, on postoperative depressive symptom scores as measured by PHQ-9 among ACDF patients.

Poster No. P0860
Radiation Disrupts the Protective Function of the Spinal Meninges in a Mouse Model of Tumor-Induced Spinal Cord Compression

Takaki Shimizu, MD
Satoru Demura, MD
Satoshi Kato, MD
Kazuya Shinmura, MD
Noriaki Yokogawa, MD
Hiroyuki Tsuchiya, MD

Disruption of barrier function against tumor was observed in post-irradiated dura mater in mice. Careful consideration should be given to this phenomenon when treating spinal tumors.

Poster No. P0861
Predicting Survival for Patients with Acute Epidural Compression or Pain from Metastatic Spine Disease: An Analysis of Nine Scoring Systems

Eric Vess, MD
Noorullah Maqsoodi, BS
Emmanuel N. Menga, MD, FAAOS
Robert W. Molinari, MD, FAAOS
Paul T. Rubery, MD, FAAOS
Addisu Mesfin, MD, FAAOS

This study suggests an increased risk for misprognostication when predicting survival in patients presenting acutely with metastatic spine disease using 9 commonly employed scoring systems.

Poster No. P0862
Surgical Plans Generated from Telemedicine Visits are Rarely Changed after In-Person Evaluation in Spine Patients

Harry M. Lightsey, MD
Alexander M. Crawford, MD
Grace Xiong, MD
Andrew J. Schoenfeld, MD, FAAOS
Andrew K. Simpson, MD, MBA

Telemedicine evaluations are efficient means of preoperative assessment of spine patients and delineation of surgical plans.

Poster No. P0863
The Epidemiology of Vertebral Osteomyelitis Requiring Surgical Intervention in the United States from 1998 to 2013

Daniel Cohen, MD
Jennifer Kurowicki, MD
Michael Falcon, MD, FAAOS
Stuart Changoo, MD
Kumar G. Sinha, MD, FAAOS
Kyi S. Hwang, MD, FAAOS
Arash Emami, MD, FAAOS

Vertebral osteomyelitis is an understudied condition with an increasing need for invasive intervention, particularly in patients with certain comorbidities which have now been identified.

Poster No. P0864
Characterizing the Effect of Perioperative Narcotic Consumption and Narcotic Prescription Dosing at Discharge on Satisfaction with Pain Control for Patients Undergoing Single-Level Anterior Cervical Discectomy and Fusion

Stephane Owusu-Sarpong, MD
Uchechi Iweala, MD, MBA
David A. Bloom, BA
Charla R. Fischer, MD, FAAOS

There is no correlation between patient pain control satisfaction and opioid consumption after single-level ACDF, suggesting factors other than narcotic consumption play a more important role.

Poster No. P0865
Does Bone Morphogenetic Protein Use or Approach Type Influence Pseudarthrosis Rates in Single Level Transforaminal Lumbar Interbody Fusion Surgeries?

Aaron J. Buckland, FRACS, MBBS
Jack R. Zhong, BA
Jarid Tareen, MD
Kimberly Ashayeri, MD
Carlos Leon
Eamonn Balouch, MD, PhD
Nicholas A. O’Malley, BS
Carolyn Stickley, BS
Constance Maglaras, PhD

This single center retrospective study assesses the rates of pseudarthrosis in open and minimally invasive transforaminal interbody lumbar fusion patients, with and without concurrent rhBMP-2 use.

Poster No. P0866
Understanding Return to Work Recommendations after Spinal Surgery

Klair Lubonja, BS
Mark Cote, PT
Isaac Moss, MD, MSc
Scott S. Mallozzi, MD

The data collected in this study showed that there is significant variability among spinal surgeons in regard to return to work recommendations after spinal surgery.
Poster No. P0867
Utilization of Intraoperative Neuromonitoring during Spine Surgeries and Associated Conflicts of Interest

Madison L. Goss, BS
Jesse E. Bible, MD, MHS, FAAOS

We assessed the use of IOMN, rationale for its use, and conflicts of interest for spine surgery. Our findings outline contemporary, common practices for the use of IONM during spine surgery.

Poster No. P0868
Reducing Postoperative Opioid Prescribing following Posterior Lumbar Fusion Does Not Significantly Change Patient Satisfaction

David A. Bloom, BA
Amit K. Manjunath, BS
Michael Dinizo, MD
Jordan W. Fried, BA
Laith M. Jazrawi, MD, FAAOS
Themisotcles S. Protopsaltis, MD, FAAOS
Charla R. Fischer, MD, FAAOS

Despite a statistically significant decrease in postoperative opioid prescription, there was no significant change in patient satisfaction with pain control, as determined the Press Ganey survey.

Poster No. P0869
Decreased Muscle Health throughout the Lumbar Spine associated with Spondylolisthesis for Operative Patients with Lumbar Spinal Stenosis

Joshua Wright-Chisem, MD
Sohrab Virk, MD
Milan S. Sandhu, BS
Avani Vaishnav, MBBS
Jung K. Mok, BS
Srivisht Iyer, MD
Todd J. Albert, MD, FAAOS
Sheeraz Qureshi, MD, FAAOS

Patients with lumbar spondylolisthesis had paralumbar muscle health measurements that were worse than for those without spondylolisthesis. The grade of slip was associated with worse muscle health.

Poster No. P0870
Depressive Symptom Differences among Gender in Lumbar Decompression

James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Elliot Cha, MSc
Caroline N. Jadcza, BS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Kern Singh, MD, FAAOS

Differences in improvement of depressive symptom improvement by gender was investigated in patients undergoing lumbar decompression.

Poster No. P0871
A Validation of Patient Health Questionnaire-9 for Cervical Spine Surgery

Elliot Cha, MSc
James M. Parrish, MPH
Nathaniel W. Jenkins, BS, MS
Conor P. Lynch, MS
Shruthi Mohan, BS
Cara E. Geoghegan, BS
Caroline N. Jadcza, BS
Kern Singh, MD, FAAOS

Comparative and validation study of PHQ-9 survey as a suitable measure of mental health following cervical spine procedures ACDF and CDR.

Poster No. P0872
Examining Patient Satisfaction with Virtual Visits: A Natural Experiment during the Coronavirus Pandemic

William R. Spiker, MD, FAAOS
Joel D. Turtle, MD
Yue Zhang
Darrel S. Brodke, MD, FAAOS
Brandon D. Lawrence, MD, FAAOS
Danny Trujillo, BS
Nicholas Spina, MD

This study examines how the transition to telehealth visits due to the rapid emergence and spread of the novel coronavirus impacts overall patient satisfaction and other virtual visit factors.

Poster No. P0873
What Provides the Best Value for Your Time in Spine Surgery? An Analysis of Relative Value Units

Muhammad B. Tariq, MD
Trevor Simcox, MD
Jacob Becker, MD
Shuriz Hishmeh, MD, FAAOS

RVU analysis of spine surgery procedures assessing operative time, complexity, and type of surgery in relation to physician work valuation.

Poster No. P0874
Outcomes following Cervical Disc Replacement in Patients with Myelopathy vs. Radiculopathy

Ryan Lee, MBA
Avani Vaishnav, MBBS
Hikari Urakawa, MD
Kosuke Sato, MD
Chirag B. Chaudhary, MS
Russel C. Huang, MD, FAAOS
Todd J. Albert, MD, FAAOS
Sheeraz Qureshi, MD, FAAOS

Our results show that patients with myelopathy demonstrate similar PROMs and rates of achievement of MCID following CDR as non-myelopathic patients. These findings suggest that cervical disc replacement is an effective surgical option in the presence of myelopathy.
Poster No. P0875
Epidemiology and Functional Outcomes after Gunshot Related Spinal Injuries

Brian Goh, MD, PhD  
Alexander M. Crawford, MD  
Brendan Striano, MD  
Stuart H. Hershman, MD, FAAOS

To counsel patients after gunshot spinal injury, one must understand long-term outcomes. In this large review, we identified trends in functional independence, ambulatory, and bowel/bladder status.

Poster No. P0876
Varied Etiology of Non-Rheumatic Retro-Odontoid Pseudotumor and Its Clinical Implications for the Selection of Surgical Procedure

Masahiko Takahata, MD  
Ryota Hyakkan, MD  
Itaru Oda, MD, PhD  
Masahiro Kanayama, MD  
Takahiko Hyakumachi, MD  
Tsutomu Endo  
Tomomichi Kajino, MD, PhD  
Norimasa Iwasaki

Varied etiology of myelopathy caused by non-rheumatic retro-odontoid pseudotumor highlights the need for the selection of appropriate surgical procedure based on the underlying pathology in each case.

Poster No. P0877
Severity and Outcome of Neurologic Deficits in Patients with Pyogenic Spondylodiscitis: A Systematic Review

Naveed Nabizadeh, MD  
Charles H. Crawford, MD, FAAOS  
John R. Dimar, MD, FAAOS  
Jeffrey Gum, MD, FAAOS  
Steven D. Glassman, MD, FAAOS  
Leah Y. Carreon, MD

One third of patients with an initial diagnosis of pyogenic spondylodiscitis present with neurologic impairment with a higher risk of permanent neurologic impairment with more severe Frankel grade.

Poster No. P0878
Cage Height is More Important than Surface Area for Subsidence in Multilevel Anterior Cervical Discectomy and Fusions

Yucheng Yao, MD  
Philip Louie, MD  
Michael H. McCarthy, MD, MPH  
Renaud Lafage, MS  
Jonathan C. Elysee  
Basel Sheikh Alshabab, MD  
Russel C. Huang, MD, FAAOS  
Todd J. Albert, MD, FAAOS  
Virginie Lafage, PhD  
Han Jo Kim, MD, FAAOS  
HSS Spine

This retrospective review of a prospective multilevel ACDFs demonstrates that cage height significantly correlates with cage subsidence.

Poster No. P0879
Comparing Outcomes and Mortality of Upper Cervical and Subaxial Cervical Spine Trauma in Elderly Patients

Catherine R. Carlile, MD  
Jacob D. Schultz, BA  
Andrew B. Rees, BS  
Byron F. Stephens, MD

This study aimed to directly compare mortality rates and outcomes between elderly patients with upper cervical and subaxial cervical spine injuries.

Poster No. P0880
Spondylolysis in Athletic Children: How Many Hours of Training a Week is Too Much?

Karen A. Weissmann, MD  
Virginie Lafage, PhD  
Renaud Lafage, MS  
David Seguel, MD  
Evangelia M. Zgonis  
Tianna T. Bennett, BS  
Monica M. Chacon Zamora, MD

Age, sex, number of training hours, type of sport, or radiological associated anomalies do not correlate with the development of lysis in athletic pediatric population.

Poster No. P0881
Intraoperative Ketamine Use on Intermediate and Long-Term Opioid Utilization following Spine Surgery

Comron Saifi, MD, FAAOS  
Carol Wang, BA  
Ivan J. Zapolsky, MD  
Chelsea J. Hendow, MD

Retrospective review investigating whether intraoperative ketamine reduces intermediate or long-term outpatient postoperative opioid use in patients undergoing spine surgery.
Poster No. P0882
Stand-Alone Cages vs. Cage and Plate Constructs for One- and Two-Level Anterior Cervical Discectomy and Fusion: A Prospective Randomized Controlled Trial

Athan G. Zavras, BA
Zakariah K. Siyaji, BS
Talha S. Qadri, BA
Michael T. Nolte, MD
Arash J. Sayari, MD
Bryce A. Basques, MD
Kern Singh, MD, FAAOS
Matthew W. Colman, MD, FAAOS

We prospectively evaluated stand-alone interbody cage (CAGE) and cage/plate (PLATE) for ACDF and found increased symptomatic reduction with PLATE, although transient postoperative dysphagia was higher.

Poster No. P0883
The Impact of Posterior Cervical Foraminotomy on Neck Pain: A Systematic Review and Meta-Analysis

Hikari Urakawa, MD
Kosuke Sato, MD
Avani Vaishnav, MBBS
Bridget Jivanelli, BA, MS
Catherine Himo Gang, MPH
Sheeraz Qureshi, MD, FAAOS

The present systematic review and meta-analysis showed, contrary to popular belief, posterior cervical foraminotomy for radiculopathy could improve neck pain in addition to arm pain.

Poster No. P0884
Can Elderly Patients Undergoing Anterior Cervical Discectomy and Fusion for Degenerative Cervical Myelopathy Experience Improvements in Function and Quality of Life Similar to their Younger Counterparts?

Gerald J. Zeng
Graham S. Goh, MD
Reuben C. Soh, FRCS (Ortho), MBBS
Chang Ming Guo, MBBS MRCS
Wai Mun Yue, MD
Seang-Beng Tan, MD
John L. Chen, ChB, FRCS

Elderly patients had poorer improvement in pain and neurological symptoms after ACDF. These patients also had greater disability, poorer physical wellbeing, and lower expectation fulfillment at 2 years.

Poster No. P0885
Is Predominant Neck Pain a Risk Factor for Worse Postoperative Outcomes following Anterior Cervical Discectomy and Fusion for Cervical Radiculopathy?

Graham S. Goh, MD
Reuben C. Soh, FRCS (Ortho), MBBS
Chang Ming Guo, MBBS MRCS
Wai Mun Yue, MD
Seang-Beng Tan, MD
John L. Chen, ChB, FRCS

Although NPP patients had poorer function and quality of life, a similar proportion experienced a clinically meaningful improvement. High rates of satisfaction and return to work were also achieved.

SPORTS MEDICINE
Poster No. P0886
Institutional Reductions in Opioid-Prescribing Do Not Change Patient Satisfaction after Arthroscopic Rotator Cuff Repair as Determined by Press-Ganey Surveys

Amit K. Manjunath, BS
David A. Bloom, BA
Yuhang Sun, MD
Nathan A. Lorentz
Kirk A. Campbell, MD, FAAOS
Laith M. Jazrawi, MD, FAAOS
Michael J. Alaia, MD, FAAOS

Opioid-sparse postoperative pain regimens are successful in reducing opioids following arthroscopic rotator cuff repairs and do not cause decreases in patient satisfaction related to pain control.

Poster No. P0887
The Importance of Surgeon Judgment in Obtaining Early Magnetic Resonance Imaging to Prevent Delays in Care for Acute Subacromial Injury

Trenton T. Stevens, MD
Jacob Hartline, MD
Tyler J. Brolin, MD, FAAOS
David Bernholt, MD
Frederick M. Azar, MD, FAAOS
Daniel T. Dibaba, MPH, PhD
Thomas W. Throckmorton, MD, FAAOS

This study evaluates the role of initial assessment by an orthopaedic surgeon to identify potential surgical lesions benefitting from early imaging in the setting of acute subacromial injury.

The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
**Poster No. P0888**
The Effect of Preoperative Bone Marrow Lesions on Outcomes following Isolated Osteochondral Allograft Transplantation

*William M. Cregar, MD*
Hailey Huddleston, BS
Stephanie E. Wong, MD
Eric Haunschild, BS
Mohamad M. Alzein, BS
Brian J. Cole MD, MBA, FAAOS
Adam B. Yanke, MD, PhD, FAAOS

Very large (> 4 cm) BMLs may be associated with an increased risk of graft failure and may signify widespread pathology that may not be completely addressed with a localized OCA alone.

**Poster No. P0889**
Obesity is Associated with Patellofemoral Compartment Osteoarthritis: A Magnetic Resonance Imaging Assessment

*Jerry Y. Du, MD*
Lakshmanan Sivasundaram, MD
Nikunj Trivedi, MD
James E. Voos, MD, FAAOS
Brian N. Victoroff, MD, FAAOS

Using MRI knee imaging, we found an independent association between obesity and preferential wear of the patellofemoral compartment of the knee over medial and lateral compartments.

**Poster No. P0890**
Clinical Efficacy of Bone Marrow Aspirate Concentrate vs. Stromal Vascular Fraction Injection in Patients with Knee Osteoarthritis: A Systematic Review and Meta-Analysis

*Ioanna Bolia, MD, MSc*
Sofia Bougioukli, MD
Nicholas A. Trasolini, MD
William Hill, MD, MPH
Frank Petriglano, MD, FAAOS
Jay R. Lieberman, MD, FAAOS
Alexander Weber, MD

Injecting BMAC or SVF products into the knee joint of patients with OA resulted in symptomatic improvement at short-term follow up; however, SVF seemed to be more effective in reducing knee pain.

**Poster No. P0891**
Differences in Clinical and Functional Outcomes between Osteochondral Allograft Transplantation used for the Treatment of Osteochondral Defects when Compared to Chondral Pathology of Other Etiology

*Anant Dixit, MD*
Joseph M. Brutico, BS, MD
Kashyap R. Chauhan
Jeremy Heard
Christopher J. Hadley, BS
Bradford S. Tucker, MD, FAAOS
Fotios P. Tjoumakaris, MD, FAAOS
Kevin B. Freedman, MD, FAAOS

Patients with osteochondral-related defects reported significantly greater functional outcome scores compared to those with chondral-related defects after knee osteochondral allograft transplantation.

**Poster No. P0892**
Tissue-Engineered Augmentation of a Rotator Cuff Tendon Using a Novel Bioinductive Biocomposite Scaffold: A Preliminary Study In Sheep

*Robert A. Arciero, MD, FAAOS*
William R. Walsh, PhD
Andrew J. Carter, PhD
Vedran Lovric, PhD
James D. Crowley
Daniel J. Willis
Tian Wang, PhD
Robert A. Stanton, MD, FAAOS
Steven P. Arnoczky, DVM

The biocomposite scaffold increased the thickness of a repaired rotator cuff tendon through the rapid induction of host generated connective tissue, and was as strong as the unoperated control by 12 weeks.

**Poster No. P0893**
Is Posttraumatic Osteoarthritis Linked to Activity Levels? A Prospective Imaging-Based Evaluation of Knee Cartilage after Anterior Cruciate Ligament Reconstruction

*James M. Friedman, MD*
Favian Su, MD
Alan Zhang, MD, FAAOS
Christina R. Allen, MD, FAAOS
Brian T. Feeley, MD, FAAOS
Richard Souza, ATC, PhD
Xiaojuan Li, PhD
ChunBong B. Ma, MD, FAAOS
Drew Lansdown, MD, FAAOS

ACL reconstruction is associated with T1rho-measured medial compartment degeneration in patients with higher MARX activity levels at 3 years.
Poster No. P0894
◆ A Prospective, Randomized Clinical Trial Comparing the One Step Minced Cartilage Procedures to Marrow Stimulation in the Treatment of Focal Chondral and Osteochondral Lesions of the Knee

Chao-Ping Chen, MD, PhD

One step minced cartilage procedure was better than marrow stimulation in treatment of focal chondral and osteochondral lesions of knee after 24 months posttreatment in terms of IKDC-2000 subjective knee evaluation.

Poster No. P0895
Patient Factors Predicting of Failure following High Tibial Osteotomy

Ron Gilat, MD
Eric Haunschild, BS
Sumit S. Patel, MS
Aghogo Ewuarherhe
Derrick Knapik, MD
Kevin C. Parvaresh, MD
Jorge A. Chahla, MD, PhD
Adam B. Yanke, MD, PhD, FAAPSO
Brian J. Cole MD, MBA, FAAPSO

High tibial osteotomy is an effective procedure for symptomatic patients with varus deformity, associated with a significant improvement in PROs.

Poster No. P0896
Public Perceptions and Preferences regarding the Use of Stem Cell Therapies in Orthopaedic Surgery

Richard Puzzitiello, MD
Mariano Menendez, MD
Nicholas R. Pagani, MD
Michael A. Moverman, MD
Matthew J. Salzler, MD, FAAPSO

The public’s naivety toward the inconclusive evidence associated with stem cell therapies for osteoarthritis and tendinous pathologies may contribute toward misinformed decision making.

Poster No. P0897
The Peroneal Strength Deficits in Patients with Chronic Ankle Instability Compared to Ankle Sprain Copers and Normal Individuals

Jae-Hyeon Jeon, MD
Byung-Ki Cho, MD
Seung Myung Choi
Minyong An

As compared to the ankle sprain copers and normal individuals, patients with chronic ankle instability who were scheduled for modified Broström procedure demonstrated a significant weakness of isokinetic peroneal strength.

Poster No. P0898
Natural History of Femoroacetabular Impingement: Using Machine Learning to Evaluate Risk Factors for Osteoarthritis in a Large Geographic Population Over the Long-Term

Ayoosh Pareek, MD
Sunho Ko, BS
Heath Melugin, MD
Changwung Jo, BA
Duhyun Ro, MD
Aaron J. Krych, MD, FAAPSO

Machine learning can accurately predict hip osteoarthritis in patients with femoroacetabular impingement with age, BMI, and presenting Tonnis grade as the most important factors.

Poster No. P0899
A Nationwide Analysis on the Impact of Depressive Disorders on Patients Undergoing Hip Arthroscopy: A Matched-Control Analysis

Ajit Vakharia, MD
Christopher McMellen, MD
Marsalis Brown, MD
Charles Su, MD, PhD
James E. Voos, MD, FAAPSO
Michael J. Salzler, MD

Matched, comparison of 90-day medical complications of patients with depressive disorders undergoing arthroscopic procedures of the hip.

Poster No. P0900
Bilateral Hip Arthroscopy for the Treatment of Femoroacetabular Impingement Syndrome: Is there an Optimal Timepoint between Index and Contralateral Surgery to Maximize the Likelihood of Achieving Clinically Significant Outcomes?

Ian Clapp, MS
Robert Browning, MD
Daniel M. Wichman, BS
Shane J. Nho, MD, FAAPSO

Patients undergoing bilateral hip arthroscopy that wait longer than 7.2 months between the index and contralateral procedure achieve a clinically significant outcome at a lower rate.

Poster No. P0901
The Natural Course of Recovery of Sports Activities following Hip Arthroscopy for Femoroacetabular Impingement Syndrome

Kevin C. Parvaresh, MD
Ian Clapp, MS
Philip Malloy, MPT, PhD
Jorge A. Chahla, MD, PhD
Shane J. Nho, MD, FAAPSO

Growth mixture modeling was used to identify 4 natural courses of sports activity recovery for patients following hip arthroscopy for the treatment of FAIS.

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**Poster No. P0902**

**Neuraxial Anesthesia for Hip Arthroscopy is Associated with Decreased Immediate Postoperative Pain Scores and Opioid Requirements Compared to General Anesthesia**

*Andrea Spiker, MD*
*Elizabeth (lily) Turner*
*Christopher J. Whalen, MD*
*Matthew Beifuss*
*Scott Hetzel, MS*
*Kristopher Schroeder, MD*

This study compared the immediate postoperative outcomes for hip arthroscopy using neuraxial or general anesthesia; neuraxial methods had lower intraoperative/PACU opioid use, lower PACU pain scores, and shorter PACU phase 1 times.

**Poster No. P0903**

**Achievement of Meaningful Clinical Outcomes is Unaffected by Capsulotomy Type during Arthroscopic Treatment of Femoroacetabular Impingement Syndrome from Multicenter Arthroscopic Study of the Hip Study Group**

*Shane J. Nho, MD, FAAOS*
*Kevin C. Parvaresh, MD*
*Jonathan Rasio, BS, Robroy L. Martin*
*Dominic S. Carreira, MD, FAAOS*
*John J. Christoforetti, MD, FAAOS*
*Joshua D. Harris, MD, FAAOS*
*Dean K. Matsuda, MD, FAAOS*
*Andrew B. Wolff, MD, FAAOS*

Arthroscopic management of FAIS results in significant clinical improvement and is independent of capsulotomy type.

**Poster No. P0904**

**Complete Capsule Closure Provides Clinically Significant Outcome Improvement and Higher Survivorship after Hip Arthroscopy at Minimum 5-Year Follow Up**

*Edward Beck, MD, MPH*
*Benedict U. Nwachukwu, MD, MBA*
*Justin Drager, MD*
*Ian Clapp, MS*
*Kyleen Jan*
*Jorge A. Chahla, MD, PhD*
*Shane J. Nho, MD, FAAOS*

At 5-year follow up, complete T-capsulotomy closure results in superior rates of achieving MCID and PASS, as well as decreased clinical failure rates when compared to vertical limb-only capsular repair.

**Poster No. P0905**

**Is there a Benefit to Preserving the Tibial Stump during Anterior Cruciate Ligament Reconstruction Surgery?**

*Kate Webster, PhD*
*Jerome Murgier, MD*
*Julian Feller, MD*
*Haydn J. Klemm*
*Brian Devitt, MD*
*Timothy S. Whitehead, FRACS*

Tibial stump remnant preservation was associated with reduced graft rupture rates for females and patients who returned to sport but not increased rates of surgery for symptomatic Cyclops lesions.

**Poster No. P0906**

**Time to Achieving Clinically Significant Outcomes after Meniscal Allograft Transplantation**

*Nabil Mehta, MD*
*Hailey Huddleston, BS*
*Kevin C. Parvaresh, MD*
*Evan M. Polce, BS*
*Mohamad M. Alzein, BS*
*Nikhil N. Verma, MD, FAAOS*
*Brian J. Cole MD, MBA, FAAOS*
*Adam B. Yanke, MD, PhD, FAAOS*

This study defined the time to achieving MCID and PASS on IKDC and KOOS subscores for patients undergoing MAT.

**Poster No. P0907**

**Relationship between Body Mass Index and Mid- to Long-Term Patient Outcomes after Multi-Ligamentous Knee Injury**

*Robert Duerr, MD*
*Danny Tan, BS*
*Alex C. Dibartola, MD, MPH*
*Eric Welder, MD*
*Christopher C. Kaeding, MD, FAAOS*
*David C. Flanigan, MD, FAAOS*
*Robert A. Magnussen, MD, FAAOS*

Elevated BMI is associated with worse quality of life and sports participation, though no difference on symptoms, ability to perform ADLs, pain, and overall health after multi-ligamentous knee injury.

**Poster No. P0908**

**Anterior Cruciate Ligament Reconstruction with Lateral Plasty Restores Anterior-Posterior Laxity in the Case of Concurrent Partial Medial Meniscectomy**

*Stefano Zaffagnini, MD*
*Stefano Di Paolo, MSc*
*Alberto Grassi, MD*
*Nicola Pizza, MD*
*Gian Andrea Lucidi*
*Giacomo Dal Fabbro*
*Luca Macchiariola, MD*

Anterior cruciate ligament reconstruction with lateral plasty restores anterior-posterior laxity in the case of concurrent partial medial meniscectomy.
Poster No. P0909
Acute Anterolateral Rotational Instability of the Knee: Mid-Term Results of a Comprehensive Surgical Treatment Using Two Different Techniques
Andrea Ferretti, MD
Edoardo Monaco, MD
Fabio Marzilli, MD
Alessandro Carrozzi, MD
Valerio Andreozzi, MD
Alessandro Annibaldi
Alessandro Giuliani, MD
Daniele Mazza, MD

We report the mid-term results of rotatory instability treatment (suture/LET) in patients who underwent acute ACL-R.

Poster No. P0910
Pain Perception as a Predictive Tool of Opioid Consumption after Anterior Cruciate Ligament Reconstruction
Ehab Nazzal
Emily L. Demaio, BSN
Rebecca Haley, BA
Jennifer Hunnicutt, ATC, PhD
Ajay Premkumar, MD, MPH
John W. Xerogeanes, MD, FAAOS

This is a prospective study of whether pain perception via algometer can identify patients at risk of increased postoperative opioid consumption after anterior cruciate ligament reconstruction.

Poster No. P0911
The Contribution of Partial Meniscectomy to Preoperative Laxity and Laxity after Anatomic Single-Bundle Anterior Cruciate Ligament Reconstruction: In Vivo Kinematics with Navigation
Alberto Grassi, MD
Gian Andrea Lucidi
Luca Macchiarola, MD
Piero Agostinone, MD
Stefano Di Paolo, MSc
Stefano Zaffagnini, MD

Before ACL reconstruction, partial medial meniscectomy increased AP laxity at 30° and 90° and lateral meniscectomy increased dynamic PS laxity.

Poster No. P0912
Factors Influencing the Outcomes of a Validated Return to Sports Test Battery after Anterior Cruciate Ligament Reconstruction: A Retrospective Analysis of 676 Patients
Adnan Saitzln, FRCS (Ortho)
Florent FRANCK, MD
Thais D. Vieira, MD
Charles Pioger, MD
Gregory Vigne, PhD
Fayard Jean Marie, MD
Mathieu Thaunat
Bertrand Sonnery-Cottet, MD

Completion of a specific return to sports program is the most important factor influencing the outcomes of a validated return to sports test score at 6 months after ACL reconstruction.

Poster No. P0913
Did the Rate of Deep Surgical Site Infection following Primary Anterior Cruciate Ligament (ACL) Reconstruction Change Over the Past Decade? Infection Trends in a Cohort of 38,169 ACL Surgeries
Gregory B. Maletis, MD, FAAOS
Priscilla H. Chan, MS
Heather A. Prentice, PhD
Jamila Champs, MD
Dana S. Clutter, MD, MS
Liz Paxton, PhD, MA

In a US healthcare system, we did not observe a difference in incidence of 90-day postoperative deep infection over time; the overall rate remained low and stable throughout the 10-year study period.

Poster No. P0914
Anterior Cruciate Ligament Deficiency Influences Medio-Lateral Tibial Alignment and Knee Varus-Valgus during In Vivo Activities
Stefano Zaffagnini, MD
Alberto Grassi, MD
Piero Agostinone, MD
Stefano Di Paolo, MSc
Erika Pinelli
Marco Bontempi, PhD
Laura Bragonzoni

ACL deficiency alters knee varus valgus and medio-lateral tibial alignment: a dynamic roentgen stereophotogrammetric analysis.

Poster No. P0915
Return to Play and Prior Performance following Anterior Cruciate Ligament Reconstruction in National Football League Players
Kush S. Mody, MBA
Amanda N. Fletcher, BA, MD
Craig C. Akoh, MD
Selene G. Parekh, MD, MBA, FAAOS

This study aims to compare return to play and performance between NFL players of different positions by using snap count and approximate value ratings.

Poster No. P0916
A Comparison of Patient-Reported and Clinical Outcomes following Fibular and Combined Tibial-Fibular-Based Reconstruction of the Posterolateral Corner of the Knee: A Systematic Review and Meta-Analysis
Nicholas C. Yeatts, BS
Allison J. Rao, MD
David Trofa, MD
Claude T. Moorman, MD, FAAOS
Dana P. Plasecki, MD, FAAOS
James E. Fleischli, MD, FAAOS
Bryan M. Saltzman, MD

This study found no statistically significant differences in PROs or objective clinical outcome measurements following fibular-based vs. combined tibial-fibular-based PLC reconstruction.

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Poster No. P0917  
Repeat Revision Anterior Cruciate Ligament Reconstruction: Clinical Outcomes of Second Revision and Risk Factors Leading to Failure of Primary Revision  
**Adnan Saithna, FRCS (Ortho)**  
Ibrahim Haidar  
Thomas Fradin, MD  
Johnny Rayes, MD  
Ngbilo Cédric, MD  
Thais D. Vieira, MD  
Bertrand Sonnery-Cottet, MD  

Quadriceps tendon autograft is associated with a significantly higher risk of graft failure following primary revision ACL reconstruction than other popular graft choices.

Poster No. P0918  
Risk Factors for Hospital Admission in Patients Undergoing Outpatient Anterior Cruciate Ligament Reconstruction: A National Database Study  
**Cris Min, MD**  
Matthew Partan, DO  
Petros Koutsogiannis, DO  
Cesar R. Iturriaga, DO  
Gus Katsigiorgis, DO  
Randy M. Cohn, MD, FAAOS  

The use of regional anesthesia alone, increasing concurrent procedures, and obesity classes II and III were associated with increased risk of admission after anterior cruciate ligament reconstruction.

Poster No. P0919  
Peroneus Longus Tendon is an Effective Autograft for Primary Anterior Cruciate Ligament Reconstruction with Limited Donor Site Morbidity at Ankle and Improved Outcomes at Knee  
**Usama Bin Saeed, MBBS**  

Peroneus longus tendon is an effective alternate for ACL (anterior cruciate ligament) reconstruction with limited donor site morbidity at ankle and improved functional outcomes at knee.

Poster No. P0920  
Mid-Term Results of Anterior Cruciate Ligament Repair with Suture Tape Augmentation  
**Graeme P. Hopper, MD, MSc**  
Joanne Aithie  
Joanne M. Jenkins  
William T. Wilson, MBCHB, MRCSED  
Gordon MacKay, FRCS  

Good survivorship and excellent PROMs at mid-term follow up for ACL repair with suture tape augmentation suggest it is an effective alternative to traditional ACL reconstructions in appropriate cases.

Poster No. P0921  
Skeletal Immaturity and Graft Type as Predictors of Reinjury after Transphyseal Anterior Cruciate Ligament Reconstruction in Pediatric and Adolescent Patients  
**Luca Rigamonti, MD**  
Nathaniel A. Bates, PhD  
Nathan Schilaty, DC, PhD  
Michael J. Stuart, MD, FAAOS  
Todd A. Milbrandt, MD, FAAOS  
Aaron J. Krych, MD, FAAOS  

Among skeletally immature patients the grey zone of surgical decision is closing physis group. Physis status is fundamental for graft choice to reduce risk of reinjury avoiding growth disturbances.

Poster No. P0922  
From the Gaming Console to the Field: Using the Microsoft Xbox Kinect to Determine Risk of Anterior Cruciate Ligament Injury in Varsity Athletes  
**Jason P. Corban, MD**  
Nicolaos Karatzas, MSc  
Stephane Bergeron, MD  
Thomas Fevens, PhD  
Hassan Rivaz, PhD  
Louis-Nicolas Veilleux, PhD  
Paul Martineau, MD  

We show a paradigm shift in assessing risk of non-contact ACL injury among athletes.

Poster No. P0923  
Gender Differences in Knee Injuries among National Collegiate Athletic Association Basketball Players  
**Ted Obi, BA**  
Daniel Charen, MD  
Hsin-Hui Huang, MD, MS  
Jashvant Poeran, MD, PhD  
Alexis C. Colvin, MD, FAAOS  

The proportion of ACL injuries among women has decreased compared to prior studies suggesting knee injury prevention strategies have been a success.

Poster No. P0924  
Computer Simulated Meniscal Allograft Transplantation in Skeletally Immature Patients: An Assessment of Physeal Relationships and Disruption  
**Curtis D. VandenBerg, MD, FAAOS**  
Brian B. Vuong, BS  
Stockton Troyer  
Eric J. Strauss, MD, FAAOS  
Theodore J. Ganley, MD, FAAOS  
Kevin G. Shea, MD, FAAOS  

Meniscus allograft transplantation using a dual-tunnel drilling technique results in low physeal violation, avoidance of the physeal periphery, and adequate epiphyseal depth for safe drill tunnels.
Poster Session II

Poster No. P0925
International Cartilage Rating Society Scores Worsen Between 2-Year Short-Term and 5-Year Mid-Term Follow Up after Transtibial Medial Meniscus Root Repair: An MRI Analysis

Daniel J. Kaplan, MD
David A. Bloom, BA
Erin Fitzgerald, MD
Robert J. Meislin, MD, FAAOS
Eric J. Strauss, MD, FAAOS
Laith M. Jazrawi, MD, FAAOS
Michael J. Alaia, MD, FAAOS

The purpose of this study was to evaluate the intermediate-term results of assessing clinical and radiographic outcomes using advanced imaging.

Poster No. P0926
Factors Associated with Clinical Failure after Arthroscopic Partial Meniscectomy for Medial Meniscus Tear

Hyuk Soo Han, MD
Chan-Hee Cho, MD
Kwanjae Cho, MD
Yong Joon Lee, MD
Duhyun Ro, MD
Myung C. Lee, DMD

Arthroscopic partial meniscectomy for medial meniscal tear may provide favorable long-term outcomes if indicated for carefully selected patients.

Poster No. P0927
Popliteal Artery is Safe in Medial Meniscal Repair Using All Inside Devices in Adults: An MRI-Based Simulation Study

Muhammed C. Shamseer, MBBS
Bipin Theruvil, FRCS (Ortho), MBBS
Nizaj N, MBBS
Appu B. Thomas, MD
Julio Chacko Kandathil, MBBS, MD
Jacob Varughese, MD

This simulation study on MRI of knee was performed to assess the safety of all inside meniscal repairs and thus to avoid injury to popliteal artery and common peroneal nerve.

Poster No. P0928
Degenerative Meniscal Tears: A Comparison of Postoperative Outcomes following Meniscectomy with and without Bone Marrow Aspirate Concentrate

Anthony J. Scillia, MD, FAAOS
Iciar M. Davila Castrodad, MD
Jennifer Kurowicki, MD
Erica Simone, ATC, MS
Alexandra Giordano
Matthew J. Kraeutler, MD
Cyrus P. Emami
Anthony Festa, MD, FAAOS
Vincent K. Mclnerney, MD, FAAOS

Patients treated for degenerative meniscal tears with adjacent chondral lesions had superior outcomes when treated with arthroscopic partial meniscectomy (PM) and BMAC compared to PM alone.

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Poster No. P0929
Clinical and Radiological Outcomes after Meniscal Root Repair: A Case Series with Prospective Follow Up

Bradley Young, MD
John Ruder, MD
Bryan M. Saltzman, MD
James E. Fleischli, MD, FAAOS

This case series of meniscal root repairs found a high rate of root healing, high rate of condylar chondromalacia progression, and favorable IKDC scores upon prospective follow up.

Poster No. P0930
Gender Parity in Academic Leadership Roles at American Orthopaedic Society for Sports Medicine Annual Meetings

James S. Potter, BS
Akash Ranpura, BS
Nicole D. Rynecki, MD
Kathleen S. Beebe, MD, FAAOS
Balazs Galdi, MD

This study investigates the female representation as academic leaders in orthopaedic surgery. We discovered an equitable and growing leadership opportunity within sports medicine for women.

Poster No. P0931
Medial Patellofemoral Ligament Length Change Patterns in Asymptomatic Knees of Patients with Contralateral Patellar Instability

Miho J. Tanaka, MD, FAAOS
Peter J. Georgakas, MD
F. Joseph J. Simeone, MD
Eric M. Berksom, MD, FAAOS
Kartik Varadarajan, MS, PhD

In asymptomatic knees of patients with contralateral instability, MPFL length varied by 20.1% between 0 and 50° flexion. Isometry of the MPFL in such knees may not reflect those in normal knees.

Poster No. P0932
Higher Risk of Contralateral Anterior Cruciate Ligament (ACL) Injury within 2 Years after ACL Reconstruction in Under 18 Years Old Patients with Steep Tibial Plateau Slope

Alberto Grassi, MD
Nicola Pizza, MD
Jacopo Zambon Bertoja, MD
Luca Macchiariola, MD
Gian Andrea Lucidi
Giacomo Dal Fabbro
Stefano Zaffagnini, MD

A steep medial TPS ≥12° is associated to a higher risk of contralateral ACL injury within 2-years after an ACL reconstruction in adolescent patients with less than 18 years of age.
**Poster No. P0933**
Implementation of an Injury Prevention Program in NCAA Division I Athletics Reduces Injury-Related Healthcare Costs

Robert L. Parisien, MD  
Marisa Pontillo, DPT, PhD  
Ali S. Farooqi, BA  
David Trofa, MD  
Brian J. Sennett, MD, FAAOS

Injury prevention programs with force plate technology can reduce the number of associated healthcare encounters and related healthcare costs across various men’s and women’s NCAA sports.

**Poster No. P0934**
The Effects of Surgical Timing on Preoperative and Postoperative Quadriceps Muscle Strength following an Anterior Cruciate Ligament Reconstruction

Scot Bauman, DPT  
Rachel Slaven, DPT, PT  
Rodney W. Benner, MD, FAAOS  
K. Donald Shelbourne, MD, FAAOS

For patients having an ACLR, those with chronic tears have better strength preoperatively and get back to preoperative strength more quickly after surgery compared to patients with acute tears.

**Poster No. P0935**
Sex-Related Outcomes following Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-Analysis

Anthony C. Mok, BS  
Drew J. Fancher  
Matthew Vopat, MD  
Armin Tarakemeh, BA  
Scott M. Mullen, MD, FAAOS  
John P. Schroeppe1, MD, FAAOS  
Kimberly J. Templeton, MD, FAAOS  
Mary K. Mulcahey, MD, FAAOS  
Bryan G. Vopat, MD, FAAOS

The purpose of this study is to conduct a systematic review and meta-analysis to evaluate and compare the outcomes of ACL reconstructions with regard to sex.

**Poster No. P0936**
Outcomes of Accelerated Physical Therapy in Patients with Transtendinous Rotator Cuff Repair

Trevor J. McBroom, BS  
Paul F. Abraham, BS  
Nathan Varady, BS  
Michael P. Kucharik, BS  
Evan O'Donnell, MD  
Scott D. Martin, MD, FAAOS

Following transtendinous rotator cuff repair, an accelerated physical therapy regimen provides superior active shoulder range of motion compared to traditional postoperative management.

**Poster No. P0937**
Failure Rates in Contact vs. Non-Contact Athletes following Arthroscopic Inferior Capsular Shift at 10-Year Follow Up

Kevin D. Plancher, MD, MPH, FAAOS  
Stephanie C. Petterson, MPT, PhD

Modified arthroscopic inferior capsular shift utilizing ≥3 suture anchors with plication sutures returns athletes to sport with excellent functional outcomes, low recurrence rates, and full ROM.

**Poster No. P0938**
Do Pitch Statistics Change in Major League Baseball Players following Placement on the Disabled List for Shoulder Injury?

Benjamin C. Mayo, MD  
Adam Miller, BS  
Garrett Schwarman, MD  
Erwin Secretov, MD  
Marshall Haden, MD  
Dmitriy Peresada, MD  
Mark R. Hutchinson, MD, FAAOS

MLB pitchers play less, lose fastball velocity, and perform worse following placement on the disabled list for shoulder injuries at both 1 and 2 years after return.

**Poster No. P0939**
Establishing the Minimal Clinically Important Difference, Substantial Clinical Benefit, and Patient Acceptable Symptomatic State for PROMIS Upper Extremity and Pain Interference following Biceps Tenodesis

Enrico Forlenza, BS  
Yining Lu, MD  
Matthew R. Cohn, MD  
James D. Baker, BA  
Ophelie Lavoie-Gagne  
Adam B. Yanke, MD, PhD, FAAOS  
Brian J. Cole MD, MBA, FAAOS  
Nikhil N. Verma, MD, FAAOS  
Brian Forsythe, MD, FAAOS

This is a retrospective analysis aiming to establish thresholds for improvement in patient-reported outcome scores and to assess patient variables that are associated with achieving these outcomes.

**Poster No. P0940**
Psychological Burnout and Age of Sport Specialization: A Profile for Current NCAA Big 12 Student-Athletes

Nick Giusti  
Seth L. Carder  
Jordan Baker  
Armin Tarakemeh, BA  
Bryan G. Vopat, MD, FAAOS  
Jeffrey C. Randall, MD, FAAOS

In total, 267 current NCAA student athletes were surveyed to compare levels of psychological burnout based on gender, year of NCAA eligibility, and age of beginning sport specialization.
Poster No. P0941

Venous Thromboembolism Prophylaxis after Ambulatory Arthroscopic Knee Surgery: A Systematic Review and Meta-Analysis of Incidence and Risk Factors

Todd W. Phillips, MD  
Brian P. Davis, MD  
Olivia Barron  
Brett L. Heldt, BS  
Andrew Bratsman, BS  
Rowland W. Pettit, BS  
Anup A. Shah, MD, FAAOS

Despite a low incidence of VTE after knee arthroscopy, thromboprophylaxis is effective in preventing VTE and risk factors exist in ambulatory sports medicine patients diagnosed with postoperative VTE.

Poster No. P0942

Longer Careers and Similar Performance following Operative Treatment of Shoulder Instability in National Football League Athletes

Lafi S. Khalil, MD  
Tahsin M. Rahman, MD  
Muhammad J. Abbas, BS  
Toufic R. Jildeh, MD  
Michael J. McIntosh, BS, MS  
Arben Sokoli, BS  
Nicholas D. Cominos  
Kelechi Okoroha, MD

Surgical stabilization following instability events in NFL athletes is associated with reduced recurrence; however, athletes who opt for nonsurgical management have similar performance after RTP.

Poster No. P0943

Concussions Increase Risk for Lower Extremity Injury in National Basketball Association Athletes

Yining Lu, MD  
Bhavik Patel, MD  
Ophelie Lavoie-Gagne  
Enrico Forlenza, BS  
Kelechi Okoroha, MD  
Brian Forsythe, MD, FAAOS

Retrospective cohort analysis aiming to determine the risk of lower extremity injury following return to play after single and multiple concussions in National Basketball Association athletes.

Poster No. P0944

Total Joint Arthroplasty and Golf Play: Analysis of a State-Wide Golf Handicap Database

Jacob Gorbaty, MD  
Allison J. Rao, MD  
Dax Varkey, MD  
Katherine M. Roberts, MS  
Bryan M. Saltzman, MD  
Nady Hamid, MD, FAAOS

In amateur golfers, return to play after joint arthroplasty remains high, patients will likely play more frequently, and handicap differential will typically increase an average of 1.3 points.

Poster No. P0945

Rotator Cuff Training with Upper Extremity Blood Flow Restriction Produces Favorable Adaptations in Division IA Collegiate Pitchers

Bradley Lambert, PhD  
Joshua R. Daum, BS  
Carter M. Taft  
Jordan P. Ankersen, BS  
Corbin Hedt, DPT  
Haley Goble, MHA  
Patrick C. McCulloch, MD, FAAOS

Standard rotator cuff training paired with blood flow restriction may produce favorable changes in shoulder muscle mass and endurance that may be beneficial for injury prevention and performance.

Poster No. P0946

What is the Probability that External Beam Irradiation is the Most Effective Modality to Prevent Heterotopic Ossification after Acetabular Surgery? A Bayesian Analysis

Qasim Ghulam, MS  
Nathan N. O’Hara, MHA  
Bennet Butler, MD  
Phillip McKegg, MS  
Zachary D. Hannan, BS  
Emilie Ludeman  
Gerard Slobogean, MD, MPH, FAAOS  
Mark Mishra, MD  
Robert V. O’Toole, MD, FAAOS

Heterotopic ossification (HO) can be a serious and debilitating consequence of operative fixation of acetabular fractures. This systematic review looks at the effectiveness of prophylactic therapies.

Poster No. P0947

The Isolated Fibula Fracture: Should Gravity Stress Radiographs be the Gold Standard for Determining Ankle Stability? Successful Outcomes with Nonsurgical, Immediate Weight-Bearing Despite Stress Positive Radiographs

Phillip Thomas, MD  
Leonid Grossman, MD  
Sara M. Putnam, MD  
Justin C. Siebler, MD, FAAOS  
Elizabeth Lyden, MS  
Matthew A. Mormino, MD, FAAOS

We describe a novel approach for determining ankle stability of isolated distal fibula fractures with nonsurgical management in a functional walking boot.

Poster No. P0948

Limiting Narcotic Utilization following Ankle Fracture Surgery

Theresa Pak, DO  
John Schlechter, DO, FAAOS

Multimodal pain medications are effective at controlling pain after ankle fracture surgery and patients use much less narcotic than what is commonly prescribed.

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Poster No. P0949
Increasing the Value of Postoperative Radiographs after Operative Fixation of Distal Radius Fractures Using Clinical Indications

Aseal Birir
Nathan H. Varady, BS
Antonia F. Chen, MD, MBA, FAAOS

Postoperative radiography after ORIF of distal radius fractures are of low clinical utility. Clinical indications appear to be a reliable indicator of when these radiographs are of high value.

Poster No. P0950
Geographic Variability of Medicare Reimbursement in Orthopaedic Trauma: 2000-2019

Jack Haglin, BS
David N. Kugelman, MD
Ariana Lott, MD
Sanjit R. Konda, MD, FAAOS
Kenneth A. Egol, MD, FAAOS

Medicare reimbursement is decreasing in orthopaedic trauma, with geographical disparities in reimbursement for common orthopaedic trauma procedures.

Poster No. P0951
Orthopaedic Admissions during the COVID-19 Pandemic in a United Kingdom District General Hospital: In-Hospital Transmission Rate and Neck of Femur Mortality

Natalie Holmes, MBCHB, MRCS
Siddharth R. Virani, MRCS, MS
Jai Relwani, MD, West Malling

COVID-19 positive mortality in our hospital was 27% compared to 4% in COVID-19 negative patients. Negative patients have a 12.5% risk of becoming positive and increases mortality relative risk to 6.4.

Poster No. P0952
Does a Delay to Surgery for Preoperative Echocardiogram in Patients with Known Aortic Stenosis Affect Outcomes in Hip Fracture Patients?

Bishoy Saad, DO
David Keller, DO
Deborah Li, MD, MPH
John J. Feldman, MD
Li Sun, DO
Frank A. Liporace, MD, FAAOS
Richard S. Yoon, MD, FAAOS

This study compares patients with hip fractures who were delayed for preoperative echocardiogram with patients who were taken to the operating room without echocardiogram.

Disclosure information available via My Academy app and on the AAOS website at www.aaos.org/disclosure
A Bioactive Synthetic Membrane Improves Bone Healing in a Preclinical Nonunion Model

Malcolm DeBaun, MD
Brett P. Salazar, BS
Yan Bai, PhD
Chi-Chun Pan
Alexander Stahl, BS
Sina Moeinzadeh
Sungwoo Kim
Carolyn Kim, BS, MS
Lawrence H. Goodnough, MD
Harsh Wadhwa, BS
Michael J. Gardner, MD, FAAOS
Yunzhi P. Yang, PhD
Stanford iTEAM

A bioactive collagen membrane improves compromised bone healing without autograft harvest or staged procedures.

Medicare Reimbursement in Orthopaedic Trauma: Decreasing Physician Payment, Despite Increasing Malpractice Coverage

Sara J. Solasz, BA
Jack Haglin, BS
Kenneth A. Egol, MD, FAAOS

This study analyzes changes to relative value unit types over time in orthopaedic trauma, particularly regarding malpractice coverage.

Extended Antibiotic Coverage in the Management of Type-2 Open Fractures

Thompson McMurtrie, MD
John C. Prather, MD
Tyler P. Montgomery, BS
Ryan Cone, MD
Gerald McGwin, MS, PhD
Clay A. Spitzer, MD, FAAOS

Piperacillin-Tazobactam increases cost of care without decreasing infection rates compared to gram positive coverage only in Gustilo Anderson type 2 open fractures.

Orthopaedic Trauma in a Rural Setting and the Need for Trauma Subspecialists

Tyler J. Dahl, MD
Jennifer King, MPH
Oluwatosin Olayia, MBCHB, MSc
David J. Polga, MD, FAAOS

The high proportion of transfers, high ISS scores, and polytrauma patients necessitate adequate resources in rural medical centers; traumatologists have a critical role.

Substantial Financial Loss and Limited Social Welfare after Orthopaedic Injury: A Retrospective Cohort Study of State Tax Data

Nathan N. O'Hara, MHA
Gerard Slobogean, MD, MPH, FAAOS
Niek Klazinga, MD
Dionne S. Kringos, MSc, PhD

In this study of 166,933 person-years of state tax records, an orthopaedic injury was associated with a $9,865 loss in annual income during the five years post-injury.

The Impact of E-Scooter Use on Orthopaedic Trauma in Denver, Colorado

Nicole E. Look, MD
Mia M. McNulty, MD
Alexander S. Lauder, MD

Electronic application-based scooters have been introduced to major United States cities in the past several years resulting in an increase in orthopaedic trauma and significant health burden.

Are Orthopaedic Trauma Surgeons Adequately Compensated for Longer Procedures? An Analysis of Relative Value Units

Trevor Simcox, MD
Jacob Becker, MD
Jason B. Kreinces, BS
Mark Grossman, MD, FAAOS
Jason Gould, MD, FAAOS

The 2020 physician wRVU scale does not allocate sufficient wRVUs to orthopaedic trauma procedures with longer mean operative time.

COVID-19: The First 30 Days at a United Kingdom Level 1 Trauma Center: Lessons Learned

Paul A. Andrezejowski, BS, MBBS
Anthony Howard, PhD
James Vun, MBCHB, MRCS-ED
Nauman Manzoor, MBBS
Nick Patsiogiannis, MD, MSc
Nikolaos K. Kanakaris, MD, PhD
Peter Giannoudis, MD, FACS

We share lessons learned from a major trauma center during the COVID crisis, and what to expect in the second wave.
**Poster No. P0964**

**Knowledge of Radiation Exposure in Orthopaedic Surgeons, Emergency Medicine Physicians, and General Surgeons in the United States**

*Fady Y. Hijji, MD*
*Matthew D. Thomas, BS*
*Andrew D. Schneider, BA, MD*
*Daniel D. Bohl, MD, MPH*
*Michael J. Rayson, MD, FAASOS*

A survey study assessing orthopaedic surgeon, general surgeon, and emergency physician knowledge regarding radiation exposure from imaging modalities commonly employed in trauma care.

---

**Poster No. P0965**

**COVID-19 in the Global Epicenter: Musculoskeletal Care Volume at a New York City Level 1 Trauma Center during a Period of Social Distancing**

*Jonathan D. Haskel, MD*
*Charles C. Lin, MD*
*Daniel J. Kaplan, MD*
*John F. Dankert, MD, PhD*
*David B. Merkow, MD*
*Alexander Crespo, MD*
*Omar A. Behery, MD*
*Abhishek Ganta, MD*
*Sanjit R. Konda, MD, FAASOS*

During a period of social distancing, overall volume of orthopaedic consults and surgeries declined, however hip, tibial shaft, and femoral shaft fracture volume remained unchanged.

---

**Poster No. P0966**

**Who Did the Arthroplasty? Hip Fracture Surgery Reoperation Rates are Not Affected by Type of Training: An Analysis of the Xx Database**

*Ryan DeAngelis, MD*
*Gregory Minutillo, MD*
*Matthew Stein, MD*
*Emil H. Schemitsch, MD, FAASOS*
*Sheila Sprague, PhD*
*Mohit Bhandari, MD, FRCSC*
*Derek J. Donegan, MD, MBA, FAASOS*
*Samir Mehta, MD, FAASOS*
*HEALTH Investigators*

Arthroplasty for hip fracture can be performed by all orthopaedic surgeons with equivalent reoperation rates.

---

**Poster No. P0967**

**Short-Term Outcomes of Native Compared to Periprosthetic Distal Femur Fractures: A National Database Study**

*Alexander Upfill-Brown, MD, MSc*
*Armin Arshi, MD*
*Troy Sekimura, BS*
*Christopher Lee, MD*
*Alexandra Stavrakis, MD*
*Adam A. Sassoon, MD, FAASOS*

Comparing native and periprosthetic distal femur fractures, there were no differences in mortality or major complications; however wound complications were increased in periprosthetic fractures.

---

**Poster No. P0968**

**Large Individual Bilateral Differences in Tibial Torsion Impacts Accurate Contralateral Templating**

*Douglass Tucker, BS*
*Matthew Gaillo, BA*
*William Pannell, MD*
*Nathanael D. Heckmann, MD*
*Geoffrey Marecek, MD, FAASOS*

Individual bilateral differences in tibial torsion are common, though most are >15°. However this must be considered when using the uninjured extremity as a template following tibial shaft fracture.

---

**Poster No. P0969**

**Cost-Effectiveness of Fixation vs. Arthroplasty for Geriatric Distal Femur Fracture**

*Dane J. Brodke, MD*
*Alexander Upfill-Brown, MD, MSc*
*Sai Devana, MD*
*Christopher Lee, MD*

Compared to distal femur replacement, ORIF is a more cost-effective treatment for distal femur fractures in the geriatric patient population.

---

**Poster No. P0970**

**Operative Fixation of Hip Fractures in Nonagenarians: Is it Safe?**

*Patawut Bovonratwet, MD*
*Brian Yang, MD*
*Zi Qi Wang, BS*
*William M. Ricci, MD, FAASOS*
*Joseph M. Lane, MD, FAASOS*

Overall complication risk after hip fracture fixation in ≥90 year olds remains relatively low but higher than their younger counterparts. Comprehensive preoperative optimization appears prudent.

---

**Poster No. P0971**

**How are We Defining Success in Hip Fractures? A Systematic Review**

*Eric F. Swart, MD, FAASOS*
*Nicholas Schraut, MD*
*Jugert Bango, BS*
*Victoria L. Rossetti*
*David C. Ayers, MD, FAASOS*

Despite the apparent advances that have been made in our ability to care for hip fractures, the overall rate of reporting outcomes beyond mortality rates remains low.

---

**Poster No. P0972**

**Subcuticular Barbed Suture Closure Decreases Reoperation and Length of Stay in Geriatric Hip Fractures when Compared to Staples**

*Emily Zhao, MD*
*Gele Moloney, MD*
*Ivan S. Tarkin, MD, FAASOS*

Barbed suture closure is associated with significantly shorter hospital stays and fewer interventions for wound drainage compared to staples following surgical treatment of geriatric hip fractures.
Poster No. P0973
Acute Retrograde Hindfoot Nailing Leads to Fewer Infections and Unplanned Subsequent Surgeries than Open Reduction Internal Fixation in the Management of Geriatric Open Ankle Fractures
Mitchell Fourman, MD
Joshua N. Adjei, MD
Gele Moloney, MD
Peter A. Siska, MD, FAAOS
Ivan S. Tarkin, MD, FAAOS
In a retrospective analysis of conventional fixation (ORIF) and acute retrograde hindfoot nailing (HFN) of geriatric open ankle fractures, HFN had fewer infections and unplanned surgeries than ORIF.

Poster No. P0974
Comparison of Trochanteric vs. Piriformis Reconstruction Nails for Femoral Neck Prophylaxis: A Biomechanical Analysis
Alvin Shieh, MD
Daniel A. Bravin, MD
Trevor J. Shelton, MD
Tanya C. Garcia, MS
Mark A. Lee, MD, FAAOS
Jonathan G. Eastman, MD, FAAOS
Instrumentation with a greater trochanter reconstruction nail demonstrates similar strength to the intact femur and is significantly stronger compared to a piriformis fossa reconstruction nail.

Poster No. P0975
The Effect of Hospital and Surgeon Volume on Complication Rates following Fixation of Peritrochanteric Hip Fractures
Edward Testa, MD
Peter G. Brodeur, MA
Lindsey G. Kahan, BS
Jacob Modest, MD
Aristides I. Cruz, MD, FAAOS
Joseph A. Gil, MD
Intertrochanteric hip fracture fixation has higher rates of mortality, readmission, and certain complications if performed at low-volume hospitals when compared to high-volume hospitals.

Poster No. P0976
Single Day Surgical Delay of Hip Fractures is Associated with Increased Morbidity and Mortality
Nipun Sodhi, MD
Jared A. Warren, ATC, DO
Christine D. Bub, MD
Hiba K. Anis, MD
Ariel Goldman, MD, FAAOS
Even a single day surgical delay was associated with an increase in 30-day mortality, longer hospital lengths-of-stay, and complications, as well as a decreased likelihood of home discharge.

Poster No. P0977
Loss of Skeletal Muscle Mass can be Predicted by Sarcopenia and Reflects Poor Functional Recovery at One Year after Surgery for Geriatric Hip Fractures
Shen-Wu Hung, MD
Yu-Pin Chen, MD
Yi-Jie Kuo, MD
Muscle mass and strength normally decrease with age and immobilization. For most geriatric patients, functional loss is inevitable after hip fracture.

Poster No. P0978
The Relationship between the Operating Surgeon Seniority, Fracture Severity, and Intraoperative Radiation Dose in the Surgical Management of Hip Fractures
Angus Bruce, MBCHB
Ramez Golmohamad, BSCE, MBBS
Saumil Shah, MBBS, MRCS
Awais Habeebullah, MBCHB
Ash Gulati, DPHIL (OXON), FRCS (Ortho)
We present our study of the relationship between surgeon experience and the quantity of intraoperative radiation dosage used in the fixation of hip fractures.

Poster No. P0979
The Natural Course of Subchondral Fatigue Fracture of the Femoral Head
Sun Hyung Lee, MB
Kangbaek Kim, MD
Jeong J. Yoo, MD
The success of conservative treatment of subchondral fatigue fracture of the femoral head can be predicted through the degree of collapse and the time of beginning conservative treatment.

Poster No. P0980
Monitored Anesthesia Care and Soft-Tissue Infiltration with Local Anesthesia: An Anesthetic Option for High Risk Patients with Hip Fractures
Sanjit R. Konda, MD, FAAOS
Rachel Ranson, MS
Nicket Dedhia, BA
Yixuan Tong, BA
Sara J. Solasz, BA
Abhishek Ganta, MD
Kenneth A. Egol, MD, FAAOS
Feasibility study demonstrates safety for monitored anesthesia care and soft-tissue infiltration with local anesthesia for hip fracture fixation with comparison to spinal and general anesthesia.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0981
Change in Radiographic Hip Offset following Sliding Hip Screw vs. Cephalomedullary Nail Fixation in Intertrochanteric and Basicervical Hip Fractures

Tom G. Pollard, MD
Torrey A. Parry, MD
Pradip Ramamurti, BS
Safa C. Fassihi, MD
William V. Probasco, MD
James N. DeBrito, MD, FAAOS

This study supports using DHS only in simple pertrochanteric fracture patterns. CMN should be used in more complex patterns to avoid femoral neck collapse and subsequent loss of hip offset.

Poster No. P0982
Proximal Tibia Fracture Dislocations: Management and Outcomes of a Severe and Under-Recognized Injury

Lukas Keil, MD
Brian Mullis, MD, FAAOS
Paul Tornetta III, MD, FAAOS
Maxwell C. Alley, MD
Nathan P. Olszewski, MD
Jonathan Wheeler
Ericka Von Kaeppler, BS
Saam Morshed, MD, FAAOS
Robert Matar, MD, MS
Michael T. Archdeacon, MD, FAAOS
Tyler W. Smith, MD
Anna N. Miller, MD, FAAOS
Daniel S. Horwitz, MD, FAAOS
Mirza Shahid Baig, MD
Zachary Telgheder, MD
Emil Azer, MD, FAAOS
Givenchy W. Manzano, MD
Heather A. Vallier, MD, FAAOS
Scott A. Barnett, MD
Peter C. Krause, MD, FAAOS
Troy Bornes, MD, PhD
William M. Ricci, MD, FAAOS
Patrick J. Dunne
Seth R. Yarboro, MD, FAAOS
Alexander J. Ment, BA
Andrew J. Marcantonio, DO, FAAOS
Rashed S. Alqudhaya, MD
Ross K. Leighton, MD
Robert F. Ostrum, MD, FAAOS
PTFD Study Group

PTFDs represent --4% of proximal tibia fractures. They are unclassifiable by Schatzker and OTA, are often unicortylar, and may go unrecognized. Their outcomes may be worse than bicondylar fractures.

Poster No. P0983
Do Psychosocial Variables Predict Chronic Pain and Pain-Related Disability 12-Months after Lower Extremity Fracture?

Josh Van Wyngaarden, DPT, PT
Kristin Archer, PhD
Cale Jacobs, PhD
Paul J. Matuszewski, MD, FAAOS
Brian Noehren, PT, PhD

The 10-item Pain Self-Efficacy Questionnaire administered 6-weeks after surgery can identify patients at-risk for poor pain and functional outcomes 12-months after lower extremity fracture.

Poster No. P0984
Extreme Diabetic Neglect is No Worse than Poor Diabetic Control in Lower Extremity Fracture Patients

Michelle Lawson, MD
Frank Rodgers, MD
Alicia J. Johnson, MPH
Austin R. Thompson, BS
Darin M. Friess, MD, FAAOS
Zachary M. Working, MD

Extreme diabetic neglect does not predict higher complication rates after lower extremity fracture fixation, and therefore should not solely determine operative fixation plan.

Poster No. P0985
Factors Associated with Perioperative Opioid Demand in Lower Extremity Fractures: Does Actual Intake Vary by Anatomic Location?

Daniel J. Cunningham, MD
Micaela A. Larose, BA
Richard S. Yoon, MD, FAAOS
Mark Gage, MD

This study evaluated the impact of fracture location on perioperative opioid demand and noted that pilon, plateau, and distal femur fractures were associated with large increases in opioid demand.

Poster No. P0986
Can We Predict the Need for Reoperation following Nonunion Repair?

Emma Landes, BA
Sanjit R. Konda, MD, FAAOS
Philipp Leucht, MD, FAAOS
Kenneth A. Egol, MD, FAAOS

The nature of the initial injury is a predictor of the need for an unplanned reoperation following fracture nonunion surgery as opposed to demographics or medical comorbidities.
Poster No. P0987
One Year Should be Final Follow Up after Surgical Treatment for Fracture Nonunion
Sanjit R. Konda, MD, FAAOS
Emma Landes, BA
Adwin Denasty, BA
Philipp Leucht, MD, FAAOS
Kenneth A. Egol, MD, FAAOS
Patient functional outcomes, pain scores, and range of motion all normalize after one year following surgical treatment for fracture nonunion and do not decay over five years.

Poster No. P0988
◆ Treatment of Infected Nonunion of the Lower Extremity with an Antibiotic Cement-Coated Intramedullary Rod: Case Series of 38 Patients
Joseph Galloway, MD
Justin Luis, BA
Joseph M. Ulitto, BS
Ashok Para
Andrew A. Dobitsch, BA
Adam N. Fano, BS
Mark R. Adams, MD, FAAOS
Mark C. Reilly, MD, FAAOS
Michael S. Sirkin, MD, FAAOS
Antibiotic cement-coated intramedullary (ACCIM) nail is an effective dual-purpose treatment modality to clear infection while providing stability during the management of infected nonunion.

Poster No. P0989
Functional Outcomes after High Energy Lisfranc Injuries
Alexander J. Benedick, MD
Michael Kavanagh, MD
Nicholas Alfonso, MD
Heather A. Vallier, MD, FAAOS
Patients report more pain compared to other foot and ankle injuries; and tobacco use, female sex, and renal disease are predictive of worse outcomes following Lisfranc injury.

Poster No. P0990
◆ Comparing the Efficacy of Synthetic Bone Void Fillers for Antimicrobial Potency and the Prevention and Killing Efficacy of Bacterial Biofilms: An In-Vitro Study
Paul Stoodley, PhD
Nan Jiang, MD
Devendra Dusane, PhD
Jack R. Brooks
Phillip A. Laycock
Sean Aiken
Craig P. Delury, PhD
Both antibiotic-loaded BVFs possess similar levels and durations of in-vitro antimicrobial activity against pathogens common to orthopaedic infection in both planktonic and biofilm phenotypes.

Poster No. P0991
A New Algorithm for Classifying Acetabular Fracture Patterns on Three-Dimensional Computed Tomography Reconstructions Significantly Improves Residents' Ability to Correctly Classify Fractures
Mohamad Shaath, MD
Frank Avilucea, MD, FAAOS
Philip Lim, MD, BS
Milton L. Routt, MD, FAAOS
We have developed a new, effective algorithm to assist with classifying acetabular fractures using 3D reconstructions.

Poster No. P0992
◆ Patient Radiation Exposure with Intraoperative Multidimensional Fluoroscopy is Significantly Less when Compared to Pelvic Computed Tomography in Pelvic and Acetabular Surgery
Mohamad Shaath, MD
Krishna C. Vemulapalli, MD, BS
Stephen J. Warner, MD, PhD, FAAOS
Joshua L. Gary, MD, FAAOS
Janet Ching-Mei Feng, PhD
Milton L. Routt, MD, FAAOS
Multidimensional fluoroscopy exposes patients to significantly less radiation than conventional pelvic CT. As this technology continues to evolve, it shows promise to duplicate the function of CT.

Poster No. P0993
Management of Morel-Lavallée Lesion Associated with Pelvic-Acetabular Fractures
Vivek Trikha, MD
Buddhadev Chowdhury
Protocol based management of Morel-Lavallée lesions assists in achieving better functional outcomes in a difficult subset of soft tissue intricacies added to already complex skeletal injuries.

Poster No. P0994
Distal Femur Replacement vs. Surgical Fixation for Treatment of Periprosthetic Distal Femur Fractures: Systematic Review and Meta-Analysis
Harsh Wadhwa, BS
Brett P. Salazar, BS
Lawrence H. Goodnough, MD
Noelle L. Van Rysseberghe, MD
Michael J. Gardner, MD, FAAOS
Julius A. Bishop, MD, FAAOS
In a systematic review and meta-analysis, open reduction and internal fixation and distal femoral replacement are both viable strategies for management of periprosthetic distal femur fractures.

* The FDA has not cleared the drug and/or medical device for the use described in this presentation (i.e. the drug or medical device is being discussed for an off label use). For full information refer to page 17.
Poster No. P0995
Reconstruction of B2 Periprosthetic Femoral Fractures: Indications, Method of Fixation, Functional and Clinical Outcome Over a Minimum Follow Up of 2 Years

Peter Giannoudis, MD, FACS
Nikolaos K. Kanakaris, MD, PhD
Joseph B. Aderinto, MB
George S. Whitwell, FRCS (Ortho), MBCHB

Good clinical, radiological, and functional outcome was recorded in a cohort of 27 frail patients with B2 periprosthetic fractures treated with internal fixation rather than revision arthroplasty.

Poster No. P0996
Utilization of Patient Comments on Patient-Reported Outcome Surveys to Improve Orthopaedic Trauma Care

Tim A. Carlson, BA
Sandy Vang, BA
Andrew C. Sibley, BA, BS
Rachel A. Huspeni, BS
Lisa K. Schroder, BSME, MBA
Peter A. Cole, MD, FAAOS
Mai P. Nguyen, MD, FAAOS

Employment of patient-comment analysis may provide useful data to better understand patient perspective and tailor future care in orthopaedic trauma.

Poster No. P0997
Engineering Standards for Trauma and Orthopaedic Implants Worldwide: A Systematic Review

Usama Rahman, MBCHB, MRCS
Frederick Henshaw, MBBS, MSc
Richard King, FRCS (Ortho), MBCHB
June K. Madete, PhD
Vincent Mutiso, MD
Andrew J. Metcalfe, FRCS (Ortho), PhD

This is a systematic review of worldwide orthopaedic implant manufacturing guidelines.

Poster No. P0998
Is Callus Desirable in Pilon Fractures? A Retrospective Case Series Comparing Metaphyseal Callus Formation and Distal Tibial Alignment over Time

Noelle L. Van Rysselbergh, MD
Sean T. Campbell, MD
Lawrence H. Goodnough, MD
Brett P. Salazar, BS
Julius A. Bishop, MD, FAAOS
Justin Lucas, MD, MS
Michael J. Gardner, MD, FAAOS

Higher metaphyseal callus formation predicted loss of coronal alignment in a retrospective case series of AO 43C3 pilon fractures, suggesting stiffer constructs may be preferable in these injuries.

Poster No. P0999
Elevated Body Mass Index is Associated with Tibial Plateau Fracture Complexity and Postoperative Complications

Katherine McGurk, MD
Sophia Traven, MD
Christopher T. Hoellwarth, MD
Kristoff R. Reid, MD, FAAOS
Langdon A. Hartsock, MD, FAAOS
Harris Slone, MD, FAAOS

Elevated BMI is associated with increased tibial plateau fracture complexity and postoperative complications.

Poster No. P1000
Osseointegrated Reconstruction following Upper Limb Amputations

Muhammed A. Akhtar, BSc, MBBS
Shakib Al-Jawazneh
Karan J. Doshi, MBBS
Russel Haque, MD
Jason S. Hoellwarth, MD
Germane J. Ong, MD
William Y. Lu, PhD, BS
Yao Chang Tan, BS
Claudia E. Roberts, PT
Kevin Tetsworth, MD

The Osseointegration Group of Australia

We studied 26 osseointegrated reconstructions performed following upper limb amputations. The main reason was trauma in 16 patients followed by blast injury in 4 patients. There was no mortality.

Poster No. P1011
Extramedullary Implantable Limb Lengthening (EMILL) for Congenital Limb Length Discrepancy (LLD) is Safe and Effective

Claire Shannon, MD
Dror Paley, MD, FAAOS
Craig A. Robbins, MD, FAAOS

Retrospective review of all EMILL cases for congenital LLD during the past 5 years. Seventeen patients (10 male, 7 female) underwent insertion of 18 nails. Diagnoses consisted of Congenital Femoral Deficiency (CFD) (8), Tibial Hemimelia (TH) (2), Fibular Hemimelia (FH) (2), Combined CFD and FH (3), Hypophosphatemic Rickets (1), and Myelomeningocele (1). Median age: 6.5 years (3.5-20 years). Femoral lengthening: 12 nails in 12 patients and tibial lengthening: 6 nails in 5 patients. One femur and 2 tibias did not have a SLIM rod inserted. Four patients had concurrent hemiepiphysodesis plates for preexisting coronal plane deformity.
Extrademedullary Implantable Limb Lengthening (EMILL) for Congenital Limb Length Discrepancy (LLD) is Safe and Effective

Claire Shannon, MD
Dror Paley, MD, FAAOS
Craig A. Robbins, MD, FAAOS

EMILL is a safe alternative to external fixation lengthening and extends indications for implantable lengthening to younger children (3 years), bones with growth plates that would be violated by intra

What are the Causes and Consequences of Delayed Surgery for Pediatric Tibial Spine Fractures?

Neeraj M. Patel, MD, MPH
Tomasina M. Leska, BS
Theodore J. Ganley, MD, FAAOS
Julien Aoyama, BA
Aristides I. Cruz Jr., MD, FAAOS
R. Justin Mistovich, MD, MBA, FAAOS
Henry B. Ellis Jr., MD, FAAOS
Peter D. Fabricant, MD, MPH, FAAOS
Daniel W. Green, MD, FAAOS
Jason Jagodzinski, MD, FAAOS
Benjamin Johnson, ATC, PA
Indranil Kusheare, MD
Rushyuan J. Lee, MD, FAAOS
Scott D. McKay, MD, FAAOS
Jason T. Rhodes, MD, FAAOS
Brant C. Sachelben, MD, FAAOS
M. Catherine Sargent, MD, FAAOS
Gregory A. Schmale, MD, FAAOS
Yi-Meng Yen, MD, PhD, FAAOS
Tibial Spine Research Interest Group

Delayed surgery for TSFs results in more concomitant meniscal injuries, longer case length, and possibly arthrofibrosis. Those who experienced delays in diagnosis or MRI, saw multiple clinicians, and had public insurance were more likely to have a delay to surgery.
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Complimentary beverages will be provided in the exhibit hall each afternoon during the 30-minute break between scientific sessions at 3:30 PM on Wednesday and Thursday and at 10:00 AM on Friday.

**Food Service**
Enjoy complimentary food and beverage items supplied by many of the exhibitors in their booth. Food service areas located throughout the Exhibit Hall will offer a variety of food and beverage options for purchase.

**Navigating the Exhibit Hall**
- Use the My Academy app to plan your Exhibit Hall experience
- Printed Floor Plans with complete exhibitor listing are available at registration and information kiosks.
- Booth numbers are located on the floor in the aisle and aisle numbers are on signs hanging overhead.

Continuing Medical Education: AAOS is the sole provider of Continuing Medical Education (CME) credits at the annual meeting between the hours of 7:30 AM to 6:00 PM on Tuesday and 7:30 AM to 5:00 PM on Wednesday through Saturday. CME credit is not provided for presentations in the exhibit hall or time spent viewing the industry exhibits.

© 2021 American Academy of Orthopaedic Surgeons
Attend daily presentations on innovative products and services

Innovation Theater - Booth 4353, Hall F

These twenty-minute presentations provide an opportunity for attendees to learn about the innovative products and services offered by AAOS 2021 exhibitors. These sessions are not eligible for continuing medical education (CME) credit.

Wednesday, September 1

9:30 – 9:50 AM
Use of ViviGen® Cellular Bone Allograft in Trauma: Do We Even Need Iliac Crest Anymore?
Presented by LifeNet Health
Presenter: Richard S. Yoon, MD, FAAOS

ViviGen is the first and only cellular allograft focused on protecting and maintaining lineage-committed bone cells and offers a viable alternative to autograft. Dr. Richard Yoon, Orthopaedic Trauma and Adult Reconstruction Surgeon from Jersey City Medical Center shares his results using ViviGen in challenging cases.

10:00 – 10:20 AM
REGENTEN Bioinductive Implant – Emerging Evidence in the Management of Rotator Cuff Disease
Presented by Smith+Nephew, Inc.
Presenter: Brandon D. Bushnell, MD, MBA, FAAOS

Discussion of recent publications on REGENTEN in the management of rotator cuff disease, including 2-year outcomes with the Isolated Bioinductive Repair technique and evidence from a 1-year clinical outcomes registry for partial-thickness tears. We will also review 1-year re-tear rates in largest case series published to-date for large full-thickness tears.

10:30 – 10:50 AM
Simple or Complex: Can an Anatomic Total Shoulder System Be Your Primary TSA?
Presented by Anika Therapeutics
Presenter: Anthony Miniacci, MD, FRCSC

This session will discuss treating Glenohumeral Osteoarthritis using the anatomic OVOMotion with Inlay Glenoid Arthroplasty System as a primary TSA. Simple or complex (A, B or C), the data shows excellent pain relief, patient satisfaction and functional improvements. Faculty will provide clinical insights, data, surgical technique and patient outcome data.

11:00 – 11:20 AM
LUMiC® Pedestal Pelvic Cup for Complex Pelvic Reconstruction
Presented by Implantcast North America
Presenter: Lee Jays, FRCS

The compromised acetabulum is a challenging issue for tumor and revision surgeons. The LUMiC pedestal cup poses an excellent alternative to cage, custom, or biological attempts at reconstruction, as well as saddle prosthesis, girdle stone, and disarticulation in more severe cases. With an intact ilium, the LUMiC allows for a stable reconstruction and functional use of the hip joint.

11:30 – 11:50 AM
Role of Cell Therapy in Meniscal Repair and Rotator Cuff Tears
Presented by Terumo Blood and Cell Technologies
Presenter: Scott A. Rodeo, MD, FAAOS

Rotator cuff tendon healing in the shoulder and meniscus healing in the knee are examples of orthopedic tissues that frequently require surgery and have distinct rates of failed or incomplete healing. I will discuss the underlying rationale for the use of bone marrow-derived cells to augment rotator cuff tendon healing and meniscus healing, practical surgical techniques for application of cells to these tissues, the current data on the use of this technique, and the limitations and outstanding questions for further study.

12:00 – 12:20 PM
Whiteside’s Line 2.0
Presented by Enhatch
Presenter: Leo A. Whiteside, MD, FAAOS

Enhatch data scientists and biomedical engineers have developed algorithms that have captured Dr. Leo Whiteside's alignment principles and applied them to surgical software, guiding the
precision application of his alignment technique intraoperatively with minimal instrumentation. This technology enables surgeons to transfer a precise preoperative plan into surgery with confidence.

1:30 – 1:50 PM
Two Year Outcomes for Treating Focal Cartilage Defects Using CartiMax® Viable Cartilage Allograft
Presented by MTF Biologics/CONMED
Presenter: Deryk G. Jones, MD, FAAOS

2:00 – 2:20 PM
Addressing Insufficiency Fractures in Active Patients
Presented by Anika Therapeutics
Presenter: Misty Suri, MD, FAAOS
This session will discuss diagnosis, treatment options and comprehensive case reviews for painful insufficiency fractures in an active patient population. Learn more about treatment in ASC settings and post procedure follow-up care.

2:30 – 2:50 PM
Dynamic Digital Radiography: The Future of Diagnosis in Upper Extremity Pathologies
Presented by Konica Minolta Healthcare Americas, Inc
Presenter: Eric R. Wagner, MD
Dynamic digital radiography is a novel low-dose x-ray imaging technique that enables visualization of joints in motion. We report initial experience using it to analyze scapulohumeral rhythm in shoulder pathologic and postoperative states, including adhesive capsulitis, small and massive rotator cuff tears, arthritis and anatomic and reverse total shoulder arthroplasty.

3:00 – 3:20 PM
OR3O Dual Mobility: A Modular Dual Mobility Option That Uses Advanced Bearing Materials
Presented by Smith+Nephew, Inc.
Presenter: Stephen T. Duncan, MD, FAAOS
Learn about the early clinical performance of the OR3O Dual Mobility System, which is the first modular dual mobility in the United States to use an advanced bearing, OXINIUM DH Technology. Hear about how the device was designed to minimize corrosion, intraprosthetic disassociation (IPD), and wear.

3:30 – 3:50 PM
Orthopedic Transparency: How Much Do Your Implants Cost and Why It Matters
Presented by OptioSurgical
OptioSurgical is a software platform designed to create pricing transparency and foster supply chain intelligence in the Orthopedic surgical market. We engage healthcare professionals involved in the purchasing of implants, disposables, biologics and other physician preference items with the goal of optimizing purchasing power via collaboration.

9:30 – 9:50 AM
Your Work Isn’t Over: Addressing the Incision
Presented by Smith+Nephew, Inc.
Presenter: Ravi K. Bashyal, MD, FAAOS
As the number of total joints procedures increases and postoperative care moves to the outpatient setting, it is vital that protocols are implemented to protect the surgeon’s work. Join this session to watch a live OR application and learn how the unique mode of action and ease of application of PICO sNPWT can impact your outcomes.

10:00 – 10:20 AM
Smart SPACE Platform: How Digital Can Support My Daily Practice
Presented by LimaCorporate S.p.A
Presenter: Anil K. Dutta, MD, FAAOS
The aim of the presentation is to provide more information about Smart SPACE ecosystem, underlining the benefits for surgeons throughout the entire episode of care of patients’ joint replacement. The presenter will share his clinical experience using Smart SPACE and the advantages of digital support in his daily practice.

10:30 – 10:50 AM
Reducing Risk of SSC: New Multi-Center RCT Data Demonstrates Decreased 90-Day Complication and Readmission Rates with ciNPT vs. SOC
Presented by 3M HealthCare
Surgical complications are reported in up to 10% of hip and knee arthroplasties. The incidence of postoperative surgical complications can be influenced by patient co-morbidities, surgery type, complexity, duration, and other interoperative risk factors. Join our esteemed panel to review and discuss new multi-center randomized control trial (RCT) data demonstrating significantly improved outcomes with ciNPT vs. silver-impregnated dressings.
Thursday, September 2 (continued)

11:30 – 11:50 AM
The Pristine Surgical Single-Use Arthroscopic Visualization System - A Novel, Cost Effective Approach To Arthroscopy
Presented by Pristine Surgical
Presenters: Bryan Lord; Stephen J. Snyder, MD, FAAOS

At Pristine Surgical, we create state of the art, digital arthroscopic visualization solutions. Our single-use platform gives the performance of a new scope for every procedure — eliminating the need for cleaning, re-sterilization or maintenance while providing a consistently clear, high-definition image, day in and day out. It's a hassle-free, reliable solution that saves valuable time and money.

12:00 – 12:30 PM
Retrospective Review of 135 High-Risk Foot and Ankle Arthrodesis and ORIF Procedures with ViviGen® Cellular Bone Allograft
Presented by LifeNet Health
Presenter: Joseph S. Park, MD, FAAOS

ViviGen is the first and only cellular allograft focused on protecting and maintaining lineage-committed bone cells and offers a viable alternative to autograft. Dr. Joseph Park, Orthopaedic Foot and Ankle Surgeon from University of Virginia shares published results using ViviGen in 135 high-risk foot and ankle arthrodesis and ORIF procedures.

1:30 – 1:50 PM
Protocols to Transition Total Joints in an ASC
Presented by Medtronic
Presenter: Charles A. DeCook, MD, FAAOS

2:00 – 2:20 PM
Improving Patient Adherence and Surgical Outcomes with Virtual PT
Presented by Smith+Nephew, Inc.
Presenter: Patrick Wilkens

ARIA Home PT aims to expand access to post-operative rehabilitative care and optimize outcomes through improved patient engagement and adherence to protocol. ARIA Home PT utilizes an on-screen avatar “coach” and remote monitoring to guide patients through post-acute physical therapy at home.

2:30 – 2:50 PM
The Surgicalist Model: The Secret to Gaining Work-Life Balance
Presented by Synergy Health Partners
Presenters: John D. Campbell, MD, MBA, FAAOS; Rand L. Schleusener, MD, FAAOS

Learn from two veteran surgeons who are on a mission to improve working conditions for clinicians, solve hospital staffing disparities, and restore patient focus. The surgicalist model is a hospital-based career path that separates private practice work from acute hospital-based care. And the best part? Surgeons get real work-life balance.

3:00 – 3:20 PM
Understanding the Impact of Air Quality in Open Surgical Procedures
Presented by Aerobiotix
Presenter: David Kirschman, MD

3:30 – 3:50 PM
Taking Orthopedic Devices Further with DSM Biomedical’s Polyurethane Portfolio
Presented by DSM Biomedical

Friday, September 3

9:30 – 9:50 AM
Clinical Outcomes and Experience of a Multiyear Consecutive Case Series of Total Knee Arthroplasty Procedures Conducted with a Bipolar Sealer System for Hemostasis
Presented by Medtronic
Presenter: Alexander P. Sah, MD, FAAOS

10:00 – 10:20 AM
Reach More, Repair More with the FAST-FIX FLEX Meniscal Repair System: A Case-Based Approach to All-Zone, All-Inside Meniscal Repair
Presented by Smith+Nephew, Inc.
Presenter: Sabrina Strickland, MD, FAAOS

Smith+Nephew has extended the reach of all-inside meniscal repairs with the all-new FAST-FIX FLEX system. FAST-FIX FLEX enables all-zone, all inside meniscal repair to treat tears previously not accessible. Join us as we present patient cases highlighting the clinical application in repairing various meniscal tear types.

10:30 – 10:50 AM
Orthopedic Transparency: How Much Do Your Implants Cost and Why It Matters
Presented by OptioSurgical

OptioSurgical is a software platform designed to create pricing transparency and foster supply chain intelligence in the Orthopedic surgical market. We engage healthcare professionals involved in the purchasing of implants, disposables, biologics and other physician preference items with the goal of optimizing purchasing power via collaboration.

11:00 – 11:20 AM
The First Sublingual Formulation of Sufentanil
Presented by AcelRx Pharmaceuticals
Presenter: Nirav H. Amin, MD, FAAOS

11:30 - 11:50 AM
OrthoKEY Clinical Diagnosis of PJI in Synovial Fluid
Presented by MicroGen DX
Presenter: Edward J. McPherson, MD, FAAOS
Have a challenging case? Seeking Advice? Ask an Expert!

Present your case challenges and receive expert diagnosis and recommendations. Bring your HIPAA compliant case on a flash drive or mobile device 10 minutes prior to the session start time.

Ask an Expert Schedule – Hall H

Wednesday, September, 1
9:30 – 10:15 AM
Periprosthetic Joint Infection
Antonia Chen, MD, MBA, FAAOS
John Sperling, MD, MBA, FAAOS

10:30 - 11:15 AM
Sports Medicine
Christopher Harner, MD, FAAOS
Marc Safran, MD, FAAOS

2:00 - 2:45 PM
Hip & Knee
David Lewallen, MD, FAAOS
Jose Rodriguez, MD, AAOS

3:00 - 3:45 PM
Hip
Alejandro Gonzalez Della Valle, MD, FAAOS
Allan Gross, MD, FRCSC

4:00 - 4:45 PM
Trauma
Robert Ostrum, MD, FAAOS
Ivan Tarkin, MD, FAAOS

Thursday, September, 2
9:30 - 10:15 AM
Shoulder
Mark Franklin, MD, FAAOS
Jon Warner, MD, FAAOS

10:30 - 11:15 AM
Foot & Ankle
Judith Baumhauer, MD, MPH, FAAOS
Kenneth Hunt, MD, FAAOS

2:00 - 2:45 PM
Knee
Amanda Marshall, MD, FAAOS
Robert Trousdale, MD, FAAOS

3:00 - 3:45 PM
Sports Medicine
James Andrews, MD, FAAOS
James Voos, MD, FAAOS

Friday, September, 3
9:30 - 10:15 AM
Hip & Knee
Adolph Lombardi, MD, FAAOS
Leo Whiteside, MD, FAAOS

10:30 - 11:15 AM
Shoulder
Eric Ricchetti, MD, FAAOS
Scott Steinmann, MD, FAAOS

Top-rated Learning Opportunity!
Learn new technology that is beneficial to your practice and your team.

TechTalks – Hall H

Learn new ways to streamline your practice and enhance your image during expert-lead sessions focused on the latest technology, mobile applications, and social media platforms.

Wednesday, September 1

9:30 - 10:15 AM
Digital Orthopaedics: Telehealth, Virtual Visits, Social Media, Digital Marketing, Patient Engagement Platforms, eConsults and Enhanced Referrals
Ryland Kagan, MD
Anna Cohen-Rosenblum, MD
Nancy Yen Shipley, MD, FAAOS
Andrew J. Wodowski, MD

Digital orthopaedics is an innovative and evolving topic. This session will introduce orthopaedic surgeons to telehealth, virtual visits, social media optimization, eConsults and enhanced referrals.

10:30 - 11:15 AM
Intra-Op Sensors Can Now Quantify Your Alignment and Soft Tissue Balance
William Leone, MD, FAAOS
Patrick Meere, MD, FAAOS
Ira Parsons, MD, FAAOS
Martin Roche, MD, FAAOS

The digital evolution through sensors, micro-electronics and wireless technology is now enabling surgeons to quantify their intra-op decisions related to alignment and soft tissue balance.

2:00 - 2:45 PM
The Digitalization of Recovery Programs with Wearables
Paul B. Jacob, DO, MPT, FAAOS
Sebastian Parratte, Dmed, PhD
Martin Roche, MD, FAAOS
Alexandar P. Sah, MD, FAAOS

Learn how the evolution of remote monitoring through wearables and sensors can improve patient outcomes, improve care efficiencies and develop a profitable program.

3:00 - 3:45 PM
Using Instagram to Enhance Your Practice
Nima Mehran, MD, FAAOS
Kelechi Okoroha, MD

Social media is being used increasingly to engage in conversations around the world and for educational purposes. Learn about the newest trends and advances in social media as well as how to use social media to enhance your practice.

4:00 - 4:45 PM
Putting ePROMs to Work: How to Incorporate Electronic Patient Reported Outcomes into Daily Clinical Practice
Eric C. Makhni, MD, MBA, FAAOS

There is little doubt that routine collection and utilization of patient reported outcome measures (PROM) can improve clinical practice and quality care. Learn different types of PROM (EMR-driven, 3rd party, free solutions) and helpful strategies in introducing PROM collection and analysis into practice.
Thursday, September 2

9:30 - 10:15 AM
Automated Online Reviews to Build Reputation and Grow Your Practice
Orrin Franko, MD

This presentation will demonstrate how to implement automated tools to request online reviews from patients. This includes acquiring 5-star reviews on Yelp, HealthGrades, Google, Vitals, and other similar websites. Automation is key to improving completion rates, and online reviews are critical to increasing patient volume and revenue in a competitive market. Most of these tools can be easily implemented for very low cost, and in some cases completely free.

10:30 - 11:15 AM
Leveraging Social Media to Promote Your Practice in 2021
Mary K. Mulcahey, MD, FAAOS
Karen M. Sutton, MD, FAAOS

This session will discuss how to leverage Instagram and Twitter through engaging content and relevant hashtags to effectively promote your practice.

2:00 - 2:45 PM
Virtual Patient Engagement: How to Shift Operations to Meet Pandemic Realities
Kathy Ford, PT

Learn how a HIPAA-compliant telehealth communications platform can play a crucial role as providers re-configure office visits, adjust to new regulations, and restore their practices.

3:00 - 3:45 PM
Killer Apps 2021
Ira H. Kirschenbaum, MD, FAAOS

In this perennial lecture, you will learn about the latest and greatest apps for personal and productive productivity.

4:00 - 4:45 PM
Orthopedic Entrepreneurism: Take Your Idea from Concept to a Company with Insights from OrthoFounders
Andrew J. Cooper, MD, FAAOS
John J. Crawford, MD, FAAOS
Michael T. Havig, MD, FAAOS
William B. Kurtz, MD, FAAOS

Are you interested in starting your own company? Learn the pearls and pitfalls about orthopedic startups from orthopedic surgeons who have done it.

Friday, September 3

9:30 - 10:15 AM
Killer Apps 2021
Ira H. Kirschenbaum, MD, FAAOS

In this perennial lecture, you will learn about the latest and greatest apps for personal and productive productivity.

10:30 - 11:15 AM
Harnessing Web Technologies to Increase Accessibility to Post-Operative Care Instructions and Rehabilitation Exercises
John Andrawis, MD
Kody K. Barrett, MD
Brett Lullo, MD

Easy-to-use web technologies can increase patient access to post-operative care instructions and rehabilitation exercises. Learn to create a custom website with downloadable PDFs, high quality videos, and QR codes specific to your own practice, most-commonly performed surgeries, post-operative care instructions, and rehabilitation exercises to increase accessibility vital to a patient's success after surgery.

Exhibit Hours:

Wednesday and Thursday
9:00 AM – 5:00 PM

Friday
9:00 AM – 1:30 PM

Dedicated Exhibit Hall Hours:

Wednesday
10:00 – 11:00 AM
12:30 – 1:30 PM
3:00 – 3:30 PM

Thursday
NEW! 9:30 – 11:00 AM
12:30 – 1:30 PM
3:00 – 3:30 PM

Friday
10:00 – 11:00 AM
12:30 – 1:30 PM
Keep up-to-date on industry trends.

Industry Lunch and Learns

Hear from dynamic and innovative industry speakers while enjoying lunch. AAOS has provided participating exhibitors with meeting rooms at the San Diego Convention Center to conduct non-CME sessions during the lunch hour, 12:40 - 1:25 PM.

Clinical Experience in Using Cryo-Technology to Manage Chronic OA: Pre-TKA AND Non-Surgical Patients
Presented by Pacira BioSciences, Inc
Room 1
Presenters: Vinod Dasa, MD, FAAOS; William M. Mihalko, MD, PhD, FAAOS; Gary B. Schwartz, MD, FAAOS; Joshua A. Urban, MD, FAAOS

The Role of a Once-Daily Intravenous Non-Opioid Option
Presented by Baudax Bio
Room 5
Presenter: Kipling P. Sharpe, MD, FAAOS

Guidelines recommend the use of non-opioid analgesia, including nonsteroidal anti-inflammatory drugs (NSAIDs), in multimodal analgesic treatment regimens for the management of perioperative pain. Join us for a discussion about a once-daily intravenous (IV) NSAID. This program will include an overview of clinical trial data, post-approval data on inpatient costs and post-discharge healthcare utilization, and the potential role of this agent in multimodal analgesia for moderate to severe pain.

The Future of Postoperative Pain Management in Orthopaedics
Presented by Heron Therapeutics
Room 5
Presenter: Paul F. Lachiewicz, MD, FAAOS

Pain management in the first 72 hours after surgery is critical. Current postoperative local anesthetics struggle to work beyond 12 to 24 hours, with pain and inflammation remaining high through 72 hours. Learn how longer-acting local anesthetics could manage postoperative pain beyond 72 hours while reducing, even eliminating, opioid usage.

Arthrex ShowCASE Session: Advanced Sports Medicine Preservation Techniques
Presented by Arthrex, Inc.
Room 6C
Presenters: Asheesh Bedi, MD, FAAOS; Brian J. Cole, MD, MBA, FAAOS; Patrick J. Denard, MD, FAAOS; Rachel M. Frank, MD, FAAOS

Through minimally invasive techniques and orthobiologic augmentation, the sports medicine surgeon’s ability to preserve the native joint is at the forefront now more than ever. Through an exciting new case-based format, this workshop will focus on joint preservation and introduce the newest innovations for the shoulder, hip, and knee.

Biofilm and Surgical Site Infections
Presented by Next Science, LLC
Room 1
Presenters: Ravi K. Bashyal, MD, FAAOS; Robert M. Harris, MD, FAAOS; Jon E. Minter, DO, FAAOS; Randall Otto, MD, FAAOS

Bacterial biofilms is a key contributor to surgical site infections. In this session, the speakers will discuss the patient and economic impact of surgical site infections, risk stratification strategies, and recent advances in infection prevention that address the problem of biofilm.
2021 Innovative Solutions for Stemless Shoulder and Anatomic Shoulder Arthroplasty
Presented by Zimmer Biomet
Room 6F
Presenter: John W. Sperling, MD, MBA, FAAOS

This session will offer a panel discussion on new stemless shoulder technologies and innovative glenoid implant technologies to address anatomic shoulder deformity. To register, visit https://cvent.me/NxL1N8

Leading Technologies with Cost Saving Efficiencies for Your ASC
Presented by Zimmer Biomet
Ask an Expert Theater, Hall H
Presenter: Trevor R. Pickering, MD, FAAOS

To register, visit https://cvent.me/M8RAqK

Can Material Science Improve Outcomes?
Presented by Smith+Nephew, Inc.
TechTalks Theater, Hall H
Presenters: Stephen T. Duncan, MD, FAAOS; Steven B. Haas, MD, FAAOS; Thorsten M. Seyler, MD, PhD, FAAOS

The selection of implant material can have an impact on wear, corrosion and biological impact. During this session we will explore how material science can help to mitigate concerns and deliver the clinical performance desired by you and your patients.

Thursday, September 2 12:40 – 1:25 PM

Creating the Future Through Digital, Data and Mako SmartRobotics™ (by Invitation Only)
Presented by Stryker
Room 1
Presenters: Paul B. Jacob, DO, MPT, FAAOS; Robert C. Marchand, MD, FAAOS; Andrew J. Wassef, MD, FAAOS

Join us for lunch with expert surgeons to discuss their use of robotics, data analytics, and digital platforms today and their thoughts on how these tools will transform the future of patient care in orthopaedics. To register, visit https://thestrykerexperience.com/

Innovation in Meniscal Repair Featuring JuggerStitch™ and The Tricera™ System - The Next Generation 3-in-1 Arthroscopy System
Presented by Zimmer Biomet
Room 5
To register, visit https://cvent.me/QrAZVx

Innovative Minimally Invasive Treatment Options for Ankle Fractures - It Takes More Than Steel To Heal
Presented by Arthrex, Inc
Room 6C
Presenters: John D. Adams, Jr, MD, FAAOS; John W. Munz, MD, FAAOS; Daniel J. Patton, MD

Ankle fractures are the most frequently encountered injuries on call. Beyond the fractures there are often injuries to articular cartilage, ligamentous structures and other soft tissues. This workshop will focus on modern surgical advancements in minimally invasive techniques for osteosyntheses, ligament repair, addressing articular cartilage injuries and soft tissue management.

Friday, September 3 12:40 – 1:25 PM

Introducing the InSpace Balloon Implant
Presented by Stryker
Room 1
Presenters: Joseph A. Abboud, MD, FAAOS; Samer S. Hasan, MD, PhD, FAAOS; Jonathan C. Levy, MD, FAAOS

The Next Generation of Shoulder Arthroplasty Featuring the INHANCE™ Shoulder System
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson
Ask an Expert Theater, Hall H
Presenters: Anand M. Murthi, MD, FAAOS; Matthew J. Smith, MD, FAAOS

Introducing the INHANCE™ Shoulder System designed to enable surgeons to seamlessly transition between stemless & short stem implants as well as a ONE STEP PREP™ Glenoid Reamer which eliminates numerous surgical steps to prepare the glenoid. In addition, INHANCE is optimized for use in ASCs where efficiency is critical. To register, contact ShoulderMarketing@its.jnj.com

Comprehensive Solutions in Outpatient Joint Arthroplasty
Presented by Smith+Nephew, Inc.
TechTalks Theater, Hall H
Presenters: Nirav H. Amin, MD, FAAOS; David W. Fabi, MD; Adam J. Rana, MD, FAAOS

Smith+Nephew offers solutions and the technologies to assist in the transition of total joints to lower dependency care systems. From clinically relevant solutions for optimal patient outcomes to business decisions, learn how S+N surrounds the surgeon and the patient along the continuum of care.
Gain hands-on experience with the latest products.

Bioskills Workshops

These hands-on workshops provide a unique opportunity for to gain experience with cutting-edge products. Each session provides a real world educational opportunity. Advance registration for these sessions is handled solely by the exhibitors that have secured Bioskills Workshop space. The Academy is not responsible for the content, faculty, or registration of attendees for these exhibitor Bioskills Workshop events and does not accredit these events for CME.

Wednesday, September 1

8:00 – 10:00 AM
VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty Cadaveric Lab (By Invitation Only)
*Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson*

In this hands-on, cadaveric experience HCPs will receive a facilitated system overview and practice using the new VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty. This experience will begin with brief review and demonstration of the robotic hardware and saw operation technique, followed by facilitated, hands-on cadaveric training. You will gain an understanding of the VELYS™ Robotic-Assisted Solution hardware and surgical workflow with the ATTUNE® Knee Implant.

8:00 – 10:00 AM
The Anterior Advantage Matta Method Technology Enabled Hip (By Invitation Only)
*Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson*

Using the Anterior Advantage Matta Method Approach combined with DePuy Synthes Hip Technologies -- VELYS Hip Navigation, KINCISE, ACTIS and MedEnvision -- surgeons receive reliable treatment options and outcomes for a variety of surgical cases.

8:00 – 10:00 AM
Technology Enabled Hip Delivered Through Posterior Approach (By Invitation Only)
*Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson*

Using DePuy Synthes Hip Technologies -- VELYS Hip Navigation, KINCISE, ACTIS and MedEnvision -- surgeons receive reliable treatment options and outcomes for a variety of surgical cases.

11:00 AM – 1:00 PM
VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty Cadaveric Lab (By Invitation Only)
*Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson*

In this hands-on, cadaveric experience HCPs will receive a facilitated system overview and practice using the new VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty. This experience will begin with brief review and demonstration of the robotic hardware and saw operation technique, followed by facilitated, hands-on cadaveric training. You will gain an understanding of the VELYS™ Robotic-Assisted Solution hardware and surgical workflow with the ATTUNE® Knee Implant.
Wednesday, September 1 (continued)

11:00 AM – 1:00 PM
ATTUNE® Revision Knee System Lab with Limb Preservation System (By Invitation Only)
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

2:00 – 4:00 PM
Simple or Complex: The Anatomic OVOMotion With Inlay Glenoid Total Shoulder System Can Be Your Primary TSA (By Invitation Only)
Presented by Anika Therapeutics
Presenter: Tyler Marshall, MD, FAAOS

This Workshop will include a didactic lecture followed by hands-on cadaveric training. Learn about treating Glenohumeral Osteoarthritis across all glenoid stages with the anatomic OVOMotion with Inlay Glenoid Arthroplasty System as a primary TSA. Simple or complex (A, B or C), the data shows excellent pain relief, patient satisfaction and functional improvements. Faculty will provide clinical insights, data, surgical technique and patient outcome data.

2:00 – 4:00 PM
VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty Cadaveric Lab (By Invitation Only)
Presented by DePuy Synthes companies of Johnson & Johnson

In this hands-on, cadaveric experience HCPs will receive a facilitated system overview and practice using the new VELYS™ Robotic-Assisted Solution for Total Knee Arthroplasty. This experience will begin with brief review and demonstration of the robotic hardware and saw operation technique, followed by facilitated, hands-on cadaveric training. You will gain an understanding of the VELYS™ Robotic-Assisted Solution hardware and surgical workflow with the ATTUNE® Knee Implant.

Thursday, September 2

8:00 – 10:00 AM
Patient Centric Solutions for Reverse Shoulder Arthroplasty (By Invitation Only)
Presented by DePuy Synthes companies of Johnson & Johnson
Presenters: Carl J. Basamania, MD, FAAOS; Amon T. Ferry, MD, FAAOS; Jacob S. Stueve, MD, FAAOS; Larry Waldrop, MD

This workshop has been designed for surgeons interested in gaining hands-on experience with advanced options in reverse shoulder arthroplasty. The workshop will consist of a brief didactic introduction of the featured products including DELTA XTEND™ Reverse Shoulder System (Central Screw Metaglene & Alternate Angle/145); GLOBAL UNITE Short Stems & TRUMATCH® Personalized Solutions Shoulder System. Following the didactic session participants will transition to the cadaver training session where they will receive hands-on education of the patient centric solutions offered within the DePuy Synthes Shoulder Portfolio.

2:00 – 4:00 PM
VELYS™ Robotic-Assisted Solution for Total Knee with Patient Specific Alignment (By Invitation Only)
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

6:00 – 8:00 PM
APEX 3D Total Ankle Replacement System & MAVEN PSI Technology (By Invitation Only)
Presented by Paragon 28
Presenter: Thomas P. San Giovanni, MD, FAAOS

Explore the Paragon 28® APEX 3D™ Total Ankle Replacement System powered by MAVEN PSI Technology. Experience enhanced alignment accuracy, streamlined precision instrumentation, and targeted bone preparation options. Discover groundbreaking implant technology featuring 3D printed tibial trays designed for rotational stability, vitamin e poly inserts with improved wear characteristics and anatomic talar domes that mimic natural motion.

8:00 – 10:00 AM
ATTUNE® Cementless FB Knee with AFFIXIUM™ 3DP Technology (By Invitation Only)
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

2:00 – 4:00 PM
Identity Imprint First Look Bioskills Workshop (By Invitation Only)
Presented by Conformis
Presenters: Raj K. Sinha, MD, FAAOS; Robert J. Tait, MD, FAAOS; Emmanuel Theinpont, MD

Conformis is hosting a Bioskills Workshop introducing our innovative new TKA – Identity Imprint. Inspired by our rich patient-specific heritage, Imprint is a morphologic implant built from 85,000 patient CT scans. Join us to learn how Imprint and Conformis’ Surgery in a Box technology can improve patient and surgeon satisfaction.

2:00 – 4:00 PM
VELYS™ Robotic-Assisted Solution for Total Knee with Patient Specific Alignment (By Invitation Only)
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson
Thursday, September 2

2:00 – 4:00 PM  
The Anterior Advantage Matta Method Technology Enabled Hip (By Invitation Only)  
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

Using the Anterior Advantage Matta Method Approach combined with DePuy Synthes Hip Technologies -- VELYS Hip Navigation, KINCISE, ACTIS and MedEnvision -- surgeons receive reliable treatment options and outcomes for a variety of surgical cases.

Friday, September 3

8:00 – 10:00 AM  
ATTUNE® Revision Knee System Lab with Limb Preservation System (By Invitation Only)  
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

8:00 – 10:00 AM  
Treating Complex Shoulder Pathologies (By Invitation Only)  
Presented by DePuy Synthes, The Orthopaedics Company of Johnson & Johnson

Through instruction and hands-on application, this lab aims to educate surgeons on shoulder procedures to treat irreparable cuffs and recurrent shoulder instability. This course is for surgeons seeking to either learn how to perform or increase their surgical skills with the Lower Trap Transfer and Arthroscopic Anatomic Glenoid Reconstruction procedures.

Industry Evening Events

Continue your learning during evening educational events presented by industry-experts on top-of-mind issues.

Wednesday, September 1

5:30 – 7:30 PM  
First Annual North American Amputee Osseointegration Association Meeting  
Presented by Signature Orthopaedics  
Presenters: Daniel C. Allison, MD, FAAOS;  
David B. Doherty, JR, MD; Jeremy Gililland, MD, FAAOS;  
Ronald W. Hillock, MD, FAAOS;  
Benjamin K. Potter, MD, FAAOS;  
Jason W. Stoneback, MD, FAAOS  
Manchester Grand Hyatt - Regatta B-C

The First Annual North American Amputee Osseointegration Association meeting brings together providers, researchers, manufacturers, and other innovative individuals from across the globe dedicated to the advancement of the field of osseointegration for amputation patients. Come to see the current North American perspective of this important and emerging field of medicine and rehabilitation. Clinicians will present their data, patients will present their experience, and ample time will be set for Q&A and discussion regarding protocols, research & development opportunities, and more. To register, email Events@signatureortho.com.au.

Wednesday, September 1

5:30 – 8:00 PM  
Life Unlimited: Evening of Innovation  
Presented by Smith+Nephew, Inc.  
Venue 808 - 808 J St, San Diego, CA 92101

Join us as we explore the latest innovations across our Orthopaedics, Sports Medicine and Advanced Wound Management portfolio. Learn how a partnership with Smith+Nephew can deliver Life Unlimited to your patients.
### Exhibitor Listing as of July 20, 2021

The American Academy of Orthopaedic Surgeons invites you to visit the industry exhibits as part of your educational experience at the annual meeting. The products displayed in the industry exhibits area and the uses suggested by the manufacturer do not represent an endorsement nor imply that the products have been evaluated or approved by the American Academy of Orthopaedic Surgeons.

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| DePuy Synthes,                              | 2935, 4755 |
| The Orthopaedics Company of Johnson & Johnson |           |
| Warsaw, IN                                  |           |
| Phone: 574-372-7147                         |           |
| www.depuy.synthes.com                       |           |

| Designs for Vision, Inc.                    | 2310      |
| Bohemia, NY                                 |           |
| Phone: 631-585-3300                         |           |
| www.designsforsvision.com                   |           |

| DeSoutter Medical Ltd                       | 3835      |
| Aylesbury, Bucks, Buckinghamshire           |           |
| United Kingdom                             |           |
| Phone: 44 1442860300                       |           |
| www.des-soutter.com                        |           |

| Dipromedic Group                            | 4941      |
| Ciudad de Mexico                            |           |
| Mexico                                      |           |
| Phone: 52 5590004888                       |           |
| www.dipromedic.com                          |           |

| Disior Ltd.                                 | 5045      |
| Helsinki                                    |           |
| Finland                                    |           |
| Phone: 358 504836433                       |           |
| www.disior.com                              |           |

| DJO Global                                  | 3435      |
| Lewisville, TX                              |           |
| Phone: 760-734-3125                         |           |
| www.djoglobal.com                           |           |

| DNE LLC                                     | 5219      |
| Boca Raton, FL                              |           |
| Phone: 610-442-1017                         |           |
| www.sealexfx.com                            |           |

| doctormultimedia.com                         | 4841      |
| La Jolla, CA                                |           |
| Phone: 800-679-3309                         |           |
| www.doctormultimedia.com                    |           |

| DOT America                                 | 912       |
| Columbia City, IN                           |           |
| Phone: 260-244-5700                         |           |
| www.dot-coatingusa.com                      |           |

| DSM Biomedical                              | 4513      |
| Exton, PA                                   |           |
| Phone: 484-713-2100                         |           |
| www.dsm.com/medical                         |           |

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| ECA Medical Instruments                      | 2546      |
| Thousand Oaks, CA                            |           |
| Phone: 805-376-2509                          |           |
| www.ecmedical.com                            |           |

| Echolight Medical                            | 1110      |
| Kenmore, WA                                  |           |
| Phone: 833-263-7367                          |           |
| www.echolightmedical.com                     |           |

| ECLERIS USA                                  | 5012      |
| Medley, FL                                   |           |
| Phone: 786-483-7490                          |           |
| www.ecleris.com                              |           |

| Eclipse                                      | 2540      |
| The Colony, TX                               |           |
| Phone: 800-759-6876                          |           |
| www.eclipsemed.com                           |           |

| eCure                                        | 221       |
| San Diego, CA                                |           |
| Phone: 646-469-9316                          |           |
| www.ecurehealth.com                          |           |

| EDGe Surgical, Inc.                          | 5227      |
| Chicago, IL                                  |           |
| Phone: 773-368-1314                          |           |
| www.edgesurgical.com                         |           |

| Efferent Health                              | 445       |
| Estero, FL                                   |           |
| Phone: 630-815-4818                          |           |
| www.efferenthealth.com                       |           |

| Electrozizing Corporation of Ohio            | 4046      |
| Cleveland, OH                                |           |
| Phone: 800-451-8655                          |           |
| www.ecofohio.com                             |           |

| Element Materials Technology                 | 3853      |
| Fairfield, OH                                |           |
| Phone: 513-984-4112                          |           |
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| Eliquence LLC                                | 2926      |
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| Elsevier                                     | 4434      |
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| Emovi, Inc.                                  | 4906      |
| Montreal, QC                                 |           |
| Canada                                       |           |
| Phone: 514-907-0866                          |           |
| www.emovi.ca                                 |           |

| Empirical                                    | 1740      |
| Colorado Springs, CO                         |           |
| Phone: 719-264-9937                          |           |
| www.empiricaltech.com                        |           |

| ENDO Manufacturing Co., Ltd.                 | 1712      |
| Tsubame, Niigata                             |           |
| Japan                                        |           |
| Phone: 81 256638165                          |           |
| www.endo-mfg.co.jp/eng                       |           |

| Engage Surgical LLC                          | 4354      |
| Orlando, FL                                  |           |
| Phone: 833-364-2432                          |           |
| www.engagesurgical.com                       |           |

| Enhatch                                      | 235       |
| Hoboken, NJ                                  |           |
| Phone: 201-755-2065                          |           |
| www.enhatch.com                              |           |

| Enztec                                       | 5027      |
| Christchurch, Canterbury                     |           |
| New Zealand                                  |           |
| Phone: 64 33480203                           |           |
| www.enztec.com                               |           |

| EOS Imaging                                  | 1315      |
| Saint-Paul, MN                               |           |
| Phone: 33 155256127                          |           |
| www.eos-imaging.com                          |           |

| EOS North America                            | 709       |
| Novi, MI                                     |           |
| Phone: 877-388-7916                          |           |
| www.eos.info                                 |           |

| Esaote North America                         | 4735      |
| Fishers, IN                                  |           |
| Phone: 317-813-6000                          |           |
| www.esaoteusa.com                            |           |

| Evonik Corporation                           | 4216      |
| Parsippany, NJ                                |           |
| Phone: 973-929-8000                          |           |
| www.evonic.com/vestakeep                      |           |

<p>| Exactech, Inc.                                | 1035      |
| Gainesville, FL                               |           |
| Phone: 800-392-2832                          |           |
| <a href="http://www.exac.com">www.exac.com</a>                                  |           |</p>
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<td>Phone: 44 1235754920 <a href="http://www.electrospinning.co.uk">www.electrospinning.co.uk</a></td>
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<td>Schaerer Medical USA</td>
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<td>Shenyang Pusm Medical Device Co., Ltd.</td>
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<td>Shukla Medical</td>
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<td>SI-BONE, Inc.</td>
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<td>Smith+Nephew, Inc.</td>
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<td>Synergie Ingenierie Medicale (synimed)</td>
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<td>Synergy Health Partners</td>
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<td>TDM Co., Ltd.</td>
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<td>Techfit Digital Surgery INC.</td>
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<td>Tegra Medical</td>
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The American Academy of Orthopaedic Surgeons wishes to thank the following companies for their promotional support of the AAOS 2021 Annual Meeting.
<table>
<thead>
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<th>Event Title</th>
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<tr>
<td>AAOS Leadership Institute - Level 4 Workshop</td>
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<td>2:00 - 4:00 PM</td>
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<td>AAOS Leadership Institute - Levels 3 and 4 Reception</td>
<td>Thursday, September 2</td>
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<tr>
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<td>Friday, September 3</td>
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<td>Thursday, September 2</td>
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<tr>
<td>Board of Councilors Business Meeting</td>
<td>Friday, September 3</td>
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<td>Manchester Grand Hyatt, Grand Hall D</td>
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<tr>
<td>Board of Directors Meeting</td>
<td>Monday, August 30</td>
<td>7:00 AM - 5:00 PM</td>
<td>Marriott Marquis San Diego, Marina, D</td>
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<tr>
<td>Board of Specialty Societies Business Meeting</td>
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<td>Thursday, September 2</td>
<td>7:00 - 8:00 AM</td>
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<tr>
<td>Committee on Ethics and Outside Interests</td>
<td>Wednesday, September 1</td>
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<tr>
<td>Communications Committee</td>
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<tr>
<td>International Presidents Breakfast &amp; World Opinion Forum</td>
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<tr>
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<td>Friday, September 3</td>
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<tr>
<td>Medical Liability Committee Meeting</td>
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<td>Tuesday, August 31</td>
<td>11:30 AM - 1:30 PM</td>
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<tr>
<td><strong>Orthopaedic PAC Donor Lunch</strong></td>
<td><strong>Resident Assembly Peer to Peer Mentoring</strong></td>
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<th><strong>Resident Assembly Research Committee</strong></th>
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<td>Marina, Dana Point (Water View)</td>
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<th><strong>Resident Assembly Education Forum</strong></th>
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<td><strong>Meeting</strong></td>
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<tr>
<td><strong>Friday, September 3</strong></td>
<td>333 W Harbor Dr</td>
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<tr>
<td>10:00 - 11:30 AM</td>
<td>San Diego, CA 92101</td>
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<td>17B at the San Diego Convention Center</td>
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<th><strong>Resident Assembly Executive Committee Meeting</strong></th>
<th><strong>Hilton San Diego Bayfront</strong></th>
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<td>Marriott Marquis San Diego</td>
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<td>Marina, Oceanside Room</td>
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<th><strong>Resident Assembly Health Policy Committee</strong></th>
<th><strong>Manchester Grand Hyatt San Diego</strong></th>
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<th><strong>Resident Assembly Innovation Committee</strong></th>
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<tr>
<td>Marriott Marquis San Diego</td>
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<td>Marina, Newport Beach (Water View)</td>
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<th><strong>Hotels</strong></th>
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<td><strong>Marriott Marquis San Diego Marina</strong></td>
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<td>American Association of Latino Orthopaedic Surgeons</td>
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<td>Luncheon</td>
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<tr>
<td>American Orthopaedic Association</td>
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<tr>
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<td>Wednesday, September 1</td>
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<td>3:00 - 4:00 PM</td>
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<tr>
<td>DEI Think Tank Committee Meeting</td>
<td>Thursday, September 2</td>
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<tr>
<td>Annual Association of VA Orthopaedic Surgeons</td>
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<tr>
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<tr>
<td>Association of Bone &amp; Joint Surgeons</td>
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<td>CORR Advisory Board of Directors Meeting</td>
<td>Friday, September 3</td>
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<td>CORR Reception</td>
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<td>Brown University</td>
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<td>Florida Orthopaedic Society</td>
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<tr>
<td>Lipscomb- Chapman Orthopaedic Alumni Society</td>
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<tr>
<td>Loma Linda University</td>
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<td>Alumni Reception</td>
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<tr>
<td>Medical College of Wisconsin</td>
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<td>The Haskell Reception</td>
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<tr>
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<tr>
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<tr>
<td>NYU Langone HJD Alumni Association</td>
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<td>Alumni Reception</td>
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<tr>
<td>Pediatric Orthopaedic Society of North America &amp; Scoliosis Research Society</td>
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<tr>
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<tr>
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<tr>
<td>Saint Louis University</td>
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<td>Walter Reed Bethesda Orthopaedic Alumni Reception</td>
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<tr>
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<tr>
<td>Alumni Reception</td>
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## Active Fellows

### A
Adam Adler, MD, FAAOS  
Okezie K Agwu, MD, FAAOS  
Amiethab Aiyer, MD, FAAOS  
Keith P Aldrich Jr, MD, FAAOS  
Ilyas Aleem, MD, FAAOS  
Keith Alfieri, MD, FAAOS  
Hasham M Alvi, MD, FAAOS  
Spencer H Amundsen, MD, FAAOS  
Jason Scott Andersen, MD, FAAOS  
Steven P Anderson, MD, FAAOS  
Lucas Anderson, MD, FAAOS  
Toby L Anderton, MD, FAAOS  
Jovito Gomez Angeles, MD, FAAOS  
Valentin Antoci JR, MD, PhD, FAAOS  
Luke Armstrong, MD, FAAOS  
William Arroyo Sifuentes, MD, FAAOS  
Andrew T Assenmacher, MD, FAAOS, FACS  
William Arroyo Sifuentes, MD, FAAOS  
Brian Matthew Culp, MD, FAAOS  
Paul Maxwell Courtney, MD, FAAOS  
James A Costanzo, MD, FAAOS  
Jacqueline Corona, MD, FAAOS  
Jason A Costanzo, MD, FAAOS  
Paul Maxwell Courtney, MD, FAAOS  
Brian Matthew Culp, MD, FAAOS  
Boleslaw L Czachor, MD, FAAOS  

### B
Jonathan D Backus, MD, FAAOS  
Sameer Badarudeen, MD, FAAOS  
Haleh Badkooebi, MD, FAAOS  
Evon Baird, MD, FAAOS  
Stephanie Baker, MD, FAAOS  
Todd P Balog, MD, FAAOS  
David Barba, MD, FAAOS  
Scott E Barbash, MD, FAAOS  
Brian Barlow, MD, FAAOS  
James W Barnes, MD, FAAOS  
Mark Timothy Barron, MD, FAAOS  
Justin H Bartley, MD, FAAOS  
Michael Devon Bates, MD, FAAOS  
Clark Baumbusch, MD, FAAOS  
Chad J Beck, MD, FAAOS  
Katherine Marie Bedigrew, MD, FAAOS  
Krysten Marie Bell, MD, FAAOS  
Matthew C Bessette, MD, FAAOS  
Siddharth Bhola, MD, FAAOS  
Jason Billington, MD, FAAOS  
Debdut Biswas, MD, FAAOS  
Adam Bitterman, DO, FAAOS  
John-David Black, MD, FAAOS  
Sheena R Black, MD, FAAOS  
Alan T Blank, MD, MS, FAAOS  
Yoni Blau, MD, FAAOS  
Ljljana Bogunovic, MD, FAAOS  
Trevor R Born, MD, FAAOS  
Daniel Bouton, MD, FAAOS  
William McKenna Braaksm, MD, FAAOS  
Houston L Braly, MD, FAAOS  
Eric Breitbart, MD, FAAOS  
Jeffrey L. Brewer, MD, FAAOS  
Matthew M Brewster, DO, FAAOS  
Holly L Brockman, MD, FAAOS  
Tyler James Brolin, MD, FAAOS  

### C
Nicholas M Caggiano, MD, FAAOS  
Kenneth Lee Caldwell, MD, FAAOS  
Alexandra Kathleen Callan, MD, FAAOS  
Sean Patrick Calloway, MD, FAAOS  
Colleen Calvey, MD, FAAOS  
Jonathan E Campbell, MD, FAAOS  
Brian Campfield, MD, FAAOS  
Robert Bruce Canham, MD, FAAOS  
Colin D Canham, MD, FAAOS  
Jaimie A Carvajal-Alba, MD, FAAOS  
Jordan M Case, MD, FAAOS  
Tiffany Castillo, MD, FAAOS  
Michael J Chambers, MD, FAAOS  
Chung Ming Chan, MBBS, FAAOS  
Edward S Chan, MD, FAAOS  
Philip James Chandler, MD, FAAOS  
Eric Brandon Chapman, MD, FAAOS  
Joseph E Chase, MD, FAAOS  
Austin Warren Chen, MD, FAAOS  
Steven Matthew Cherney, MD, FAAOS  
Noah Chinitz, MD, FAAOS  
Michael Daniel Chiu, MD, FAAOS  
Daniel Choi, MD, FAAOS  
James Ollie Clark, MD, FAAOS  
Jonathan Clark, MD, FAAOS  
Jason D Clark, DO, FAAOS  
Andrew Cleveland, MD, FAAOS  
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- Prithviraj Chavan, MD
- Ozgur Dede, MD
- Pier Francesco Indelli, MD, PhD

### Associate Member Allied Specialties

- Jose Salvador Reyes, MD

### Associate Member Basic Science

- Vaida Glatt, PhD
- Jashvant Poeran, MD, PhD
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<td>Umberto Alves Sr, BA, Joao Paulo Lins De Albuquerque Lafayette Araujo Sr, MD, MMED (Ortho), Bruno Santos Leal Campos Sr, Leonardo Veloso Vieira Da Cunha Sr, MMED (Ortho), Italo Jose Fernandes De Galiza Sr, MD, Leonardo Lott, MD, Bruno Fernando Carvalho Nogueira Sr, MD, Adalberto Mendes Placha Sr, MD</td>
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<td>Mohamed Emara, PhD, Mohamed Abdelmoniem Khattab, MSc, MBChB, Ahmed Sirageldin Massoud, MD, Ali Ahmed Ouda Sr, MMED (Ortho), Mohamed Fekry Rahhal Sr, MBChB, Ahmed Elsayed Semaya, MD</td>
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### New Associate Members – Physician Assistant

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<td>Haley Nicole Von Haven, BS, MS, PA, PA-C</td>
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<td>John Voros, PA-C</td>
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References