Medical Student Orthopaedic Exam Blueprint

1. Orthopaedic Anatomy (17%)

1.1 Muscle and Tendon Anatomy

- 1.1.1 Paraspinal muscles
- 1.1.2 Periscapular and deltopectoral muscles
- 1.1.3 Rotator cuff
- 1.1.4 Anterior and posterior compartments of the arm
- 1.1.5 Anterior and posterior compartments of the forearm
- 1.1.6 Intrinsic muscles of the hand
- 1.1.7 Hip flexors and abductors
- 1.1.8 Short external rotators around the hip
- 1.1.9 Anterior, medial and posterior compartment of the thigh
- 1.1.10 Four compartments of the leg
- 1.1.11 Intrinsic muscles of the foot

1.2 Peripheral Nerve Anatomy

- 1.2.1 Cervical nerve roots and dermatomes
- 1.2.2 Brachial plexus
- 1.2.3 Upper extremity nerves
- 1.2.4 Lumbosacral nerve roots and dermatomes
- 1.2.5 Lumbosacral plexus
- 1.2.6 Lower extremity nerves

1.3 Vascular Anatomy

- 1.3.1 Upper extremity vascular tree
- 1.3.2 Lower extremity vascular tree

1.4 Regional Anatomy

- 1.4.1 Spine
- 1.4.2 Elbow
- 1.4.3 Knee
- 1.4.4 Ankle
- 1.4.5 Shoulder
- 1.4.6 Wrist and Hand

2. Basic Science (11%)

2.1 Bone and Cartilage Biology/Bone Healing and Remodeling

- 2.1.1 Types of bone and cell lineages for osteoblasts, osteocytes, osteoclasts
- 2.1.2 Bone homeostasis
- 2.1.3 Primary vs secondary bone healing

2.2 Types and kinematics of major joints

- 2.2.1 Types of joints
- 2.2.2 Basic kinematics of spine, shoulder, elbow, wrist, hip, knee, ankle

2.3 Medicine in Orthopaedics

- 2.3.1 Thromboembolic events
- 2.3.2 Orthopaedic pharmacology
- 2.3.3 Medical comorbidities and their intersection with orthopaedics

2.4 Biomechanics

- 2.4.1 Wolff's law
- 2.4.2 Types of stability (matching different fixation methods to different types of stability)

2.5 Nonunion, Malunion, and Hardware Failure

- 2.5.1 Types of nonunion
- 2.5.2 Malunion vs nonunion diagnosis

3. Clinical Evaluation and Diagnosis (13%)

3.1 Gait and Functional Assessment

- 3.1.1 Gait abnormalities
- 3.1.2 Vascular examination
- 3.1.3 Muscle function
- 3.1.4 Ligament function

3.2 Physical Examination Techniques

- 3.2.1 Hand and Wrist and Forearm
- 3.2.2 Shoulder
- 3.2.3 Knee
- 3.2.4 Foot and ankle
- 3.2.5 Hip
- 3.2.6 Spine
- 3.2.7 Examination of the obtunded patient

4. Orthopaedic Trauma and Emergency Care (15%)

4.1 Fracture Classification

- 4.1.1 Humerus
- 4.1.2 Distal Radius
- 4.1.3 Hip
- 4.1.4 Tibial Plateau
- 4.1.5 Ankle

4.2 Initial Management Trauma Patient

- 4.2.1 Emergent orthopaedic Injuries and primary stabilization

4.3 Open fracture

- 4.3.1 Antibiotics
- 4.3.2 Initial management
- 4.3.3 Gustilo-Anderson classification

4.4 Compartment Syndrome

- 4.4.1 Pathophysiology of compartment syndrome
- 4.4.2 Measuring compartments
- 4.4.3 Treatment for compartment syndrome
- 4.4.4 Complications of undiagnosed compartment syndrome

5. Musculoskeletal Radiology (15%)

5.1 Plain Radiographic Interpretation and Common Terminology

- 5.1.1 Basic utilization of radiographs for musculoskeletal problems
- 5.1.2 Interpretation of radiographs
- 5.1.3 Bony terminology
- 5.1.4 Identification of fractures and radiographic description
- 5.1.5 Identification of common pathologic radiographic signs

5.2 Advanced Imaging modalities (CT, MRI, and ultrasound)

- 5.2.1 Sagittal/axial/coronal cuts
- 5.2.2 Applications and indications for computed tomography (CT)
- 5.2.3 Applications and indications for magnetic resonance imaging (MRI)
- 5.2.4 DEXA scans

6. Orthopaedic Pathophysiology (8%)

6.1 Musculoskeletal Infections

- 6.1.1 Infections that require urgent surgical intervention (examples: native septic arthritis, flexor tenosynovitis, necrotizing fasciitis, etc)

6.2 Bone Tumors and Lesions

- 6.2.1 Ewing sarcoma
- 6.2.2 Osteosarcoma
- 6.2.3 Chondrosarcoma
- 6.2.4 Metastatic disease
- 6.2.5 Nonossifying fibroma
- 6.2.6 Osteochondroma
- 6.2.7 Osteoid osteoma

6.3 Genetic and Metabolic Bone Disorders

- 6.3.1 Most common fragility fractures
- 6.3.2 Diagnostic criteria for osteoporosis
- 6.3.3 Paget's disease
- 6.3.4 Rickets

7. Orthopaedic Conditions and Diseases (11%)

7.1 Osteoarthritis and Rheumatoid Arthritis

- 7.1.1 Basic science
- 7.1.2 Anatomic joint changes
- 7.1.3 Conservative management options
- 7.1.4 Operative management options

7.2 Pediatric Orthopaedic Conditions

- 7.2.1 Physeal injuries/Salter Harris classification
- 7.2.2 Slipped capital femoral epiphysis
- 7.2.3 Elbow centers of ossification
- 7.2.4 Perthes disease
- 7.2.5 Developmental hip dysplasia
- 7.2.6 Clubfoot and metatarsus adductus

7.3 Spine Disorders

- 7.3.1 Radiculopathy
- 7.3.2 Spinal stenosis
- 7.3.3 Cauda equina
- 7.3.4 Epidural abscesses

7.4 Sports Injuries

- 7.4.1 Knee
- 7.4.2 Shoulder

7.5 Overuse Syndromes

- 7.5.1 Lateral epicondylitis
- 7.5.2 Medial epicondylitis
- 7.5.3 De Quervain tenosynovitis
- 7.5.4 Tendinopathy
- 7.5.5 Stress fractures

8. Surgical Indications for Musculoskeletal Conditions and Injuries (10%)

8.1 Arthroscopy and OR Equipment

- 8.1.1 Arthroscopy
- 8.1.2 OR equipment

8.2 Joint Replacement Fundamentals

- 8.2.1 Indications for joint replacement of shoulder, elbow, hip, knee, and ankle
- 8.2.2 Outcomes for joint replacement, including survivorship, functional limitations, and complications

8.3 Tendon and Ligament Repair

- 8.3.1 Key components of tendon repair and effect on strength of repair: suture techniques, repair gap, and augmentation (biologics and grafts)
- 8.3.2 Common complications and prevention techniques (rupture, adhesions)

8.4 Fracture Fixation Principles

- 8.4.1 Basic fixation techniques and indications for each: external fixation, cortical, locking, lag screw, buttress plating, intramedullary, spanning plates
- 8.4.2 Differences between load sharing and load bearing fixation
- 8.4.3 Tolerances for common fractures in both adults and children: clavicle, forearm, femur including hip, ankle

8.5 Bracing and Orthotics

- 8.5.1 Function bracing for humerus fractures, tibia fractures, and Achilles ruptures
- 8.5.2 Key types of bracing and indications for each

8.6 Nonoperative Management of Fractures and Soft Tissue Injuries

- 8.6.1 Indications, protocols, and outcomes for non-operative treatment of conditions
- 8.6.2 Role of intraarticular injections of steroids, and hyaluronic acid
- 8.6.3 Pediatric nonaccidental trauma