FACES OF Orthopaedics

Nearly 1 of every 3 Americans has a musculoskeletal condition requiring medical attention.

These are some of their stories.

Patients advocating for an increase in musculoskeletal research funding

American Academy of Orthopaedic Surgeons
2015 Research Capitol Hill Days Patient Vignettes
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Orthopaedics is the medical specialty devoted to the diagnosis, treatment, rehabilitation, and prevention of injuries and diseases of the body’s musculoskeletal system. This complex system includes bones, joints, ligaments, tendons, muscles, and nerves and provides for movement and activity.

The American Academy of Orthopaedic Surgeons (AAOS) provides education and practice management services for orthopaedic surgeons and allied health professionals. The AAOS also serves as an advocate for improved patient care and informs the public about the science of orthopaedics.

Nearly one third of Americans suffer from a musculoskeletal impairment requiring medical care. $874 billion is spent annually in the United States on healthcare for persons with musculoskeletal diagnoses, representing 5.7% of the GDP. Musculoskeletal conditions account for 18% of all health care visits. Persons with musculoskeletal diagnoses account for 11.2 million hospital discharges and over 1 billion physician offices visits each year.

Together with their physicians, these patients are advocating for an increase in federal funding for musculoskeletal research:

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You may recognize his face from the WMC-TV evening news, but you may not know that Joe Birch almost lost his leg in a bicycling accident in 2013.

Joe Birch has been reporting the news for more than 35 years in Memphis, Tennessee. He is extremely active in the community and has received numerous awards and accolades for his journalism and his philanthropy. Joe, an avid runner, has raised over $100,000 for St. Jude’s Children’s Research Hospital through his participation in twelve marathons and half marathons since the event began in 2002. He also co-founded a 5K run/walk event that raises money for St. Patrick Learning Center, Inc., a non-profit agency that serves local underprivileged families.

Running and cycling are as much a part of Joe’s life as his career. In September of 2013, Joe was in a freak cycling accident that shattered multiple bones in his ankle.

Joe was taken to the Campbell Clinic, where an orthopaedic surgeon performed open reduction internal fixation to stabilize fractures in Joe’s malleolus and talus bones. Joe had damaged the inferior tibiofibular joint, where the two long bones of the leg join near the ankle. A metal plate and multiple screws were inserted to stabilize the bones and promote the healing process, and infected tissue was removed. If the surgery was not successful, amputation would have been a possibility.

Fortunately, Joe’s surgeries saved his ankle.

This was not Joe’s first visit to the Campbell Clinic. Several years ago, Joe was treated for an elbow injury also sustained from a cycling injury. Under the expert care of Frederick Azar, MD, chief-of-staff at the Campbell Clinic and president of the American Academy of Orthopaedic Surgeons, Joe had an open reduction internal fixation surgery to stabilize and repair his broken elbow. He underwent a six-month recovery time before he was able to fully use his arm again.

In 2012, Joe was in a car accident that left him with a broken neck. Fortunately, the fractures in his cervical vertebrae did not require surgery and healed after three months in a stabilizing neck brace, thanks to Joe’s excellent health and physical fitness. Joe considers himself to be one of Campbell Clinic’s best customers.

Joe’s bike accidents have appreciably slowed his athletic lifestyle. His exercise environment is now significantly more controlled. Joe works with a physical therapist and is focusing on walking properly again. He diligently rides his stationary bike and lifts weights to stay active. Joe’s running days are likely over, but he looks forward to a bright, accident-free future in cycling.

Joe was fortunate to receive outstanding orthopaedic care at the Campbell Clinic. His leg was spared, thanks to advancements in orthopaedic trauma care. “Since amputation was a possibility,” he says, “more research into complex fracture repair may benefit other patients in the future.”

Joe is a passionate advocate of medical research. In addition to his support of St. Jude’s Children’s Hospital, he dedicates his time and energy to raising funds for Alzheimer’s research, in memory of his late father.
Math teacher Margaret “Peg” Cagle is no stranger to orthopaedic care. In her early 20s, a skiing accident caused extensive damage to her left foot and ankle. At the time, it was treated as a sprain. For the next 30 years, various physicians told Peg that outside of orthotics, there was nothing that could be done about her ongoing foot pain and instability.

When she was in her early 50s, Peg began experiencing extreme hip pain. In 2006, the severity of pain in her left hip started to impede her daily activities. “It had reached the point where the joint would intermittently lock; I could not move my leg to get up from a chair,” she recalls. “It ached all the time.” Peg was told she had extensive calcification and deterioration of the joint, and would eventually need a hip replacement. This news came as a shock to Peg, as she was otherwise in good health and relatively young.

By 2008, she was walking with a cane. Knowing that the available technology would not offer a solution that would last a lifetime, Peg wanted to put off surgery as long as possible. She explored various options, and was ultimately referred to Daniel Oakes, MD, an orthopaedic surgeon at University of California, Los Angeles.

In 2009, Peg had bilateral total hip replacement; her left hip in August, followed by her right in December. On a follow up visit with Dr. Oakes, he remarked on the degree of deformity of her left foot. He pointed out that severe pronation of her foot meant her knee was out of alignment, putting stress on her hip replacement and potentially causing premature failure of the implant. Dr. Oakes assured Peg that there were options to correct her foot, and referred her to Timothy Charlton, MD, an orthopaedic foot and ankle surgeon.

In 2010, Dr. Charlton confirmed that Peg had posterior tibial tendon dysfunction (PTTD), which contributed to her severe flatfoot deformity. After discussing a range of surgical options, Peg and Dr. Charlton opted for a total flatfoot reconstruction that included bone realignments, tendon transfers, and ligament reconstruction. Recovery involved three months in a cast, non-weight bearing, followed by a surgical boot and a knee scooter. In her transition to partial weight bearing, it became evident that something was not right. Peg was in Washington, DC, on a fellowship for work and was unable to see Dr. Charlton for a month. X-rays ultimately determined that the arch in her foot was sagging, and the ligament reconstruction was failing.

In order to buy time so she could complete her fellowship in DC, Peg had a specialized brace made that she wore underneath her surgical boot. She continued to walk with crutches to avoid full weight bearing. “I lived this way for nearly a year, but I did not let it keep me from attending a presidential speech in the rose garden of the White House, high-level meetings in and around DC, and traveling extensively, including participating in an international congress on mathematics education in Seoul, Korea,” Peg says.

At the conclusion of her fellowship, Peg returned to California and in September 2012, she had her second surgery. The surgery was successful, but Peg subsequently began to experience extreme pain in her ankle. She was diagnosed with a possible tendon tear, which was treated by extending the period of bracing and limited weight bearing, aided by cortisone injections. The pain subsided without requiring additional surgery.

In 2013, Peg began to experience pain in her other foot, and was diagnosed with a tear of her right posterior tibial tendon. She returned to bracing, icing, and using crutches and hopes she will not need to endure further surgical intervention.

“Living in pain for years on end takes a toll,” she says. “While it does not impact the quantity of my life, the quality of my life has been seriously compromised.” Peg hopes that additional research will ultimately provide more options for treatment of soft tissue deformities and improve the materials used in orthopaedic implants.
As an avid athlete, Caileen Coleman was concerned when her left leg began to throb with pain after soccer practices. The high school freshman needed to rest during intense workouts due to unusual soreness. Her pediatrician suggested ibuprofen and muscle cream, and after four weeks of increasing pain, she was prescribed physical therapy. However, Caileen’s mother was not satisfied with this answer.

“My mom took me to an orthopaedic specialist instead of physical therapy, and an x-ray of my leg showed a tumor in my left femur,” Caileen says. “After an MRI, bone scan, and biopsy, the tumor was confirmed to be cancerous.”

Caileen was diagnosed with osteosarcoma, a form of bone cancer. Primary malignant bone tumors are relatively rare, representing only 2.2% of cancer cases annually.

Caileen immediately began a three-month course of chemotherapy to shrink her tumor. Following chemotherapy, she underwent limb salvage surgery to remove the remaining tumor and surrounding bone and soft tissue. Caileen received a total knee arthroplasty with modular oncology prosthesis enclosure, a surgery that allowed her to keep her leg.

After the surgery to remove her tumor, Caileen continued chemotherapy for seven months. Although she has been cancer-free for ten years, she has endured multiple subsequent surgeries to remove scar tissue from around her knee. Her range of motion remains restricted and she has been in and out of physical therapy since 2004.

“Living with chronic pain and knowing that the prosthesis will need to be replaced in the near future is my greatest challenge,” she says. “It is difficult living with limited strength and mobility, knowing that at some point I will need another major surgery and will need to decide between another internal prosthesis and an amputation.”

Caileen swims, walks, plays golf, and practices yoga to stay in shape. She is no longer able to play physically demanding sports, but has refocused her life on helping others.

Now 26, Caileen is a special education teacher and dedicated advocate for the American Cancer Society and the Make-A-Wish Foundation.

“My condition has inspired me to work with other people who are living with disabilities,” she says. Through public speaking and volunteer work, Caileen hopes to continue helping those with disabilities to have a meaningful and productive life.

Caileen knows that additional research into developing more sustainable prostheses would benefit future osteosarcoma patients and others suffering from degenerative joint diseases. “It is necessary to create and perfect sustainable devices that not only save limbs, but also provide an enhanced quality of life free from endless complications.”
Sally DeGruttola was diagnosed with lupus in 2003. Lupus is an autoimmune disease that causes the immune system to attack various tissues throughout the body. Lupus can cause achy and swollen joints and extreme fatigue, among other symptoms.

Sally, who has always enjoyed knitting, sewing, and crafting, began experiencing increasing difficulty using her hands. The lupus was attacking the lining of the joints in her fingers, causing the soft tissues in her hands to deteriorate. She was becoming increasingly disabled and was in significant pain.

Sally was referred to Lana Kang, MD, a hand and upper extremity surgeon at the Hospital for Special Surgery in New York. Dr. Kang diagnosed Sally with autoimmune inflammatory arthropathy, a joint disease caused by the aggressive nature of the lupus.

Sally’s hands were experiencing ulnar deviation, also known as ulnar drift, a hand deformity where increasing swelling of the metacarpophalangeal joints (the large knuckles) causes the fingers to become displaced. The bones of the fingers were bending away from the thumb and leaning towards the ulna, the forearm bone that lies on the pinky side of the hand.

Progression of autoimmune inflammatory arthropathy can be unpredictable, and a careful surgical plan must be executed. On May 7, 2014, Dr. Kang operated on Sally’s hand to realign her knuckle joints, rebalance her tendons, correct the ulnar drift, and abate the progression of the deformity. On October 29, 2014, she had the same surgery on her left hand.

Sally controls the lupus with medication, and continues to do physical therapy to regain strength in her hands. She hopes to return soon to her craft projects and avoid future surgical intervention for her condition.

Sally would like to see research on autoimmune diseases and the implication they have on joint damage, with the hope of finding a cure for this disabling condition.
Alexandra Heifetz has been dancing since she was three years old. Although she participated in gymnastics as a young child, her true passion was dance. In elementary school, Alex danced three hours a day, five days a week as part of a competitive dance company. In 2009, during a routine doctor’s visit, a 10-year-old Alex was diagnosed with scoliosis, a sideways curvature of the spine that occurs in 2-3% of children ages 10-16.

Initial x-rays of Alex’s spine showed a curvature of 23°. She was referred to Baron Lonner, MD, Director of Scoliosis and Spine Associates in New York and Chief of the Division of Spine Surgery at Mount Sinai Beth Israel. Within a month, Alex’s scoliosis had progressed an additional 10°.

Dr. Lonner suggested taking a genetic test to assess Alex’s risk of progressing to a severe curve. With a score of 180 / 200, the test indicated that she was at high risk of curve progression. Instead of fitting Alex with a brace to slow the advancement of her spinal curvature, Dr. Lonner performed vertebral body stapling of the lumbar spine to help correct her scoliosis. The surgery corrected Alex’s curve from 34° to -5°.

“The stapling surgery was amazing; it maintained her curve for about 5 years, without the use of body bracing which she would have had to wear daily for 23 hours per day,” her mom Anna says. “The brace would have limited her activities and have had an adverse effect on her self-image.”

After the stapling surgery, Alex was able to return to dance without limitations. However, as she continued to grow, Alex’s spinal curves ultimately progressed. Her spine was rotated, which also affected her hip alignment. She had a noticeable hump on the left side of her back, and had become increasingly self-conscious. The once-positive and upbeat girl had become withdrawn and sullen.

“It has been heartbreaking watching this very confident, happy, outgoing child turn into someone totally different,” Anna recalls. “She became unhappy, hated to look at herself in the mirror, hated being called out in dance for not being able to do a particular movement to perfection because of her spine limitations.”

By the summer of 2014, Alex’s spine had rotated and the curve had progressed to 43°. On September 4, 2014, Dr. Lonner performed posterior spinal fusion surgery from T8-L3. Since the surgery, Alex’s overall attitude has changed and her gregarious personality is returning.

“The spinal fusion has really helped with my self-confidence,” Alex states. “It has corrected the curve to a lesser angle, the rotation is not as evident and my hips are more aligned. My posture is better and clothing fits better.”

Scoliosis has had a significant impact on Alex’s life. “I have had to endure two major operations which have left scars on my back. I have had to miss school; I have had to give up dance which I love.”

Alex benefitted from advancements in scoliosis research. The DNA test was instrumental in deciding the course of treatment, and helped her avoid years of a rigid back brace. There is no known cause of scoliosis. Further research into the genetic cause of the condition could benefit future generations and reduce the need for surgery.
On a Sunday afternoon in October of 2012, Nicholas Kennedy was playing a game of flag football with friends. Already favoring his left leg due to a pulled muscle, Nick aggravated his injury again while going in on defense to rush the opposing team. On the next play, Nick was running toward the quarterback. When he took a step to his right, Nick cut back to the left to grab his flag and felt a pop in his knee.

Fortunately, Nick’s teammates included four doctors and two medical students, who were able to examine his knee on the field. They determined he had likely torn his fibular collateral ligament (FCL).

The next day, Nick visited Robert LaPrade, MD, PhD, an orthopaedic surgeon and researcher at the Steadman Philippon Research Institute. Dr. LaPrade ordered x-rays and an MRI scan, and diagnosed him with a torn FCL and anterior cruciate ligament (ACL), and a partially torn medial meniscus - a pad of cartilage in the knee.

Nick underwent surgery twelve days after his injury. Dr. LaPrade repaired Nick’s ligaments using an autograft technique, in which tissue is taken from another part of the patient’s body to replace the torn ligaments. Dr. LaPrade also sutured Nick’s torn meniscus.

Nick has always been extremely active and competitive in multiple sports. Nick lettered in high school football, baseball, golf, and basketball. He was all-state in football at two positions, kicker and cornerback, and continued to stay active through college. He has run a half marathon, competed in weightlifting and crossfit competitions, and enjoys outdoor activities such as fly fishing and hunting.

“After my injury, I just realized how important my health, or anyone’s health, is for allowing them to live life the way they want to live it,” Nick says. “Walking was hard. I couldn’t bike, walk up stairs, or sit in a seat at an NBA game. I was suddenly unable to do the littlest things that I had taken for granted.”

Two days after his surgery, Nick began physical therapy to regain range of motion and prevent the development of scar tissue. Five weeks after surgery, Nick was able to ride his bike, and at six weeks he was permitted to begin weight bearing exercises such as walking, working out in a pool, leg presses, and more. “I am now just very grateful I can start to get back to doing the things I love to do; the things that help me enjoy life,” he says.

Two and a half years after his surgery, Nick’s knee has healed extremely well. He has returned to competing in men’s league, plays intramural sports, and is able to participate in all the activities he loves, like boating and hunting. He is in his second year of medical school and is engaged to be married.

Nick’s injury influenced his career direction; his research focuses on complex knee surgery. In 2014, Nick’s research on posterior cruciate ligament graft fixation angles was awarded the American Orthopaedic Society for Sports Medicine (AOSSM) Excellence in Research Award, representing the top paper presented at the AOSSM annual meeting.

“Fifteen to twenty years ago, my kind of injury could have been life-altering,” he says. “It could have meant I would never be able to move my knee the same, or compete in sports and athletic activities at the same level. Thanks to research and recent advancements, ligamentous repairs are now showing great follow-ups, and people are able to perform at the exact same, and sometimes higher, level as before their injuries.”
At age 17, Craig King was an athletic honor student, playing both football and baseball at his South Carolina high school. At the beginning of his senior year, Craig noticed a lump on his leg and overlooked it as a sports injury. Although the lump grew as his senior year progressed, Craig played every game. With hopes of one day becoming a teacher, he graduated from high school and prepared for college.

Less than two months after graduation, he bumped his leg and was shocked by the pain. He saw multiple doctors before he was diagnosed with osteogenic sarcoma – bone cancer – in his left leg. Instead of packing for college, Craig underwent eleven months of chemotherapy to aggressively treat the cancer. During his chemotherapy, Craig had limb salvage surgery to save his leg and his life. His tibia was removed and replaced with a donor bone and his knee was reconstructed using orthopaedic cement and chrome cobalt.

Craig underwent intensive physical therapy after his surgery. “One of the biggest challenges was learning how to walk again,” Craig remembers. He experienced significant pain in his leg for months after surgery. He used a wheelchair to get around, and eventually progressed to crutches, then a walker, and eventually was able to walk on his own. “Physical therapy was hard, but the hospital provided a great support staff and my family and faith played a significant role in my rehabilitation.”

Osteogenic sarcoma is one of the most common types of bone cancers in children and young adults, representing 35% of all bone cancer cases. To prevent the spread of the cancer, osteogenic sarcoma patients require surgery to remove bone tumors and surrounding tissues. New techniques and materials in limb salvage surgery, reconstruction, and prosthetic technology continue to be a focus of musculoskeletal research.

While Craig is no longer able to play physically demanding sports, he was able to return to school and pursue his teaching degree. In 2007, Craig earned his Master’s degree in Rehabilitation Counseling. He served as an adjunct professor at South Carolina State University teaching leadership development to incoming freshmen. Now the Director of Governmental Affairs for the Palmetto State Teachers Association, Craig serves as an advocate for public education in South Carolina. Recently, Craig developed a workshop for male teachers. Craig is also active in many community organizations serving children with cancer. Craig is currently planning the third annual Craig Q. King’s Celebration of Life Gala, which benefits Camp Kemo, an oncology camp for children with cancer, and the American Cancer Society’s Relay for Life.

Craig, a 14-year cancer survivor, serves as an Ambassador for the American Cancer Society, traveling throughout South Carolina to advocate the need for further research. Additionally, Craig has traveled to Washington, DC, for several years to advocate for musculoskeletal research on Capitol Hill. “Without musculoskeletal research, I might not be doing the things I am doing today,” Craig says.

Craig is currently pursuing his Ed.D in Curriculum and Instruction from the University of South Carolina. In February 2015, he was selected as a recipient of the 20 Under 40 Award by The State Newspaper for his service to the community.

Additional research funding can improve the lives of people suffering from bone cancer by helping to develop better surgical techniques and advancements in materials and technologies that can save limbs and avoid amputation. “This type of research might allow others like me to be given a chance to reach their goals with a powerful testimony on life.”
College student Theodore “TJ” Luster was born with a rare bone condition called Osteogenesis Imperfecta (OI), also known as “brittle bone disease.” OI causes a defect in connective tissue which makes bones prone to fracture.

There are eight different types of OI, ranging in severity. TJ is OI Type IV, which means his body produces enough collagen, but it is low quality. His bones are weak; he has a short stature and moderate bone deformity.

Throughout his life, TJ endured many broken bones and multiple orthopaedic surgeries. In order to stabilize his legs, he had rods inserted in his femur and tibia bones. “As a child, I had surgeries somewhat regularly to replace the rods as my body outgrew them,” TJ explains. “This was also when my bones were at their weakest, meaning more injuries occurred.”

TJ was wheelchair-bound for his entire childhood. That did not stop him from playing with friends and participating in activities like swimming and basketball. “As a child, I never really felt like the disease slowed me down. It was all I knew.”

As his skeleton matured, the instances of fractures began to decline, and his bones became stronger. Now, TJ needs the wheelchair only for sports and long distances; he is otherwise able to walk unassisted. He has learned to be more careful and to take calculated risks, which has helped him avoid some injuries.

TJ maintains a close relationship with his orthopaedic surgeons. Laura L. Tosi, MD, a pediatric orthopaedic surgeon at Children’s National Medical Center who specializes in rare bone diseases, performed all of the operations on his legs. TJ also suffers from platybasia, a spinal disease where the base of the skull and the cervical spine do not properly connect. In 2002, Paul Sponseller, MD, MBA, a pediatric orthopaedic surgeon at Johns Hopkins Children’s Center, performed surgery to install a stabilizing plate in his neck.

As an adult, TJ became very active in a wheelchair basketball league. His team plays 3-5 days a week, and has even won tournaments. “It has become a passion of mine,” he says. “The games are very rough and competitive. Given my disease, this comes with risk. Just this season I have broken two fingers during games.”

This is a risk TJ feels is worthwhile. He hopes to continue playing the sport he loves while finishing college and beginning a career.

TJ appreciates the opportunities he has had because of his orthopaedic care. “Without the surgeries, I would not be able to live anywhere near the quality of life I have now,” TJ says. “I have been blessed with amazing parents who were supportive and did their best to not let their fears impact the way I lived my life.”

Supporting research for OI is vital for people living with the disabling disease. “In the past years, advances in medicine have increased the quality of life for many people living with OI and it is important to keep moving in the right direction.”
Andrew Meyers dedicated his life to competitive sports. From a young age, he participated in soccer programs and spent countless weekends traveling the country for tournaments. He advanced to elite status, and was awarded MVP, first place all-conference, and second place team all-state. Andrew's other passion was track and cross country; his achievements took him to National competitions twice in the Junior Olympics.

After high school, Andrew took a summer job with a local landscape service. He returned to work at the company during the summers while in college. His third summer, Andrew received a promotion which required him to organize job sites, work directly with customers, and handle invoices. On occasion, he helped out in the field as a laborer, acting as the foreman on the jobsite.

August 23, 2006, was a day that changed Andrew’s life. He arrived at work knowing he would be working in the field; his company was in the midst of moving equipment to a new site. “The day was nearing an end when a task required the use of one of our track loaders,” Andrew recalls. He located the track loader, which was being operated by a coworker. He stopped the operator and directed him to complete the task. In an effort to expedite his transportation across the job site, Andrew climbed on the track loader and instructed the worker to head to the area.

“After I instructed the coworker to go, he pushed the loader into full throttle and took off. Right then I knew something was wrong as I was flung into the cage of the pallet forklift,” he states. Andrew heard his coworker laughing, as if he had intended to scare him. Unbeknownst to the operator, Andrew was losing his balance, as he was standing on only a four inch step. “I repeatedly told the worker to slow down and stop, but he persisted. Before we knew it, the loader hit a bump and I was thrown from the forklift.”

Andrew landed in front of one of the track wheels. It caught his left leg, crushing his femur, tibia, and fibula. The pain was like nothing Andrew had ever before experienced. He recalls instructing his coworker to back off of him slowly, as not to induce further injury. In a surprising moment of clarity, Andrew yelled for someone to call 911 and then his parents. “I tried to stand up at first, but nothing happened. I made a second attempt, and then felt my leg bend at mid-thigh; this knocked the wind out of me. I felt like I was glued to the ground.”

Andrew was placed in a drug-induced coma for several days during which he endured several surgeries to attempt to save his leg. He suffered numerous infections, which required additional surgeries. Andrew’s injuries were so severe that amputation was ultimately required to save his life.

In 2008, Andrew had a revision surgery on his amputated limb, which led to three subsequent operations to combat infection. Andrew had a total of 18 surgeries on his leg. Six years after his accident, Andrew struggles with phantom leg sensation and pain, but he is adapting to life as an amputee. He learned to walk again with the aid of a prosthetic, and now participates in extreme sports with a special prosthesis designed for running. He is training to run competitively and enjoys challenging himself with rock climbing.

Andrew changed his career focus and is now studying to be a mechanical engineer at the University of Cincinnati. “I believe research dollars in areas that could improve the quality of life for amputees is money well spent. I dream of the days where we will be able to combine technology with biology and create biomedical devices that replace lost limbs.”

Andrew frequently speaks publicly about living with a disability, and has been interviewed on National Public Radio. “I like to make people aware that I am a person living a life with a “disability”, not a “disabled person” living a life,” he says. “Being an amputee is a physical condition; what I do as an amputee is what will define me.”
Shortly after starting a new job as a flight attendant, 23-year-old Pamela Schroeder was in a terrible automobile accident. The accident claimed the lives of two people and severely injured four. Pam’s lower body was completely crushed. Nearly every bone had been broken, including both legs and her spine. Only her arms and neck were spared. Pam had a collapsed lung and a ruptured spleen. Doctors were unsure if she would live through the night.

It was a miracle Pam survived. Shortly after the accident, Pam had surgery to repair her crushed ankle and lower spine. Six pins were used to stabilize her ankle. Two separate spinal surgeries fused nine of her vertebrae, sparing her from paralysis. Three bone grafts were required.

Months of intensive physical therapy followed. Eventually, Pam was able to walk again and was slowly able to return to her job. Her activities were limited, and her lifestyle changed completely. “I cannot risk damaging my spine and joints, so I have to be careful in choosing the activities I can do,” she says. She has never been able to return to skiing and dancing, two of her favorite pastimes before the accident. However, she is grateful for the ability to walk and to not be confined to a wheelchair. Pam’s tenacity allowed her to raise two children and work to support them.

Over the last three decades, Pam has had multiple surgeries due to damage from the accident and joint deterioration from posttraumatic arthritis. She struggled with significant pain in her back and ankles. In 2008, Pam had her knee replaced. In 2005, she had total ankle replacement surgery on her right ankle, performed by Steven Haddad, MD, an orthopaedic surgeon at the Illinois Bone and Joint Institute who specializes in complex foot and ankle reconstruction. “Within five years, materials testing and computer-assisted design allowed orthopaedic surgeons to develop a new generation of total ankle prostheses which provide better stability, bone integration, and longevity than the prior generation,” Dr. Haddad says. In 2009, he performed revision replacement surgery on Pam’s right ankle with the new implant.

In September 2012, Pam had a second knee replacement surgery, marking her 33rd surgery in 34 years. The joint replacement surgeries helped Pam live with a lot less pain. She still faces challenges with climbing stairs, lifting, and bending due to her spinal fusions.

“The accident completely changed my life,” Pam states. “There are so many things I could never try or had to give up. There were years of pain and surgeries, and my quality of life changed. However, I am grateful for what orthopaedic surgery has done to help my life.”

In 2014, over 65.8 million musculoskeletal injuries were reported, representing 77.4% of all unintentional injuries. Pam hopes that research funding will continue to improve the technology available to treat orthopaedic trauma. “New technologies must continually be developed to successfully help treat patients in the future.”

Pam is a dedicated advocate for orthopaedic surgery and advancements in musculoskeletal research. She served on the American Academy of Orthopaedic Surgeons Patient Advisory Board for five years and has advocated on Capitol Hill for musculoskeletal research funding. Pam spends her free time talking to patients considering ankle replacement surgery. She takes pride in the work of her surgeons and her renewed lease on life.
On October 1, 2011, Charles “Skip” Shank’s life took an unexpected turn. Skip, a father and avid outdoorsman, was riding his motorcycle when he was cut off by a car. He tried to avoid a collision, but an impact was inevitable.

The motorcycle accident crushed Skip’s pelvis and severely fractured his right leg, leaving a gaping open wound. He underwent emergency surgery to stabilize his leg. Lisa K. Cannada, MD, Associate Professor, Saint Louis University and Director of Trauma at Mercy Medical Center, used external fixation, a series of metal rods on the outside of his leg secured to the bone above and below the fracture, to attempt to stabilize the bone and save his limb.

Unfortunately, Skip’s injury had caused extensive damage to the muscle and soft tissue. His leg became infected and necrotic. Just nine days after the accident, Dr. Cannada concluded that the leg could not be spared. “When the tissue continued to die, it was determined that the best thing to do was amputate,” Skip laments.

Skip’s leg was amputated below the knee. In the months after his surgery, Skip developed heterotopic ossification (HO) around his knee joint. HO is the formation of bone in soft tissue. Posttraumatic HO is common and highly problematic. In some patients, HO is asymptomatic; but in others, the abnormal growth causes pain, stiffness, and requires surgical removal.

Skip spent five months in a wheelchair, and eventually graduated to crutches. With the help of physical and occupational therapy, Skip was able to return to his job and start to drive again. In June of 2012, Skip was fitted with a prosthetic leg to allow him to walk without an assistive device. Three months later, he was able to walk down the aisle at his son’s wedding.

With daily exercise, Skip continued to gain strength and has adapted to using his prosthesis. “The residual limb is holding up quite well and there seems to be no increase in the HO at this time,” he notes.

Each day, Skip encounters obstacles and challenges, but overall is thriving. “I have returned to work full time and the leg is doing very well,” he says. In 2013, Skip was able to start riding his motorcycle again. “I took a couple trips with friends and had an amazing time.”

Skip is enjoying his new role as a grandfather. He loves to babysit his 10 month-old grandson Brayden. In his free time, Skip volunteers at the hospital meeting with new amputees and their families to discuss the injury and recovery process.

Skip hopes that continued musculoskeletal research will help future trauma patients have more favorable outcomes. “Additional muscular and vascular research could have a major impact on the ability to save limbs.”
In the fall of 2012, style expert Alison Skogen was walking down the stairs in her home. Suddenly, her ankle gave way and she fell, landing face down. She heard a pop, and knew instantly that she had broken her ankle.

A few days after her injury, Alison underwent surgery to stabilize her fracture. Laura M. Bruse Gehrig, MD, an orthopaedic surgeon who specializes in foot and ankle, inserted a plate and screws, which allowed Alison’s bones to heal.

Alison has suffered for years with psoriasis, an autoimmune disease characterized by painful skin rashes. She has psoriatic inflammation on the bottoms of her feet, which can cause pain while walking. Although her psoriasis is controlled by mediation and UV light, there is greater risk for patients with psoriasis to undergo surgery, especially if they have lesions or skin issues.

Two months after her surgery, Alison started walking with a boot. Under the guidance of Dr. Bruse Gehrig, Alison did her own physical therapy, slowly and steadily rebuilding the strength in her ankle. With the aid of her dermatologist, she worked diligently to maintain control of her psoriasis, as not to have to endure a recurrence while her ankle was healing.

By January of 2013, Alison was back to a fairly normal routine. “My ankle is as perfect as possible, considering the injury, surgery, and therapy,” she says. “Dr. Laura was demanding in her instructions. It was to my benefit to follow them; the outcome wouldn’t be what it was if I hadn’t.”

Alison enjoys the arts and loves to sing and do crafts. She hopes to continue to do her hobbies and walk for exercise. She listens to her body and occasionally will wear an ankle brace if needed. “I’m living my life as before with virtually no restrictions.”

With regular exercise, Alison’s ankle continues to get stronger. “I have even worn a 2” heel to work, and not had a problem,” she says. “That’s an accomplishment for working retail, with 9 pins and a plate!”

Due to her age and some of the medications she is taking for her psoriasis, Alison is at risk for developing osteoporosis, a degenerative disease that causes bone loss and an increased possibility of fractures. Osteoporosis is a significant public health problem, which affects over 44 million Americans and is responsible for two million fractures annually.

“Orthopaedics is ever-evolving; we see this in the strides made to help our veterans and in helping folks like me,” Alison says. “Research dollars are critical to improve surgeries like I had. I believe 10-15 years ago, my outcome would not have been as good as it has been.”
Brandon Smith has played the piano since he was five years old. A lifelong student of history, politics, and economics, Brandon earned undergraduate degrees in all three concentrations before attending law school.

In the winter of 2014, the recent law school graduate spent the majority of his time studying for the Pennsylvania Bar Exam. On February 7, 2014, Brandon slipped on the ice while walking from his car. He fell and landed on a sharp piece of broken glass, cutting open his right hand.

The wound was deep, causing profuse bleeding. In the emergency room, Brandon learned he severed a major nerve in his hand at the junction of the ulnar digital nerve of his middle finger and the radial digital nerve of his ring finger. Brandon was referred to John Fowler, MD, an orthopaedic hand surgeon at the University of Pittsburgh Medical Center.

On March 17, 2014, Dr. Fowler performed a surgery to repair the damaged nerves using an allograft, a cadaver nerve that has been processed to remove proteins and cells while leaving the nerve structure in place. “I was concerned that my injury would adversely affect my studying for the bar exam, adversely affect my first job post-law school, and limit me physically,” Brandon recalls.

Since his surgery, the feeling in his two affected fingers has gradually begun to return. Dr. Fowler advised him that healing from a nerve transfer can be a slow process, and that his feeling would improve over time. Within ten months of the procedure, Brandon is able to feel hot and cold sensation, and has continued to improve.

“Luckily, the injury has not impaired my life activities, other than during the recovery period in which I had to wear a large cast,” he says. After the surgery, his ability to work and drive a car was limited for about a month.

Overall, Brandon’s injury did not impact his quality of life. He regularly massages his hand and is encouraged by Dr. Fowler to participate in all of his regular activities and exercises, such as weight lifting. “I intend to remain active and not be inhibited by this or any other injury,” Brandon states.

Brandon passed his bar exam and is currently exploring various aspects of the legal profession to find the branch of law he wishes to pursue. He aims to one day go into public service, possibly in Washington, DC. Because of his surgery, he has been able to return to playing the piano.

Brandon hopes to see additional research funding to develop novel procedures like nerve transfers for trauma patients. He knows firsthand that injuries do not discriminate. “This type of injury can happen to anyone at any time. After all, I was a young, healthy 25-year-old simply walking on a snowy evening.”
In October of 2010, police officer Peter Soto was on duty and en route to investigate a domestic abuse call when a truck pulled in front of him, sideswiping his motorcycle and pinning him underneath. The truck crushed him, breaking several bones and damaging multiple internal organs.

Pete sustained a complex pelvic fracture, completely destroying his left hip socket. He also fractured his left tibia, dislocated his left shoulder and sustained a rotator cuff tear, a ruptured spleen, and a torn bladder. Miraculously, Pete never hit his head; his helmet was unscathed. However, he lost vision in one eye due to the jarring of the accident. “I had life-threatening bleeding, primarily from the pelvic fractures,” he recalls.

An ambulance was called and the trauma team resuscitated him. Pete was taken MetroHealth, where he was treated by Heather Vallier, MD, an orthopaedic traumatologist. He had an angiography for pelvic embolization, although he was still bleeding profusely. He was rushed into surgery, where Dr. Vallier repaired his pelvis and hip socket in an effort to control bleeding and realign and stabilize the fractures.

“The surgery lasted several hours and I lost five liters of blood,” Pete explains. “I received over three dozen transfusions.” He spent several days in the intensive care unit at the hospital, and many weeks in rehabilitation in an attempt to regain what he had lost.

Over the subsequent years, Pete spent a lot of time in therapy. He was able to start walking three months after the accident, but still requires an ankle-foot orthotic (AFO) to support his foot, due to damaged nerves.

Pete ultimately developed osteonecrosis, or cell death, in his left hip, which lead to severe osteoarthritis. He went under the knife again in December 2011 to remove the hardware in his pelvis, assess for residual infection, and receive a total hip replacement.

Pete has continued to heal, but has significant limitations due to stiffness and weakness in his shoulder. He experiences ankle and foot pain due to nerve damage in his leg. He tries to make the best of his situation by helping other trauma patients. Pete is an active volunteer for the peer visitor program and patient recovery groups through the Trauma Survivor Network program at MetroHealth.

Pete hopes to see medical advances in the study of resuscitation methods, bone healing, infection prevention and treatment, and treatment of nerve damage. “Research funds co-rehabilitation strategies, including efforts to optimize psychosocial recovery and employment ability,” he says.
During his senior year of high school, baseball star Latham Walleck noticed pain in his right knee. He wrote it off as a sports injury. After baseball season ended, the pain subsided. He didn’t give it any further thought.

After graduation, Latham and his friends spent their summer days playing recreational softball. He again noticed the unusual pain in his knee. He went to the doctor for x-rays. The imaging revealed a small growth on his knee. The following week, he had a biopsy and was diagnosed with a primary bone cancer called osteosarcoma.

Primary bone tumors are uncommon. Osteosarcoma occurs in approximately two new people per million annually, and is generally seen around the knee joint. Treatment options are limb salvage surgery or amputation.

Latham was referred to Rajiv Rajani, MD, a musculoskeletal oncologist and orthopaedic surgeon at the University of Texas Health Science Center San Antonio.

Three months after his biopsy, Dr. Rajani removed Latham’s tumor and the surrounding bone and tissue, saving his leg. The surgery involved a total knee replacement. He endured months of chemotherapy following surgery to ensure the cancer was gone.

Unfortunately, less than a year after completing chemotherapy, a nodule appeared on Latham’s left lung. He had surgery to remove the metastasis in March of 2014. About four months later, another nodule appeared on his right lung. He had surgery on his right lung in August of that year.

Since then, Latham has been cancer-free. “My greatest challenge was learning to cope with the fact that I would no longer be able to do all of the physical activities that I was able to do previous to surgery,” he says. Although he is no longer able to run, he is grateful to be alive. “I've become more appreciative of the life that I live.”

Latham is currently pursuing a business degree and is focusing on his studies. He hopes additional research into the treatments of primary bone tumors will benefit future patients and help prevent metastatic disease.
When Kayce Welch’s grandmother noticed there was something not quite right about her 9-year-old granddaughter’s spine, her parents made an appointment with her doctor. Upon evaluation from her pediatrician, Kayce was diagnosed with scoliosis, an abnormal sideways curvature of the spine which affects many children and adolescents. She was immediately referred to Richard McCarthy, MD, Chief of Spinal Deformities at the University of Arkansas for Medical Sciences and Arkansas Children’s Hospital.

Kayce’s close-knit family is all too familiar with scoliosis. Kayce’s mother’s cousin Greg had a severe curvature in his spine that required spinal fusion surgery when he was 16.

In June of 2007, four months after diagnosis, Dr. McCarthy performed surgery, inserting Shilla rods to straighten Kayce’s spine. The Shilla rods are designed to expand as a child grows, and allowed Kayce to live free of a restrictive back brace.

A year and a half after surgery, Kayce became very ill and was diagnosed with Type 1 Diabetes. However, she did not let her diabetes impede her life. Kayce became involved in swimming, and took an avid interest in theatre.

Within the next five years, Kayce outgrew the Shilla rods and had developed a double “S” curve in her spine. Five days before Kayce’s 15th birthday, Dr. McCarthy performed a second operation, replacing the expandable implants with permanent titanium rods to fuse her spine.

Kayce’s diabetes put her at greater risk for surgical complications. Following the spinal fusion, Kayce developed a staph infection, requiring two additional surgeries within 10 weeks. She was on a high dose of antibiotics for six months, but has since recovered and is doing extremely well.

“I believe that because of the Shilla rods, I was able to lead a normal childhood,” Kayce says. “It has also given me a chance to share my experience with others and encourage them. Even though I have a few limitations because of the rods, I know that what I can do outweighs what I can’t do.”

Kayce has made the most out of her situation. She has a natural compassion for others, and spends her free time raising awareness and money for diabetes. She organized a walk to raise money for a local camp for children with diabetes, and is currently working with community leaders to organize a Gala, aiming to raise money to open a Juvenile Diabetes Research Foundation office in Texarkana.

Kayce’s family is proud of the young woman she’s become. “She has the opportunity to share her stories and help raise funds to cure diabetes and make similar scoliosis procedures available for others with conditions like hers,” her mother Robin says. Recently, Kayce was recognized as a Prudential Spirit of Community State Honoree for Texas and awarded a President’s Volunteer Service Award winner for her work with diabetes in Texarkana.

“I do not want to be seen as a weak young girl with disabilities, but a strong young woman who has overcome obstacles,” Kayce states.

Kayce and her family know the impact of advancements in research. At the time her mother’s cousin was being treated for scoliosis, the available surgical treatment required a body cast for ten weeks. “Because of funding and medical advancements, I did not have to go through extended casting and recovery,” Kayce says. “Within a day I was up and walking on my own.”
Kyle Wells is an avid outdoorsman. He owns and operates a lawn care and landscaping company and spends as much time as possible outside playing sports and hunting. In the fall of 2013, Kyle was enjoying a sunny day, riding four-wheelers with his friends.

“I was crushing through a trail in the woods doing about 35-40 MPH when I hit a root,” Kyle recalls. He lost control of the vehicle and was thrown into a tree. His leg wrapped around the trunk and snapped in half, bones splintering through his skin.

Already deep into the forest, it took a team of paramedics on an ATV over 45 minutes to reach Kyle. He was carried on a gurney for several miles until the ambulance could meet them on a service road. After a long, bumpy ride on a gravel path, the ambulance met a helicopter in a cornfield and Kyle was airlifted 56 miles to Mercy Medical Center.

Kyle spent the next 16 days in the hospital, under the care of Lisa K. Cannada, MD, Director of Trauma at Mercy Medical Center and an Associate Professor at Saint Louis University. Dr. Cannada, an orthopaedic trauma surgeon, debrided the wound to remove dead tissue and applied an external fixator to stabilize his leg. After two subsequent debridement surgeries, Kyle’s surgical team concluded that he would need a muscle transfer if he wanted to keep his leg, due to the extensive bone and soft tissue damage.

A muscle from Kyle’s abdomen was placed on his inner calf to keep blood circulating in his leg and keep it alive. Skin was grafted from his left leg to cover the open wound. After five surgeries in two and a half weeks, Kyle was sent home to heal before his next and final procedure.

In January of 2014, Dr. Cannada performed surgery to repair the defect in Kyle’s tibia using rhBMP2, a protein that stimulates bone production. “The rhBMP2 allowed me to get back to recovery faster and without additional open wound sites,” Kyle explains. “The chunk of bone that was splintered off in the accident would have required two additional incisions with a traditional bone graft; they would have had to scrape bone off my outer hip and femur.”

After 25 intensive physical therapy sessions, Kyle took his rehabilitation into his own hands and established a routine of stretches, exercise, and weight lifting that helped him to walk again. “I was able to keep my leg and can carry on with my life,” he says. “I was threatened to lose my leg by from an accident, and here I am today walking around as if nothing happened.”

Kyle has been able to return to work, and regularly lifts weights and hunts. He walks without a limp or an assistive device, and is 95% pain-free. He has limited range of motion in his ankle and is unable to run, but is working hard to regain flexibility.

Kyle considers Dr. Cannada to be his hero. Kyle, who is part of a study on bone defects, realizes that newer treatments like rhBMP-2 are the direct result of research into less invasive and more effective treatments of orthopaedic trauma. He hopes further research will continue to benefit trauma patients.
As a preteen, Shelby Welsch was an avid athlete who enjoyed playing volleyball, running track, and exploring her musical talents on the piano and the viola. At age 12, Shelby’s cousin, a physical therapist, noticed a curve in her back. After a visit to her pediatrician, Shelby was diagnosed with scoliosis, an abnormal curvature of the spine that can cause severe deformity and difficulty breathing if left untreated.

Shelby was instructed to wear a rigid brace while sleeping to prevent the curve from worsening. However, after faithfully wearing the uncomfortable brace for a year, it was evident that her scoliosis had continued to progress. Her doctor recommended spinal fusion surgery. Shelby’s parents took her to the University of Iowa in Iowa City for a second opinion.

Pediatric orthopaedic surgeon and spine expert Stuart Weinstein, MD, agreed that Shelby’s scoliosis required surgical intervention. In July 2010, Dr. Weinstein performed spinal fusion surgery to permanently straighten Shelby’s spine.

After the surgery, Shelby was 2.5” taller and had perfect posture. “For the first few months after surgery, the biggest challenge was dealing with the incredible pain, and learning to move in different ways since Shelby couldn’t bend,” her mother Ann recalls. “It is difficult to see your child suffering.”

Shelby worked with therapists in the hospital to learn to cope with her new limitations. After the surgery, she was unable to participate in sports or play her viola for several months. She was restricted from carrying a backpack in school and from any bending. However, nine months after surgery, she rejoined the track team. She was slower and no longer able to jump hurdles, but enjoyed being active and spending time with her friends. The following year, Shelby made the tennis team.

“Once she was released to play her viola again, she got right back to being first chair in the school orchestra,” boasts Ann. “She also plays in the Simpson College-Community orchestra, and plans to continue to play viola in college.”

Now a high school senior, Shelby will attend the University of Northern Iowa in the fall with plans to major in English education. She hopes to write for the student newspaper and eventually become a teacher to inspire students to do their best and follow their dreams, even if they face obstacles.

The spinal fusion procedure Dr. Weinstein performed on Shelby was one he pioneered. “If not for medical research for the spinal fusion surgery, Shelby would have likely had to endure wearing a back brace 24 hours a day, and probably would have ended up somewhat disfigured, hunched-over, and enduring a great amount of pain in her adult life.”

Shelby and her parents are confident that with continued research, even better treatments for children with scoliosis will be developed.
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ORTHOPAEDIC CARE has changed the lives of millions of people. When Pamela Schroeder was 23, she was in a tragic automobile accident that broke nearly every bone in her body, including both legs and her spine. Over the last three decades, Pam has had 33 orthopaedic surgeries as a result of the accident and posttraumatic osteoarthritis. Because of her orthopaedic care, Pam leads a fulfilling life and has been able to raise a family and pursue a demanding career as a flight attendant. To read more about Pam’s story, turn to page 10.