SERVICE: Orthopedics - Sinai, PGY 1

General description:

The Sinai surgical residents will rotate in the Department of Orthopedic Surgery at Sinai Hospital during their intern year. The duration of this rotation is 6 weeks.

The Sinai resident will be a fully integrated member of the Orthopedic Surgery team, under the supervision of the senior Orthopedic Surgery resident, experienced Orthopedic Surgery mid-level provider(s) and the Orthopedic Surgery attending staff.

The surgical residents will participate in all care rendered to inpatient Orthopedic Surgery patients at Sinai Hospital: admission, diagnostic work-up, operations, post-operative care and discharge. In addition, the surgical residents will participate in the care/operations of Orthopedic Surgery patients in the Orthopedic Surgery clinic and Orthopedic Surgery attending office hours.

The surgical residents will attend the following educational activities:

Orthopedic Tumor Conference—Monday 1700-1830
Total Joint Conference—Tuesday 700-800
Fracture Conference—Thursday 700-830
Didactic Conference—Friday 700-830 (various rotating topics including journal club, medical ethics, hand, foot, etc.)
Orthopedic Grand Rounds—once monthly lecture incorporating M&M conference, Tuesday 1700-1800

Competencies:

Goals and Objectives:

<table>
<thead>
<tr>
<th>Competencies:</th>
<th>Goals:</th>
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<td>Patient Care:</td>
<td>During this rotation, the resident should learn and practice to:</td>
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<td>• Demonstrate caring and respectful behaviors when interacting with patients and their families; demonstrate sensitivity to gender, age, ethnicity, religion, value systems and other potential differences of patients and their families; practice according to the clinical standards of Sinai Hospital</td>
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<td>• Gather patient and case specific essential, comprehensive multi-source and accurate information about their patients for initial or peri-operative workup and patient follow-up in the inpatient and outpatient setting</td>
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<td>• Using all available resources, under the guidance of the senior Orthopedic Surgery resident and attending, make informed decisions about diagnostic and therapeutic interventions based on patient information, up-to-date scientific evidence and clinical judgment; evaluate and implement priorities in patient care and incorporate preventive</td>
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measures

- Under the guidance of the senior Orthopedic Surgery resident, attending and other designated Orthopedic Surgery related expert personnel, develop and **carry out** patient management plans

- Under the guidance of the senior Orthopedic Surgery resident, attending and other designated Orthopedic Surgery related expert personnel, **monitor** closely the patients' clinical progress, review and react to variances in patient progress or response to therapeutic interventions; **communicate** the details and changes of patient care, progress and complications to the senior Orthopedic Surgery resident and/or attending in a timely manner

- Under **close and direct** supervision of the Orthopedic Surgery attending and other designated Orthopedic Surgery related expert personnel, **counsel and educate patients** and their families on the state of the patient's disease, necessary diagnostic tests, operative procedures and medical management

- Use information technology (hospital computer system) to support patient care decisions and patient education (electronic patient record, electronic radiology studies, online educational resources, including literature research)

- **Work closely with other healthcare professionals**, including those from other disciplines (Trauma Surgery, Neurosurgery, (Rehabilitation-)Medicine, mid-level providers, nurses, Orthopedic Surgery office staff, etc.), to provide patient-focused and optimum outcome driven care

- Ensure that the **needs of the patient and team supersede individual preferences** when managing patient care; incorporate evidence-based medicine into patient care whenever possible; comply with changes in clinical practice and standards given by senior Orthopedic Surgery resident and/or attending

**Objectives:**

During the rotation, the resident should:

- Under one-on-one supervision of the Orthopedic Surgery attending, **perform competently and/or assist in procedures** (both in the inpatient and outpatient setting) **considered essential for the area of practice**.

**Perform:**

a. Closed reduction of extremity fractures and dislocations and immobilization, using various splints and casts

b. Application of spine and extremity traction systems

c. Simple joint aspiration/injections such as of the knee or shoulder

d. Evaluation of post-operative wounds and application of orthopedic dressings and
| Assist/observe: | 
| --- | --- |
| a. External/internal fixation of extremity fractures |
| b. Joint replacement (hip, knee, shoulder) |
| c. Arthroscopic surgery (mostly knee, also shoulder, ankle or hip) |
| d. Soft tissue repairs/reconstruction (rotator cuff, quadriceps or Achilles tendon, anterior cruciate ligament ACL) |

| Observe: | 
| --- | --- |
| a. Complex cases (limb-lengthening, soft tissue and bone tumor resections, redo-joint replacement, operative treatment of osteomyelitis and hardware infection |
| b. Orthopedic spine surgery (discectomy, scoliosis, spinal fusion) |

- Under supervision by the senior Orthopedic Surgery resident, experienced Orthopedic Surgery mid-level provider(s) and attendings, participate in the pre- and post-operative surgical management of patients before and after orthopedic procedures; evaluate new emergency and inpatient consultations; participate on daily morning and afternoon patient rounds on the Orthopedic Surgery service at Sinai.

- Under supervision by the senior Orthopedic Surgery resident, experienced Orthopedic Surgery mid-level provider(s) and attendings, manage post-operative surgical complications, including wound infection, compartment syndrome, neurovascular injuries, non-union, bleeding, etc.

- Attend Orthopedic Surgery (attending) clinic at least once a week and under one-on-one supervision by the Orthopedic Surgery attending, participate in the evaluation of patients in the office setting.

| Medical Knowledge: | 
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**Goals:**

Residents must demonstrate knowledge about established and evolving biomedical, clinical and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.

**Objectives:**

At the end of the Orthopedic Surgery rotation, the resident should be able to:

- Describe the anatomy and (patho-)physiology of the musculo-skeletal system, including normal anatomy of the major bones and joints, histology of different types of bone and their dynamic nature, basics of fracture healing (primary, secondary), basics of arthritis/degenerative joint disease and changes of bone structure and physiology with age/hormonal influences/medications, etc.; differences of bone and joint anatomy and behavior in childhood.
- Describe the gross **anatomical structures of the skeletal system** and the function of the specific bones and muscles of the body; understand fundamental patterns of innervation and sensory feedback from the musculoskeletal system, particularly pain.

- Explain the **physiology and biochemistry of bone growth and maturation** from childhood to adulthood:
  a. Basic bone, cartilage and muscle embryology, common genetic abnormalities of the musculoskeletal system
  b. Calcium-phosphate homeostasis, osteoblast and osteoclast activity
  c. Vascular supply and innervation of bones
  d. Components of long bones, growth plate function
  e. Influence of hormones on bone growth and metabolism (estrogen and testosterone, corticosteroids, PTH and calcitonin, etc.)
  f. Influence of (mal-) nutrition on bone growth and healing
  g. Influence of vascular disease and inactivity on bone growth and metabolism

- Analyze the principal **concepts of pain** causation and perception.

- Analyze the orthopedic role in **evaluation and management** of:
  a. Musculoskeletal trauma
  b. Inflammatory, infectious and metabolic disorders (Rheumatoid arthritis, Pyogenic arthritis, steomyelitis, osteomalacia, hypothyroidism, hyperparathyroidism, gout, etc.)
  c. Musculoskeletal tumors (sarcomas, malignant bone tumors, benign bone tumors)
  d. Degenerative conditions (osteoarthritis, traumatic arthritis, osteoporosis)
  e. Soft tissue sprains and overuse injuries (ankle sprain, tendon tear, myofascial pain)

- Outline a **systematic approach for the assessment of the skeletal system** using history taking and physical examination; identification and localization of potential fractures/dislocations, accurate assessment of neurovascular status.

- Discuss the use of **radiographic imaging** in the evaluation and management of the following **orthopedic pathology**:
  a. Musculoskeletal tumors (primary, metastatic)
  b. Isolated extremity injuries (long bones, joints)
  c. Spinal injury (fracture, [sub-]luxation)
  d. Pelvic trauma (fracture, hip dislocation)
  e. Chronic musculo-skeletal pain syndromes
  f. Degenerative, inflammatory, metabolic joint and bone disease (osteoarthritis, osteoporosis, gout, osteomalacia, rheumatoid arthritis, SLE, hyperparathyroidism / Vitamin D deficiency, etc.)

and include **imaging techniques** such as:

a. Plain films in 2 planes and special projections, functional plain radiographs (spine...
flexion and extension), conventional contrast studies (myelography)
b. Computed tomography (axial, sagittal, 3D reconstruction)
c. Magnetic resonance imaging (MRI), with and without contrast
d. Radionuclide imaging
e. Arteriography

- Discuss the role of arthroscopy in the evaluation and therapy of orthopedic pathology (specifically for the knee)

- Identify considerations for basic care of patients with acute trauma to the musculo-skeletal system:
  a. Fundamental fracture classification (open [grades]/closed, simple, complex/comminuted, fractures that involve growth plate/joints, angulation / dislocation) and their implication for management
     - Types of spine fractures (including dens), mechanism of trauma and implications for stability and spinal cord/nerve root injury
     - Major types of pelvic fractures (including acetabulum), mechanism of trauma and implications for bleeding problems; acute stabilization (binder, external fixation)
     - Types of shoulder and proximal humerus fracture/dislocation, mechanism of trauma and implications for ligamentous (capsule, rotator cuff, etc.) and neurovascular injury; supracondylar humerus fracture
     - Wrist fractures and injury to carpal bones, mechanism of trauma and implications for neurovascular injury, aseptic bone necrosis
     - Types of hip fracture/dislocation, mechanism of trauma and implications for neuro-vascular injury and aseptic necrosis of the hip
     - Types of knee (distal femur, proximal tibia) fractures /dislocation, mechanism of trauma and implications for neurovascular injury
     - Types of ankle fractures and mechanism of trauma; calcaneus and major tarsal fractures / dislocations
  b. Combination injuries (bone, soft tissue), crush injury (compartment syndrome, rhabdomyolysis), fractures that have potential for neuro-vascular involvement and their implication for management; diagnosis and management of fat embolism
  c. Pain – physiologic implications, diagnosis and management (immobilization, analgesics [non-steroidal, narcotics, anti-depressants and medications for neuropathic pain])
  d. Considerations in the management of poly-traumatized patients:
     - Head, chest, abdominal trauma, shock
     - Management priorities
     - Orthopedic damage control techniques
  e. Explain the fundamental management principles for orthopedic trauma,
including:
- Compartment pressure problems – accurate (clinical) diagnosis and indication / technique(s) of fasciotomy (upper and lower extremity)
- Indications and limitations of closed reduction and casting
- Indications and limitations of reduction and external fixation, including orthopedic damage control (pelvic fracture external fixation for pelvic hemorrhage, extremity external fixation with acute vascular injury)
- Indications for open reduction and internal fixation of fractures, and basic techniques (plate and screws, rods/nails)
- Open fracture management: debridement, irrigation, primary vs. delayed closure
- Indications and methods for application of skeletal traction
- Timing of therapy
- Principles of early mobilization and rehabilitation
- Assessment of DVT risk, prevention and management

f. Understand differences in trauma management in children and elderly patients:

Children:
- Epiphyseal fractures: Salter-Harris Classification, impact on growth and deformity
- Greenstick fractures (plastic deformation)
- Differences in bone healing and remodeling in the pediatric patient
- Pediatric joint trauma
  - Supracondylar elbow fractures in children (optimal treatment, risks, vascular evaluation)
  - Operative Salter-Harris fractures
  - Hip dislocation or fracture (risk of avascular necrosis)
  - Role of closed reduction/casting
  - Femur fractures (spica cast vs. external fixation vs. intra-medullary fixation)
- Differences in pain management, management of psycho-social stress, involvement of Pediatric specialists

Elderly patients:
- Comorbid conditions and their influence of peri-operative complications
- Fractures with lower impact trauma (osteoporosis); differences in bone healing in the elderly patient
- Increased risk for thromboembolic disease, bleeding dyscrasias, (occult) infections, wound healing problems, prolonged immobilization, etc.

g. Explain the management of nerve injury associated with musculoskeletal trauma and other pathology, including:
- Response of nervous tissue to injury (regeneration, degeneration, chronic pain)
- Evaluation of nerve injury (peripheral nerve/radicular/cord)
- Referred pain, non-somatoform pain
- Therapy with physical therapy, non-drug therapy, analgesics (non-steroidal, narcotics, anti-depressants, etc.), nerve injection, electro-stimulation, operative options

- Determine the management of **selected congenital and developmental musculo-skeletal defects** in children to include:
  a. Scoliosis
  b. Achondroplasia
  d. Cervical spine congenital deformity, pseudo-subluxation
  e. Developmental hip dislocation
  f. Talipes equinovarus (club foot)

- Explain the basic management of the following **systemic diseases affecting the musculo-skeletal system**:
  a. Osteoporosis
  b. Infectious diseases (septic arthritis, osteomyelitis)
  c. Initial evaluation and rheumatology referral of psoriatic arthritis, rheumatoid arthritis, gout, SLE, etc.
  d. Use of other providers ([Rehabilitation-) Medicine, Rheumatology, pain-management, etc.)

- Outline the management of **musculo-skeletal tumors**, including:
  a. Identification of most common musculoskeletal tumors with basic patterns of spread and prognosis
  b. Evaluation and staging: Enneking Classification
    - Open- versus fine needle aspiration, open biopsy, total excision
    - Frozen section versus permanent section
  c. Adjuvant therapy options for most common tumors
    - Chemotherapy
    - Radiation

- Demonstrate the **evaluation of back and leg pain** using a standard algorithm
  a. Bone vs. disc related disease
  b. Local vs. radicular pain
  c. Operative vs. non-operative management
  d. Diagnostic imaging
  e. Recognize emergencies (sensory-motor loss)

- Demonstrate the management of the **painful/swollen joint and chronic joint disease**
  a. Differential diagnosis (trauma, osteoarthritis, gout, infection, etc.)
  b. Indications and contraindications for joint aspiration and arthroscopy
  c. Summarize the role of joint replacement in the management of orthopedic pathology (particularly knee and hip); basic understanding of expected outcomes, complications and longevity
Summarize the characteristics of infection/sepsis secondary to prosthetic implants or orthopedic hardware; discuss treatment strategies
a. Diagnosis of overt and occult infection (osteomyelitis, septic joint)
b. Systemic +/- local antibiotic therapy, indications for removal of hardware
c. Techniques for prevention, including the “clean air” OR environment (laminar air flow systems, use of ultraviolet light, operating room traffic, soft tissue handling, use of prophylactic antibiotics, etc.)

Explain the importance and timing of physical therapy and rehabilitation in the care of postoperative orthopedic repairs
Explain the importance of organized approach to chronic pain (psycho-social impact of chronic pain, the “drug-seeking patient,” disability, etc.)

Objectives – General:
- Complete the reading assignment (see literature list)
- Attend all (≥ 85%) conferences, M&M conferences, Grand Rounds/other educational activities of the Department of Orthopedic Surgery during the rotation
- Take a post-rotation self-assessment test with at least 75% correct answers

Practice-based Learning and Improvement:

Goals and Objectives:
Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:

- Self-assessment: Analyze practice experience during the rotation, as well as own performance, based on interaction with Orthopedic Surgery senior resident, attending(s) and other key Orthopedic Surgery staff; accept and use constructive criticism to improve performance in the six core competencies

- Medical knowledge: Self-directed and under mentorship of Orthopedic Surgery senior resident and attending staff, locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems; use evidence based medicine approach to patient care whenever possible; apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness; use information technology to manage information, access online medical information, and support their own education; Facilitate the learning of students and other healthcare professionals on the Orthopedic Surgery service by sharing pre-existing and newly acquired knowledge (general and case-based) on rounds and during formal educational activities. Residents are encouraged to ask/question the Orthopedic Surgery fellow, attending staff and/or other Orthopedic Surgery related expert providers for clarification of unclear
**Interpersonal and Communication Skills:**

**Goals and Objectives:**

Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patient’s families and professional associates. Residents are expected to:

- Develop interpersonal skills necessary to communicate effectively with patients, patient families, nursing staff, mid-level healthcare providers, ancillary staff, medical students, fellow residents and attending staff in the complex multi-specialty environment that constitutes Orthopedic Surgery

- Contribute to creating an atmosphere of collegiality and mutual respect with all providers involved in the care of patients

- Develop effective listening, questioning and documentation skills

- Demonstrate ability to work effectively as a member of a team

- Demonstrate ethically sound behavior (see also Professionalism)

- Share own knowledge with other members of the team to foster an environment of learning

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**Professionalism:**

**Goals and Objectives:**

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence
Residents are expected to:

- Demonstrate adherence to institutional and departmental standards and policies
- Demonstrate respect, compassion, integrity and ethical behavior that are consistent with the values of the department and institution; develop and sustain sensitivity toward differences of age, gender, culture, religion, ethnicity or other diversities in both co-workers and patients
- Demonstrate ability to appropriately take on, share and delegate responsibilities with regard to patient care; balance own rights and privileges appropriately with responsibilities and accountability resulting from being a member of a team dedicated to patient care
- Demonstrate commitment to excellence and on-going professional development
- Under attending and other Orthopedic Surgery staff guidance, develop skill to resolve potential problem and conflicts that occur in a complex corporate environment using the appropriate channels and methods of communication to maximize patient care and surgical service performance
- Evaluate and formulate a response to ethical and socioeconomic questions, including:
  a. Elder abuse and neglect and resultant trauma, contractures and other orthopedic problems.
  b. Child abuse and neglect and resultant trauma and other orthopedic problems.
  c. Life with amputation: body image, energy expenditure.
  d. Cosmetic or functional orthopedics: limb lengthening, corrective osteotomies, etc.

Systems-based Practice:

Goals and Objectives:

Residents must demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:

- Understand how choices in patient care and other professional practices affect other healthcare professionals, the healthcare organization, and the larger society and how these elements of the system affect their own practice:
  a. Average cost of joint replacement surgery, and morbidity associated with hip fractures
  b. The relevance and components of clinical pathways and how to deal with deviation
- Practice cost-effective health care and resource allocation that does not compromise quality of care
- Know how to partner with healthcare managers (Orthopedic Surgery coordinator, social work, case management, PT/OT and rehabilitation medicine, etc.) and other health care providers (PMD, specialty providers in and out of the hospital) to assess, coordinate, and improve healthcare for the individual patient and cohorts of patients