ORTHOPEDICS
RESIDENCY TRAINING
PROGRAM

CURRICULUM FOR TRAINING

Second Edition
(updated November 2015)
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Oman Medical Specialty Board

ORTHOPEDICS RESIDENCY TRAINING PROGRAM

INTRODUCTION

Core Training in Orthopedics is the initial period of postgraduate training required to acquire knowledge, skills and attitudes relating to the practice of Orthopedic Surgery. This is the period after their undergraduate year and internship where proper clinical expertise is introduced to the residents. During their training they will be gradually and systematically be exposed to all the facets of Orthopedics and Trauma care.

The main aims of the Orthopedic Residency Training Program are to:

- Provide comprehensive and specialized training to the residents in Orthopedics and Trauma, and become caring experienced and skillful orthopedic surgeons.
- Provide an adequate environment for teaching and learning
- Provide a fair review for the trainees
- Ensure the program evaluation methods are fair and open to criticism.

MISSION

The mission of the OMSB Orthopedics Residency Training program is to provide the trainee with the highest level of knowledge, clinical and orthopedic surgical skills necessary to produce an orthopedic surgeon with the highest possible level of competence, who can function independently in any health care setting in Oman. The Orthopedics Residency Training Program is designed to fulfill the OMSB general and specific requirements of training.

VISION

To achieve excellence in care for patients with orthopedic problems by producing a surgeon who is excellent in both knowledge and skills, and who is capable of updating himself/herself with latest studies and contributing to his/her field with research.
GENERAL OBJECTIVES

Upon the completion of the Orthopedics residency training, the trainee should have acquired adequate knowledge and skills of the principles and methods of management of orthopedic and trauma cases:

- Become proficient in the physical examination and diagnosis of patients with trauma
- Evaluate and treat patients in the emergency room, the orthopedic clinics, and in the hospital.
- Perform initial and ongoing assessments of patient’s orthopedic, medical, physical and psychosocial status. (Proper assessment and clinical diagnosis)
- Become proficient in the physical examination and diagnosis of orthopedic patients.
- Ensure that clinical interventions are carried out and appropriately documented. (appropriate investigations)
- Provide patient education and counseling, covering health status, test results, medical processes, and discharge planning. (proper communication skills)
- Monitor medications to effectively provide appropriate drug therapy and treatment plans, thus ensuring positive patient outcomes.
- Become proficient in the non-operative and operative management of patients. (proper communication skills)
- Become full oriented on how to deliver a cost effective health care
- Assist in surgery and perform surgeries under supervision to high international standards.

SPECIFIC GOALS AND OBJECTIVES

(Adapted from the Orthopedic Surgery Residency Training Program Objectives, Faculty of Medicine, University Calgary, Canada, Revised 2008)

At the completion of training, the resident should have acquired the following competencies and will function effectively as:
1. Medical Knowledge

Orthopedic surgeons possess a defined body of knowledge and procedural skills, which are used to collect and interpret data, make appropriate clinical decisions, and carry out diagnostic and therapeutic procedures within the boundaries of their discipline and expertise. Their care is characterized by up-to-date, ethical, and cost-effective clinical practice. They display effective communication in partnership with patients, other health care providers, and the community. The role of medical expert/clinical decision-maker is central to the function of orthopedic surgeons, and draws on the competencies included in their other roles in medical knowledge, interpersonal and communication skills, professionalism, practice based learning and improvement, systems based practice and patient care.

The resident must be able to relate basic science knowledge and principles to patient care. Furthermore, the resident must be able to relate sound knowledge of axial and appendicular anatomy in an applied manner as a prelude to safe surgical exposure and appropriate manipulation of tissues.

1.1. General Requirements
   a) Demonstrate diagnostic and therapeutic skills for ethical and effective patient care.
   b) Access and apply relevant information and therapeutic options to clinical practice.
   c) Demonstrate effective consultation services with respect to patient care, education and legal opinions.
   d) Recognize personal limits of expertise.

1.2. Specific Requirements
   1.2.1. KNOWLEDGE — BASIC SCIENCE AND ANATOMY
   Demonstrate knowledge of the following:
a) The anatomy growth and development of the axial and appendicular skeleton; embryology, histology, physiology and biochemistry of bone, cartilage, tendon, ligament, muscle, nerve and skin
b) Fracture healing, wound healing, trauma management
c) Metabolic bone disease, congenital abnormalities, inflammatory conditions and arthritis, infections related to the musculoskeletal system
d) Pertinent biomechanical principles of the musculoskeletal system, including joint reconstruction
e) Pathology and treatment of soft tissue and bone neoplasia related to the musculoskeletal system
f) Pharmacology including principles of metabolism, action and toxicity of drugs commonly used in orthopedics, as well as variations associated with age, gender and ethnicity; be familiar with drug interactions and recognize and manage adverse drug reactions.

1.2.2. **KNOWLEDGE — CLINICAL**

Recommend appropriate method in performing:

a) Medical history: relevant, concise, accurate and appropriate to the patient’s problem(s)
b) Physical examination: relevant, sufficiently elaborate, and appropriate
c) Diagnostic tests: medically appropriate investigative tools in a cost-effective, ethical and useful manner
d) Medical imaging tests: appropriate imaging investigations; interpretation of basic x-ray, ultrasound, computer-assisted tomography (CT), magnetic resonance imaging (MRI) and radionuclide studies
e) Clinical diagnosis and decision-making: analysis, synthesis and integration of all relevant data to formulate a rational and effective diagnostic and therapeutic strategy for problems encountered in patients of all ages
f) Documentation/presentation: well-documented and organized assessments and recommendations in written and/or coherent and concise verbal form in response to a request from another health provider

g) Preoperative planning: understand the concept; order of appropriate preoperative investigations to assist in planning; execution of preoperative plan during surgery

h) Intraoperative decision-making: arrive at correct, timely operative decisions for routine and complex procedures

i) Postoperative care: provide appropriate care to include effective pain management (with multidisciplinary assistance, if necessary), both in the hospital and office environments; recognize promptly and manage postoperative complications in an effective manner

j) Emergency management — recognition: able to identify and respond appropriately to urgent medical and surgical problems. Efficiently provide appropriate therapy

k) Emergency management — decision to operate: intervene based on rational interpretation of clinical and ancillary investigation. Intervention is timely, with appropriate preoperative assessment


1.2.3. **KNOWLEDGE — TECHNICAL**

Demonstrate knowledge of surgical options that allow appropriate operative selection, including:

a) Trauma: management of fractures, joint and soft tissue injuries

b) Competence in all surgical and technical procedures commonly performed in orthopedics
c) Use of surgical equipment: understand its use, recognize its limits and apply to tissues safely, simultaneously taking measures to protect both oneself and other associates from blood and airborne debris.

d) Use of imaging equipment: understand its use, recognize the risks of, and appreciate safety measures required to protect patients, self and other personnel from ionizing radiation.

2. Interpersonal and Communication Skills
Orthopedic surgeons will provide human, high-quality care and establish effective relationships with patients, their families, other physicians, and other health professionals. Communication skills are essential for the functioning of an orthopedic surgeon, and are necessary for obtaining information from, and conveying information to patients and their families. Furthermore, these abilities are critical in eliciting patients’ beliefs, concerns, and expectations about their illnesses, and for assessing key factors impacting on their patients’ health.

Orthopedic surgeons work in partnership with others who are appropriately involved in the care of individuals or specific groups of patients. It is therefore essential for orthopedic surgeons to be able to collaborate effectively with patients and a multidisciplinary team of expert health professionals for provision of optimal patient care, education, and research.

2.1. General Requirements
a) Establish therapeutic relationships with patients/families.
b) Obtain and synthesize relevant history from patients/families/communities.
c) Listen effectively.
d) Discuss appropriate information with patients/families and the health care team.
e) Consult effectively with other physicians and health care professionals.
f) Contribute effectively to other interdisciplinary team activities.
2.2. Specific Requirements

a) Recognize that being a good communicator is an essential function of a physician, and understand that effective patient-physician communication can foster patient satisfaction and compliance as well as influence the manifestations and outcome of a patient’s illness and surgical intervention.

b) Establish relationships with the patients that are characterized by understanding, trust, respect, empathy and confidentiality.

c) Recognize the emotional stress for patients and families faced with orthopedic conditions and their associated surgical management, a stress especially accentuated in the treatment of children.

d) Gather information not only about the disease but also about the patient’s beliefs, concerns and expectations about the illness, while considering the influence of factors such as the patient’s age, gender, ethnic, cultural and socioeconomic background, and spiritual values on that illness and on any proposed surgical intervention.

e) Deliver information to the patient and family in a humane manner and in such a way that it is understandable; encourage discussion and promote patient’s participation in decision-making to the degree that they wish.

f) As a prelude to surgical intervention use above skills to obtain informed consent; appreciate alternative means of achieving consent if the patient is incompetent to provide consent, be it on the grounds of age or mental status, other disqualifier.

g) Understand and demonstrate the importance of cooperation and communication among health professionals involved in the care of individual patients such that the roles of these professionals are delineated and consistent messages are delivered to patients and their families.

h) Maintain clear, accurate and appropriate written records.

i) Write well-organized and legible orders and progress notes.

j) Complete concise hospital discharge summaries promptly.

k) Write well-organized letters, providing clear direction to the referring physician and other physician and allied personnel, where indicated.
l) Identify and describe the role, expertise and limitations of all members of an interdisciplinary team required to optimally achieve a goal relate to patient care, a research problem, an educational task, or an administrative responsibility.

m) Develop a care plan for a mutual-interest patient, which includes investigation, treatment and continuing care, whether preoperatively or postoperatively, as well as in both hospital and community settings.

n) Participate in an interdisciplinary team, demonstrating the ability to accept, consider and respect the opinions of other team members, while contributing specialty specific expertise.

4. Systems Based Practice

Orthopedic surgeons function as managers when they make everyday practice decisions involving resources, co-workers, tasks, policies, and their personal lives. They do this in the settings of individual patient care, practice organizations, and in the broader context of the health care system. Thus, orthopedic surgeons require the abilities to prioritize and effectively execute tasks through teamwork with colleagues, and make systematic decisions when allocating finite health care resources. As managers, orthopedic surgeons are encouraged to take on positions of leadership within the context of professional organizations.

4.1. General Requirements

a) Utilize resources effectively to balance patient care, learning needs, and outside activities.

b) Allocate finite health care resources wisely.

c) Work effectively and efficiently in a health care organization.

d) Utilize information technology to optimize patient care, life-long learning and other activities.
4.2. **Specific Requirements**

   a) Have basic knowledge of how to function effectively in health care organizations, ranging from an individual clinical practice to organizations at the local, regional and national level.

   b) Have ability to access and apply a broad base of information to the care of patients in ambulatory care, hospitals and other health care settings.

   c) Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served. This allows for an advocacy role primarily for the individual but in the context of societal needs when monitoring and allocating needed resources.

   d) Be open to working effectively as a member of a team or a partnership and to accomplish tasks whether one is a team leader or a team member.

   e) Have basic knowledge of population-based approaches to health care services and their implication for medical practice.

5. **Practice Based Learning & Improvement**

   Orthopedic surgeons recognize the importance of advocacy activities in responding to the challenges represented by those social, environmental, and biological factors that determine the health of patients and society. They recognize advocacy as an essential and fundamental component of health promotion that occurs at the level of the individual patient, the practice population, and the broader community. Health advocacy is appropriately expressed both by the individual and collective responses of orthopedic surgeons in influencing public health and policy.

   Orthopedic surgeons engage in a lifelong pursuit of mastery of their domain of professional expertise. They recognize the need to be continually learning and model this for others. Through their scholarly activities, they contribute to the appraisal, collection, and understanding of health care knowledge, and facilitate the education of their students, patients, and others.
5.1. General Requirements

a) Identify the important determinants of health affecting patients.
b) Contribute effectively to improved health of patients and communities.
c) Recognize and respond to those issues where advocacy is appropriate.
d) Develop, implement and monitor a personal continuing education strategy.
e) Critically appraise sources of medical information.
f) Facilitate learning of patients, house staff/students and other health professionals.
g) Contribute to development of new knowledge.

5.2. Specific Requirements

a) Demonstrate knowledge of determinants of health by identifying the most important determinants of health (i.e., poverty, unemployment, early childhood education, and social support systems), being familiar with the underlying research evidence, and applying this understanding to common problems and conditions in orthopedics.
b) Demonstrate knowledge of public policy for health by describing how public policy is developed; identifying current policies that affect health, either positively or negatively (i.e., communicable diseases, tobacco, substance abuse); and citing examples of how policy was changed as a result of actions by physicians.
c) Demonstrate knowledge of these concepts as applied to the following three levels. In the management of individual patients, by identifying the patient's status with respect to one or more of the determinants of health (e.g., unemployment); adapting the assessment and management accordingly (e.g. the medical history to the patient's social circumstances); and assessing the patient's ability to access various services in the health and social system. In the analysis of an orthopedic surgeon's practice population work with the specialty society, and other associations, in identifying current "at risk" groups within a given orthopedic practice and applying the available knowledge about prevention to "at risk" groups within the practice; and
contributing "group data" for better understanding of health problems within the population. In relation to the general population by describing, in broad terms, the key issues currently under debate regarding changes in the Oman health care system, indicating how these changes might affect societal health outcomes and advocating to decrease the burden of illness (at a community or societal level) of a condition or problem relevant to orthopedics through a relevant orthopedic society, community based advocacy group, other public education bodies, or private organizations.


d) Demonstrate the following clinical skills:

e) Pose a clinical question.

f) Recognize and identify gaps in knowledge and expertise around the clinical question.

g) Formulate a plan to fill the gap including to:
   • conduct an appropriate literature search based on the clinical question;
   • assimilate and appraise the literature;
   • develop a system to store and retrieve relevant literature;
   • consult others (physicians and other health professionals) in collegial manner.

e) Propose a solution to the clinical question.

f) Implement the solution in practice. Evaluate the outcome and reassess the solution.

g) Identify practice areas for research.

5.2.1. Demonstrate the following research skills:

a) Pose a research question (clinical, basic or population health)

b) Develop a proposal to solve the research question including to:
   • conduct an appropriate literature search based on the research question;
   • identify, consult and collaborate with appropriate content experts to conduct the research; and to
   • propose a methodological approach to solve the question
c) Carry out the research outlined in the proposal
d) Defend and disseminate the results of the research
e) Identify areas for further research that flow from the results

5.2.2. Acquire the following educational experience:
   a) Demonstrate knowledge of, and the ability to apply, the principles of adult learning, with respect to oneself and others.
   b) Demonstrate knowledge of preferred learning methods in dealing with students, residents, and colleagues.

7. Professionalism
Orthopedic surgeons have a unique societal role as professionals with a distinct body of knowledge, skills, and attitudes dedicated to improving the health and well-being of others. Orthopedic surgeons are committed to the highest standards of excellence in clinical care and ethical conduct, and to continually perfecting mastery of their discipline.

7.1. General Requirements
   a) Deliver highest quality care with integrity, honesty and compassion.
   b) Exhibit appropriate personal and interpersonal professional behaviors.
   c) Practice medicine ethically consistent with obligations of a physician.

7.2. Specific Requirements
   7.2.1 Achieve the following discipline-based objectives:
      a) Display attitudes commonly accepted as essential to professionalism.
      b) Use appropriate strategies to maintain and advance professional competence.
      c) Continually evaluate his/her abilities, knowledge and skills and know his/her limitations of professional competence.
   7.2.2 Achieve the following personal/professional boundary objectives:
a) Adopt specific strategies to heighten personal and professional awareness and explore and resolve interpersonal difficulties in professional relationships.

b) Consciously strive to balance personal and professional roles and responsibilities and to demonstrate ways of attempting to resolve conflicts and role strain.

7.2.3 Achieve the following objectives related to ethics and professional bodies:

a) Know and understand the professional, legal and ethical codes to which physicians are bound.

b) Recognize, analyze and attempt to resolve in clinical practice ethical issues such as truth-telling, consent, advanced directives, confidentiality, end-of-life care, conflict of interest, resource allocation, research ethics, etc.

c) Have basic knowledge of and be able to apply relevant legislation that relates to the health care system in order to guide one’s clinical practice.
ADMISSION CRITERIA

1. The candidate must be a holder of a bachelor’s degree in Medicine and Surgery or equivalent from a recognized university.
2. The candidate must have completed one year of a recognized internship program.
3. The candidate must be of good conduct and medically fit for training.
4. The candidate’s records and achievements in the undergraduate studies together with the training period will be considered as part of admission.
5. The candidate must pass the OMSB selection examination before being scheduled for interview.
6. The candidate must pass the interview by the Orthopedics Education Committee.
Please refer to Appendix I for the Education Committee and subcommittee members.
CURRICULUM

Training Positions
The Orthopedics Residency Training Program accepts a minimum of four (4) and a maximum of six (6) residents in each academic year.

Duration of the Program
Orthopedics is a five-year program that provides each trainee with the necessary knowledge, clinical and surgical skills in all areas of Orthopedics.

Each academic year will have 13 blocks, with four weeks in each block. This includes 12 blocks of rotations in the different training centers and four weeks of annual leave.

Structure of the Program

The program is divided into 2 phases:

Phase 1 (Junior Residency and Intermediate Residency) is the first three years of the program (R1, R2 and R3). The first six blocks of R1 include exposure to non-Orthopedic specialties and the second half of the academic year will cover basic Orthopedics rotations, including 1 block of orthopedics simulation workshops. In the first two years, emphasis will be on the learning of basic surgical techniques and acquisition of surgical skills. During this phase, the trainee, under the guidance of the faculty, will be increasingly familiar with the care of orthopedic inpatients, surgical techniques, and the evaluation of outpatients, both in the clinics and the emergency room. By R2, the trainee should have completed the AO basic principles of fracture fixation, basic surgical skills and ATLS courses. During the second and third years, the trainee can have general orthopedic rotations and various orthopedic subspecialty training.
**Phase 2 (Senior Residency)** is the final two years of the program (R4 and R5). The trainee will be exposed to specific orthopedic and trauma training. In this phase, the trainee will be exposed to major orthopedic specialties and complex trauma management with considerable independence, and will consult with orthopedic patients and participate in preoperative decisions, surgical procedures and postoperative management at the hospital and outpatient clinics.
# ORTHOPEDICS FIVE-YEAR ROTATION PLAN

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<th>BLOCKS</th>
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<td>General Surgery – Trauma Vascular Surgery</td>
<td>1</td>
<td>SQUH or KH</td>
<td>Should be done in 2 consecutive blocks in the same training center</td>
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<tr>
<td></td>
<td>1</td>
<td>SQUH or RH</td>
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<tr>
<td>Neurosurgery</td>
<td>1</td>
<td>KH</td>
<td></td>
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<tr>
<td>Emergency Medicine</td>
<td>1</td>
<td>KH</td>
<td></td>
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<td>Plastic Surgery &amp; Burn Care</td>
<td>2</td>
<td>KH</td>
<td>1 week in Burn Unit</td>
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<td>Core Orthopedic Skills Rotation</td>
<td>1</td>
<td>Simulation Center</td>
<td>Done during block 7</td>
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<tr>
<td>General Orthopedics</td>
<td>5</td>
<td>AFH, SQU, KH</td>
<td>- General Orthopedics rotations will be reduced to 4 blocks if the resident will take a full annual leave block - Should be done in the 2nd half of R1</td>
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<tr>
<td>Fracture &amp; Orthotics Clinic</td>
<td>1</td>
<td>KH, AFH</td>
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All non-Orthopedic rotations should be done in the first 6 blocks

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| Orthopedics:  
- Junior Orthopedics Trauma – 2 blocks  
- General Orthopedics – 6 blocks  
- Regional Hospital Orthopedics – 2 blocks | 10 | Orthopedics Trauma – KH  
General Orthopedics – AFH, SQU, KH  
Regional Hospital Orthopedics – Sohar & Nizwa Hospitals | General Orthopedics rotations will be reduced to 5 blocks if the resident will take a full annual leave block |
| Surgical ICU / Orthopedic Anesthesia | 1 | KH | |
| Elective  
- Rheumatology  
- Radiology | 1 | Rheumatology – RH, SQUH  
Radiology – KH | |
| Research | 1 | KH / SQU / AFH | |

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<th>BLOCKS</th>
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<td>Upper Limb &amp; Shoulder Surgery</td>
<td>3</td>
<td>KH</td>
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<tr>
<td>Spine Surgery</td>
<td>3</td>
<td>KH, AFH</td>
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<tr>
<td>Annual Leave</td>
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</table>

If the resident will not take a full annual leave block, he/she could do any of the above rotations
### R4

<table>
<thead>
<tr>
<th>Blocks</th>
<th>Training Centers</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>Adult Reconstruction</td>
<td>3</td>
<td>KH, SQUH, AFH</td>
</tr>
<tr>
<td>Hand &amp; Microvascular Surgery</td>
<td>3</td>
<td>KH</td>
</tr>
<tr>
<td>Orthopedics Trauma</td>
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<td>KH</td>
</tr>
<tr>
<td>Research</td>
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<td>KH, SQUH, AFH</td>
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<td>*Foot &amp; Ankle</td>
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<td>KH, AFH</td>
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<tr>
<td>*Orthopedic Oncology</td>
<td>2</td>
<td>KH or abroad</td>
</tr>
</tbody>
</table>

*Foot & Ankle and Orthopedic Oncology rotations can be done in R4 or R5

**Annual Leave**

If the resident will not take a full annual leave block, he/she could do any of the above rotations

### R5

<table>
<thead>
<tr>
<th>Blocks</th>
<th>Training Centers</th>
<th>Remarks</th>
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</thead>
<tbody>
<tr>
<td>Pediatric Orthopedics</td>
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<tr>
<td>Sport Medicine</td>
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</tr>
<tr>
<td>*Elective Orthopedics</td>
<td>3</td>
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<tr>
<td>*Trauma Chief</td>
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<tr>
<td>*Foot &amp; Ankle</td>
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<td>KH, AFH</td>
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<tr>
<td>*Orthopedic Oncology</td>
<td>2</td>
<td>KH or abroad</td>
</tr>
</tbody>
</table>

*Foot & Ankle and Orthopedic Oncology rotations can be done in R4 or R5

**Annual Leave**

*Elective Orthopedics block will be tailored according to the resident’s career planning and subspecialty interest

*Trauma Chief - each R5 resident will have a chance to act as administrative chief of the hospital for 1 block

If the resident will not take a full annual leave block, he/she could do any of the above rotations

As per the OMSB bylaws, the residents are allowed to take annual leave per academic year, either a full block or for two consecutive weeks. The residents are required to have 75% attendance in one block of each rotation.
Rotation Specific Objectives

**General Orthopedics Rotation**

**Year:** R1  
**Duration:** 5 blocks  
**Training Center:** AFH, SQUH, KH

I. Introduction:

The overall goal of this rotation is to provide the resident with a basic understanding of the pre and post-operative evaluation of the emergent and elective orthopedic surgery cases, basic knowledge of surgical decision making, proper wound and musculoskeletal management. Patient population includes those of a wide variety of age ranges, functional levels, and joint involvement. The resident should also develop fundamental orthopedic psychomotor skills. During the general orthopedics rotation, the residents work with faculty members to develop skills in history taking and physical examination, diagnosis of a variety of adult and pediatric orthopedic conditions, and formulation of surgical and nonsurgical treatment plans. Surgical skills are developed in a variety of orthopedic procedures as the resident assists faculty and other senior residents. Continuity of care is ensured as the resident follows patients through surgical or non-surgical treatment and rehabilitation. So, this rotation will prepare the resident to assume the medical and administrative responsibilities involved in the care of patients with common musculoskeletal conditions.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist/senior resident. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant.

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the direct supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents are also directly responsible for the supervision of junior residents. Senior residents must be available for consultation at all times.

V. Rotation Core Competencies

**Patient Care**

The resident will demonstrate competency in the following objectives:

1. Know the pathophysiology, assessment, and management of basic musculoskeletal system problems and particularly traumatic injuries
2. Know the technique of basic musculoskeletal and neurologic examinations
3. Know the most common orthopedic emergencies and their initial management
4. Know basic surgical techniques related to orthopedic surgery
5. Recognize postoperative wound healing problems such as wound infection and hematoma
6. Appropriately use sterile technique and infection control practices in the orthopedic environment
7. Understand the indications for and provide appropriate prophylaxis against infection and thromboembolic problems
8. Evaluate and perform initial management of patients with blunt or penetrating trauma to the musculoskeletal system
9. Understand the etiology, presentation, and treatment of compartment syndrome
10. Identify when to measure compartment pressures, demonstrate competence in performing the measurement, and know how to perform a fasciotomy
11. Identify and describe common fractures and dislocations using physical examination and appropriate radiographic tests
12. Identify and describe and initiate appropriate management of open fractures, open joints, dislocations, and cauda equina syndrome
13. Recognize indications for emergency surgical intervention for musculoskeletal conditions
14. Demonstrate the ability to perform thorough extremity, spinal, and neurologic examinations
15. Recognize the role of radiographic evaluations for musculoskeletal pathology
16. Position and prepare a patient for surgery in the operating room for orthopedic procedures
17. Close orthopedic surgical wounds in a satisfactory fashion using sutures and staples using appropriate surgical technique
18. Demonstrate competency in major joint aspiration and injection

**Medical Knowledge**

The resident will demonstrate competency in the following objectives:
1. Understand basic cellular structure and function as it relates to musculoskeletal system
2. Know the basic genetics, embryology, anatomy and physiology of the musculoskeletal system
3. Know basic principles involved in the radiographic evaluation of musculoskeletal problems
4. Know the pharmacology of drugs commonly used in orthopedic surgery practice
5. Identify cellular structures and outline cellular activities and cellular signaling including the functions of various cytokines as it relates to the musculoskeletal system.
6. Describe the pathophysiology of basic musculoskeletal conditions
7. Demonstrate knowledge of musculoskeletal anatomy, grossly and radiographically
8. Describe the dosage, routes of administration, metabolic pathways, major side effects of drugs used commonly in orthopedic surgical practice, including analgesics, local anesthetics, antibiotics, anticoagulants, anti-inflammatory agents, diuretics, laxatives, and amnestics
9. Describe factors that can impair wound and bone healing.
10. Describe the appropriate use of musculoskeletal imaging modalities

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Presents cases during morning sign-out rounds
2. Assess ones own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient's problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques
Interpersonal and Communication Skills

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

Professionalism

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

Systems-Based Practice

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions

VI. Rotation Specific Psychomotor Skills

By the end of the General Orthopedics rotation, the resident should be able to:
1. Demonstrate physical examination techniques appropriate to the patient’s chief complaint and history, and arrange further studies as needed
2. Demonstrate the assessment and management of orthopedic injuries and illnesses commonly encountered in the emergency room, including appropriate physical and imaging examinations, recognition of important features of the condition, and the appropriate type of procedure required for initial treatment
3. Perform a basic interpretation of imaging and laboratory study findings in the context of the patient’s history and examination
4. Evaluate emergency room patients and effectively triage patients having injuries of illnesses that are considered to be orthopedic emergencies such as acute septic disease, infections, open fractures, compartment syndrome, etc.
5. Demonstrate the manual techniques for initial management of commonly encountered orthopedic problems in the emergency room such as reduction of fractures and dislocations, treatment of lacerations, examination of soft tissue injuries, and aspiration of joint or fluid collection
6. Demonstrate appropriate immobilization and dressing techniques for commonly encountered orthopedic problems
7. Demonstrate the appropriate pre-operative work-up of orthopedic patients, including functional assessment
8. Perform an appropriate screening pre-operative history and physical examination, and refer for further studies as needed for pre-operative clearance for the procedure in question
9. Determine the indications for and use of casting, bracing and orthoses
10. Participate in the definitive management, including surgical intervention when appropriate, of conditions commonly encountered by the general orthopaedist (i.e. traumatic injuries of the spine and extremities, arthritic conditions involving the spine and extremities, orthopedic infections, acute and chronic athletic injuries involving bone, muscle, ligament, and tendons)
11. Serves as first/second assistant for operative procedures such as arthroplasty, tendon transfers, amputation, intramedullary nailing of long bone fractures, closed reduction and percutaneous pinning of fractures, open reduction and internal fixation of fractures, and arthroscopic reconstructive procedures
12. Evaluate and determine appropriate interventions for the post-operative issues that arise in the care of post-operative patients (i.e. pain control, bleeding and drainage, fevers, traction and post operative stabilization)

13. Recommend and arrange as necessary, appropriate post-operative of post-procedure care, including pain control, activity status including immobilization and/or therapeutic exercise, wound management and appropriate nursing or custodial care for orthopedic patients upon discharge

14. Demonstrate the ability to effectively manage the responsibilities of call duty

VII. Core Surgical Competencies

By the end of the General Orthopedics rotation, the resident should be able to assist/perform, under direct supervision, the following procedures:

1. Surgical approaches
2. Joint injection techniques
3. Open reduction and internal fixation
4. Intra-medullary nailing
5. Irrigation and debridement
6. Amputation procedures
7. Soft tissue procedure (e.g. Ganglion cyst removal)
8. Knee arthroscopy
   - Setup and positioning -standard portals and diagnostic exam
   - Removal of loose bodies
   - ACL reconstruction with hamstring allograft or autograft
9. Shoulder arthroscopy
   - Setup and positioning standard portals and diagnostic exam -subacromial decompression -rotator cuff mobilization and repair
10. Hardware removal
    - Positioning and fluoroscopic visualization
    - Techniques and pitfalls in surgical exposure
    - Removal of broken screws
11. Lower extremity tendon ruptures
12. Total knee arthroplasty
    - Indications and non-arthroplasty options
    - Surgical approaches
    - Principles of implant positioning and ligament balancing
13. Total hip arthroplasty
    - Indications surgical approaches
    - Acetabular and femoral preparation

VIII. Implementation

In addition to the daily apprenticeship model of one-to-one instruction, the resident will enhance his/her treatment skills by a number of specific activities:

1. Daily rounds/sign-out of pre- and postoperative patients, discussion of treatment and follow-up protocols with the senior team members
2. Daily departmental meetings including didactic lectures presentations
3. Core curriculum conference series of presentations on common orthopedic diseases and conditions
4. Departmental journal club
5. Basic Science lecture series on the anatomy, biology, and biomechanics of orthopedic disease, which are presented in the weekly resident conference

IX. Rotation Reading Resources
- OKU 10
- Canale: Campbell's Operative Orthopedics, 10th edition
- Current relevant articles (list can be distributed to residents at start of rotation)
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- Wheeless’ Textbook of Orthopedic (Duke University) website
- Orthoportal (American Academy of Orthopedics Surgeons website)

X. Assessment & Evaluation Tools
The resident will be evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, the resident will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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<thead>
<tr>
<th>Core Competency</th>
<th>Evaluation Tool</th>
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<td>Direct observation</td>
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<td>Orthopedic surgery milestones, ACGME report worksheet</td>
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<tr>
<td>Medical Knowledge</td>
<td>In-training evaluation</td>
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<td></td>
<td>Direct observation</td>
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<td>In-training examination</td>
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<td>Practice Based Learning &amp; Improvement</td>
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<td>Direct observation</td>
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<td>Morbidity/mortality conference</td>
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<td>Interpersonal &amp; Communication Skills</td>
<td>In-training evaluation</td>
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<td>360° evaluation</td>
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29
| System-Based Practice | In-training evaluation  
|                       | Direct observation  
|                       | Resident participation in clinical protocols  
| Technical Skills      | O-Score  
|                       | OSATS Score  
|                       | Global Performance Assessment  
|                       | Procedure Based Assessment  |
Fracture & Orthotics Clinic Rotation

Year: R1
Duration: 1 block
Training Center: AFH

I. Introduction:

Musculoskeletal injuries are common orthopedic problems in Oman. They cause a lot of disability and financial burden to the society. The fracture clinic rotation is a 1-block rotation that takes place in the first year of residency. The residents are expected to gain proficiency and experience in diagnosis, investigation and management of traumatic musculoskeletal conditions in the outpatient setting allowing residents to experience continuity of care from presentation to discharge. He/she also will develop skills and learn techniques of fracture reduction manipulation and casting. He/she will also learn the different types of orthotics and their indications. At the end of this rotation, the resident should be able to perform all of the goals and objectives. It is the responsibility of both the resident and the rotation supervisor to go over the goals and guidelines included in this document at the beginning of the rotation, mid-rotation and the conclusion of the rotation.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient attending the fracture clinic. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist in charge of the service in that specific time prior to discharge. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident will assume a senior role of the trauma team and act as a supervisor and instructor to junior residents in the service.

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the cases.

IV. Resident Supervision

Senior team members are responsible for the supervision of resident in the clinic to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. The residents will have a chance to work with different team members every day based on the departmental scheduling. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents. The residents also will be supervised and taught by senior fracture clinic technicians.

V. Rotation Core Competencies

Patient Care

By end of the fracture & orthotics clinic rotation, residents will demonstrate competency in the following objectives:
1. Demonstrate proficiency in biomechanics and treatment alternatives for traumatic injuries of the upper extremity, lower extremity, and pelvis
2. Understand the pathoanatomy of long bone fractures including recognition of associated injuries and classification of fractures
3. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for the musculoskeletal trauma cases
4. Be competent to order the appropriate imaging views for all types of Musculoskeletal injuries
5. Interpret imaging studies (radiographs, CT, MRI) of the musculoskeletal injuries
6. Develop an organized approach to each type of injury
7. Demonstrate knowledge of initial management of soft tissue injuries including reduction, immobilization, compression and elevation.
8. Understand the pharmacologic treatment of musculoskeletal injuries in outpatient setting
9. Understand patient selection and indications for non-operative and operative treatment of musculoskeletal injuries in outpatient setup
10. Know how and when to prioritize a treatment intervention
11. Be able follow up patients through initial assessment, workup, post-operative care and outpatient follow up
12. Be able to formulate physical and rehabilitation protocols for operative and non-operative cases
13. Review each consultation with senior team member and perform complete preoperative evaluation of each surgical candidate including assessment of risk and potential complications
14. Be available to see patients in the emergency department when requested
15. Coordinate orthopedic treatment with other disciplines in multiply injured patients
16. Coordinate the plan for admission and transfer to other outpatient clinics or inpatient services
17. Be competent in manipulation and reduction techniques of fractures and dislocations in fracture clinic setting
18. Be competent to apply different types of splinting and casting
19. Be competent to apply braces and different types of orthotics
20. Demonstrate knowledge of indications and selection of each casting techniques
21. Be competent to formulate a clear follow up plan for each fractures and musculoskeletal injuries
22. Be competent to know when non-operative treatment fails and when to advise surgical management.

**Medical Knowledge**

The resident will demonstrate competency in the following objectives:
1. Ability to take full history and conduct appropriate physical examination of musculoskeletal trauma
2. Ability to appropriately manage pre and postoperative orthopedic patients in fracture clinic setting
3. Knowledge of fracture patterns, classifications, and means of fixation
4. Knowledge of x-ray interpretation of fractures and musculoskeletal injuries
5. Knowledge of common orthopedic traumatic injuries and their acute management (examples: distal radius, tibia, femur, & humerus fractures, shoulder & hip dislocations, hand lacerations, and open fractures)
6. Knowledge of / ability to appropriately manage acutely injured patients (examples: required imaging, when/how to sheet a pelvis or reduce cervical spine dislocation, and indications for traction)
7. Knowledge of reduction and splinting principles and techniques
8. Knowledge of appropriate indications for surgical and nonoperative management of traumatic orthopedic injuries
9. Knowledge of relative and absolute contraindications for surgical management of traumatic orthopedic injuries
10. Knowledge of expected risk of common surgical interventions (examples: malrotation of transverse/comminuted femur fractures, nonunion of segmental bone loss, knee pain following IMN of the tibia, etc.) and be able to consent the patients for the selected treatment
11. Knowledge of AO fracture fixation including lag screw, plate function, modes of fracture healing, material properties, and basic biomechanics
**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Presents cases to senior team members in the fracture clinic
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Know how to critically evaluate the effectiveness of the management of patients attending fracture clinic
4. Integrate evidence from scientific studies in the care of patient’s problems
5. Take responsibility for lifelong learning
6. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
7. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
8. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
9. Usage the available information technology to obtain and manage information
10. Willingness to take time to educate students and other health care professionals
11. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise
**Professionalism**

The resident will demonstrate competency in the following objectives:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life in order to maximize the care of patients with musculoskeletal trauma
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Know the impact of disability related to fractures and other soft tissue injuries.
5. Understand how musculoskeletal injuries and their treatment affect the health care organization and the society
6. Work effectively and efficiently in a health care institution
7. Effectively utilize information technology to optimize patient care and for continued self-learning
8. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
9. Further his/her understanding of the structure, financing and operation of the Oman health system
10. Work in interprofessional teams to enhance patient safety and improve patient care quality
11. Participate in identifying system errors and implementing potential systems solutions

**VI. Rotation-Specific Psychomotor Skills**

By the end of the senior orthopedic trauma rotation and in addition to junior trauma objectives, senior level resident should be able to:

1. Master clinical examinations including knowledge of special tests for each injury type
2. Know how to accomplish basic radiographic measurements and parameters such as comminution degree, angulation, fracture displacement, joints angles and normal variations
3. Document clinical notes and conduct follow up plans
4. Practice appropriate dictation of clinic notes
5. Understand the communication pipelines with other consulting services such as physiotherapy, plaster technicians and orthotics specialists
6. Master techniques of manipulation, reductions, splinting and casting of different injuries to bones and joints
7. Perform basic outpatient procedures under direct supervisions such as suturing, foreign body removal and sutures removal
8. Master the systematic assessment of soft tissue injuries and musculoskeletal wounds
9. Demonstrate skills in the following procedures: halo, casting and bracing
10. Know how to book cases for admissions and inpatient management
11. Master the communications skills and understand the different pathway of discharging patients from the fracture clinic

VII. Core Surgical Competencies

By the end of the spine rotation, resident will be able to assist in or perform, under supervision, the following procedures:
- Different suturing techniques used in the clinic
- Removal of foreign bodies
- Suture removal
- Joints injections
- Joints aspiration techniques
- Manipulation and reduction of fractures
- Manipulation and reduction of joints
- Plaster and casting techniques
- Application of orthotics such as halo, braces, collars and removable orthotics
- Application of traction techniques

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her orthopedic trauma management skills by a number of specific activities including:
1. Daily morning meeting/sign-out for presentation and discussion of patients with musculoskeletal injuries
2. Weekly meeting at which different cases are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident’s reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of patients with musculoskeletal trauma
5. Basic science lecture series at the weekly resident didactics in biomechanics of fractures
6. Trauma journal club for discussion of relevant current literature
IX. Rotation Reading Resources

- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Orthopedic trauma books that are available in OMSB E-Library
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Gross Anatomy texts
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless’ Textbook of Orthopedic (Duke University) website
- Tournetta power point presentations & other resources in the OMSB Orthopedics residents’ website, www.omsbortho.net

X. Assessment & Evaluation Tools

The resident is evaluated in outpatient clinical settings and also when he/she covers the on call duty for the service. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME-I. Other tools could be used to evaluate the technical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Core Orthopedic Skills Rotation

Year: R1
Duration: 1 block
Training Center: Simulation Center (Ortho Skills Lab)

Orthopedic surgical education is undergoing a paradigm shift. The traditional way is used to be that residents acquire their surgical skills in the operating rooms under the supervision of senior surgeons. Due in part, however, to the rapid evolution of orthopedic surgical techniques, patient safety and restricted working hours, today's residents are expected to acquire more complex and diverse surgical skills in less time. As a result, alternative teaching methods such as surgical skills labs with cadaver models and synthetic bones, software tools, and computerized simulators, give residents the opportunity to acquire necessary skills outside the OR and before they attempt them on patients.

All orthopedic residents should have the chance to be trained to proficiency. It used to be that a resident was considered skillful in a certain type of procedure after completing a set number of cases. However, not all residents have the same psychomotor abilities. With simulation-based training, every resident can practice a procedure until he or she gains proficiency. The concept is similar to using flight simulators in flight training.

In addition, simulation-based training is ideal for orthopedics procedures where it is difficult to teach and assess skill level during the real surgery. Simulated environments enable orthopedic surgeons to practice and refine their skills before operating on patients; thus, shortening the learning curve without compromising patient safety. Simulation can also lead to decreases in soft-tissue injuries and surgical duration. That would directly correlate with a reduced risk for infection.

Orthopedic surgical training is moving toward a competency-based medical education model where residents must learn and demonstrate surgical skills before they can move on to the higher training level. Simulation training will foster this by providing the virtual reality environment. Simulation-based training will eventually be a mandatory component of orthopedic residency curriculum worldwide.

The Orthopedics Training Program is currently in the process of putting up an orthopedic simulation training area in the OMSB Medical Simulation Center. This will serve as the site for the simulation-based training and orthopedics workshops. It could also be utilized as a training place for trainers and other orthopedic surgeons in the country.

The implementation of simulation-based training as part of the Orthopedics curriculum will be through the following ways:

a) A 30-day intensive skills course for R1 residents at the beginning of their orthopedic surgery block. - This will include training in basic orthopedics skills and also basic surgical training in general. There will be 16 modules which are adopted from the American Board of Orthopedic Surgery (ABOS) curriculum.
b) **A simulation training block during the third or fourth year.** - The resident will spend time in the simulation center simulating different advanced techniques such as arthroscopies, reconstruction of complex fractures and pedicle screws insertion. The period can be extended to more than one block if it is found to be useful for the residents.

c) **Running orthopedic workshops and courses throughout the year.** - The residents will be able to participate actively and the simulation center will be an excellent environment to do those skills courses locally.

d) **The orthopedics simulation training can have a research role for residents.** - Orthopedics simulation-based training is relatively new with limited literature evidence. There are good opportunities for the program to conduct research projects in simulation and virtual reality training. It can also serve as an innovative environment for the Orthopedic residents in OMSB.

At the end of the simulation rotation, the resident will be competent to do the following:

1. Plastering (standard & synthetic)
2. Tissue handling
3. Suturing
4. Concept of fracture reduction and means of stabilization
5. Concept of three-point fixation
6. Concept of application of traction
## SURGICAL SKILLS MODULES

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**General Surgery - Trauma Rotation**

**Year:** R1  
**Duration:** 1 block  
**Training Center:** SQUH, KH

By the end of the General Surgery - Trauma rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Assist in the systematic evaluation, interventions, and the workup of a severely injured patient as directed by senior residents and staff  
2. Demonstrate ability to begin to formulate a diagnostic and treatment plan for all level injured trauma patients  
3. Demonstrate the basic critical care management principles  
4. Relate basic medical knowledge to trauma patient care  
5. Identify the indications for emergency operative procedures such as emergent vascular access, needle and tube thoracostomy, cricothyroidotomy  
6. Understand the criteria for triage of trauma alert and activation patients.

**Patient Care:**

1. Participates on daily rounds on all patients on the service and assists in the management of patient care on the service with assistance of the senior residents  
2. Communicates effectively with consulting services and other healthcare providers  
3. Make informed decisions appropriate to level of training about diagnostic and therapeutic interventions based on patient information and preferences, up to date scientific evidence and clinical judgment  
4. Discuss the implications of associated medical conditions seen in the trauma patient  
5. Maintain open communication with the senior residents and attending physician regarding the patient status and care plan  
6. Demonstrate early ability to communicate effectively with patient and families regarding injuries and plan of care as outlined by Team leaders  
7. Communicate effectively with the night float team and on call staff about patient problems and issues  
8. The senior resident will be expected to demonstrate technical skills including:  
   - Performs primary and secondary surveys based on ATLS training and is able to formulate a treatment plan based on findings  
   - Demonstrates competence by the end of the rotation in basic surgical skills like suturing and wound management  
   - Develops ability to make appropriate and timely decisions in regards to operative interventions  
   - Demonstrates manual dexterity appropriate to his/her level of training
Practice Based Learning and Improvement:

1. Investigates and evaluates patient care practices
2. Analyzes practice experience using a systematic methodology
3. Locates, appraises and assimilates evidence from scientific studies related to their patients’ injuries
4. Applies knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
5. Performs practice-based improvement activities using a systematic methodology
6. Uses information technology to manage information, access on-line medical information; and support his/her own education
7. Facilitates the learning of students
8. Demonstrates the ability to analyze personal practice outcomes to improve patient care.

Interpersonal and Communication Skills:

1. Demonstrates skill and sensitivity for appropriate counseling and educating patients and their families in a variety of trauma and critical care situations
2. Creates and sustains appropriate doctor-patient relationships with patients and families
3. Works effectively with others as a leader of the health care team and/or other professional groups
4. Effectively and promptly documents practice activities
5. Presents all patients and conference material in a concise, organized, chronologic, logical and knowledgeable manner
6. Utilizes input from all collaborative interactions with all personnel contributing to the surgical patient care
7. Works effectively as a team member and leader
8. Contributes via effective teaching and example to the educational efforts of the surgical residency.

Professionalism:

1. Demonstrates respect, compassion and integrity; a responsiveness to the needs of patients and society that supersedes self-interest; accountability to patients, society and the profession; and a commitment to excellence an on-going professional development
2. Demonstrates a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent and business practices
3. Demonstrates sensitivity and responsiveness to patients’ culture, age, gender and disabilities
4. Exhibits professionalism through timely completion of required administrative responsibilities (evaluations, recoding hours, chart documentation, medical record dictations, etc.)
5. Maintain positive relationships with team members and other health care providers
6. Demonstrate accountability for actions and decisions.
**Systems-Based Practice:**

1. Awareness and responsiveness to the Health Care System
2. Understands how patient care and other professional practices affect other health care professionals, the health care organization, and the larger society. Understand how these elements of the system affect their own practice
3. Begins to practice cost-effective health care and resource allocation that does not compromise quality of care for the trauma patient and/or critically ill
4. Advocates for quality patient care and assist patients in dealing with system complexities
5. Partner with health care managers and health care providers to assess, coordinate and improve health care and understand how these activities can affect system performance

**Conditions of Learning**
- Junior level – one month rotation in General Trauma ward

**Methods of Instruction/Learning**
- Ward management of patients
- Trauma room resuscitation of the injured patient
- Surgical experience in the operating room

**Evaluation:**
ITER completed by preceptors
Vascular Surgery Rotation

Year:  R1  
Duration:  1 block  
Training Center:  SQUH, RH

By the end of the Vascular Surgery rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Demonstrate and understand the medical knowledge necessary in the practice of general vascular surgery in a general practice setting
2. Demonstrate the basic knowledge in caring for general vascular surgical patients
3. Demonstrate the ability to acquire medical knowledge and apply such knowledge to patient care
4. Demonstrate the ability to use information technology to increase medical knowledge base

**Patient Care:**

1. Develop independent skills in assessing vascular surgical patients and decision-making in such patients
2. Demonstrate and understand the knowledge and skill necessary to practice vascular surgery in the general practice environment
3. Demonstrate knowledge of all components of general vascular surgery and apply them appropriately to vascular surgical patients
4. Demonstrate an understanding of the principles of pre- and post-operative management of general vascular surgical patients
5. Demonstrate appropriate use of invasive and non-invasive tests

**Practice Based Learning and Improvement:**

1. Evaluate own performance
2. Incorporate feedback into improvement activities
3. Effectively use technology to manage information for patient care and self-improvement

**Interpersonal and Communication Skills:**

1. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning and writing skills
2. Work effectively with others as a member of the OR team
**Professionalism:**

1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients, and a commitment to excellence and on-going professional development
2. Demonstrate a commitment to ethical principles pertaining to confidentiality of patient information and informed consent
3. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender and disabilities

**Systems-Based Practice:**

1. Practice cost-effective health care and demonstrate knowledge of resource allocation that does not compromise quality of care
2. Advocate for quality patient care and assist patients in dealing with the complexities of the OR experience

**Conditions of Learning**
- Junior level: One block rotation in vascular surgery service

**Methods of the Structure/Learning**
- Ward management of patients
- On call duties for vascular surgery
- Surgical experience in the operating room

**Evaluation:**
ITER completed by preceptors
Neurosurgery Rotation

Year:  R1  
Duration:  1 block  
Training Center:  Khoula Hospital

While in this rotation, the orthopedic resident will learn the essentials of neurologic examination and the basic management principles of closed head and neck injuries. Neurosurgery training is largely takes place in the outpatient services. Residents will be required to rotate in the outpatient clinics as well under the direct care and supervision of the Neurosurgery staff.

By the end of the Neurosurgery rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Understand and use basic science principles as related to medical practice.
2. Integrates medical facts and clinical data as the basis for diagnosis
3. Performing physical examinations that are accurate, comprehensive, and directed to the patient's problems. This applies to the outpatient clinics and in-patient setting.
4. Formulation and carry our of a complete and effective treatment plan for patients in the wards, and the outpatient department
5. Understands the performance of medical procedures related to the treatment plan.
6. Evaluates risks, benefits and alternative treatments for patients
7. Responsive to the individual needs of patients and their families.
8. Referral of the patient to the appropriate specialties for further management.
9. Demonstrate knowledge and therapeutic skills in the management of the following conditions:
   a. Clinical classification of cranial trauma
   b. Mechanistic classification of cranial trauma
   c. Pathophysiology of TBI
   d. Understanding regulation of CBF
   e. Understanding Brain oedema and intracranial pressure (ICP).
   f. Cellular and vasogenic oedema
   g. Understanding systemic manifestations of head injury.
   h. Understanding pathology of closed head injury.
   i. Understanding rationale of coma scale.
   j. GCS for adults and children.
   k. Indentifying herniation syndromes.
   l. Examination for brain death.
   m. Adjuvent diagnostic modalities and their indications
   n. Radiologic evaluation of head trauma.
   o. Pediatric head injury.
   p. Outcome prediction in severe head injury
   q. Minor head injury management and outcome
r. Sequelae of minor head injury
s. Indications and surgical techniques for degenerative cervical intervertebral disc disorders.

10. Demonstrate proficiency in:
   a. Basic operative skills and good surgical techniques
   b. Patient evaluation and management

11. Demonstrate progressive skills in:
   a. Intensive care treatment of TBI.
      • Avoiding Hypoxia and hypercapnia
      • Seizure prophylaxis
      • Maintaining electrolyte balance
      • ARDS
      • ICP monitoring and management
      • Cerebral perfusion pressure management.
   b. Preoperative, intraoperative, and post operative care of neurosurgical patient.

**Patient Care:**

1. Gather and understand essential patient information of neurosurgical patients in a timely manner (this include both brain and spine conditions)
2. Take appropriate history and physical examination and order the appropriate imaging studies
3. Assess the neurosurgical patients using the appropriate scores such as Glasgow Coma scale
4. Effectively assess patients with head trauma and discuss the case promptly with the senior team members
5. Generate an appropriate differential diagnosis in-patient with neurological symptoms
6. Develop basic pre and post neurosurgical care plan of patients
7. Be familiar with the basic neurosurgical techniques such as craniotomies and hematoma evacuations
8. Form appropriate treatment plans for a neurosurgical patient.

**Interpersonal and Communication Skills:**

1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s condition and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments.
2. Establish relationships with the patient that is characterized by understanding, respect empathy and confidentiality.
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation.
4. Ability to obtain an informed consent.
5. Understand and demonstrate the importance of the cooperation and communication among health care team, within and outside the Neurosurgery Department
6. Demonstrates skills in working with others who present communication challenges such as anger, confusion, ethno-cultural background.
7. Effectively teach co-workers, fellow residents, medical students and others in the ward at rounds, outpatient clinic, and lectures.
8. Define the role and expertise of various professionals involved in treating patients with burns, and during the pre, and post operative periods.
9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Systems Based Practice:**

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life.
2. Have an understanding of health care allocation and health education resources.
3. Work effectively and efficiently in a health care organization.
4. Effectively utilize information technology to optimize patient care and for continued self learning.
5. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.

**Practice Based Learning and Improvement:**

1. Identify the determinants of specific population needs of patient that include such factors as occupation type, education level, smoking, fitness level. Other risk factors include workers who are working at height, young patients who are drinking and driving, motor vehicle collisions and sporting injuries.
2. Know and apply preventive measures to minimize anticipated complications that may occur.
3. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluation the outcome.
4. Pose a research question, conduct an appropriate literature, propose a methodological approach and if the resident is inclined and interested, carry out the research outlined in the proposal.
5. Demonstrate an understanding of effective teaching techniques.

**Professionalism:**

1. Deliver the highest quality care with integrity, honesty and compassion.
2. Exhibit appropriate personal and interpersonal professional behaviors.
3. Practice in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
4. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation, research ethics etc.

**Evaluation:** ITER completed by preceptors
**Emergency Medicine Rotation**

**Year:** R1  
**Duration:** 1 block  
**Training Center:** Khoula Hospital

The Emergency Medicine rotation is intended to provide the junior orthopedic resident with experience in management of patients with medical or surgical emergencies. During this time, the resident sees patients and is supervised by the emergency medicine staff. The resident is required to see the patient and, in concert with the attending emergency room physicians, makes decisions concerning the diagnosis and appropriate treatment plans. The resident is required to dictate a note regarding participation with the emergency room patient.

By the end of the Emergency Medicine rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Understands and uses basic science principles as related to medical practice.
2. Integrates medical facts and clinical data as the basis for diagnosis
3. Performs physical examinations that are accurate, comprehensive, and directed to the patient’s problems.
4. Formulates and carries out a complete and effective treatment plan for patients attending the emergency room.
5. Understands the performance of medical procedures related to the treatment plan.
6. Evaluates risks, benefits and alternative treatments for patients referred to the emergency room.
7. Responds to the individual needs of patients and their families
8. Demonstrates therapeutic skills in the management of the following conditions:
   a. Shock
   b. Chest injuries
   c. Abdominal injuries
   d. Common sprain, dislocations.
   e. Wounds and lacerations
   f. Open and closed fractures, including. Closed reduction of simple fractures and dislocations, applying of splints and plaster application technique.
9. Demonstrates adequate and effective understanding during the following conditions:
   a. Management of patients with carding arrest, including the employment of CPR techniques, and employment of safe defibrillation.
   b. Role of the residents during mass casualty and major disasters
   c. Triage of patients with polytrauma.
   d. Evaluation of patients with polytrauma.
   e. Evaluation of patients with walk in trauma.
   f. Techniques of evacuation of the polytrauma at the site of accident.
**Patient Care:**

1. Effectively perform initial evaluation and management of patients with medical and surgical emergencies
2. Effectively manage patients with multiple traumas as per ATLS protocol
3. Learn how to manage common orthopedic cases that present to the emergency departments and be familiar with transfer of care protocols
4. Effectively assess patient's need for hospital admission and appropriate level of care
5. Know indications for common emergency department procedures and perform these procedures with appropriate supervision
6. Counsel patient and family in treatment procedure, options, and potential outcomes
7. Respond to the individual needs of patients and their families
8. Able to work well with entire team of health care professionals and be involved in care of the patient.

**Interpersonal and Communication Skills:**

1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient's condition and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments.
2. Establish relationships with the patient that is characterized by understanding, respect empathy and confidentiality.
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation.
4. Ability to obtain an informed consent.
5. Understand and demonstrate the importance of the cooperation and communication among health care team, within and outside the emergency room.
6. Demonstrates skills in working with others who present communication challenges such as anger, confusion, ethno-cultural background.
7. Effectively teach co-workers, fellow residents, medical students and others in the emergency room, at rounds and lectures.
8. Define the role and expertise of various professionals involved in treating patients referred to the emergency room.
9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Systems Based Practice:**

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life.
2. Have an understanding of health care allocation and health education resources.
3. Work effectively and efficiently in a health care organization.
4. Effectively utilize information technology to optimize patient care and for continued self learning.
5. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.
**Practice Based Learning and Improvement:**

1. Identify the determinants of specific population needs of patient that include such factors as occupation type, education level, smoking, fitness level. Other risk factors include workers who are working at height, young patients who are drinking and driving, motor vehicle collisions and sporting injuries.
2. Know and apply preventive measures to minimize complications in the emergency room (DVT prophylaxis, antibiotics and antiseptic measures, etc.)
3. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluation the outcome.
4. Pose a research question, conduct an appropriate literature, propose a methodological approach and if the resident is inclined and interested, carry out the research outlined in the proposal.
5. Demonstrate an understanding of effective teaching techniques.

**Professionalism:**

1. Deliver the highest quality care with integrity, honesty and compassion.
2. Exhibit appropriate personal and interpersonal professional behaviors.
3. Practice in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
4. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, paraplegia and tetraplegia, end of life care, consent, conflict of interest, resource allocation, research ethics etc.

**Evaluation:**
ITER completed by preceptors
Plastic Surgery Rotation

Year: R1
Duration: 2 blocks
Training Center: Khoula Hospital

This rotation focuses on the teaching of the basic principles of wound management such as skin grafts, and flap construction. The residents should assist in the operating room, and attends patients in the in-patient, and out-patient departments. The Resident is required as well to participate in the care of burn patients under direct supervision of a trainer from either Intensive Care Unit or burn unit.

By the end of the Plastic Surgery rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

Medical Knowledge:

1. Understand and use basic science principles as related to medical practice.
2. Integrates medical facts and clinical data as the basis for diagnosis
3. Performing physical examinations that are accurate, comprehensive, and directed to the patient’s problems. This applies to the outpatient clinics and in-patient setting.
4. Formulation and carry our of a complete and effective treatment plan for patients in the wards, and the outpatient department
5. Understands the performance of medical procedures related to the treatment plan.
6. Evaluates risks, benefits and alternative treatments for patients
7. Responsive to the individual needs of patients and their families.
8. Referral of the patient to the appropriate specialties for further management.
9. Demonstrate knowledge and therapeutic skills in the management of the following conditions
   - Understand the basic principles of wound management, general principles and techniques.
   - Fractures of small bone-fixation techniques.
   - Small joint arthrodesis
   - Tenosynovial diseases of the hand and their techniques
10. Demonstrate Proficiency in
    - Wound suturing techniques.
    - Pressure Dressings
    - Z plasty and its variations
    - Skin grafting techniques.
    - Use of Dermatomes
    - Use of Vac system.
11. Demonstrate progressive skills in
    - Examination of hand and relevant anatomy.
    - Free hand cutting of split thickness grafts
    - Principles of skin flap surgery.
    - Classification of skin flaps
• Faciocutaneous flaps
• Myocutaneous flaps
• Monitoring of Flap perfusion.
• Tendon repair and grafting principles and techniques.
• Tendon transfers for nerve palsy.
• Amputations in the hand
• Replantation - principles and indications
• Reconstruction of lower limbs.

**Patient Care:**

1. Know how to take history in patients with plastic surgical issues including comorbidities and issues related to immunosuppression
2. Know how to recognize and manage surgical infection
3. Effectively assess soft tissue injuries and tissue loss in trauma patient with special regard to musculoskeletal system
4. Describe wound management techniques for incisional wounds, partial thickness injuries, and full thickness wounds.
5. Discuss treatment options, risks and potential complications of patients with plastic surgery issue
6. Treat common soft tissues infections, acquired both from the community and in the postoperative setting
7. Demonstrate appropriate sterile techniques and infection control policies
8. Recognize postoperative wound healing problems such as wound infection, hematoma, and fascial dehiscence
10. Assist in the performance of plastic and reconstructive surgery procedures
11. Demonstrate skill in basic surgical techniques, including: Knot tying, exposure and retraction, knowledge of instrumentation used in plastic surgery, closure of incisions, handling of graft material including mesh and how to do skin harvesting and grafting
12. Know how to deal with special dressing
13. Recognize and manage postoperative surgical complications
14. Provide burn wound care including dressing changes and describe surgical management

**Interpersonal and Communication Skills:**

1. Recognition of the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s condition and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments.
2. Establishment of relationships with the patient that is characterized by understanding, respect, empathy and confidentiality.
3. Deliverance of information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation.
4. Ability to obtain an informed consent.
5. Understanding and demonstrating of the importance of the cooperation and communication among health care team, within and outside the Plastic Surgery Department.
6. Demonstrating skills in working with others who present communication challenges such as anger, confusion, ethno-cultural background.
7. Effectively teaching co-workers, fellow residents, medical students and others in the ward at rounds, outpatient clinic, and lectures.
8. Defining the role and expertise of various professionals involved in treating patients with burns, and during the pre, and post operative periods.
9. Demonstrating the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Systems Based Practice:**
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life.
2. Have an understanding of health care allocation and health education resources.
3. Work effectively and efficiently in a health care organization.
4. Effectively utilize information technology to optimize patient care and for continued self learning.
5. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.

**Practice Based Learning and Improvement:**
1. Identify the determinants of specific population needs of patient that include such factors as occupation type, education level, smoking, fitness level. Other risk factors include workers who are working at height, young patients who are drinking and driving, motor vehicle collisions and sporting injuries.
2. Know and apply preventive measures to minimize anticipated complications that may occur.
3. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluation the outcome.
4. Pose a research question, conduct an appropriate literature, propose a methodological approach and if the resident is inclined and interested, carry out the research outlined in the proposal.
5. Demonstrate an understanding of effective teaching techniques.

**Professionalism:**
1. Deliver the highest quality care with integrity, honesty and compassion.
2. Exhibit appropriate personal and interpersonal professional behaviors.
3. Practice in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
4. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation, research ethics etc.

**Evaluation:**
ITER completed by preceptors
Junior Orthopedic Trauma Rotation

Year: R2  
Duration: 2 blocks  
Training Center: Khoula Hospital

I. Introduction:

The goal of the junior Orthopedic trauma rotation is to prepare the resident to be competent in the evaluation and treatment of traumatic injuries to the long bones, joints, and pelvis. It serves to introduce the junior resident to the treatment of patients with traumatic orthopedic injuries and prepare him/her for more responsibilities and active role when advancing during the training program. The resident will function as an integral part of the trauma team. With faculty supervision, he/she will formulate emergency treatment plans and determine appropriate indications for operative or non-operative treatment. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist/senior resident. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant.

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents are also directly responsible for the supervision of junior residents. Senior residents must be available for consultation at all times.

V. Rotation Core Competencies

**Patient Care**

The resident will demonstrate competency in the following objectives:
1. Demonstrate the biomechanics and treatment alternatives for traumatic injuries of the upper extremity, lower extremity, and pelvis
2. Understand the pathoanatomy of long bone fractures including recognition of associated injuries, classification of fractures, and temporary stabilization
3. Utilize proper triage procedures
4. Demonstrate proficiency in the clinical examination and resuscitation of the trauma patient
5. Demonstrate familiarity with the ATLS protocol for resuscitation of the trauma patient
6. Demonstrate familiarity with the interpretation of radiographs of the long bones and large joints
7. Select appropriate diagnostic procedures for trauma patients
8. Demonstrate the ability to evaluate a trauma series, including lateral c-spine, pelvis, and chest radiographs
9. Discuss indications for further radiographic evaluation of a trauma patient
10. Be able to classify and correctly workup periarticular injuries including pilon, plateau, distal femur, distal radius, elbow and shoulder fractures
11. Understand the treatment methods for major joint dislocations, including when to order adjunctive tests including angiograms
12. Determine necessity of consultation with other specialties
13. Recognize orthopedic surgical emergencies
14. Demonstrate competency in assessment and proper management of open injuries
15. Demonstrate competency in timely assessment and management of compartment syndrome
16. Determine indications for and timing of orthopedic surgical procedures needed
17. Coordinate orthopedic treatment with other disciplines in multiply injured patients
18. Demonstrate knowledge of the indications for and potential complications related to the orthopedic trauma surgery
Medical Knowledge

The resident will demonstrate competency in the following objectives:
1. Ability to appropriately manage pre and postoperative orthopedic patients
2. Knowledge of fracture patterns, classifications, and means of fixation
3. Knowledge of common orthopedic traumatic injuries and their acute management (examples: distal radius, tibia, femur, & humerus fractures, shoulder & hip dislocations, hand lacerations, and open fractures)
4. Knowledge of / ability to appropriately manage acutely injured patients (examples: required imaging, when/how to sheet a pelvis or reduce cervical spine dislocation, and indications for traction)
5. Knowledge of reduction and splinting principles and techniques
6. Knowledge of appropriate indications for surgical and nonoperative management of traumatic orthopedic injuries
7. Knowledge of relative and absolute contraindications for surgical management of traumatic orthopedic injuries
8. Knowledge of expected risk of common surgical interventions (examples: malrotation of transverse/comminuted femur fractures, nonunion of segmental bone loss, knee pain following IMN of the tibia, etc.)
9. Knowledge of AO fracture fixation including lag screw, plate function, modes of fracture healing, material properties, and basic biomechanics

Practice-Based Learning and Improvement

The resident will demonstrate competency in the following objectives:
1. Presents cases during morning sign-out rounds
2. Assess ones own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

Interpersonal and Communication Skills

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the
elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health care system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation-Specific Psychomotor Skills

By the end of the junior Orthopedic Trauma rotation, the resident should be able to:
1. Thoroughly evaluate patient with orthopedic issues in the clinic and emergency department settings including the ability to effectively communicate findings with senior residents, specialists and consultants
2. Work with multiple surgical specialties in the triage and management of the polytraumatized patient as per the ATLS protocol
3. Identify the appropriate imaging required to evaluate an injury
4. Interpret diagnostic plain films, CTs, and MRIs
5. Acutely manage open fractures including, irrigation & debridement, antibiotic selection, tetanus prophylaxis, reduction, immobilization, and assessment of associated injuries (typically vascular or neurologic)
6. Identify patient in need of medical consultation early in the hospital course
7. Perform closed reduction and manipulations of fractures and dislocations including appropriate casting, splinting, and immobilization
8. Demonstrate sterile technique, patient site preparation, patient positioning, and aseptic draping
9. Master the basic suturing technique, including multi-layer wound closure and complex wound management
10. Master the basic surgical instrument skills (tools for exposure, hemostasis, retraction, tissue handling, and closure) including aseptic technique and atraumatic soft-tissue handling
11. Understand common surgical approaches for fracture care. Examples include lateral approach to the ankle, lateral approach to the femur, deltopectoral approach to the shoulder, volar approach to the forearm
12. Reduce basic fracture patterns with manipulation, clamps, and K-wires
13. Understand basic AO techniques including knowledge of screw and plate design
14. Perform basic plate osteosynthesis
15. Drill, measure, and tap bone for screw placement including lag screw technique
16. Perform the approach and find the starting point for femoral and tibial nails
17. Know the steps for medullary nailing for diaphyseal fractures
18. Insert free hand interlocks in intramedullary nails
19. Reduce basic fracture patterns with manipulation, clamps, and K-wires
20. Perform local nerve blocks, joint aspirations
21. Identify potential complications of traumatic injuries such as compartment syndrome, cognitive impairment, and depression
22. Review, daily, of anticoagulation, activity, and antibiotic plan for each patient
23. Maintain an up to date sign-out list of trauma inpatients and their active issues
VII. Core Surgical Competencies

By the end of the junior orthopedic trauma rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:

- Casting and splinting techniques
- Closed reduction of fractures reduction
- Fixation of simple fracture patterns
- Hardware removal
- Irrigation and debridement of open wounds
- Suturing and stapling techniques
- Intramedullary nailing of long bone fractures
- Closed reduction and percutaneous pinning of fractures
- Plate-and-screw fixation
- Application of external fixation devices
- Bone graft harvesting
- Bone grafting

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her orthopedic trauma management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly fracture meeting at which different fractures are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of fracture and trauma patients
5. Basic science lecture series at the weekly resident didactics in biomechanics of fracture fixation and fracture healing
6. Trauma journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of trauma patients such as general/trauma surgeons, plastic surgeons, Intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- AO Manual of Fracture Fixation
- Bucholz and Heckman: Rockwood and Green's Fractures in Adults
- Browner, Jupiter, Levine, and Trafton: Skeletal Trauma, 3rd edition
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell's Operative Orthopedics, 10th edition
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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General Orthopedics Rotation

Year: R2 or R3
Duration: 6 blocks
Training Center: KH, AFH, SQUH

I. Introduction:

The overall goal of this rotation is to provide the resident with a basic understanding of the pre and post-operative evaluation of the emergent and elective orthopedic surgery cases, basic knowledge of surgical decision making, proper wound and musculoskeletal management. Patient population includes those of a wide variety of age ranges, functional levels, and joint involvement. The resident should also develop fundamental orthopedic psychomotor skills. During the general orthopedics rotation, the residents work with faculty members to develop skills in history taking and physical examination, diagnosis of a variety of adult and pediatric orthopedic conditions, and formulation of surgical and non-surgical treatment plans. Surgical skills are developed in a variety of orthopedic procedures as the resident assists faculty and other senior residents. Continuity of care is ensured as the resident follows patients through surgical or non-surgical treatment and rehabilitation. So, this rotation will prepare the resident to assume the medical and administrative responsibilities involved in the care of patients with common musculoskeletal conditions.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist/senior resident. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant.

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the direct supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents are also directly responsible for the supervision of junior residents. Senior residents must be available for consultation at all times.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:

1. Know the pathophysiology, assessment, and management of basic musculoskeletal system problems and particularly traumatic injuries
2. Know the technique of basic musculoskeletal and neurologic examinations
3. Know the most common orthopedic emergencies and their initial management
4. Know basic surgical techniques related to orthopedic surgery
5. Recognize postoperative wound healing problems such as wound infection and hematoma
6. Appropriately use sterile technique and infection control practices in the orthopedic environment
7. Understand the indications for and provide appropriate prophylaxis against infection and thromboembolic problems
8. Evaluate and perform initial management of patients with blunt or penetrating trauma to the musculoskeletal system
9. Understand the etiology, presentation, and treatment of compartment syndrome
10. Identify when to measure compartment pressures, demonstrate competence in performing the measurement, and know how to perform a fasciotomy
11. Identify and describe common fractures and dislocations using physical examination and appropriate radiographic tests
12. Identify and describe and initiate appropriate management of open fractures, open joints, dislocations, and cauda equina syndrome
13. Recognize indications for emergency surgical intervention for musculoskeletal conditions
14. Demonstrate the ability to perform thorough extremity, spinal, and neurologic examinations
15. Recognize the role of radiographic evaluations for musculoskeletal pathology
16. Position and prepare a patient for surgery in the operating room for orthopedic procedures
17. Close orthopedic surgical wounds in a satisfactory fashion using sutures and staples using appropriate surgical technique
18. Demonstrate competency in major joint aspiration and injection

**Medical Knowledge**

The resident will demonstrate competency in the following objectives:

1. Understand basic cellular structure and function as it relates to musculoskeletal system
2. Know the basic genetics, embryology, anatomy and physiology of the musculoskeletal system
3. Know basic principles involved in the radiographic evaluation of musculoskeletal problems
4. Know the pharmacology of drugs commonly used in orthopedic surgery practice
5. Identify cellular structures and outline cellular activities and cellular signaling including the functions of various cytokines as it relates to the musculoskeletal system.
6. Describe the pathophysiology of basic musculoskeletal conditions
7. Demonstrate knowledge of musculoskeletal anatomy, grossly and radiographically
8. Describe the dosage, routes of administration, metabolic pathways, major side effects of drugs used commonly in orthopedic surgical practice, including analgesics, local anesthetics, antibiotics, anticoagulants, ant-inflammatory agents, diuretics, laxatives, and amnestic
9. Describe factors that can impair wound and bone healing.
10. Describe the appropriate use of musculoskeletal imaging modalities

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:

1. Presents cases during morning sign-out rounds
2. Assess ones own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient's problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques.
Interpersonal and Communication Skills

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

Professionalism

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

Systems-Based Practice

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation Specific Psychomotor Skills

By the end of the General Orthopedics rotation, the resident should be able to:
1. Demonstrate physical examination techniques appropriate to the patient’s chief complaint and history, and arrange further studies as needed
2. Demonstrate the assessment and management of orthopedic injuries and illnesses commonly encountered in the emergency room, including appropriate physical and imaging examinations, recognition of important features of the condition, and the appropriate type of procedure required for initial treatment
3. Perform a basic interpretation of imaging and laboratory study findings in the context of the patient's history and examination
4. Evaluate emergency room patients and effectively triage patients having injuries of illnesses that are considered to be orthopedic emergencies such as acute septic disease, infections, open fractures, compartment syndrome, etc.
5. Demonstrate the manual techniques for initial management of commonly encountered orthopedic problems in the emergency room such as reduction of fractures and dislocations, treatment of lacerations, examination of soft tissue injuries, and aspiration of joint or fluid collection
6. Demonstrate appropriate immobilization and dressing techniques for commonly encountered orthopedic problems
7. Demonstrate the appropriate pre-operative work-up of orthopedic patients, including functional assessment
8. Perform an appropriate screening pre-operative history and physical examination, and refer for further studies as needed for pre-operative clearance for the procedure in question
9. Determine the indications for and use of casting, bracing and orthoses
10. Participate in the definitive management, including surgical intervention when appropriate, of conditions commonly encountered by the general orthopaedist (i.e. traumatic injuries of the spine and extremities, arthritic conditions involving the spine and extremities, orthopedic infections, acute and chronic athletic injuries involving bone, muscle, ligament, and tendons)
11. Serves as first/second assistant for operative procedures such as arthroplasty, tendon transfers, amputation, intramedullary nailing of long bone fractures, closed reduction and percutaneous pinning of fractures, open reduction and internal fixation of fractures, and arthroscopic reconstructive procedures
12. Evaluate and determine appropriate interventions for the post-operative issues that
arise in the care of post-operative patients (i.e. pain control, bleeding and drainage, fevers, traction and post operative stabilization)

13. Recommend and arrange as necessary, appropriate post-operative of post-procedure care, including pain control, activity status including immobilization and/or therapeutic exercise, wound management and appropriate nursing or custodial care for orthopedic patients upon discharge

14. Demonstrate the ability to effectively manage the responsibilities of call duty.

VII. Core Surgical Competencies

By the end of the General Orthopedics rotation, the resident should be able to assist/perform, under direct supervision, the following procedures:

- Surgical approaches
- Joint injection techniques
- Open reduction and internal fixation
- Intra-medullary nailing
- Irrigation and debridement
- Amputation procedures
- Soft tissue procedure (e.g. Ganglion cyst removal)
- Knee arthroscopy
  - setup and positioning -standard portals and diagnostic exam
  - removal of loose bodies
  - ACL reconstruction with hamstring allograft or autograft
- Shoulder arthroscopy
  - setup and positioning standard portals and diagnostic exam -subacromial decompression -rotator cuff mobilization and repair
- Hardware removal
  - positioning and fluoroscopic visualization
  - techniques and pitfalls in surgical exposure
  - removal of broken screws
- Lower extremity tendon ruptures
- Total knee arthroplasty
  - indications and non-arthroplasty options
  - surgical approaches
  - principles of implant positioning and ligament balancing
- Total hip arthroplasty
  - indications surgical approaches
  - acetabular and femoral preparation

VIII. Implementation

In addition to the daily apprenticeship model of one-to-one instruction, the resident will enhance his/her treatment skills by a number of specific activities:

1. Daily rounds/sign-out of pre- and postoperative patients, discussion of treatment and follow-up protocols with the senior team members
2. Daily departmental meetings including didactic lectures presentations
3. Core curriculum conference series of presentations on common orthopedic diseases and conditions
4. Departmental journal club
5. Basic Science lecture series on the anatomy, biology, and biomechanics of orthopedic disease, which are presented in the weekly resident conference

IX. Rotation Reading Resources
- OKU 10
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Current relevant articles (list can be distributed to residents at start of rotation)
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless’ Textbook of Orthopedic (Duke University) website

X. Assessment & Evaluation Tools

The resident will be evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An Interim evaluation is performed at mid-rotation. Additionally, the resident will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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| Technical Skills          | O-Score  
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|                         | Procedure Based Assessment  

Regional Hospital Orthopedics Rotation

Year:  R2 or R3  
Duration: 2 blocks 
Training Center:  Nizwa Hospital / Sohar Hospital

I. Introduction:

The overall goal of this rotation is to understand the differences between community and academic orthopedic practice and the limitations that may present in the regional hospital. It exposes the resident to the concept of a “general orthopedic surgeon” and provides him/her with exposure to the practices of orthopedic surgeons in regional clinical settings throughout the country. Residents can expect to gain valuable experience in diverse areas of clinical practice having spent a portion of their training in such environment. They will benefit from this comprehensive learning approach with additional experiences and proficiency in subspecialty areas that are integral to regional practice. The rotation also will enhance administrative responsibilities of the residents including the decision making and communication with tertiary institutions for transfer of patients in need of advanced care.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist/senior resident. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant:

a. Develop a program of self-study to acquire the medical knowledge 
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the direct supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Senior surgeons are available for consultation at all times.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Know the pathophysiology, assessment, and management of basic musculoskeletal system problems and particularly traumatic injuries
2. Know the technique of basic musculoskeletal and neurologic examinations
3. Know the most common orthopedic emergencies in regional hospital and their initial management
4. Know basic surgical techniques related to orthopedic surgery
5. Recognize postoperative wound healing problems such as wound infection and hematoma
6. Appropriately use sterile technique and infection control practices in the orthopedic environment
7. Understand the indications for and provide appropriate prophylaxis against infection and thromboembolic problems
8. Evaluate and perform initial management of patients with blunt or penetrating trauma to the musculoskeletal system
9. Understand the etiology, presentation, and treatment of compartment syndrome
10. Identify and describe common fractures and dislocations using physical examination and appropriate radiographic tests
11. Identify and describe and initiate appropriate management of open fractures, open joints, dislocations, cauda equine syndrome and compartment syndrome
12. Recognize indications for emergency surgical intervention for musculoskeletal conditions
13. Demonstrate the ability to perform thorough extremity, spinal, and neurologic examinations
14. Recognize the role of radiographic evaluations for musculoskeletal pathology
15. Position and prepare a patient for surgery in the operating room for orthopedic procedures
16. Determine indications for and timing of orthopedic surgical procedures needed
17. Coordinate orthopedic treatment with other disciplines in multiply injured patients
18. Demonstrate knowledge of the indications for and potential complications related to the orthopedic surgery
19. Understand the structure of health care in a community setting including access to tertiary care and the need to transfer a patient when this care is not available.
Medical Knowledge

The resident will demonstrate competency in the following objectives:
1. Understand basic cellular structure and function as it relates to musculoskeletal system
2. Know the basic genetics, embryology, anatomy and physiology of the musculoskeletal system
3. Know basic principles involved in the radiographic evaluation of musculoskeletal problems
4. Know the pharmacology of drugs commonly used in orthopedic surgery practice
5. Identify cellular structures and outline cellular activities and cellular signaling including the functions of various cytokines as it relates to the musculoskeletal system.
6. Describe the pathophysiology of basic musculoskeletal conditions
7. Demonstrate knowledge of musculoskeletal anatomy, grossly and radiographically
8. Describe the dosage, routes of administration, metabolic pathways, major side effects of drugs used commonly in orthopedic surgical practice, including analgesics, local anesthetics, antibiotics, anticoagulants, ant-inflammatory agents, diuretics, laxatives, and amnestics
9. Describe factors that can impair wound and bone healing.
10. Describe the appropriate use of musculoskeletal imaging modalities.

Practice-Based Learning and Improvement

The resident will demonstrate competency in the following objectives:
1. Presents cases during morning sign-out rounds
2. Assess ones own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques.

Interpersonal and Communication Skills

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Understand the structure of health care in a community setting including access to tertiary care and the need to transfer a patient when this care is not available
5. Work effectively and efficiently in a health care institution
6. Understand the scope of orthopedic practice in a community setting and the limitations of resources based on geographical variations
7. Effectively utilize information technology to optimize patient care and for continued self-learning
8. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
9. Further his/her understanding of the structure, financing and operation of the Oman health system
10. Work in interprofessional teams to enhance patient safety and improve patient care quality
11. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation Specific Psychomotor Skills

By the end of the Regional Orthopedics rotation, the resident should be able to:
1. Demonstrate physical examination techniques appropriate to the patient’s chief complaint and history, and arrange further studies as needed
2. Demonstrate the assessment and management of orthopedic injuries and illnesses commonly encountered in the emergency room, including appropriate physical and imaging examinations, recognition of important features of the condition, and the appropriate type of procedure required for initial treatment
3. Perform a basic interpretation of imaging and laboratory study findings in the context of the patient’s history and examination
4. Evaluate emergency room patients and effectively triage patients having injuries of illnesses that are considered to be orthopedic emergencies such as acute septic disease, infections, open fractures, compartment syndrome, etc.
5. Demonstrate the manual techniques for initial management of commonly encountered orthopedic problems in the emergency room such as reduction of fractures and dislocations, treatment of lacerations, examination of soft tissue injuries, and aspiration of joint or fluid collection
6. Demonstrate appropriate immobilization and dressing techniques for commonly encountered orthopedic problems
7. Demonstrate the appropriate pre-operative work-up of orthopedic patients, including functional assessment
8. Perform an appropriate screening pre-operative history and physical examination, and refer for further studies as needed for pre-operative clearance for the procedure in question
9. Determine the indications for and use of casting, bracing and orthoses
10. Participate in the definitive management, including surgical intervention when appropriate, of conditions commonly encountered by the general orthopaedist (i.e. traumatic injuries of the spine and extremities, arthritic conditions involving the spine and extremities, orthopedic infections, acute and chronic athletic injuries involving bone, muscle, ligament, and tendons)
11. Serves as first assistant for operative procedures such as arthroplasty, amputation, intramedullary nailing of long bone fractures, closed reduction and percutaneous pinning of fractures, open reduction and internal fixation of fractures, arthroscopic reconstructive procedures and fixation of simple pediatric fractures
12. Evaluate and determine appropriate interventions for the post-operative issues that arise in the care of post-operative patients (i.e. pain control, bleeding and drainage, fevers, traction and post operative stabilization)
13. Recommend and arrange as necessary, appropriate post-operative of post-procedure care, including pain control, activity status including immobilization and/or therapeutic exercise, wound management and appropriate nursing or custodial care for orthopedic patients upon discharge.

14. Demonstrate the ability to effectively manage the responsibilities of call duty.

VII. Core Surgical Competencies

By the end of the General Orthopedics rotation, the resident should be able to assist/perform, under direct supervision, the following procedures:

- **Surgical approaches**
- **Joint injection techniques**
- **Open reduction and internal fixation of common fractures**
- **Intra-medullary nailing**
- **Irrigation and debridement**
- **Amputation procedures**
- **Soft tissue procedure (e.g. Ganglion cyst removal)**
- **Knee arthroscopy**
  - setup and positioning - standard portals and diagnostic exam
  - removal of loose bodies
- **Damage control orthopedics**
- **Uncomplicated pediatric fractures**
- **Hardware removal**
  - positioning and fluoroscopic visualization
  - techniques and pitfalls in surgical exposure
  - removal of broken screws
- **Total knee arthroplasty**
  - indications and non-arthroplasty options
  - surgical approaches
  - Principles of implant positioning and ligament balancing

VIII. Implementation

In addition to the daily apprenticeship model of one-to-one instruction, the resident will enhance his/her treatment skills by a number of specific activities:

1. Daily rounds/sign-out of pre- and postoperative patients, discussion of treatment and follow-up protocols with the senior team members
2. Daily departmental meetings including didactic lectures presentations
3. Core curriculum conference series of presentations on common orthopedic diseases and conditions
4. Departmental journal club
**IX. Rotation Reading Resources**

- OKU 10
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Current relevant articles (list can be distributed to residents at start of rotation)
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless’ Textbook of Orthopedic (Duke University) website

**X. Assessment & Evaluation Tools**

The resident will be evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An Interim evaluation is performed at mid-rotation. Additionally, the resident will complete an evaluation that encompasses his/her feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Surgical Intensive Care Unit Rotation

Year:  R2 or R3  
Duration:  1 block  
Training Center:  Khoula Hospital

The Surgical Intensive Care Unit rotation is intended to provide the junior orthopedic resident with experience in management of patients with medical or surgical emergencies. During this rotation, the resident will have a structured training in multi-system trauma and intensive care, specifically in the management of shock, sepsis, multi-organ failure and respiratory failure. The primary goal of the rotation is to provide the resident with the experience in the care of critically ill patients. During this time, the resident will function under the direct supervision of the Intensive Care Unit staff. The resident is required to see the patient and, in concert with the attending Intensive Care Unit physicians, makes decisions concerning the diagnosis and appropriate treatment plans.

By the end of the Surgical Intensive Care Unit rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

Medical Knowledge:

1. Understands and uses basic science principles as related to medical practice.
2. Integrates medical facts and clinical data as the basis for diagnosis
3. Performs physical examinations that are accurate, comprehensive, and directed to the patient's problems.
4. Formulates and carries out a complete and effective treatment plan for patients admitted to the Intensive Care Unit.
5. Understands the performance of medical procedures related to the treatment plan.
6. Evaluates risks, benefits and alternative treatments for patients admitted to the Intensive Care Unit.
7. Responds to the individual needs of patients and their families
8. Demonstrates therapeutic skills in the management of the following conditions admitted to the Intensive Care Unit:
   a. Polytrauma patients
   b. Shock, due to polytrauma, post operative bleedings, and septic shock
   c. Abdominal injuries
   d. Comatosed patients
   e. Role of parenteral in polytrauma patients
   f. Demonstrate Proficiency in performing of the following
9. Airway management and insertion of endotracheal tube insertion, or other advanced airway adjuncts, (e.g. LMS, Combitube).
Patient Care:
1. Know how to evaluate surgical patient in intensive care setting including postoperative patient, patient with multiple trauma and patients with surgical infections
2. Know how to gather appropriate patient information including history, physical examinations, lab works and imaging
3. Be able to formulate differential diagnoses for different clinical scenarios or any change in patient status
4. Effectively formulate a treatment plan and appropriate intervention
5. Assist senior team members in doing bed side procedures such as central lines and intubations
6. Liaise and counsel the patient’s family in a timely manner

Interpersonal and Communication Skills:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s condition and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments.
2. Establish relationships with the patient that is characterized by understanding, respect empathy and confidentiality.
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation.
4. Ability to obtain an informed consent.
5. Understand and demonstrate the importance of the cooperation and communication among health care team, within and outside the Intensive Care Unit.
6. Demonstrates skills in working with others who present communication challenges such as anger, confusion, ethno-cultural background.
7. Effectively teach co-workers, fellow residents, medical students and others in the Intensive Care Unit, at rounds and lectures.
8. Define the role and expertise of various professionals involved in treating patients admitted to the Intensive Care Unit.
9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

Systems Based Practice:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life.
2. Have an understanding of health care allocation and health education resources.
3. Work effectively and efficiently in a health care organization.
4. Effectively utilize information technology to optimize patient care and for continued self learning.
5. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.
Practice Based Learning and Improvement:

1. Identify the determinants of specific population needs of patient that include such factors as occupation type, education level, smoking, fitness level. Other risk factors include workers who are working at height, young patients who are drinking and driving, motor vehicle collisions and sporting injuries.

2. Know and apply preventive measures to minimize anticipated complications that may occur in the Intensive Care Unit (DVT prophylaxis, antibiotics and antiseptic, and infection control measures, etc.)

3. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluation the outcome.

4. Pose a research question, conduct an appropriate literature, propose a methodological approach and if the resident is inclined and interested, carry out the research outlined in the proposal.

5. Demonstrate an understanding of effective teaching techniques.

Professionalism:

1. Deliver the highest quality care with integrity, honesty and compassion.

2. Exhibit appropriate personal and interpersonal professional behaviors.

3. Practice in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.

4. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation, research ethics etc.

Evaluation:

ITER completed by preceptors
**Rheumatology Rotation (Elective)**

**Year:**  R2 or R3  
**Duration:**  1 block  
**Training Center:**  Royal Hospital

The Rheumatology rotation is intended to provide the junior orthopedic resident with experience in management of patients with rheumatological diseases. During this time, the resident sees the patients under the direct supervision of a rheumatologist.

By the end of the Rheumatology rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Understands and uses basic science principles as related to medical practice.
2. Integrates medical facts and clinical data as the basis for diagnosis
3. Performs physical examinations that are accurate, comprehensive, and directed to the patient’s problems. This applies to the outpatient clinics and in-patient setting.
4. Formulates and carries out a complete and effective treatment plan for patients in the wards, and the outpatient department
5. Understands the performance of medical procedures related to the treatment plan.
6. Evaluates risks, benefits and alternative treatments for patients
7. Responds to the individual needs of patients and their families.
8. Refers the patient to the appropriate specialties for further management.
9. Demonstrates therapeutic skills in the management of the following conditions
   a. Patho-physiology of common rheumatological diseases
   b. Rheumatoid arthritis and Sero negative arthopathies
   c. Evaluation and investigation required for patients with rheumatological diseases, including laboratory, and radiographic studies.

**Patient Care:**

1. Gather correct information and history about patients with rheumatology conditions
2. Conduct proper physical examination and be familiar with special tests for rheumatology and connective tissue diseases
3. Formulate a differential diagnoses
4. Effectively formulate a treatment plan for patients that suffer from rheumatology conditions
5. Be familiar with the common pharmacologic drugs and regimens used
6. Counsel patient and families appropriately and treat them with compassion
7. Be competent to take care of inpatients that got flare up
8. Work as a team member and share the clinical work with others including inpatient and emergency coverage
9. Perform, under supervision, common procedures such as joint aspirations/injections and other musculoskeletal procedures
Interpersonal and Communication Skills:

1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s condition and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments.
2. Establish relationships with the patient that is characterized by understanding, respect, empathy and confidentiality.
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation.
4. Ability to obtain an informed consent, in case procedures needed to be carried out, e.g. knee aspiration.
5. Understand and demonstrate the importance of the cooperation and communication among health care team, within and outside the Rheumatology Department.
6. Demonstrates skills in working with others who present communication challenges such as anger, confusion, ethno-cultural background.
7. Effectively teach co-workers, fellow residents, medical students and others in the ward at rounds, outpatient clinic, and lectures.
8. Define the role and expertise of various professionals involved in treating patients with Rheumatological diseases.
9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

Systems Based Practice:

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life.
2. Have an understanding of health care allocation and health education resources.
3. Work effectively and efficiently in a health care organization.
4. Effectively utilize information technology to optimize patient care and for continued self learning.
5. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.

Practice Based Learning and Improvement:

1. Identify the determinants of specific population needs of patient that include such factors as occupation type, education level, smoking, fitness level. Other risk factors include workers who are working at height, young patients who are drinking and driving, motor vehicle collisions and sporting injuries.
2. Know and apply preventive measures to minimize anticipated complications that may occur.
3. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluation the outcome.
4. Pose a research question, conduct an appropriate literature, propose a methodological approach and if the resident is inclined and interested, carry out the research outlined in the proposal.

5. Demonstrate an understanding of effective teaching techniques.

**Professionalism:**

1. Deliver the highest quality care with integrity, honesty and compassion.
2. Exhibit appropriate personal and interpersonal professional behaviors.
3. Practice in an ethically responsible manner that respects the medical, legal and professional obligations of belonging to a self-regulating body.
4. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation, research ethics etc.

**Evaluation:**

ITER completed by preceptors
**Radiology Rotation (Elective)**

**Year:**  R2 or R3  
**Duration:**  1 block  
**Training Center:**  Khoula Hospital

By the end of this one-month elective rotation in Radiology, the Orthopedics resident should have acquired competency basic skills in radiographic image interpretation, knowledge appropriate imaging modalities for different pathologies, and familiarity with some image-guided biopsy procedures.

**Overall rotation goals:**
1. Plain film interpretation of extremity, spine, joints, soft tissues
2. CT – indication and interpretation
3. MRI – indication and interpretation of bone, joint and soft tissue pathology
4. Arthrography (XR, CT, MRI) – knowledge of appropriate indications and interpretation
5. Musculoskeletal ultrasound – indication and basic interpretation
6. Interventional procedures – exposure to and understanding of the indications

By the end of the Radiology rotation, the Orthopedics resident should be able to demonstrate competency in the following objectives:

**Medical Knowledge:**

1. Demonstrate knowledge of radiological anatomy of peripheral and axial skeleton, including the relevant soft tissues
2. Demonstrate skills in interpretation of plain films
3. Spine imaging interpretation – approach to interpretation of spine plain films for trauma patients; spine CT imaging indications and interpretation; common injury patterns; role of MRI in spine imaging
4. Demonstrate knowledge and awareness of common anatomic variants, including accessory ossicles, growth centers, normal variants, etc.
5. Demonstrate familiarity with standard views and projections for plain film MSK imaging
6. Recognize and describe common fractures, dislocations and injury patterns
7. Obtain an approach to common joint disorders, including knowledge of clinical and imaging features differentiating various forms of arthritis
8. Obtain an approach to assessment and diagnosis of tumors and tumor-like conditions, in particular the radiographic features discriminating non-aggressive from aggressive bone lesions
9. Recognize and describe key features of common tumor-like conditions or mimics, for example Paget’s disease, fibrous dysplasia, etc.
10. Demonstrate an understanding of infection and how it affects the musculoskeletal system (osteomyelitis, septic arthritis, diskitis)
11. Differentiate infection from malignancy
12. Familiarize with appearance and interpretation of normal MRI, various sequences of MRI, their advantages and appearance of common pathologies on MRI
13. Understand the different advantages and disadvantages of CT versus MRI for orthopedic applications
14. Gain an understanding of the role of musculoskeletal ultrasound and introduction on how to do a musculoskeletal ultrasound examination, including a basic understanding of ultrasound appearance of normal structures (tendons, ligaments, muscles) as well as common pathologies (for example, rotator cuff tear, Achilles tendon tear)

Patient Care:
1. Gather appropriate information about their patients
2. Collaborate efficiently with referring departments to prepare patients for radiological procedures
3. Understand different modalities used in musculoskeletal system including x-rays, CT, MRI and bone scans
4. Identify appropriate studies for a given clinical situation
5. Understand the limits of different imaging modalities
6. Assist radiologists in performing interventional procedures related to musculoskeletal systems such as joint aspirations/injection, image guided biopsies, epidurals, etc.
7. Know how to read musculoskeletal x-rays, CT and MRI of different musculoskeletal areas

Interpersonal & Communication Skills:
1. Describe relevant findings, diagnosis and recommendations, using appropriate terminology and descriptive terms
2. Demonstrate effective communication skills when dealing with patients, technologists and clinical colleagues
3. Demonstrate good peer skills when interacting with other physicians & health team members
4. Interact appropriately with other radiology department staff, demonstrating a team approach to patient care

Professionalism:
1. Demonstrate integrity, honesty and compassion and respect for others
2. Demonstrate professional appearance and communication
3. Demonstrate good work ethic, with enthusiasm and motivation for learning
4. Demonstrate professional work habits with punctuality, organization and efficiency
5. Demonstrate awareness of own limitations
6. Incorporate feedback into improved personal performance

Practice-Based Learning & Improvement:
1. Set personal learning goals and reading plan during rotation
2. Recognize and consider radiation doses in patient care management choices
**Systems-Based Practice:**

1. Develop an understanding of indication for plain film assessment, nuclear medicine, CT and MRI, considering advantages and disadvantages of available imaging modalities
2. Consider available imaging resources when planning and recommending patient care, using them effectively and efficiently.

**Evaluation:**

ITER completed by preceptors
Junior Pediatric Orthopedic Rotation

Year: R2 or R3
Duration: 3 blocks
Training Center: KH, AFH

I. Introduction:

The Junior Pediatric Orthopedic Rotation is designed to introduce the resident to the pediatric orthopedic surgery and prepare their clinical and surgical skills. Residents will observe and participate in evaluation and treatment planning for all pediatric cases under the direct supervision of the consultant or other senior team members. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge. At the end of rotations, the resident should be able to achieve all of the goals and objectives of the pediatric orthopedic rotation.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident will assume a senior role of the pediatric orthopedic team and act as a supervisor and instructor to junior residents in the service. He/she should:

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Consultants are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Demonstrate ability to conduct a problem-based history and gather information from the child and the parents about the presenting symptoms
2. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for pediatric orthopedic patient.
3. Be able to interpret various laboratories, radiologic, and other diagnostic tests for the conditions listed above
4. Demonstrate the ability to evaluate and describe potential treatment plans for common pediatric orthopedic conditions, including but not be limited to the following:
   a. Foot deformities in the newborn
   b. The limping child
   c. Developmental hip dysplasia
   d. Slipped capital femoral epiphysis
   e. Perthes disease of the hip
   f. Rotational and angular deformities in the lower extremities including genu varus and valgus
   g. Intoeing, and out-toeing
   h. Osteochondrosis
   i. Osgood-Schlatter’s and Severs disease
   j. Possible child abuse
   k. Neuromuscular diseases in the child including cerebral palsy, muscular dystrophy, spina bifida
   l. Peripheral neuropathy such as Charcot Marie Tooth disease
   m. Common bone dysplasias such as multiple hereditary exostosis, polyostotic fibrous dysplasia, osteogenesis imperfecta, multiple epiphyseal dysplasias, and multiple metaphyseal dysplasia
   n. Musculoskeletal infections in the child including osteomyelitis and septic arthritis
   o. Leg length discrepancy, including the various treatment options such as epiphysiodesis
   p. Pathologic angular deformities in the lower extremities
   q. Blount’s disease of the knee
   r. Cavus foot deformities and flat foot deformities in the child
s. Pediatric sports injuries
t. Pediatric spinal deformity

5. Implement treatment plans, both operative and non-operative, with appropriate supervision of clinical faculty
6. Demonstrate ability to solve problems by initiating investigations and recommending a treatment plan
7. Be able to counsel child and parents about the treatment plan
8. Be able to prepare the child for surgery
9. Be able to manage the operating room schedule to ensure timely and seamless surgical care
10. Perform or assist in surgical procedures required to address the conditions listed above
11. Provide a daily plan of care for each inpatient on service and advise on the necessary steps required to implement said plan including the need to consult other services
12. Recognize and approve/refuse transfer of patient care to/from the orthopedic service.

**Medical Knowledge:**

Upon completion of the Pediatric Orthopedic rotation, the resident will be able to:

1. Demonstrate knowledge and organized problem solving approach to the following:
   a. Embryology, anatomy and biomechanics of the immature skeleton.
   b. Biomechanics and injury patterns, unique to the paediatric population, including physeal injuries.
   c. Implication of these injuries or conditions on the growing musculo-skeletal system.

2. Demonstrate diagnostic skills to effectively and ethically manage a wide spectrum of paediatric orthopedic pathologies and problems to include:
   a. Paediatric trauma: paediatric ATLS/multiple trauma, complications of trauma including angular and length abnormalities, diaphyseal / metaphyseal / physeal/epiphyseal fracture patterns, C/T/L spine fractures, major joint dislocations.
   b. Paediatric sepsis: septic arthritis, osteomyelitis, multi-focal patterns, chronic osteomyelitis, chronic recurrent osteomyelitis, discitis.
   c. Paediatric basic science: differences to adult bone, growth plate, secondary ossification centres, biomechanics relative to physis.
   d. Birth deformities: congenital amputations, clubfoot, club hand, congenital spinal abnormality, Sprengel’s deformity, obstetrical palsies.
   e. Generalized disorders: bone dysplasias, metabolic disorders, juvenile rheumatoid arthritis.
   f. Paediatric spine problems: scoliosis, kyphosis, spondylolisthesis.
   g. Paediatric hip problems: developmental dysplasia and dislocation, proximal femoral focal dysplasia, slipped capital femoral epiphysis, Legge-Calve-Perthes disease, femoral anteversion, septic arthritis.
   h. Paediatric knee disorders: anterior knee pain, patellar-femoral instability, Osgood-Schlatter’s disease, torsional deformities, varus and valgus deformity, Blount’s disease, discoid meniscus.
i. Paediatric foot disorders: clubfoot, vertical talus, tarsal coalition, flexible flat feet.

j. Paediatric gait abnormalities: painless and painful limps, limb-length discrepancies, physiologic torsional and angular deformity.

k. Paediatric neuromuscular problems: cerebral palsy, muscular dystrophy, spinal muscular atrophy, hereditary sensory-motor neuropathies.

l. Paediatric neoplasia: bone cysts, osteochondromas/enchondromas, fibrous dysplasia, Ewing's sarcoma, osteosarcoma.

m. Collect data by history, physical exam and investigations, interpret the data and demonstrate cognitive skills towards solving the patient’s problem.
   - Elicit a history that is relevant, concise, accurate and appropriate to the patient’s problem. Identify the severity and urgency of the problem.
   - Elicit and identify chief complaint of patient/care-giver.
   - Elicit perinatal, developmental, familial (genetic), and general paediatric information relevant to the problem.
   - Identify functional impact of problem upon patient/care-givers.

n. Perform a physical examination that will elicit all aspects of the musculoskeletal examination with the following emphasis:
   - Newborn examination for foot abnormalities, hip instability, congenital spinal abnormality, torticollis, other extremity abnormalities
   - Paediatric/adolescent assessment of gross motor, fine motor, secondary sexual development with general musculoskeletal assessments.
   - General gait evaluation.
   - Appropriate application and interpretation of special tests is expected according to the presenting complaint/area of concern.
   - Select appropriate investigative tools in a cost effective, ethical and useful manner for the diagnosis of paediatric orthopedic pathologies.

**Practice-Based Learning and Improvement**

Upon completion of the Pediatric Orthopedic rotations, the resident will be able to:

1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques
**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:

1. Recognize the importance of patient/parent-surgeon communication in the knowledge and appreciation of the patient’s specific problem and general health, the elaboration of a treatment plan and the general outcome and patient/parent satisfaction of prescribed treatments.

2. Accomplish effective communication with patient, family, and caregivers, while considering pertinent ethical, financial, and legal factors.

3. Establish relationships with the patient and their caregivers that are characterized by understanding, trust, respect, empathy and confidentiality.

4. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient/parent participation. The resident should be able to obtain an informed consent.

5. Understand and demonstrate the importance of cooperation and communication among health professionals involved in the care of individual patient such as nurses, physiotherapists, paediatricians, radiologists, anesthesiologists, social workers, psychologists, etc.

6. Demonstrate skills in working with patients who present communication challenges such as age-group, fear of the hospital experience, anger, confusion, ethno-cultural background and critical illnesses.

7. Effectively teach co-workers, fellow residents, medical students and others on the ward, at rounds and lectures.

8. Define the role and expertise of various professionals involved in treating patients with Paediatric Orthopedic conditions: orthopedic surgeons, physiatrists, radiologists, interventional radiology, emergency and intensive care staff, nurses, physiotherapists, case managers, social services, pain management services, anesthesiologists etc.

9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Professionalism**

The resident will demonstrate competency in the following objectives:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society

2. Demonstrate respect for patient privacy and autonomy

3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent

4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury

5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities

6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics
**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation-Specific Psychomotor Skills**

**Therapeutic Skills – Junior Level:**
1. Adequate history and physical examination of paediatric patient and problems
2. Assessment of gait abnormalities
3. Assessment and management principles of paediatric trauma
4. Management of fluid and electrolytes balance in the paediatric patient
5. Closed treatment of fractures including the utilization of skeletal traction
6. Introduction to paediatric orthopedic operative skills and surgical problems
7. Develop competencies as a surgical assistant in paediatric orthopedic surgery.
8. Develop knowledge of the surgical approaches, handling of tissues, use of paediatric orthopedic tools and instrumentation, and appropriate wound closures.

**VII. Core Surgical Competencies**

By the end of the junior Pediatric Orthopedic rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:

**Trauma:**

1. Intramedullary fixation of forearm shaft fracture
2. Open reduction and internal fixation of displaced lateral condyle fractures of the humerus
3. Open reduction and internal fixation of fracture of medial epicondyle
4. Open reduction of supracondylar fractures of the humerus
5. Closed reduction and percutaneous pinning of supracondylar fractures of the humerus
6. Closed, percutaneous, and open reduction of radial head and neck fractures
7. Percutaneous joystick and intramedullary reduction (Metaizeau) techniques of radial neck fractures
8. Supracondylar humeral osteotomy for correction of cubitus varus
9. Closed reduction and spica casting of femur fractures
10. Closed reduction and external fixation femoral shaft fractures
11. Flexible intramedullary nailing of femoral shaft fractures
12. Submuscular plating of femoral shaft fractures
13. Open reduction and internal fixation of tibial tuberosity fractures

**Arthroscopic and Sports Medicine:**

1. Elbow arthroscopy for Panner’s Disease and osteochondritis dissecans
2. Proximal patellar realignment
3. Arthroscopy-assisted management or open reduction and internal fixation of tibial spine fractures
4. Anterior cruciate ligament reconstruction in the skeletally immature patient
5. Arthroscopic drilling of osteochondritis dissecans
6. Meniscoplasty for discoid lateral meniscus

**Reconstruction:**

1. Proximal femoral rotational osteotomy
2. Proximal femoral varus osteotomy
3. Surgical repair of irreducible congenital dislocation of the knee
4. Percutaneous distal femoral or proximal tibial epiphysiodesis
5. Excision of physeal bar
6. Limb lengthening using the Ilizarov method or a monopolar fixator
7. Guided growth to correct limb deformity
8. Distal tibial osteotomy
9. Multiple percutaneous osteotomies and Fassier-Duval telescoping nailing of long bones in osteogenesis imperfecta
10. Syme and Boyd amputations for fibular deficiency
11. Hemi-epiphysiodesis for ankle valgus

**Neuromuscular Correction:**

1. Adductor and iliopsoas release
2. Rectus femoris transfer
3. Proximal hamstring and adductor lengthening
4. Distal hamstring lengthening
5. Gastrocnemius fascia lengthening
6. Distal femoral osteotomy for crouch gait
Upper Extremity:

1. Release of simple syndactyly
2. Correction of thumb-in-palm deformity in cerebral palsy
3. Release of the A1 pulley to correct congenital trigger thumb
4. Transfer of flexor carpi ulnaris for wrist flexion deformity
5. Radial dysplasia reconstruction
6. Forearm osteotomy for multiple hereditary exostoses
7. Modified Woodward repair of Sprengel deformity

Hip:

1. Anterior drainage of the septic hip in children
2. Innominate osteotomy of Salter
3. Periscapular osteotomies of Pemberton or Dega
4. Labral support (Shelf) procedure
5. Triple innominate osteotomy
6. Chiari medial displacement osteotomy of the pelvis
7. Bernese periacetabular osteotomy
8. Surgical dislocation of the hip
9. Valgus osteotomy for developmental coxa vara
10. Valgus osteotomy for Perthes disease
11. Percutaneous in situ cannulated screw fixation of the slipped capital femoral epiphysis
12. Flexion intertrochanteric osteotomy for severe slipped capital femoral epiphysis
13. Closed reduction and spica casting for DDH

Foot & Ankle:

1. Triple arthrodesis
2. Calcaneal lengthening osteotomy for the treatment of hindfoot valgus deformity
3. Posteromedial release for clubfoot
4. Tibialis anterior transfer
5. Posterior release for clubfoot

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her pediatric orthopedic management skills by a number of specific activities including:
1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion.
2. Weekly meeting at which different pathologies are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident’s reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of pediatric orthopedic patients
5. Multi-disciplinary conferences in collaboration with other specialties that take care of pediatric patients such as pediatricians, general/trauma surgeons, plastic surgeons, intensivist, emergency physician, etc.

**IX. Rotation Reading Resources**

- Tachdjian Pediatric Orthopedics
- Lovell and Winter’s Pediatric Orthopedics
- Staheli practice of Pediatric Orthopedics
- Beaty and Kasser: Rockwood and Green’s Fractures in children
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) Portal in E-Library
- Journal of Pediatric Orthopedic
- Journal of Pediatric Orthopedics (B)
- Journal of Children’s Orthopedics
- Wheeless’ Textbook of Orthopedic (Duke University) website
- Other resources in the OMSB Orthopedics residents’ website, [www.omsbortho.net](http://www.omsbortho.net)

**X. Assessment & Evaluation Tools**

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via the in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.
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<td>Medical Knowledge</td>
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Junior Sports Medicine Rotation

Year: R2 or R3
Duration: 3 blocks
Training Center: KH, AFH

I. Introduction:

The Orthopedic Sports Rotation is designed to educate residents in a broad variety of aspects regarding upper and lower extremity sports injuries, with concentration on clinical evaluation, and non-operative as well as operative treatment of shoulder, knee and hip and thigh injuries. The residents will focus on developing surgical and clinical skills to manage sports related injuries and also become proficient in common procedures such as arthroscopies, ligaments repair, meniscal and chondral injury management.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the residents are expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care:

The resident will demonstrate competency in the following objectives:
1. Take an appropriate history including the date of injury, duration of symptoms, mechanism of injury, prior treatment and present it in a concise way
2. Perform a physical examination of the knee, shoulder, hip and elbow joints and identify all pertinent anatomic landmarks, quantify range of motion, evaluate stability and know the special provocative tests for each pathology/injury.
3. Make a clinical diagnosis of the following related to the shoulder: labral tear, rotator cuff tear, adhesive capsulitis, anterior instability, posterior instability, rotator cuff tendinitis, impingement syndrome, AC joint arthrosis, AC joint separation and grade, and biceps rupture.
4. Make a clinical diagnosis of conditions related to knee including ACL tear, PCL tear, MCL injury/tear, LCL injury/tear rupture, knee dislocation, Posterior lateral corner injuries, meniscal tear, , chondromalacia patella, patella instability, degenerative arthritis, pre-patella bursitis, quadriceps rupture, patellar tendon loose body, synovitis, plica syndrome, etc.
5. Make a clinical diagnosis of conditions related to the hip and thigh including femoroacetabular impingement, labral hip injuries, iliotibial band syndrome, tendonitis, bursitis, snapping syndrome, etc.
6. Know the indications for ordering specific imaging modalities including x-rays, CT, MRI, ultrasound and arthography.
7. Discuss and point out the positive findings on plain films and other special imaging studies
8. List an appropriate differential diagnoses
9. Be able to the list the various treatment options available
10. Be proficient on counseling the patient and family about the different treatment modalities including risks and benefits.
11. Understand the options for non-operative treatment and various rehabilitation protocols
12. Understand the indications for surgical management and be familiar with the different common surgical techniques
13. Be able to formulate a postoperative treatment protocols and rehabilitation after surgery
14. Understands the issues related to after care of sport injuries including return to play and duration of bracing
15. Be able to recognize complications related to various therapies
**Medical Knowledge:**

The resident will demonstrate competency in the following objectives:

1. Demonstrate knowledge (including current literature), understanding and organized problem solving approach to the following:
   - Embryology, anatomy (clinical, topical and surgical) and biomechanics of the human body and rehabilitation.
   - Basic science as it relates to: Ligaments, cartilage, bone, muscle, tendon, synovium, and biomechanics.
   - Wound injury and healing
   - The inflammatory process
   - Thigh, hip and pelvis: contusions, muscle strains, bursitis, nerve entrapment, intrarticular disorders, bone disorders, and hip area syndromes
   - Knee: acute chronic and combined ligament injuries and instability, meniscal disorders, synovial lesions, chondral and osteochondral lesions, patellofemoral disorders, bursitis, loose bodies, monoarticular arthritis and childhood/adolescent disorders.
   - Leg, foot and ankle: exertional compartment syndrome, stress and fatigue fractures, tendon injury, nerve entrapment, plantar fascitis, Os trigonum, ankle instability, osteochondral disorders, great toe injuries, and fractures of the foot and ankle.
   - Shoulder: the throwing athlete, acute and chronic anterior posterior and multidirectional instability, impingement syndromes and rotator cuff disease, calcific tendonitis, biceps tendon and superior labral injury, acromioclavicular and sternoclavicular disorders and injury, tendon / muscle ruptures, nerve disorders, fractures, and shoulder stiffness
   - Elbow: instability, tendon injury, articular injury, fractures, compression neuropathy
   - Hand and wrist: tendon and ligament injuries and dislocations, carpal instabilities, fractures, tendonitis, entrapment neuropathies, and post-traumatic problems
   - The principles of management of infection and tumors related to orthopedic sports medicine
   - The problems of inappropriate surgery
   - Complications of arthroscopic and open sport surgery

2. Demonstrate diagnostic skills to effectively and ethically manage a wide spectrum of sport medicine pathologies and problems.
   - Elicit a history that is relevant, concise, accurate and appropriate to the patient’s problem. Identify previous treatments administered and the results of such treatments. Identify the severity and urgency of the problem.
   - Perform a physical examination that will elicit all aspects of the musculoskeletal examination with emphasis of the spine and extremities involved, special tests with knowledge of normal and pathologic results, and the neurovascular exam.
   - Select appropriate investigative tools in a cost effective, ethical and useful manner for the diagnosis.
   - Collect data by history, physical exam and investigations, interpret the data and demonstrate cognitive skills towards solving the patient’s problem.
3. Demonstrate therapeutic skills in keeping with the surgical management of sport medicine pathologies.

**Therapeutic Skills – Junior Level**
- Develop competencies as a surgical assistant in sports medicine surgery.
- Develop knowledge of the surgical approaches, handling tissues and appropriate wound closures.
- Diagnostic and therapeutic joint injections.
- Become familiar with the use of arthroscopy and open surgery instruments and techniques and power instruments with laboratory and patient exposure, with emphasis on mastering basic knee arthroscopy technique (lavage, meniscal resection, synovial biopsy, debridement/resection of intrarticular structures).

**Therapeutic Skills – Senior Level**
- Develop competence in more surgical procedures of the procedures in the field of sports medicine.
- Should be competent in basic techniques for open anterior shoulder repair, acromioplasty and rotator cuff repair, acromioclavicular joint resection, diagnostic shoulder arthroscopy, therapeutic shoulder arthroscopic debridement and basic skills for acromioplasty, principles and techniques for ACL reconstruction with reasonable ability to perform individual components of the procedure.

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Use the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the
elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation-Specific Psychomotor Skills

By the end of the Sports Medicine rotation, resident should be able to:
1. Describe, demonstrate and perform routine arthroscopic portal placement in the shoulder, elbow, knee, and ankle.
2. Perform a routine diagnostic arthroscopy in the shoulder and knee.
3. Become familiar with all instrumentation used to perform arthroscopic procedures on these joints.
4. Describe the steps and perform a routine knee meniscectomy
5. Describe the steps of an uncomplicated primary anterior cruciate ligament reconstruction.
6. Describe the steps of proximal and/or distal realignment procedure for the treatment of patellar instability.
7. Describe the steps of evaluation and debridement of the gleno-humeral joint, including labral pathology
8. Describe the steps in performing a subacromial decompression, arthroscopic AC joint decompression, and evaluation and repair of the rotator cuff.
9. Understand the principles of arthroscopy of other joints such as the elbow, ankle, and hip
10. Be familiar with rehabilitation protocols for different reconstructive procedures
11. Recognize problems related to rehabilitation and therapy

VII. Core Surgical Competencies

By the end of the Sports Medicine rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:

- Knee Arthroscopy
- Knee ligaments reconstruction including ACL, PCL, MCL, LCL
- Meniscectomy and meniscal repairs
- Chondral lesion repair and reconstruction
- Diagnostic shoulder arthroscopy and portal placement
- Debridement structure within the shoulder arthroscopically
- Arthroscopic knot techniques
- Surgical approaches for open surgery in the shoulder
- Arthroscopic anterior acromioplasty
- Rotator cuff repair
- Distal clavicle excision
- Portions of a shoulder stabilization procedure
• Bankart repair
• Placement of suture anchors in instability or SLAP lesions
• Passage of suture through the capsule and or labrum
• Biceps Tenotomy

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her Sports Medicine management skills by a number of specific activities including:
1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly meeting at which different sport related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of sport injuries
5. Basic science lecture series at the weekly resident didactics in biomechanics of knee, shoulder and hip joints
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of patients with sport injuries such as physiotherapist, occupational therapist and orthotist.

IX. Rotation Reading Resources

➢ Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
➢ Canale: Campbell’s Operative Orthopedics, 10th edition
➢ Hoppenfield Surgical Exposure in Orthopedics
➢ Gross Anatomy texts
➢ Miller’s Review of Orthopedics
➢ Journal of American Academy of Orthopedic Surgery (JAAOS)
➢ American Academy of Orthopedics Surgeons (AAOS) Portal through E-Library
➢ Wheeless’ Textbook of Orthopedic (Duke University) website

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is
performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Upper Limb & Shoulder Surgery Rotation

Year: R2 or R3
Duration: 3 blocks
Training Center: KH, SQUH

I. Introduction:

The Upper Limb & Shoulder Surgery rotation is designed to provide the residents with a broad exposure to conditions which cause pain and/or impaired function to the upper extremity. Depending on scheduling, residents may be assigned to this rotation at different times during their training. The resident will work and be evaluated in the out-patient, in-patient, and operating room settings.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the residents are expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor's assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Know how to obtain a complete patient history and physical exam for common upper extremity conditions.
2. Know the appropriate imaging studies to obtain for common upper extremity conditions.
3. Know how to interpret standard radiographs of the upper extremity
4. Be able to provide a differential diagnoses of the patient condition
5. Be able to formulate a treatment plan including operative and non-operative options.
6. Be proficient in preparing patients to the operating room and consult proper services
7. Know how to counsel the patient and states the risks and benefits of the proposed treatment.
8. Know sterile technique, with the ability to appropriately prep and drape extremities
9. Know appropriate soft tissue handling
10. Become competent in performing standard and less complex surgical techniques.
11. Become competent in working under loop magnification and operating microscope.
12. Know the technique for common upper extremity injections
13. Know how to order appropriate post-operative care including medications, bracing and physical therapy protocols
14. Know how to recognize and evaluate common post-operative complications.

Medical Knowledge:

Upon completion of the Upper Limb & Shoulder Surgery rotation, the resident should have knowledge, comprehension and problem-solving abilities, and evaluation skills for the following:

Cognitive Domain
1. Anatomy and pathophysiology and biomechanics of the upper limb.
2. Upper limb fractures and dislocations. This shall include:
   a. Shoulder, elbow, forearm, DR. UJ and carpal instabilities and dislocations.
   b. Complex MCP and digital dislocations.
   c. Complex periarticular upper limb fractures.
   d. Fractures of carpus, metacarpals and phalanges
3. Overuse syndromes.
4. Joint replacement in osteoarthritis and rheumatoid arthritis for the shoulder, elbow, wrist, and metacarpal joints.
5. Brachial plexus and peripheral nerve injuries, entrapments and tendon transfers.
6. Elbow contractures and Dupuytren’s contracture and ganglions.
7. Splinting and rehabilitation.
8. Principles and indications for arthroscopy in the upper limb.
9. Infections specific to the hand.
11. Upper limb compartment syndromes

**Psychomotor Domain**

1. History
   - Elicit history of upper limb disorders with emphasis on patient's vocation or sport.
2. Physical Examination
   - Special tests of upper limb examination including those for shoulder and elbow stability and impingement, muscle and tendon ruptures and tendinitis and wrist instability, hand examination and assessment of the upper limb for permanent clinical impairment

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding
of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation-Specific Psychomotor Skills**

By the end of the Upper Limb & Shoulder Surgery rotation, resident should be able to:
1. Master surgical approaches for shoulder and upper limb
2. Perform common operations under direct supervision
3. Partially perform/participate in complex operations with direct senior surgeon guidance including,
4. Understand surgical techniques in details.
5. Be able to lead a surgical team including implant & instrument selection, directing staff, and time management

**VII. Core Surgical Competencies**

By the end of the Upper Limb & Shoulder Surgery rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:
Junior Level
- Diagnostic and therapeutic injections to the upper limb.
- Surgical approach to compartment syndromes.
- Surgical approach to nerve entrapment, median nerve at the wrist, ulnar nerve at the elbow and wrist.
- Surgical management of ganglions.
- Acromioclavicular joint repair, tendon rupture repair and reconstruction.
- Closed reduction and percutaneous pinning of upper limb fractures.

Senior Level
- Shoulder, elbow and MCP arthroplasty.
- Management of intra-articular fractures of the upper limb.
- Treatment of shoulder, elbow and carpal instabilities and dissociations.
- Scaphoid bone grafting.
- Shoulder, wrist and IP arthrodesis.
- Dupuytren’s.
- Corrective osteotomies.
- Arthroscopy of the upper limb

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her upper limb and shoulder surgery management skills by a number of specific activities including:
1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion.
2. Weekly meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident’s reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of upper limb and shoulder surgery patients
5. Basic science lecture series at the weekly resident didactics
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of upper limb and shoulder surgery patients such as general/trauma surgeons, plastic surgeons, Intensivist, emergency physician, etc.
IX. Rotation Reading Resources

- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) Portal through E-Library
- Wheeless’ Textbook of Orthopedic (Duke University) website

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Spine Surgery Rotation

Year:  R2 or R3  
Duration:  3 blocks  
Training Center:  KH, AFH

I.  Introduction:

Spine pathologies and injuries are common orthopedic problems in Oman. They cause a lot of disability and financial burden to the society. The spine rotation is a 3–block rotation that take place in intermediate or senior level. The residents are expected to gain proficiency and experience in diagnosis, investigation and management of traumatic and non-traumatic spine conditions. Progression is based on each resident’s level of competence, knowledge and skill. He/she will also instruct and assist more junior residents in their duties. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge. At the end of this rotation, the resident should be able to perform all of the goals and objectives. It is the responsibility of both the resident and the rotation supervisor to go over the goals and guidelines included in this document at the beginning of the rotation, mid-rotation and the conclusion of the rotation.

II.  Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the residents are expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Demonstrate proficiency at history taking (including red flags) for spinal symptoms
2. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for the following spinal conditions: Disc disorders, spinal stenosis, spinal trauma, spinal cord injury, deformities, genetic/congenital spine conditions, inflammatory spine disorders, spinal malignancy, spinal infections, failed back syndrome and spinal instability
3. Interpret imaging studies (radiographs, CT, MRI) of the spine
4. Develop an organized approach to evaluation and treatment of spine-injured patients with or without neurological involvement
5. Understand patient selection and indications for non-operative and operative treatment of spinal conditions either in outpatient setup or emergency
6. Know how and when to prioritize a treatment intervention
7. Be able follow up patients through initial assessment, workup, surgery, post-operative care and outpatient follow up
8. Be able to formulate physical and rehabilitation protocols for operative and non-operative cases
9. Assist junior residents in clinical decision making for spinal conditions
10. Review each consultation with junior residents and perform complete pre-operative evaluation of each surgical candidate including assessment of risk and potential complications
11. Be available to see patients in the emergency department when the junior becomes backed-up with consultations
12. Be able to manage the operating room schedule to ensure timely and seamless surgical care
13. Be able to take junior residents through a case while teaching basic surgical technique
14. Manage a team of care providers to ensure excellent inpatient hospital care with respect to the preferences of the consultant on the spine service
15. Provide a daily plan of care for each inpatient on the spine service and advise on the necessary steps required to implement said plan including the need to consult other services
16. Recognize and treat complication of spine surgery or non-operatively treated cases
17. Recognize and approve/refuse transfer of patient care to/from the spine service

**Medical Knowledge**

The resident will demonstrate competency in the following objectives:

1. Knowledge of complete history taking of spinal symptoms
2. Knowledge of the complete neurologic and spine exam
3. In-depth knowledge of how to treat patients with low back pain including familiarity with the management algorithms and guidelines
4. Knowledge of appropriate indications for surgical and non-operative management of traumatic and non-traumatic spinal conditions
5. Knowledge of relative and absolute contraindications for surgical management of spinal conditions
6. Knowledge of non-operative modalities including physical therapy techniques, spinal injections, casting, bracing and halo application
7. Knowledge of direct and indirect decompression of the spine, realignment, and stabilization, including spinal arthrodesis, instrumentation, and other modalities
8. Knowledge of anterior and posterior surgical approaches to the cervical and thoracolumbar spine.
9. Knowledge of expected risk of surgical interventions
10. Knowledge of the advantages / disadvantages of commonly used spinal implants
11. Knowledge of basic science relevant to the spine
12. Differentiate between traumatic, congenital, and degenerative conditions of the spine
13. Present a reasonable classification system for all spinal pathologies
14. Accurately define the difference between the anterior, posterior and middle columns
15. Understands the importance of biomechanics of spinal pathologies including traumatic and non-traumatic conditions

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:

1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Know how to critically evaluate the effectiveness of the management of patients with spinal disorders
4. Integrate evidence from scientific studies in the care of patient's problems
5. Take responsibility for lifelong learning
6. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome

7. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal

8. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies

9. Usage the available information technology to obtain and manage information

10. Willingness to take time to educate students and other health care professionals

11. Demonstrate and understanding of effective teaching techniques.

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:

1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments

2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality

3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation

4. The resident should be able to obtain an informed consent

5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients

6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families

7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses

8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

**Professionalism**

The resident will demonstrate competency in the following objectives:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society

2. Demonstrate respect for patient privacy and autonomy

3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent

4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury

5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life in order to maximize the care of spine patients.
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Know the impact of disability related to conditions of the spine.
5. Understand how spinal conditions and their treatment affect the health care organization and the society
6. Work effectively and efficiently in a health care institution
7. Effectively utilize information technology to optimize patient care and for continued self-learning
8. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
9. Further his/her understanding of the structure, financing and operation of the Oman health system
10. Work in interprofessional teams to enhance patient safety and improve patient care quality
11. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation-Specific Psychomotor Skills**

By the end of the Spine Surgery rotation, resident should be able to:
1. Master spinal and neurological exam including knowledge of the spinal scores such as ASIA, Frenkl, AO score, TLICS, SLIC and SINS scores.
2. Know how to accomplish basic radiographic measurements such as coronal Cobb measurements, sagittal Cobb angles and other commonly used spine parameters
3. Conduct daily rounds and document clinical notes
4. Practice appropriate dictation of operative notes
5. Understand the communication pipelines with other consulting services
6. Master surgical approaches for spinal operations
7. Perform basic spinal operations under direct supervisions such as laminectomy, Lumbar discectomy
8. Partially perform/participate in advanced spine operations with direct senior surgeon guidance including multi-level decompression, non-instrumented fusion, instrumentation and pedicle screw fixation, fracture reduction and fixation techniques
9. Demonstrate skills in the following procedures: halo, casting and bracing
10. Understand techniques required to perform different types of grafting and arthrodesis
11. Be an active part of a surgical team including implant & instrument selection, directing staff, and time management.
VII. Core Surgical Competencies

By the end of the Spine Surgery rotation, resident will be able to assist in or perform, under direct supervision, the following procedures:

1. Surgical approaches to the spine
   - Posterior cervical, thoracic, lumbar
   - Costotransversectomy and posterolateral approaches
   - Anterior cervical and transoral
   - Transthoracic and thoracoabdominal
   - Retroperitoneal, transperitoneal
2. Posterior decompressions (cervical, thoracic, lumbar)
   - Discectomy
   - Laminectomy
   - Foraminotomy
   - Posterolateral decompression
   - Costotransversectomy
3. Anterior decompressions
   - Discectomies
   - Corpectomies
4. Bone graft techniques and harvest
5. Cervical (wiring techniques, lateral mass screws, pedicle screws, anterior plates)
6. Odontoid ORIF
7. Posterior C1-2 fusions
8. Thoracic: principles of hook/rod fixation for deformity and trauma
9. Lumbosacral: pedicle screws and rod constructs

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her spine surgery management skills by a number of specific activities including:
1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative spine patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident’s reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of patients with spinal conditions
5. Basic science lecture series at the weekly resident didactics in biomechanics of spine and spinal fractures
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of spine patients such as general/trauma surgeons, Intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Spine books that are available in OMSB E-Library
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless’ Textbook of Orthopedic (Duke University) website
- Tournetta power point presentations & other resources in the OMSB Orthopedics residents’ website, www.omsbortho.net

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.
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Simulation Rotation for Senior Residents

Year: R3
Duration: 1 block
Training Center: Simulation Center (Ortho Skills Lab)

Simulation-based training is ideal for orthopedics procedures where it is difficult to teach and assess skill level during the real surgery. Simulated environments enable orthopedic surgeons to practice and refine their skills before operating on patients; thus, shortening the learning curve without compromising patient safety. Simulation can also lead to decrease in soft-tissue injuries and surgical duration. That would directly correlate with a reduced risk for infection.

Simulation training block during the third or fourth year will be four weeks. In this rotation, the resident will spend time in simulation centre simulating different advanced techniques such as arthroscopies, reconstruction of complex fractures, techniques of knee and hip arthroplasty, and pedicle screws insertion.

By the end of this rotation, the resident should have learnt and be able to perform the following procedures:

1. Techniques of reduction and internal fixation of complex and peri articular fractures.
2. Basic principles and techniques of the biplanar and circular external fixation.
3. Techniques of the knee, shoulder and ankle arthroscopy.
4. Insertion of pedicle screw with aid of navigation system.
5. Arthroplasty skills (TKA & THA) including principle of using navigation system in arthroplasty.
6. Microsurgical suturing technique with conjunction with plastic surgery department.

The specific objectives of each module / technique will be distributed to the resident prior to the beginning of the Simulation Rotation.

Assessment & Evaluation Tools

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Adult Reconstruction Rotation

Year: R4  
Duration: 3 blocks  
Training Center: KH, SQUH, AFH

I. Introduction

On top of the rotation specific objectives for General Orthopedics rotation, the Adult Reconstruction rotation will cover the following:

- Total Hip Replacement
- Total Knee Replacement
- Corrective and off-loading osteotomies
- Limb deformity corrections,
- Circular Frame (Illizarov, Taylor Spatial Frame and Hybrid)

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Etiology, pathophysiology and altered biomechanics in degenerative congenital disease and acquired deformities. Good grip on complete concept of biomechanics of joints in extremities.
2. Clinical examination and specific clinical tests for upper and lower limb joints.
3. Knowledge, prevention and management and possible intra-operative and post-operative complications in Arthroplasty and Adult Reconstruction patients.
4. Understand the indications for and provide appropriate prophylaxis against infection and thromboembolic problems
5. Assessment, investigations and evaluation of patients and tailoring their management specific to each patient based on evidence based orthopedics
7. Recognize the role of various modalities of investigations pre-operatively and post-operatively including scans and nuclear medicine.
8. Position and prepare a patient for arthroplasty in the operating room.
9. Close wounds after arthroplasty in a satisfactory fashion using sutures and staples using appropriate surgical technique
10. At the end of year 5 residents must have done at least 4 complete arthroplasty procedures supervised.
11. Indications, limitations and contraindications of external fixators
12. Biomechanics and principles of external fixators
13. Indications and techniques of osteotomies in extremities. Good knowledge of commonly performed osteotomies i.e. high tibial, surgical technique and pit falls.

Medical Knowledge

The resident will demonstrate competency in the following objectives:
1. Development, anatomy and physiology of synovial joints
2. Know basic principles involved in the radiographic evaluation of upper and lower limb joints, including special views.
3. Indication and interpretation of scans i.e. MRI, CT, nuclear
4. Non-operative management of degenerative joint disease
5. Tribology, wear, allergic reaction, septic and aseptic loosening
6. Defining loosening and bone loss with grading and implications
7. Indications of revision arthroplasty surgery and principles  
8. When is time for arthrodesis or excision arthroplasty  
9. How to critically analyses x-rays i.e. TKR  
10. Types of infection in a prosthetic joint and management  
11. Joint replacement in rheumatoid and immune compromised patients  
12. Tribology of prosthetic joints  
13. Value of international joint registries data  
14. Current concepts reviews about joint replacement  
15. Properties of materials used in arthroplasty  
16. Clinical and radiological features of loosening of prosthetic joints , causes and management  
17. Clinical presentation, investigations, diagnosis of and management peri-prosthetic infections  
18. Effect of prosthetic joint wear debris, body reaction and loosening  
19. Management of post-operative pain after arthroplasty  
20. Types of design philosophy of prosthetic joints (i.e. CR vs PS knee ) and choices of bone implant interface fixation  
21. Choices of pins and wires in external fixators  
22. Anatomical planes for placement of pins in extremities  
23. Biomechanics of unilateral, multi plane, hybrid and circular frames  
24. Post op care of external fixators  

**Practice-Based Learning and Improvement**  
The resident will demonstrate competency in the following objectives:  
1. Present cases during morning sign-out rounds  
2. Assess one’s own patient management skills and ability to make appropriate changes in practice  
3. Integrate evidence from scientific studies in the care of patient’s problems  
4. Take responsibility for lifelong learning  
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome  
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal  
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies  
8. Usage the available information technology to obtain and manage information  
9. Willingness to take time to educate students and other health care professionals  
10. Demonstrate and understanding of effective teaching techniques  

**Interpersonal and Communication Skills**  
The resident will demonstrate competency in the following objectives:  
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the
elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation Specific Psychomotor Skills

By the end of the Adult Reconstruction rotation, the resident will demonstrate competency in the following objectives:
1. History focused on degenerative joint disease, type and level of pain, exasperating factors, quality of life
2. Pre-operative history and physical examination and refer for further tests and studies as needed for pre-operative clearance for the procedure in consideration
3. Physical examination of upper and lower extremities, including special tests for specific joints
4. Commonly used scores i.e. AAOS, oxford, Harris
5. Determine the indications for and use of casting, bracing and orthotics
6. Comprehensive knowledge of non-operative management of degenerative disease and limb deformities i.e. pharmacology agents, orthotics
7. Coming up with a working management plan for a patient after putting in context history physical examination, blood investigations and imaging
8. Resident must be capable of assessing an deciding appropriate surgical intervention and implant for a patient i.e. multi ligament deficit knee
9. Assessment of patient in follow up clinics after arthroplasty, osteotomies and external fixators, diagnosis and investigating early problems
10. Forward thinking as confirming enough skills, instruments and implants are available for a particular patient when adding to waiting list for surgery
11. Capability to do surgical approach to hip and knee joint
12. Functional assessment of patient pre and post-operatively
13. Pros & cons of lower and upper limb arthroplasty patient in young patients or high demand patients (physiological age below 55)

VII. Core Surgical Competencies

By the end of the Adult Reconstruction rotation, the resident will demonstrate competency in the following objectives:
1. Surgical approaches to hip, knee, ankle, elbow, shoulder and wrist
2. Safe corridors for external fixators, especially in growing skeleton
3. Pros and cons of cemented and un-cemented hip replacement
4. Cementing techniques
5. Good knowledge of component orientation for total hip replacement and total knee replacement
6. Which type of implant to be used for routine arthroplasty and reasons and rationale
7. Tips and tricks for TKR and THR
8. Joint replacement in patients with deformity
9. Rheumatoid, and DDH patients
10. Difficult primary total knee replacement
11. What can go wrong in total knee replacement and how to manage
12. Peri-prosthetic fracture, causes, classification and management
13. Indications for special implants and pros and cons
14. Sutures and staples using appropriate surgical technique
15. At the end of year 5, resident must have done at least 4 complete arthroplasty procedure supervised.
16. At the end of year 5, resident must have done at least one complete external fixator application supervised.
17. Assisting revision surgeries
18. Critically analyzing post-operative arthroplasty x-rays
19. Reflection on operative experience

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her adult reconstruction management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Basic science lecture series at the weekly resident didactics
5. Journal club for discussion of relevant current literature
6. Multi-disciplinary conferences in collaboration with other specialties that take care of patients with injuries such as general/trauma surgeons, plastic surgeons, intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- The Basic Principles of External Fixation using the Ilizarov, by Leonid N.Solomin
- Total Knee Arthroplasty by Richard D Scott
- Total Hip replacement Surgery Principles and technique By SKS Marya
- Hoppenfield Surgical Exposure in Orthopedics
- Journal of Arthroplasty
- Bone & Joint Journal
- AAOS Journal
- Journal of Bone & Joint Surgery
- AAOS Portal
- www.orthobullets.com
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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**Hand & Microvascular Surgery Rotation**

**Year:** R4  
**Duration:** 3 blocks  
**Training Center:** KH

I. **Introduction:**

The hand resident will experience inpatient, outpatient, and surgical care of upper extremity patients under staff supervision. The resident gains experience in the diagnosis and treatment of a variety of congenital, developmental, and traumatic hand conditions. The resident assumes more responsibility as a member of the Hand team and his/her active participation in surgery increases from serving as second assistant to being the primary surgeon, under the direct and close supervision of a senior team member. Progression is based on each resident’s level of competence, knowledge and skill. He/she will also instruct and assist more junior residents in their duties. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge. At the end of this rotation, the resident should be able to perform all of the goals and objectives of the Hand rotation in addition to the advanced goals and objectives listed below.

II. **Resident Responsibilities for Patient Care**

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident is expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

**Patient Care**

The resident will demonstrate competency in the following objectives:

1. Evaluate the following conditions thoroughly with history, physical examination and radiographs as appropriate: ganglia of the hand and wrist, infections - finger and hand, mallet finger injuries, phalangeal and metacarpal fractures, soft tissue coverage problems, dorsal hand trauma, sprains and dislocations of the CMC, MCP, and PIP joints, static carpal instability, tendonitis, thumb basal joint arthritis, trigger finger, carpal tunnel syndrome, cubital tunnel syndrome, de Quervain's tendonitis, fingertip injuries and amputations, flexor and extensor injuries, flexor tenosynovitis animal and human bites, soft tissue infections and osteomyelitis

2. Assess hand surgery problems/injuries in the emergency department, obtain history, perform pertinent physical exam, develop differential diagnosis, and communicate findings in a succinct and professional manner

3. Use diagnostic tests and maneuvers for hand and wrist disorders, including diagnosis of peripheral nerve disorders

4. Interpret imaging studies of hand and wrist disorders including xrays, CT scan and MRI

5. Demonstrate knowledge and application of knowledge of non-operative treatment, which includes anti-inflammatories, basics of splinting and hand therapy

6. Formulate physical therapy protocol for nonoperative treatment

7. Perform incision and draining procedures such as paronychia, felon, finger abscesses, and suppurative flexor tenosynovitis.

8. Perform open and closed treatment of extra-articular fractures of the finger, hand and wrist

9. Execute the preoperative preparation of each patient

10. Demonstrate the ability of in the applying a brachial or forearm tourniquet in the operating room, appropriate prepping and draping of the patient, and the appropriate application of postoperative dressings
11. Perform invasive and non-invasive surgical skills/procedures that are outlined below under the psychomotor skills
12. Demonstrate the ability to perform postoperative hand therapy and formulate appropriate postoperative orders and postoperative rehabilitation protocols after hand or wrist surgery.

**Medical Knowledge:**

The resident will demonstrate competency in the following objectives:
1. Demonstrate knowledge and an organized problem solving approach to the following:
   a. Basic anatomy and anatomical variations
   b. Basic biomechanics of hand and wrist
   c. Basic cellular mechanisms of repair and regeneration of tendon and nerve anatomical variations relevant to the conditions encountered in the upper extremity
   d. Anatomical structure and function of the upper extremity and, especially, the hand.
   e. Skeletal disorders: Trauma to bones and joints in the forearm, wrist and hand. There is emphasis on fractures of the distal radius, fractures and fracture dislocations about the wrist, metacarpal and phalangeal fractures, and simple and complex dislocations and fracture dislocations of MCPJs and IPJs.
   f. Degenerative and inflammatory joint disease of the wrist and hand. This includes an understanding of the development of post traumatic SLAC and SNAC wrist, Kienbock’s disease, DISI and VISI, first CMC OA, RA and other inflammatory arthropathies.
   g. Soft tissue disorders:
      - Evaluation, classification and treatment of different types of soft tissue injury with skin and/or muscle loss.
      - Evaluation, classification and treatment of different types of tendon abnormalities including lacerations, avulsions, tumourous, frictional and other inflammatory conditions.
      - Evaluation, classification and treatment of different types of neurological disorder including cerebral palsy, brachial plexus injury and its sequelae, nerve tumour and other forms of peripheral neuropathy, compression neuropathies, and lacerations.
      - Evaluation, classification and treatment of different types of vascular disorders including Raynaud’s phenomenon, embolus, malformations, and injury (including reimplantation).
      - Evaluation, classification and treatment of different types of other miscellaneous conditions including injection injuries, compartment syndromes, Dupuytren’s contracture. Miscellaneous conditions:
      - Management of WCB issues, insurance company concerns and litigation regarding Hand Surgery patients.
      - The principles of rehabilitation (physiotherapy and occupational therapy) for hand surgery patients.
      - Diagnosis and management of chronic wrist pain, and specifically the appropriate use of different tests available.
      - Complications of hand surgery.
2. Demonstrate diagnostic skills to effectively and ethically manage a wide spectrum of clinical problems in the hand.
   a. Elicit a history that is relevant, concise, accurate and appropriate to the patient’s hand problem. Identify previous treatments administered and the results of such treatments. Identify the severity and urgency of the problem.
   b. Perform a physical examination that will elicit all aspects of the musculoskeletal examination with emphasis on the neck (when appropriate), upper arm, forearm, wrist and hand. Do a comprehensive neurological and vascular examination of the upper extremity. Appropriately apply and interpret special tests such as Watson shift test, Regan test, Lichtman test, and Finkelstein test.
   c. Select appropriate investigative tools in a cost effective, ethical and useful manner for the diagnosis of hand and wrist problems.
   d. Collect data by history, physical exam and investigations, interpret the data and demonstrate cognitive skills towards solving the patient’s clinical problem.
   e. Demonstrate therapeutic skills in keeping with the surgical management of hand disorders:

**Therapeutic Skills – Junior Level:**
- Develop competencies as a surgical assistant in hand surgery.
- Develop knowledge of the surgical approaches, handling skeletal and soft tissues and appropriate wound closure techniques.
- Develop skills in the correct application of post operative dressings, splints and casts. Learn how to recognize tight casts, neurovascular problems and compartment syndrome.
- Become familiar was the use of standard and delicate hand surgery instruments, power tools, and commonly used implants for fracture fixation and small joint arthroplasty.
- Learn simple surgical techniques such as trigger finger release, carpal tunnel decompression, traumatic wound management, amputation revision, closed reduction +/- percutaneous pin fixation of simple fractures and dislocations.

**Therapeutic Skills – Senior Level:**
- Develop competence and an organized approach to basic surgical procedures in the hand including surgical approaches, tendon repair techniques, soft tissue releases, fracture fixation, basic level small joint arthroplasty, ulna recessional osteotomy, and partial / total wrist fusion.
- Should be competent in use of K wire fixation, Acutrak screw fixation, Synthes modular hand set, Synthes small fragment set, Swanson arthroplasty set, Synthes wrist fusion set, Synthes small external fixator, TriMed distal radius set.

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Present cases during morning sign-out rounds
2. Assess one's own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients' culture, age, gender,
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socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation-Specific Psychomotor Skills**

By the end of the Hand & Microvascular Surgery rotation, resident should be able to:
1. Show appropriate written documentation skills
2. Perform incision and draining procedures such as paronychia, felon, finger abscesses, and suppurative flexor tenosynovitis
3. Master surgical approaches for hand and wrist surgeries
4. Perform primary and delayed primary repair of extensor tendons (i.e., finger, hand, wrist, forearm)
5. Perform amputation of the following: digits, hand, wrist, forearm
6. Perform partial or radical facieotomies
7. Perform common operations such as excisions of ganglia, fixation of fractures, carpal tunnel release, tendon repair, etc.
8. Partially perform/participate in complex hand operations with direct senior surgeon guidance including Tendon transfer, microvascucular surgeries, nerve repairs and reconstructions.
9. Understand surgical techniques required to perform complex wrist and hand surgeries
10. Be able to lead a surgical team including implant & instrument selection, directing staff, and time management.
VII. Core Surgical Competencies

By the end of the Hand & Microvascular Surgery, resident should be able to assist in/perform, under direct supervision, the following procedures:

1. Local block anesthesia for hand and wrist surgery
2. Basic skin incisions and skin closure techniques (i.e., Z-plasty), closed and open fixation of hand and wrist fractures
3. Incision and draining procedures such as paronychia, finger abscesses, and suppurative flexor tenosynovitis
4. Fixation of fracture of the hand and wrist
5. Carpal and cubital tunnel releases
6. Tendon repair
7. Ligament repair
8. Nerve repair and reconstruction
9. Tendon transfers
10. Excision or resection of tumors
11. Use of flaps and grafts for wound coverage
12. Arthrodesis and arthroplasty of phalangeal and carpal joints
13. Replantation of digits
14. Wrist arthroscopy

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her hand and microvascular surgery management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly hand meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of hand and microvascular injuries
5. Basic science lecture series at the weekly resident didactics
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of hand and microvascular surgery patients such as general/trauma surgeons, plastic surgeons, Intensivist, emergency physician, etc.
8. Hands-on microvascular workshop either during the rotation or as part of the program based curriculum.
IX. Rotation Reading Resources

- Greens’ Operative Hand Surgery
- Bucholz and Heckman: Rockwood and Green's Fractures in Adults
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) portal through OMSB website
- Wheeless’ Textbook of Orthopedic (Duke University) website

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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<td>Global Performance Assessment</td>
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<td>Procedure Based Assessment</td>
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Senior Orthopedic Trauma Rotation

Year:  R4
Duration:  3 blocks
Training Center:  Khoula Hospital

I. Introduction:

The senior orthopedic trauma rotation is built upon the knowledge and skills acquired in the junior level Trauma rotation. The resident assumes more responsibility as a member of the orthopedic trauma team and his/her active participation in surgery increases from serving as second assistant to being the primary surgeon, under the direct and close supervision of a senior team member. Progression is based on each resident's level of competence, knowledge and skill. He/she will also instruct and assist more junior residents in their duties. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge. At the end of this rotation, the resident should be able to perform all of the goals and objectives of the junior level trauma rotation in addition to the advanced goals and objectives listed below.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident will assume a senior role of the trauma team and act as a supervisor and instructor to junior residents in the service. The resident is also expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care

In addition to the junior trauma objectives, senior level residents will demonstrate competency in the following objectives:
1. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for traumatic injuries to both the axial and appendicular skeleton
2. Demonstrate ability to oversee the complete examination, resuscitation, investigation, and treatment plan for a multisystem trauma patient
3. Demonstrate ability to solve problems by initiating investigations and recommending a treatment plan
4. Assist junior residents in clinical decision making and fracture care
5. Teach the junior resident reduction and splinting of all fractures and dislocation
6. Review each consultation with junior residents and perform complete pre-operative evaluation of each surgical candidate including assessment of risk and potential complications
7. Be available to see patients in the emergency department when the junior becomes backed-up with consultations
8. Be able to manage the operating room schedule to ensure timely and seamless surgical care
9. Be able to take junior residents through a case while teaching basic surgical technique and AO principles
10. Manage a team of care providers to ensure excellent inpatient hospital care with respect to the preferences of the attending on service
11. Provide a daily plan of care for each inpatient on service and advise on the necessary steps required to implement said plan including the need to consult other services
12. Recognize and approve/refuse transfer of patient care to/from the orthopedic service
**Medical Knowledge**

In addition to the junior trauma objectives, senior level residents will demonstrate competency in the following objectives:

1. Ability to appropriately manage pre and postoperative orthopedic patients
2. Knowledge of fracture patterns, classifications, and means of fixation
3. Knowledge of common orthopedic traumatic injuries and their acute management (examples: distal radius, tibia, femur, & humerus fractures, shoulder & hip dislocations, hand lacerations, and open fractures)
4. Knowledge of / ability to appropriately manage acutely injured patients (examples: required imaging, when/how to sheet a pelvis or reduce cervical spine dislocation, and indications for traction)
5. Knowledge of reduction and splinting principles and techniques
6. Knowledge of appropriate indications for surgical and non-operative management of traumatic orthopedic injuries
7. Knowledge of relative and absolute contraindications for surgical management of traumatic orthopedic injuries
8. Knowledge of expected risk of common surgical interventions (examples: malrotation of transverse/comminuted femur fractures, nonunion of segmental bone loss, knee pain following IMN of the tibia, etc.)
9. Knowledge of AO fracture fixation including lag screw, plate function, modes of fracture healing, material properties, and basic biomechanics Advanced knowledge of / ability to appropriately manage injured patients
11. Knowledge of advanced AO fracture fixation technique
12. Knowledge of the advantages / disadvantages of commonly used implants
13. Ability to generate multiple options for fracture fixation and knowledge of each method's advantages and disadvantages
14. Sound understanding of pelvic and acetabular fractures and approaches

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:

1. Presents cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics
**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation-Specific Psychomotor Skills**

By the end of the senior orthopedic trauma rotation and in addition to junior trauma objectives, senior level resident should be able to:
1. Master surgical approaches for fracture care and advance understanding of complex exposures including those used for pelvic fixation
2. Perform common trauma operations independently such as ankle fractures, intramedullary nailing of long bones, hip fracture fixation, etc.
3. Partially perform/participate in complex trauma operations with direct senior surgeon guidance including ORIF pilon, bicondylar tibial plateau, calcaneus, talus, elbow, & LisFranc fractures
4. Understand surgical techniques required to perform ORIF acetabulum/pelvis, percutaneous screw fixation of pelvic ring injuries, and osteotomies for non-union
5. Be able to lead a surgical team including implant & instrument selection, directing staff, and time management

**VII. Core Surgical Competencies**

By the end of the senior orthopedic trauma rotation and in addition to junior trauma surgical competencies, senior resident should be able to assist in/perform, under direct supervision, the following procedures:
- Intramedullary nailing of long bone fractures
- Closed reduction and percutaneous pinning of fractures
- Plate-and-screw fixation
- Application of external fixation devices
- Acetabular, pelvic fractures
- Comminuted fractures
- Intraarticular fractures
- Reconstructive procedures for malunion or nonunion
- Bone graft harvesting
- Bone grafting

**VIII. Implementation**

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her orthopedic trauma management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion.
2. Weekly fracture meeting at which different fractures are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study.
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future.
4. Weekly resident didactic teaching emphasizing the management of fracture and trauma patients.
5. Basic science lecture series at the weekly resident didactics in biomechanics of fracture fixation and fracture healing.
6. Trauma journal club for discussion of relevant current literature.
7. Multi-disciplinary conferences in collaboration with other specialties that take care of trauma patients such as general/trauma surgeons, plastic surgeons, Intensivist, emergency physician, etc.

**IX. Rotation Reading Resources**

- AO Manual of Fracture Fixation
- Bucholz and Heckman: Rockwood and Green's Fractures in Adults
- Browner, Jupiter, Levine, and Trafton: Skeletal Trauma, 3rd edition
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller's Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless’ Textbook of Orthopedic (Duke University) website
- Tournetta trauma power point presentations & other resources in the OMSB Orthopedics residents' website, [www.omsbortho.net](http://www.omsbortho.net)
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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<tr>
<th>Core Competency</th>
<th>Evaluation Tool</th>
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<tr>
<td>Patient Care</td>
<td>In-training evaluation Direct observation Orthopedic Surgery Milestones, ACGME Report Worksheet</td>
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<tr>
<td>Medical Knowledge</td>
<td>In-training evaluation Direct observation Orthopedic Surgery Milestones, ACGME Report Worksheet In-Training examination</td>
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<td>Practice Based Learning &amp; Improvement</td>
<td>In-training evaluation Direct observation Morbidity/mortality conference</td>
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<td>In-training evaluation 360° evaluation</td>
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<td>System-Based Practice</td>
<td>In-training evaluation Direct observation Resident participation in clinical protocols</td>
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<td>Technical Skills</td>
<td>O-Score OSATS Score Global Performance Assessment Procedure Based Assessment</td>
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Foot and Ankle Surgery Rotation

Year: R4 or R5
Duration: 3 blocks
Training Center: KH, AFH

I. Introduction:

Orthopedic Surgery of the Foot and Ankle addresses problems of the musculoskeletal system, both traumatic and atraumatic, that occur in the lower extremity. Knowledge of the anatomy, biomechanics, and pathophysiology of the region is required to effectively and efficiently diagnose and treat common disease entities and injuries. Also, a sound knowledge of effects of systemic disease on the foot and ankle is essential.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident is expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge
b. Participate in at least 1 full day of clinic per week (or 2 half days)
c. Complete medical records in a timely fashion
d. Document all procedures in the surgical logbook
e. Dress professionally as per the dress code of the institution
f. Organize M&M documents
g. Report any incidents or medical errors
h. Provide educational sessions for medical students and junior staff throughout the rotation
i. Complete evaluation forms for rotation before the end of the rotation
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

IV. Rotation Core Competencies

Patient Care:

1. Know how to obtain a complete history, perform a physical exam, and develop a treatment plan for patients with foot and ankle conditions.
2. Know detailed foot and ankle anatomy, especially in terms of surgical approaches.
3. Workup and present a patient with a foot/ankle problem specifying the working diagnosis, additional studies to confirm or change the diagnosis, the treatment alternatives and expected outcome. This includes demonstrating the ability to take a detailed history and perform an accurate foot and ankle exam.
4. Recognize and take into account the lower extremity angular and rotational alignment, foot type, footwear, relevant biomechanics, and lifestyle.
5. Appropriately use laboratory testing for underlying disease states that affect the foot and ankle.
6. Know how to interpret imaging studies of patients with foot and ankle disorders.
7. Describe Specific surgical and non-surgical alternatives of therapy.
8. Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families.
9. Prescribe an appropriate orthotics/prosthetics and shoe wear modifications.
10. Describe the natural history of the patient’s problem if untreated, treated non-operatively and treated operatively.
11. Correctly assist and apply dressings, splints, and casts for protecting injuries and postoperative conditions.
12. Perform local anesthesia to include: ankle, metatarsal and digital blocks; field local infiltration; joint injection for pain localization.
13. Demonstrate pre-op readiness by specifying the following for each case:
   - Surgical indications and goals
   - Incision, approach relevant anatomy and step-by-step procedure
   - Three-dimensional considerations
   - Expected difficulties and potential pitfalls
   - Contingency plans
14. Be able to know and describe criteria of acceptable result
15. List the equipment needed for all the basic procedures and demonstrate the ability to correctly review the completeness of this equipment before starting a procedure.
16. Demonstrate attention to detail in follow-up for postoperative patients.
17. Formulate physical therapy protocol for nonoperative treatment and postoperative rehabilitation protocols after foot or ankle surgery, including splinting and bracing. Recognize the postop foot/ankle in trouble.
18. Demonstrate the ability to recognize and initiate treatment of complications.
19. Critique foot and ankle literature at the department and foot/ankle journal clubs.

**Medical Knowledge**

The resident will demonstrate competency in the following objectives:

1. Obtain appropriate history and perform physical examination and be competent in assessing the following:
   a. Rudimentary abnormalities of gait (e.g. antalgic gait).
   b. Recognize and describe foot and ankle deformities.
   c. Differentiate between normal and abnormal joint arc of motion.
   d. Soft tissue contractures of the Achilles tendon, subtalar joint complex and midfoot.
   e. Grade of strength of the extrinsic and intrinsic foot and ankle muscles.
   f. Neurovascular status of the foot.
   g. Instability of the ankle and MTP joints.
   h. Location of pain and defining the pathology producing the pain.
   i. Grades and types of ulcers based on depth and location.

2. Describe, order and interpret the plain radiographs for foot and ankle conditions and be knowledgeable in the following:
   a. Radiographic characteristics of ankle, hindfoot, midfoot, and forefoot deformities.
   b. Classification of ankle, hindfoot, midfoot, and forefoot arthritis.
   c. Classification of ankle, talar, calcaneal, and midfoot fractures.
   d. Specialized views for common pathologies (e.g. calcaneonavicular coalition, subtalar pathology, hindfoot alignment views).
   e. Appropriate use of further diagnostic imaging (CT scan, MRI, bone scan and gallium scans).

3. Establish a differential diagnosis based on the knowledge of the foot and ankle anatomy, biomechanics and physiology.

4. Describe the appropriate role of further investigations, such as a CT scan, MRI, bone scans, and local anesthetic blocks.

5. Describe a non-operative treatment program, i.e. the role of regular and custom-made orthotics and shoe modifications, and write prescriptions for braces and orthotics.

6. Prescribe appropriate diabetic footwear.

7. Describe the surgical approaches for reconstruction and trauma.

8. Describe a management plan (investigations, non-operative and operative) for the following pathology:
   a. Foot and ankle trauma
      - Ankle fractures
      - Talar fractures
      - Calcaneal fractures
- Lisfranc fracture dislocation
- Metatarsal fractures
- Compartment syndrome
- Stress fractures
- Osteochondral fractures of talus

b. Deformity
- Symptomatic flat foot
- Cavus foot deformity
- Tarsal coalition
- Hallux valgus
- Lesser toe deformities (claw and hammer toes)

c. Foot and ankle tendon and ligament pathology
- Acute/delayed Achilles tendon ruptures
- Achilles tendonitis
- Peroneal tendonitis
- Posterior tibial tendon dysfunction
- Plantar fasciitis
- Ankle ligament reconstruction

d. Rheumatoid arthritis
- Ankle, hindfoot and midfoot
- Forefoot deformities

e. Diabetic foot and ankle disorders
- Infection
- Ulcer
- Charcot arthropathy

f. Foot and ankle nerve disorders
- Reflex sympathetic dystrophy/complex regional pain syndrome
- Tarsal tunnel syndrome
- Morton's neuroma
- Drop foot
- Peripheral neuropathy

g. Foot and ankle tumours
- Approach to malignant tumors
- Approach to benign tumours

9. Describe surgical indications, obtain preoperative imaging, obtain informed consent, describe patient positioning, surgical approach, surgical anatomy, fixation techniques (if applicable), intra-operative imaging, wound closure, and postoperative management for the following procedures:
a. Ankle procedures
- Ankle arthroscopy (anterior impingement, osteochondral lesions, ankle cheilectomy)
- Ankle cheilectomy
- Ankle arthrodesis
- Ankle ligament reconstruction
- Tendo-achilles lengthening
• Repair of acute/delayed Achilles tendon ruptures
• Achilles tendonitis debridement and reconstruction
• Tarsal tunnel release
b. Hindfoot procedures
  • Calcaneal osteotomy (medial or lateral)
  • Subtalar arthrodesis
  • Triple arthrodesis
c. Midfoot procedures
  • Midfoot fusion
  • ii. Midfoot osteotomy
d. Forefoot procedures
  • Proximal and distal metatarsal osteotomies for hallux valgus
  • Rheumatoid arthritis forefoot reconstruction
  • Correction of claw and hammer toes
  • 1st MTP joint cheilectomy
  • 1st MTP joint arthrodesis
  • Excision of Morton’s neuroma
e. Fracture fixation
  • Ankle
  • Talus
  • Calcaneus
  • Lisfranc
  • Metatarsal
f. Diabetic ulcer
  • Debridement
  • Exostectomy
  • Reconstruction of Charcot arthropathy
g. Tendon transfers
  • FHL tendon transfer to calcaneus for delayed Achilles tendon reconstruction
  • FDL transfer for posterior tibial tendon dysfunction
  • Posterior tibial tendon transfer for drop foot

10. Diagnose, investigate, and treat the following postoperative complications:
  a. Wound necrosis
  b. Wound infection
c. Nonunion of an arthrodesis or fracture
d. Malunion of an arthrodesis or fracture
e. Reflex sympathetic dystrophy
f. Nerve injury
g. Dysvascular foot after foot and ankle reconstruction
h. Painful hardware
i. Compartment syndrome
j. Postoperative pain
**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching technique.

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and out-patient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics.

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served.
7. Further his/her understanding of the structure, financing and operation of the Oman health system.
8. Work in interprofessional teams to enhance patient safety and improve patient care quality.

**VI. Rotation-Specific Psychomotor Skills**

By the end of the Foot & Ankle Surgery rotation, the resident will demonstrate competency in the following objectives:

1. Identify the appropriate surgical approach
2. Describe potential pitfalls
3. Outline the operative procedure
4. Identify required equipment
5. Observe and perform under supervision or describe the procedure in details if not able to see it the following procedures
   a. Ankle Arthroscopy
   b. Ankle Cheilectomy
   c. Ankle Arthrodesis
   d. Lateral Ankle Ligament Reconstruction
   e. Haglund/Retrocalcaneal Resection
   f. Gastrocnemius Slide
g. Tendoachilles Lengthening
h. Calcaneal Osteotomy
i. Subtalar Arthrodesis
j. Triple Arthrodesis
k. Midfoot procedures
   • Midfoot fusion
   • Midfoot osteotomy
l. Forefoot procedures
   • Proximal and distal metatarsal osteotomies for hallux valgus
   • Rheumatoid arthritis forefoot reconstruction
   • Correction of claw and hammer toes
   • 1st MTP joint cheilectomy
   • 1st MTP joint arthrodesis
   • Excision of Morton’s neuroma
m. Fracture fixation
   • Ankle
     • ii. Talus
     • iii. Calcaneus
     • iv. Lisfranc
     • v. Metatarsal
n. Diabetic ulcer
   • Debridement
   • Exostectomy
   • Reconstruction of Charcot arthropathy
o. Tendon transfers
   • FHL tendon transfer to calcaneus for delayed Achilles tendon reconstruction
   • FDL transfer for posterior tibial tendon dysfunction
   • Posterior tibial tendon transfer for drop foot
p. 1st Tarsometatarsal Arthrodesis
q. Lateral Column Lengthening
r. Lapidus Procedure for Hallux Valgus
s. Proximal Metatarsal Osteotomy for Hallux Valgus
t. Chevron Osteotomy for Hallux Valgus
u. Medial Capsulorraphy (1st TMT)
v. 1st MTP Cheilectomy
w. 2nd Metatarsal Shortening Osteotomy
x. 5th Metatarsal Rotational Osteotomy for Bunionette
y. Tendon Transfers
   • FDL to Posterior Tibial Tendon
   • Posterior Tibial Tendon to Dorsum
   • Peroneus Longus to Peroneus Brevis
   • FHL to Peroneus Brevis
   • Peroneus Longus to Achilles
   • FHL to Achilles
VII. Core Surgical Competencies

By the end of the Foot & Ankle Surgery rotation, the resident will demonstrate competency in the following objectives:
1. Demonstrate competence in performing the described task.
2. Appreciate the pitfalls and possible complications
3. Surgical Planning
4. Prepping and Draping
5. Use of a Tourniquet
6. Choice of suture material
7. Suture tying
8. Regional Anesthetic Blocks
9. Local Anesthetic Blocks
10. Application of Short Leg Splint/Cast

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her foot and ankle surgery management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of foot and ankle injuries
5. Basic science lecture series at the weekly resident didactics
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of patients with foot and ankle injuries such as general/trauma surgeons, plastic surgeons, intensivist, emergency physician, etc.
IX. Rotation Reading Resources

- The Journal of Foot and Ankle Surgery
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS) and AAOS Portal
- www.orthobullets.com

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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<td>O-Score OSATS Score Global Performance Assessment Procedure Based Assessment</td>
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Orthopedic Oncology Rotation

Year: R4 or R5  
Duration: 3 blocks  
Training Center: Khoula Hospital or Abroad

I. Introduction:

The overall goal of this rotation is to gain expertise in the evaluation, diagnosis and management of patients with musculoskeletal tumors and metabolic bone disease. It is designed to introduce residents to all aspects of management of patients with benign and malignant bone and soft tissue tumors of the extremities, pelvis, and spine. The rotation includes clinical experience in managing patients with these conditions in outpatients and inpatients setup. It also exposes the residents to an environment of multidisciplinary approach to the patient with musculoskeletal tumors. The resident is expected to read and acquire the basics and principles of musculoskeletal oncology. It is not expected that he will have advanced exposure or acquire complex skills involved in this high subspecialty.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist/senior resident. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the residents are expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the direct supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Senior surgeons are available for consultation at all times.

V. Rotation Core Competencies

Patient Care

The resident will demonstrate competency in the following objectives:
1. Know how to complete a patient history with regard to musculoskeletal oncology in an accurate and comprehensive way
2. Demonstrate ability to perform a detailed physical examination
3. Use diagnostic tests for benign and malignant musculoskeletal tumors in adults and children.
4. Interpret imaging studies of musculoskeletal neoplasms including x-rays, CT, MRI and bone scans
5. Interpret pathology studies for benign and malignant tumors including histopathology slides
6. Use staging systems for musculoskeletal tumors
7. Formulate and carry out of a complete and effective treatment plan (operative and non-operative)
8. Coordinate treatment with other medical specialties
9. Counsel the patient and family in treatment procedure, options, and potential outcomes
10. Demonstrate competency with techniques for biopsy, curettage, and grafting

Medical Knowledge:

The resident will demonstrate competency in the following objectives:
1. Demonstrate the knowledge and organized problem-solving approach to the following:
   a. Formulate a differential diagnosis from “unknown” case presentations including infection
   b. Identify etiology, natural history and prognosis of specific neoplasias including issues specific to age and gender
      ➢ Primary bone tumors
         a. Chondroid
         b. Osseous
         c. Fibroid
         d. Other
      ➢ Primary soft tissue tumors
         a. Fibrous
b. Lipoid
c. Muscle
d. Vascular
e. Nerve
f. Other
c. Identify pathologic features of bone and soft tissue neoplasms, both clinically and radiographically
d. Describe the different tumour classes and their behavior:
   ➢ Bone tumors
      a. Secondary (Metastatic)
      b. Primary
         • Aggressive
         • Non-aggressive
         • Benign
         • Malignant
   ➢ Soft tissue tumors
      a. Size of tumour and relationship to fascia
      b. Neurovascular, articular, and lymphatic involvement
      ➢ Tumor-like conditions (e.g. infection, nodular fasciitis, myositis ossificans)
      ➢ Pathologic fractures
e. Understand the histology, cytology, pathology and anatomy as it applies to specific musculoskeletal tumor conditions
f. Correlate clinical, radiological, gross and microscopic pathologic examinations and appreciate the difficulties and controversies surrounding pathologic, histologic and histochemical assessment of pathologic specimens
g. Describe recent advances in radiologic imaging techniques and their applications
h. Summarize the work-up, biopsy and staging of bone and soft tissue tumours
   ➢ Sites of metastatic potential for primary MSK tumors
   ➢ Organ systems likely to metastasize to the MSK system
   ➢ Enneking Musculoskeletal Tumour Society (MSTS) System
   ➢ Describe the appropriate biopsy principles of MSK tumors
i. Formulate a treatment plan for the MSK oncology surgery
   ➢ Comparison of treatment modalities including radiotherapy, chemotherapy and other adjuvants, such as bisphosphonates
   ➢ Plan and describe appropriate surgical interventions appropriate to his/her level of training, including advances in limb salvage surgery
   ➢ Multidisciplinary approach to:
      a. Curative treatment
      b. Palliative care
j. Understand the indications, mechanisms and complications of prosthetics
k. Understand the complications of orthopedic tumor surgery

2. Demonstrate **diagnostic skills** to effectively and ethically manage a wide spectrum of oncologic pathologies and problems.
   a. Elicit symptoms and presenting features of primary and secondary neoplastic conditions and the complications arising from such conditions
Bone pain
- Radiologic lesion with or without symptoms
- Soft tissue mass with or without symptoms
- Metastatic bone disease
- Pathologic fractures

b. Determine predisposing factors in musculoskeletal neoplasia
c. Regional examination appropriate to the lesion including characterization of mass lesions
d. Examination for occult primary disease
e. Identify features suggestive of aggressive and non-aggressive lesions
f. Understand the severity and urgency of the problem

3. Demonstrate **therapeutic skills** in keeping with the surgical management of oncologic pathologies:

**Junior Level**
- Understand diagnostic percutaneous aspiration biopsy of mass lesion with or without radiologic guidance
- Open biopsy of appendicular bony or soft tissue lesion
- Principles and practice of stabilizing metastatic disease
- Surgical treatment of common benign soft tissue and bone tumors
- Below and above knee amputation

**Senior Level**
- Open biopsy of axial lesions
- Definitive tumour resection
- Amputations of all extremities
- Prosthetic prescription
- Be competent with allograft harvest and use
- Participate in limb-sparing surgery, including tumour resection and reconstruction with oncologic prosthesis

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Use the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics
**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

**VI. Rotation Specific Psychomotor Skills**

By the end of the Orthopedic Oncology Rotation, the resident should be able to:

1. Demonstrate physical examination techniques appropriate to the patient’s chief complaint and history, and arrange further studies as needed
2. Interpret radiologic studies that are common in the evaluation of bone and soft tissue tumors of the extremities
3. Demonstrate appropriate documentation skills
4. Demonstrate the appropriate pre-operative work-up of oncology patients, including functional assessment
5. Perform an appropriate screening pre-operative history and physical examination, and refer for further studies as needed for pre-operative clearance for the procedure in question
6. Understand various surgical procedures including: Biopsy (Needle/Incisional/Excisional, Excision of Benign masses, Curettage of benign bone tumors, Bone grafting techniques, stabilization of impending pathologic fractures, Resection of bone and soft tissue sarcomas, reconstruction, Endoprosthesis, etc.)
7. Evaluate and determine appropriate interventions for the post-operative issues that arise in the care of post-operative patients (i.e. pain control, bleeding and drainage, fevers, traction and post-operative stabilization)
8. Recommend and arrange as necessary, appropriate post-operative of post-procedure care, including pain control, activity status including immobilization and/or therapeutic exercise, wound management and appropriate nursing or custodial care for orthopedic patients upon discharge.
VII. Core Surgical Competencies

By the end of the Orthopedic Oncology rotation, the resident should be able to assist/partially perform, under direct supervision, the following procedures:

1. Surgical approaches
2. Biopsy (Needle /Incisional/Excisional
3. Excision of Benign masses, Curettage of benign bone tumors
4. Bone grafting techniques
5. Stabilization of impending pathologic fractures
6. Resection of bone and soft tissue sarcomas
7. Reconstruction
8. Endoprosthesis

VIII. Implementation

In addition to the daily apprenticeship model of one-to-one instruction, the resident will enhance his/her Orthopedic Oncology management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion.
2. Weekly meeting at which different cases/related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of musculoskeletal injuries
5. Basic science lecture series at the weekly resident didactics
6. Journal club for discussion of relevant current literature
7. Multi-disciplinary conferences in collaboration with other specialties that take care of patients with musculoskeletal injuries such as general/trauma surgeons, plastic surgeons, intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- Canale: Campbell’s Operative Orthopedics, 10th edition
- Current relevant articles in musculoskeletal Oncology (list can be distributed to residents at start of rotation)
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- OKU 2 Musculoskeletal Tumors (AAOS eBooks Portal)
- Wheeless’ Textbook of Orthopedic (Duke University) website
The following topics must be covered in the self-study plan:
- Radiographic evaluation
- Tumor staging
- Principles of Biopsy
- Treatment of benign bone & cartilage tumors
- Treatment of malignant bone and cartilage tumors
- Benign soft tissue masses
- Malignant soft tissue masses
- Miscellaneous Lesions (Mimickers)
- Treatment of patients with metastatic disease
- Adjuvant treatments (Radiation therapy, Chemotherapy)
- Basic Histopathology stains and Immunohistochemistry

X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Senior Pediatric Orthopedic Rotation

Year: R5  
Duration: 3 blocks  
Training Center: KH, AFH

I. Introduction:

The Senior Pediatric Orthopedic Rotation is built upon the knowledge and skills acquired in the junior level rotation. The resident assumes more responsibility as a member of the pediatric orthopedic team and his/her active participation in surgery increases from serving as second assistant to being the primary surgeon, under the direct and close supervision of a senior team member. Progression is based on each resident’s level of competence, knowledge and skill. He/she will also instruct and assist more junior residents in their duties. Further diagnostic, treatment-planning, and follow-up skills are developed in the outpatient clinic, allowing residents to experience continuity of care from presentation to discharge. At the end of both rotations, the resident should be able to achieve all of the goals and objectives of the pediatric orthopedic rotation.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident will assume a senior role of the pediatric orthopedic team and act as a supervisor and instructor to junior residents in the service. He/she should:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress
III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.

IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Consultants are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

**Patient Care**

In addition to the junior rotation competencies, the resident will demonstrate competency in the following objectives:

1. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for pediatric orthopedic patient.
2. Demonstrate ability to oversee the complete examination, resuscitation, investigation, and treatment plan for a multisystem trauma child patient.
3. Demonstrate ability to solve problems by initiating investigations and recommending a treatment plan.
4. Assist junior residents in clinical decision making and fracture care.
5. Teach the junior resident reduction and splinting of all fractures and dislocation.
6. Review each consultation with junior residents and perform complete pre-operative evaluation of each surgical candidate including assessment of risk and potential complications.
7. Be available to see patients in the emergency department when the junior becomes backed-up with consultations.
8. Be able to manage the operating room schedule to ensure timely and seamless surgical care.
9. Be able to take junior residents through a case while teaching basic surgical technique.
10. Manage a team of care providers to ensure excellent inpatient hospital care with respect to the preferences of the attending on service.
11. Provide a daily plan of care for each inpatient on service and advise on the necessary steps required to implement said plan including the need to consult other services.
12. Recognize and approve/refuse transfer of patient care to/from the orthopedic service.
**Medical Knowledge:**

The resident will demonstrate competency in the following objectives:

1. Demonstrate knowledge and organized problem solving approach to the following:
   a. Embryology, anatomy and biomechanics of the immature skeleton.
   b. Biomechanics and injury patterns, unique to the paediatric population, including physeal injuries.
   c. Implication of these injuries or conditions on the growing musculo-skeletal system.

2. Demonstrate diagnostic skills to effectively and ethically manage a wide spectrum of paediatric orthopedic pathologies and problems to include:
   a. Paediatric trauma: paediatric ATLS/multiple trauma, complications of trauma including angular and length abnormalities, diaphyseal / metaphyseal / physeal/epiphyseal fracture patterns, C/T/L spine fractures, major joint dislocations.
   b. Paediatric sepsis: septic arthritis, osteomyelitis, multi-focal patterns, chronic osteomyelitis, chronic recurrent osteomyelitis, discitis.
   c. Paediatric basic science: differences to adult bone, growth plate, secondary ossification centres, biomechanics relative to physis.
   d. Birth deformities: congenital amputations, clubfoot, club hand, congenital spinal abnormality, Sprengel’s deformity, obstetrical palsies.
   e. Generalized disorders: bone dysplasias, metabolic disorders, juvenile rheumatoid arthritis.
   f. Paediatric spine problems: scoliosis, kyphosis, spondylolisthesis.
   g. Paediatric hip problems: developmental dysplasia and dislocation, proximal femoral focal dysplasia, slipped capital femoral epiphysis, Legge-Calve-Perthes disease, femoral anteversion, septic arthritis.
   h. Paediatric knee disorders: anterior knee pain, patellar-femoral instability, Osgood-Schlatter’s disease, torsional deformities, varus and valgus deformity, Blount’s disease, discoid meniscus.
   i. Paediatric foot disorders: clubfoot, vertical talus, tarsal coalition, flexible flat feet.
   j. Paediatric gait abnormalities: painless and painful limps, limb-length discrepancies, physiologic torsional and angular deformity.
   k. Paediatric neuromuscular problems: cerebral palsy, muscular dystrophy, spinal muscular atrophy, hereditary sensory-motor neuropathies.
   l. Paediatric neoplasia: bone cysts, osteochondromas enchondromas, fibrous dysplasia, Ewing’s sarcoma, osteosarcoma.
   m. Collect data by history, physical exam and investigations, interpret the data and demonstrate cognitive skills towards solving the patient’s problem.
      - Elicit a history that is relevant, concise, accurate and appropriate to the patient’s problem. Identify the severity and urgency of the problem.
      - Elicit and identify chief complaint of patient/care-giver.
      - Elicit perinatal, developmental, familial (genetic), and general paediatric information relevant to the problem.
      - Identify functional impact of problem upon patient/care-givers.
   o. Perform a physical examination that will elicit all aspects of the musculoskeletal examination with the following emphasis:
- Newborn examination for foot abnormalities, hip instability, congenital spinal abnormality, torticollis, other extremity abnormalities
- Paediatric/adolescent assessment of gross motor, fine motor, secondary sexual development with general musculoskeletal assessments.
- General gait evaluation.
- Appropriate application and interpretation of special tests is expected according to the presenting complaint/area of concern.
- Select appropriate investigative tools in a cost effective, ethical and useful manner for the diagnosis of paediatric orthopedic pathologies.

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:

1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient's problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:

1. Recognize the importance of patient/parent-surgeon communication in the knowledge and appreciation of the patient’s specific problem and general health, the elaboration of a treatment plan and the general outcome and patient/parent satisfaction of prescribed treatments.
2. Accomplish effective communication with patient, family, and caregivers, while considering pertinent ethical, financial, and legal factors.
3. Establish relationships with the patient and their caregivers that are characterized by understanding, trust, respect, empathy and confidentiality.
4. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient/parent participation. The resident should be able to obtain an informed consent.
5. Understand and demonstrate the importance of cooperation and communication among health professionals involved in the care of individual patient such as nurses,
physiotherapists, paediatricians, radiologists, anesthesiologists, social workers, psychologists, etc.

6. Demonstrate skills in working with patients who present communication challenges such as age-group, fear of the hospital experience, anger, confusion, ethno-cultural background and critical illnesses.

7. Effectively teach co-workers, fellow residents, medical students and others on the ward, at rounds and lectures.

8. Define the role and expertise of various professionals involved in treating patients with Paediatric Orthopedic conditions: orthopedic surgeons, physiatrists, radiologists, interventional radiology, emergency and intensive care staff, nurses, physiotherapists, case managers, social services, pain management services, anesthesiologists etc.

9. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise.

Professionalism

The resident will demonstrate competency in the following objectives:

1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society

2. Demonstrate respect for patient privacy and autonomy

3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent

4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury

5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities

6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

Systems-Based Practice

The resident will demonstrate competency in the following objectives:

1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life

2. Have an understanding of health care allocation and health education resources

3. Practice effective allocation of health care resources to avoid compromising quality of care

4. Work effectively and efficiently in a health care institution

5. Effectively utilize information technology to optimize patient care and for continued self-learning

6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served

7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation-Specific Psychomotor Skills

**Therapeutic Skills – Junior Level:**
1. Adequate history and physical examination of paediatric patient and problems
2. Assessment of gait abnormalities
3. Assessment and management principles of paediatric trauma
4. Management of fluid and electrolytes balance in the paediatric patient
5. Closed treatment of fractures including the utilization of skeletal traction
6. Introduction to paediatric orthopedic operative skills and surgical problems
7. Develop competencies as a surgical assistant in paediatric orthopedic surgery.
8. Develop knowledge of the surgical approaches, handling of tissues, use of paediatric orthopedic tools and instrumentation, and appropriate wound closures.

**Therapeutic Skills – Senior Level:**
1. Capable of managing well-defined problems but lacks expert capabilities with regards to:
   a. Skeletal dysplasia (achondroplasia)
   b. Constitutional diseases (e.g. renal rickets, Downs’, JRA)
   c. Haematological disorders (e.g. haemophilia, hemoglobinopathies)
   d. Specific neoplastic disorders (e.g. cysts, osteoid osteoma, osteochondroma, fibrous dysplasia, osteosarcoma, Ewing’s)
   e. Neuromuscular conditions (e.g. muscular dystrophies, spinal muscular atrophy, polio, cerebral palsy)
   f. Spinal deformities (e.g. idiopathic scoliosis, congenital scoliosis, postural kyphosis, Scheuermann’s, spondylosis, and spondylolisthesis)
   g. Non-operative management of congenital limb deficiencies
   h. Non-progressive limb length discrepancies
   i. Developmental hip dysplasia (up to walking age)
   j. Slipped capital femoral epiphysis
   k. Non-operative treatment principles of Legg-Calve-Perthes
   l. Lower limb torsional and mal-alignment problems (e.g. tibia vara, tibial bowing).
   m. Newborn foot deformities
   n. Overuse syndromes
   o. Amputations and juvenile prosthetic prescription
VII. Core Surgical Competencies

By the end of the senior Pediatric Orthopedic rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:

**Trauma:**
1. Intramedullary fixation of forearm shaft fracture
2. Open reduction and internal fixation of displaced lateral condyle fractures of the humerus
3. Open reduction and internal fixation of fracture of medial epicondyle
4. Open reduction of supracondylar fractures of the humerus
5. Closed reduction and percutaneous pinning of supracondylar fractures of the humerus
6. Closed, percutaneous, and open reduction of radial head and neck fractures
7. Percutaneous joystick and intramedullary reduction (Metaizeau) techniques of radial neck fractures
8. Supracondylar humeral osteotomy for correction of cubitus varus
9. Closed reduction and spica casting of femur fractures
10. Closed reduction and external fixation femoral shaft fractures
11. Flexible intramedullary nailing of femoral shaft fractures
12. Submuscular plating of femoral shaft fractures
13. Open reduction and internal fixation of tibial tuberosity fractures

**Arthroscopic and Sports Medicine:**
1. Elbow arthroscopy for Panner's Disease and osteochondritis dissecans
2. Proximal patellar realignment
3. Arthroscopy-assisted management or open reduction and internal fixation of tibial spine fractures
4. Anterior cruciate ligament reconstruction in the skeletally immature patient
5. Arthroscopic drilling of osteochondritis dissecans
6. Meniscoplasty for discoid lateral meniscus

**Reconstruction:**
1. Proximal femoral rotational osteotomy
2. Proximal femoral varus osteotomy
3. Surgical repair of irreducible congenital dislocation of the knee
4. Percutaneous distal femoral or proximal tibial epiphysiodesis
5. Excision of physeal bar
6. Limb lengthening using the Ilizarov method or a monopolar fixator
7. Guided growth to correct limb deformity
8. Distal tibial osteotomy
9. Multiple percutaneous osteotomies and Fassier-Duval telescoping nailing of long bones in osteogenesis imperfecta
10. Syme and Boyd amputations for fibular deficiency
11. Hemi-epiphysiodesis for ankle valgus
**Neuromuscular Correction:**
1. Adductor and iliopsoas release
2. Rectus femoris transfer
3. Proximal hamstring and adductor lengthening
4. Distal hamstring lengthening
5. Gastrocnemius fascia lengthening
6. Distal femoral osteotomy for crouch gait

**Upper Extremity:**
1. Release of simple syndactyly
2. Correction of thumb-in-palm deformity in cerebral palsy
3. Release of the A1 pulley to correct congenital trigger thumb
4. Transfer of flexor carpi ulnaris for wrist flexion deformity
5. Radial dysplasia reconstruction
6. Forearm osteotomy for multiple hereditary exostoses
7. Modified Woodward repair of Sprengel deformity

**Hip:**
1. Anterior drainage of the septic hip in children
2. Innominate osteotomy of Salter
3. Periscapular osteotomies of Pemberton or Dega
4. Labral support (Shelf) procedure
5. Triple innominate osteotomy
6. Chiari medial displacement osteotomy of the pelvis
7. Bernese periacetabular osteotomy
8. Surgical dislocation of the hip
9. Valgus osteotomy for developmental coxa vara
10. Valgus osteotomy for Perthes disease
11. Percutaneous in situ cannulated screw fixation of the slipped capital femoral epiphysis
12. Flexion intertrochanteric osteotomy for severe slipped capital femoral epiphysis
13. Closed reduction and spica casting for DDH

**Foot & Ankle:**
1. Triple arthrodesis
2. Calcaneal lengthening osteotomy for the treatment of hindfoot valgus deformity
3. Posteromedial release for clubfoot
4. Tibialis anterior transfer
5. Posterior release for clubfoot
VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her pediatric orthopedic management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
2. Weekly meeting at which different pathologies are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
4. Weekly resident didactic teaching emphasizing the management of pediatric orthopedic patients
5. Multi-disciplinary conferences in collaboration with other specialties that take care of pediatric patients such as pediatricians, general/trauma surgeons, plastic surgeons, intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- Tachdjian Pediatric Orthopedics
- Lovell and Winter’s Pediatric Orthopedics
- Staheli practice of Pediatric Orthopedics
- Beaty and Kasser: Rockwood and Green's Fractures in children
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell's Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) Portal in E-Library
- Journal of Pediatric Orthopedic
- Journal of Pediatric Orthopedics (B)
- Journal of Children’s Orthopedics
- Wheeless' Textbook of Orthopedic (Duke University) website
- Other resources in the OMSB Orthopedics residents’ website, www.omsbortho.net
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via the in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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**Senior Sports Medicine Rotation**

**Year:** R5  
**Duration:** 3 blocks  
**Training Center:** KH, AFH

I. **Introduction:**

The Orthopedic Sports Rotation is designed to educate residents in a broad variety of aspects regarding upper and lower extremity sports injuries, with concentration on clinical evaluation, and non-operative as well as operative treatment of shoulder, knee and hip and thigh injuries. The residents will focus on developing surgical and clinical skills to manage sports related injuries and also become proficient in common procedures such as arthroscopies, ligaments repair, meniscal and chondral injury management.

II. **Resident Responsibilities for Patient Care**

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. In addition, the resident will assume a senior role of the trauma team and act as a supervisor and instructor to junior residents in the service. In addition, the residents are expected to assume the following responsibilities:

a. Develop a program of self-study to acquire the medical knowledge  
b. Participate in at least 1 full day of clinic per week (or 2 half days)  
c. Complete medical records in a timely fashion  
d. Document all procedures in the surgical logbook  
e. Dress professionally as per the dress code of the institution  
f. Organize M&M documents  
g. Report any incidents or medical errors  
h. Provide educational sessions for medical students and junior staff throughout the rotation  
i. Complete evaluation forms for rotation before the end of the rotation  
j. Monitor themselves for fatigue and stress

III. **Resident Level of Responsibility for Patient Care**

The rotation is structured so that the resident has a graduated level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Attending surgeons are available for consultation at all times. Senior residents must be available for consultation at all times. Ultimately, chief residents are responsible for the supervision of all residents.

V. Rotation Core Competencies

Patient Care:

The resident will demonstrate competency in the following objectives:
1. Take an appropriate history including the date of injury, duration of symptoms, mechanism of injury, prior treatment and present it in a concise way
2. Perform a physical examination of the knee, shoulder, hip and elbow joints and identify all pertinent anatomic landmarks, quantify range of motion, evaluate stability and know the special provocative tests for each pathology/injury.
3. Make a clinical diagnosis of the following related to the shoulder: labral tear, rotator cuff tear, adhesive capsulitis, anterior instability, posterior instability, rotator cuff tendinitis, impingement syndrome, AC joint arthrosis, AC joint separation and grade, and biceps rupture.
4. Make a clinical diagnosis of conditions related to knee including ACL tear, PCL tear, MCL injury/tear, LCL injury/tear rupture, knee dislocation, Posterior lateral corner injuries, meniscal tear, chondromalacia patella, patella instability, degenerative arthritis, pre-patella bursitis, quadriceps rupture, patellar tendon loose body, synovitis, plica syndrome, etc.
5. Make a clinical diagnosis of conditions related to the hip and thigh including femoroacetabular impingement, labral hip injuries, iliotibial band syndrome, tendonitis, bursitis, snapping syndrome, etc.
6. Know the indications for ordering specific imaging modalities including x-rays, CT, MRI, ultrasound and arthrography.
7. Discuss and point out the positive findings on plain films and other special imaging studies
8. List an appropriate differential diagnoses
9. Be able to the list the various treatment options available
10. Be proficient on counseling the patient and family about the different treatment modalities including risks and benefits.
11. Understand the options for non-operative treatment and various rehabilitation protocols
12. Understand the indications for surgical management and be familiar with the different common surgical techniques
13. Be able to formulate a postoperative treatment protocols and rehabilitation after surgery
14. Understands the issues related to after care of sport injuries including return to play and duration of bracing
15. Be able to recognize complications related to various therapies
**Medical Knowledge:**

The resident will demonstrate competency in the following objectives:

1. Demonstrate knowledge (including current literature), understanding and organized problem solving approach to the following:
   - Embryology, anatomy (clinical, topical and surgical) and biomechanics of the human body and rehabilitation.
   - Basic science as it relates to: Ligaments, cartilage, bone, muscle, tendon, synovium, and biomechanics.
   - Wound injury and healing
   - The inflammatory process
   - Thigh, hip and pelvis: contusions, muscle strains, bursitis, nerve entrapment, intrarticular disorders, bone disorders, and hip area syndromes
   - Knee: acute chronic and combined ligament injuries and instability, meniscal disorders, synovial lesions, chondral and osteochondral lesions, patellofemoral disorders, bursitis, loose bodies, monoarticular arthritis and childhood/adolescent disorders.
   - Leg, foot and ankle: exertional compartment syndrome, stress and fatigue fractures, tendon injury, nerve entrapment, planar fascitis, Os trigonum, ankle instability, osteochondral disorders, great toe injuries, and fractures of the foot and ankle.
   - Shoulder: the throwing athlete, acute and chronic anterior posterior and multidirectional instability, impingement syndromes and rotator cuff disease, calcific tendonitis, biceps tendon and superior labral injury, acromioclavicular and sternoclavicular disorders and injury, tendon / muscle ruptures, nerve disorders, fractures, and shoulder stiffness
   - Elbow: instability, tendon injury, articular injury, fractures, compression neuropathy
   - Hand and wrist: tendon and ligament injuries and dislocations, carpal instabilities, fractures, tendonitis, entrapment neuropathies, and post-traumatic problems
   - The principles of management of infection and tumors related to orthopedic sports medicine
   - The problems of inappropriate surgery
   - Complications of arthroscopic and open sport surgery

2. Demonstrate diagnostic skills to effectively and ethically manage a wide spectrum of sport medicine pathologies and problems.
   - Elicit a history that is relevant, concise, accurate and appropriate to the patient’s problem. Identify previous treatments administered and the results of such treatments. Identify the severity and urgency of the problem.
   - Perform a physical examination that will elicit all aspects of the musculoskeletal examination with emphasis of the spine and extremities involved, special tests with knowledge of normal and pathologic results, and the neurovascular exam.
   - Select appropriate investigative tools in a cost effective, ethical and useful manner for the diagnosis.
   - Collect data by history, physical exam and investigations, interpret the data and demonstrate cognitive skills towards solving the patient’s problem.
3. Demonstrate therapeutic skills in keeping with the surgical management of sport medicine pathologies.

**Therapeutic Skills – Junior Level**
- Develop competencies as a surgical assistant in sports medicine surgery.
- Develop knowledge of the surgical approaches, handling tissues and appropriate wound closures.
- Diagnostic and therapeutic joint injections.
- Become familiar with the use of arthroscopy and open surgery instruments and techniques and power instruments with laboratory and patient exposure, with emphasis on mastering basic knee arthroscopy technique (lavage, meniscal resection, synovial biopsy, debridement/resection of intrarticular structures).

**Therapeutic Skills – Senior Level**
- Develop competence in more surgical procedures of the procedures in the field of sports medicine.
- Should be competent in basic techniques for open anterior shoulder repair, acromioplasty and rotator cuff repair, acromioclavicular joint resection, diagnostic shoulder arthroscopy, therapeutic shoulder arthroscopic debridement and basic skills for acromioplasty, principles and techniques for ACL reconstruction with reasonable ability to perform individual components of the procedure.

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:
1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques
**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics

**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions.

VI. Rotation-Specific Psychomotor Skills

By the end of the Sports Medicine rotation, resident should be able to:
1. Describe, demonstrate and perform routine arthroscopic portal placement in the shoulder, elbow, knee, and ankle.
2. Perform a routine diagnostic arthroscopy in the shoulder and knee.
3. Become familiar with all instrumentation used to perform arthroscopic procedures on these joints.
4. Describe the steps and perform a routine knee meniscectomy
5. Describe the steps of an uncomplicated primary anterior cruciate ligament reconstruction.
6. Describe the steps of proximal and/or distal realignment procedure for the treatment of patellar instability.
7. Describe the steps of evaluation and debridement of the gleno-humeral joint, including labral pathology
8. Describe the steps in performing a subacromial decompression, arthroscopic AC joint decompression, and evaluation and repair of the rotator cuff.
9. Understand the principles of arthroscopy of other joints such as the elbow, ankle, and hip
10. Be familiar with rehabilitation protocols for different reconstructive procedures
11. Recognize problems related to rehabilitation and therapy

VII. Core Surgical Competencies

By the end of the Sports Medicine rotation, the resident should be able to assist in/perform, under direct supervision, the following procedures:
- Knee Arthroscopy
- Knee ligaments reconstruction including ACL, PCL, MCL, LCL
- Meniscectomy and meniscal repairs
- Chondral lesion repair and reconstruction
- Diagnostic shoulder arthroscopy and portal placement
- Debridement structure within the shoulder arthroscopically
- Arthroscopic knot techniques
- Surgical approaches for open surgery in the shoulder
- Arthroscopic anterior acromioplasty
- Rotator cuff repair
- Distal clavicle excision
- Portions of a shoulder stabilization procedure
- Bankart repair
- Placement of suture anchors in instability or SLAP lesions
- Passage of suture through the capsule and or labrum
- Biceps Tenotomy

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her Sports Medicine management skills by a number of specific activities including:

8. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion
9. Weekly meeting at which different sport related conditions are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident’s reading and study
10. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future
11. Weekly resident didactic teaching emphasizing the management of sport injuries
12. Basic science lecture series at the weekly resident didactics in biomechanics of knee, shoulder and hip joints
13. Journal club for discussion of relevant current literature
14. Multi-disciplinary conferences in collaboration with other specialties that take care of patients with sport injuries such as physiotherapist, occupational therapist and orthotist.

IX. Rotation Reading Resources

- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell’s Operative Orthopedics, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller’s Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) Portal through E-Library
- Wheeless’ Textbook of Orthopedic (Duke University) website
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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Trauma Chief Rotation

Year: R5  
Duration: 1 block  
Training Center: Khoula Hospital

I. Introduction:

The PGY 5 resident has a significant role in leading the orthopedic trauma services. The trauma chief operates every week and enjoys a greater amount of autonomy. The goals are to teach the essentials of orthopedic trauma to junior residents relevant to a general orthopedic practice as well as the foundation for independent post residency practice in orthopedic trauma. It introduces the resident to the various skills he/ she will need to manage an orthopedic practice. The residents are heavily involved in the pre-op, intra-op, and post-op of the Trauma patients.

By the PGY 5 year, the resident is expected to be functioning at the level of a specialist in Orthopedics but still with direct supervision and guidance of the responsible consultant.

The trauma chief rotation is built upon the knowledge and skills acquired in the junior and senior level Trauma rotation. The resident assumes more responsibility as a leader in the orthopedic trauma team and his/her active participation in surgery increases from serving as second assistant to being the primary surgeon, under the direct and close supervision of a consultant.

II. Resident Responsibilities for Patient Care

Residents are expected to have seen and written (or directed junior residents to write) a complete and detailed note on each patient prior to going to OR. Consultation should be seen as soon as possible and should be seen in person and discussed with the consultant/specialist. The consultation should be followed based on urgency level after discussion between the senior team member and the resident. Rounds should be done daily and treatment plans should be discussed with the consultant. The trauma chief should lead and oversee the trauma service and make sure the team is running smoothly. In addition, the trauma chief resident will act as a supervisor and instructor to junior residents in the service.

III. Resident Level of Responsibility for Patient Care

The rotation is structured so that the resident has a progressing level of responsibility. The level of responsibility given by the rotation supervisor to the resident is determined by that supervisor himself, depending on the supervisor’s assessment of the resident’s level of competence, knowledge and skills, and the complexity of the procedure.
IV. Resident Supervision

Rotation supervisor is responsible for the supervision of resident in both the clinic and the operating room, as well as in on-call duties to assure that they are acquiring orthopedic knowledge and developing appropriate examination and surgical skills to ensure the highest quality, safety, and effectiveness of patient care. Ultimately, the trauma chief should report to the director of Orthopedic trauma and the head of the department. The resident may be given deputy position in the administration of trauma on the discretion of the head of the department.

V. Rotation Core Competencies

Patient Care

The trauma chief residents will demonstrate competency in the following objectives:
1. Demonstrate proficiency at clinical examination, investigation, and planning of a treatment plan for traumatic injuries to both the axial and appendicular skeleton
2. Demonstrate ability to oversee the complete examination, resuscitation, investigation, and treatment plan for a multisystem trauma patient
3. Demonstrate ability to solve problems by initiating investigations and recommending a treatment plan
4. Assist junior residents in clinical decision making and fracture care
5. Teach the junior resident reduction and splinting of all fractures and dislocation
6. Review each consultation with junior residents and perform complete pre-operative evaluation of each surgical candidate including assessment of risk and potential complications
7. Be available to see patients in the emergency department when the junior becomes backed-up with consultations
8. Be able to manage the operating room schedule to ensure timely and seamless surgical care
9. Be able to take junior residents through a case while teaching basic surgical technique and AO principles
10. Manage a team of care providers to ensure excellent inpatient hospital care with respect to the preferences of the attending on service
11. Provide a daily plan of care for each inpatient on service and advise on the necessary steps required to implement said plan including the need to consult other services
12. Recognize and approve/refuse transfer of patient care to/from the orthopedic service
13. Conduct and organize weekly trauma conferences
14. Conduct and organize audit and mortality and morbidity conferences in the trauma services
15. Coordinate the daily schedule of surgeries posting and communicate with different units to make sure the care for the trauma patient is timely and optimal
16. Review the care of post operative patient and ensure that the continuum of care is assured
**Medical Knowledge**

Trauma chief residents will demonstrate competency in the following objectives:

1. Ability to appropriately manage pre and postoperative orthopedic patients
2. Knowledge of fracture patterns, classifications, and means of fixation
3. Knowledge of common orthopedic traumatic injuries and their acute management (examples: distal radius, tibia, femur, & humerus fractures, shoulder & hip dislocations, hand lacerations, and open fractures)
4. Knowledge of ability to appropriately manage acutely injured patients (examples: required imaging, when/how to sheet a pelvis or reduce cervical spine dislocation, and indications for traction)
5. Knowledge of reduction and splinting principles and techniques
6. Knowledge of appropriate indications for surgical and non-operative management of traumatic orthopedic injuries
7. Knowledge of relative and absolute contraindications for surgical management of traumatic orthopedic injuries
8. Knowledge of expected risk of common surgical interventions (examples: malrotation of transverse/comminuted femur fractures, nonunion of segmental bone loss, knee pain following IMN of the tibia, etc.)
9. Knowledge of AO fracture fixation including lag screw, plate function, modes of fracture healing, material properties, and basic biomechanics Advanced knowledge of ability to appropriately manage injured patients
11. Knowledge of advanced AO fracture fixation technique
12. Knowledge of the advantages / disadvantages of commonly used implants
13. Ability to generate multiple options for fracture fixation and knowledge of each method’s advantages and disadvantages
14. Sound understanding of pelvic and acetabular fractures and approaches

**Practice-Based Learning and Improvement**

The resident will demonstrate competency in the following objectives:

1. Present cases during morning sign-out rounds
2. Assess one’s own patient management skills and ability to make appropriate changes in practice
3. Integrate evidence from scientific studies in the care of patient’s problems
4. Take responsibility for lifelong learning
5. Pose a clinical question, recognize and identify gaps in knowledge, conduct an appropriate literature search, assimilate and appraise the literature, propose a solution, implement the solution in practice, evaluate the outcome
6. Pose a research question, conduct an appropriate literature search, propose a methodological approach and if the resident is inclined and interested carry out the research outlined in the proposal
7. Demonstrate knowledge of study designs and statistical methods in order to evaluate scientific studies
8. Usage the available information technology to obtain and manage information
9. Willingness to take time to educate students and other health care professionals
10. Demonstrate and understanding of effective teaching techniques

**Interpersonal and Communication Skills**

The resident will demonstrate competency in the following objectives:
1. Recognize the importance of patient-surgeon communication in the knowledge and appreciation of the patient’s musculoskeletal problem and general health, the elaboration of a treatment plan and the general outcome and patient satisfaction of prescribed treatments
2. Establish a relationship with the patient that is characterized by understanding, trust, respect, empathy and confidentiality
3. Deliver information to the patient and family in a humane manner and in such a way that it is understandable, encourages discussion and promotes patient participation
4. The resident should be able to obtain an informed consent
5. Know how to interact in an effective manner with all personnel in hospital and outpatient environments involved in the care of orthopedic patients
6. Demonstrate culturally competent communication skills during interactions with colleagues, hospital personnel, patients, and families
7. Demonstrate skills in working with others who present communication challenges such as anger, confusion, language barriers, ethno-cultural background, and critical illnesses
8. Demonstrate the ability to accept, consider and respect the opinions of other team members, while contributing specialty-specific expertise

**Professionalism**

The resident will demonstrate competency in the following objectives:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the general medical and orthopedic needs of patients and society
2. Demonstrate respect for patient privacy and autonomy
3. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent
4. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, socioeconomic status, and disabilities that may have resulted from musculoskeletal injury
5. Demonstrate sensitivity and responsiveness to fellow health care professionals’ culture, age, gender, and disabilities
6. Recognize, analyze and attempt to resolve ethical issues such as critical illness management, end of life care, consent, conflict of interest, resource allocation and research ethics
**Systems-Based Practice**

The resident will demonstrate competency in the following objectives:
1. Utilize time and resources effectively in order to balance patient care, outside activities and personal life
2. Have an understanding of health care allocation and health education resources
3. Practice effective allocation of health care resources to avoid compromising quality of care
4. Work effectively and efficiently in a health care institution
5. Effectively utilize information technology to optimize patient care and for continued self-learning
6. Make clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population served
7. Further his/her understanding of the structure, financing and operation of the Oman health system
8. Work in interprofessional teams to enhance patient safety and improve patient care quality
9. Participate in identifying system errors and implementing potential systems solutions

**VI. Rotation-Specific Psychomotor Skills**

By the end of the trauma chief rotation, the trauma chief resident should be able to:
1. Master surgical approaches for fracture care and advance understanding of complex exposures including those used for pelvic fixation
2. Perform common trauma operations independently such as ankle fractures, intramedullary nailing of long bones, hip fracture fixation, etc.
3. Partially perform/participate in complex trauma operations with direct senior surgeon guidance including ORIF pilon, bicondylar tibial plateau, calcaneus, talus, elbow, & LisFranc fractures
4. Understand surgical techniques required to perform ORIF acetabulum/pelvis, percutaneous screw fixation of pelvic ring injuries, and osteotomies for non-union
5. Be able to lead a surgical team including implant & instrument selection, directing staff, and time management
6. Be able to coordinate the trauma service and communicate effectively to run the service in a smooth manner
7. Be able to lead and guide junior members of the team and resolve any conflict.

**VII. Core Surgical Competencies**

By the end of the senior orthopedic trauma rotation and in addition to junior trauma surgical competencies, senior resident should be able to assist in/perform, under direct supervision, the following procedures:

- Intramedullary nailing of long bone fractures
- Closed reduction and percutaneous pinning of fractures
- Plate-and-screw fixation
- Application of external fixation devices
- Acetabular, pelvic fractures
- Comminuted fractures
- Intraarticular fractures
- Reconstructive procedures for malunion or nonunion
- Bone graft harvesting
- Bone grafting

VIII. Implementation

In addition to the apprenticeship model of one-to-one supervision, the resident will enhance his/her orthopedic trauma management skills by a number of specific activities including:

1. Daily morning meeting/sign-out for presentation and discussion of postoperative and preoperative trauma patients for planning of treatment and follow-up care and review of complications. Every new patient is presented to the team for discussion.
2. Weekly fracture meeting at which different fractures are presented and discussed, with emphasis on classification, treatment options, and outcomes based on the resident's reading and study.
3. Morbidity and mortality meeting at which outcomes and complications are presented and discussed with a view to preventing such complications in the future.
4. Weekly resident didactic teaching emphasizing the management of fracture and trauma patients.
5. Basic science lecture series at the weekly resident didactics in biomechanics of fracture fixation and fracture healing.
6. Trauma journal club for discussion of relevant current literature.
7. Multi-disciplinary conferences in collaboration with other specialties that take care of trauma patients such as general/trauma surgeons, plastic surgeons, Intensivist, emergency physician, etc.

IX. Rotation Reading Resources

- AO Manual of Fracture Fixation
- Bucholz and Heckman: Rockwood and Green's Fractures in Adults
- Browner, Jupiter, Levine, and Trafton: Skeletal Trauma, 3rd edition
- Selected articles from relevant literature (list can be distributed to residents at the start of the rotation)
- Canale: Campbell's Operative Orthopedic, 10th edition
- Hoppenfield Surgical Exposure in Orthopedics
- Gross Anatomy texts
- Miller's Review of Orthopedics
- Journal of American Academy of Orthopedic Surgery (JAAOS)
- American Academy of Orthopedics Surgeons (AAOS) website
- Wheeless' Textbook of Orthopedic (Duke University) website
- Tournetta trauma power point presentations & other resources in the OMSB Orthopedics residents' website, www.omsbortho.net
X. Assessment & Evaluation Tools

The resident is evaluated in both outpatient and inpatient clinical settings, including the emergency department and operating room. He/she is evaluated via in-training evaluation, 360° evaluation, and direct observation used to measure core competencies set forth by the ACGME. Other tools could be used to evaluate the surgical competence and resident progress to more responsibilities and participation in surgeries. An interim evaluation is performed at mid-rotation. Additionally, residents will complete an evaluation that encompasses their feedback/input on the rotation as a whole as well as faculty evaluations for each faculty member.

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<td>Procedure Based Assessment</td>
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**Graded Responsibilities for Residents:**

The resident will be expected to handle increasing specified responsibilities. Graded responsibility is present throughout the training years providing residents with opportunities for decision making, clinical care, and surgical experience.

**R1, R2 & R3 (junior and intermediate residents)**
- General ward duties
- Daily rounds and notes
- Clerking of admissions
- Preparation of discharge summaries
- Ordering and follow up of investigations
- Assisting in minor and major surgeries
- Performing simple operations under supervision
- Initial review of A&E and inpatient referrals
- Presentation of cases in daily X-Ray review
- Participation in all department activities including workshops, seminars, and lectures
- Management of plaster and traction techniques
- Maintaining detailed log book of all clinical and academic activities

**R4 to R5 (senior residents)**

The below responsibilities will be progressive as the resident advances in the training program and as per clinical competencies.

- Examination and management of patients in Orthopedic Clinics
- Co-ordinating with peripheral hospitals for transfer of patients
- Presentation in clinical reviews, journal cases, clinical pathological and radiology meetings
- Graded participation in all surgical procedures including assisting and performing under supervision
- Attending on-call cases during on-call duties and making supervised decisions about their management (according to the resident’s level).
- Active participation in all academic activities of the department including lectures, seminars, workshops and clinical meetings
- Attending courses to upgrade basic and advanced orthopedic knowledge.
- Maintaining detailed log books of all clinical and academic activities
- Participating in teaching & supervision of junior residents.
- Participating in research activities as specified by department
- Participation in quality management activities eg audit, mortality & morbidity meetings
**Academic Activities**

The Orthopedic Surgery educational curriculum is composed of core lectures. Every session will be divided in three parts: basic sciences, core subspecialties, & miscellaneous activities.

The residents have academic half-day teaching once a week. The residents are being officially released during the lecture timing in addition to 1 hour before starting and 1 hour after the end of the activity. Usually, the lectures are held every Monday between 2:00 to 5:00 pm. The junior residents give a presentation about basic sciences. The assigned faculty will give a lecture on core subspecialties. The senior residents are also expected to present the miscellaneous activities. They also should contribute to the weekly teaching with new concepts and knowledge they learned from workshops and conferences that they attend.

**BASIC SCIENCE**

1. Bone histology, development, growth, and repair
2. Bone metabolism
3. Metabolic bone disease
4. Nerve and muscle
5. Tendon and ligament
6. Embryology of the musculoskeletal system
7. Skeletal dysplasias I
8. Skeletal dysplasias II
9. Synovial fluid analysis, arthritis
10. Osteomyelitis and septic arthritis
11. Biomechanics and biomaterials
12. Corrosion, biocompatibility, tribology
13. Basic microbiology and antimicrobial pharmacology
14. Orthopedic pharmacology I
15. Orthopedic pharmacology II
16. Articular cartilage repair
17. Orthopedic pathology
18. Benign cartilage tumors
19. Benign fibrous and cystic lesions
20. Benign bony lesions
21. Osteosarcoma and chondrosarcoma
22. Soft tissue lesions
23. Vascular and neural lesions
24. Orthopedic pathology I
25. Orthopedic pathology II
26. Connective tissue disorders
27. Occupational Radiation Exposure to the Surgeon
28. Surgical Priorities in Damage Control in Polytrauma
29. The Use of Regional Anesthesia in Ambulatory Orthopedic Surgery
30. Nerve conduction studies
AAOS BASIC SCIENCE CHAPTERS

Section 1:

1. Molecular and Cell Biology in Orthopedics
   Francis Y. Lee, MD; M. Hicham Drissi, PhD; Michael J. Zuscik, PhD; Saqib Nizami, BS; Hana Goto, BSc, MSc
2. Genetic Disease in Orthopedics
   P. Christopher Cook, MD, FRCSC; James O. Sanders, MD
3. Biomechanics of Musculoskeletal Tissues
   Jason P. Caffrey, BS; Robert L Sah, MD, ScD
4. Biomaterials in Orthopedic Practice
   Kenneth A. Mann, PhD; Matthew J. Allen, VetMB, PhD
5. Principles of Tissue Engineering in Orthopedics
   Tamim Diab, PhD; Nick J. Willett, PhD; Robert E. Guldberg, PhD
6. Basic Science of Immunology in Orthopedics
   Kofi A. Mensah, MD, PhD; Regis J. OKeefe, MD, PhD

Section 2: Physiology of Musculoskeletal Tissues, Editor: Joshua J. Jacobs, MD

7. Thromboembolic Disease and Fat Embolism Syndrome
   Vincent D. Pellegrini Jr, MD
8. The Development and Growth of the Skeleton
   Maurizio Pacifici, PhD
9. Form and Function of Bone
   Oran D. Kennedy, PhD; Robert J. Majeska, PhD; Mitchell B. Schaffler, PhD
10. Form and Function of Articular Cartilage
    Susan Chubinskaya, PhD; Anne-Marie Malfait, MD, PhD; Markus A. Wimmer, PhD
11. Form and Function of the Knee Meniscus
    Johannah Sanchez-Adams, PhD; Farshid Guilak, PhD
12. Form and Function of Tendon and Ligament
    Katherine E. Reuther, BS; Chancellor F. Gray, MD; Louis J. Soslowsky, PhD
13. Form and Function of Skeletal Muscle
    Adam Wright, MD; Burhan Gharaiheb, PhD; Johnny Huard, PhD
14. Peripheral Nerves: Form and Function
    Wesley M. Jackson, PhD; Edward Diao, MD
15. Form and Function of the Intervertebral Disk
    Isaac L. Moss, MD, MAsc, FRCSC; Howard S. An, MD
16. Kinesiology of the Knee Joint
    Jing-Sheng Li, MS; Ali Hosseini, PhD; Hemanth Reddy Gadikota, MS; Guoan Li, PhD

Section 3: Basic Principles and Treatment of Musculoskeletal Disease, Editor: Constance R. Chu, MD

17. Bone Biology and Engineering
    Jennifer Westendorf, PhD; Lichun Lu, PhD; Michael J. Yaszemski, MD, PhD
18. Posttraumatic Osteoarthritis
    Constance R. Chu, MD
19. Articular Cartilage Repair and Regeneration
    Rocky S. Tuan, PhD; Robert L. Mauck, PhD
20. **Tendinopathy and Tendon Repair**  
   *Stavros Thomopoulos, PhD; Peter C. Amadio, MD; Chunfeng Zhao, MD; Richard H. Gelberman, MD*

21. **The Biologic Response to Orthopedic Implants**  
   *Stuart B. Goodman, MD, PhD*

22. **Metabolic Bone Disease**  
   *Susan V. Bukata, MD; Wakenda K. Tyler, MD, MPH*

23. **Neuromuscular Diseases**  
   *Mary Ann. Keenan, MD*

24. **Molecular Pathophysiology of Musculoskeletal Tumors**  
   *Francis Y. Lee, MD; Sung Wook Seo, MD, PhD; Han-Soo Kim, MD, PhD*

25. **Orthopedic Infection**  
   *James Cashman, MD; Javad Parvizi, MD, FRCS*

Section 4: Clinical Science, Editor: Thomas A. Einhorn, MD

26. **Evidence-Based Medicine: A Practical Guide for Orthopedic Surgeons**  
   *Suneel B. Bhat MD, MPhil; Mohit Bhandari, MD, MSc; Richard C. Mather III, MD; Samir Mehta, MD*

27. **The Design of Clinical Investigations: Randomized, Cohort, and Case Studies**  
   *Charles L. Cox, MD, MPH; Kurt P. Spindler, MD*

28. **Systematic Reviews and Meta-analyses**  
   *Reza Firoozabadi, MD; Saam Morshed, MD, PhD, MPH*

29. **Fundamentals of Cost-Effectiveness Research**  
   *David Shearer, MD, MPH; Kevin J. Bozic, MD, MBA*

30. **The Scientific Foundations of Clinical Practice Guidelines**  
   *Charles M. Turkelson, PhD; Kristy Weber, MD*

31. **Detection of Bias in Clinical Research**  
   *Andrew H. Schmidt, MD; Seth S. Leopold, MD; Steven D. Stovitz, MD, MS*

32. **Decision Analysis**  
   *Julius Bishop, MD; Mininder S. Kocher, MD, MPH*

33. **Biostatistics in Clinical Research**  
   *Elena Losina, PhD, MSc; William Reichmann, MA; Jeffrey N. Katz, MD, MSc*

34. **Ethical Considerations in Clinical Research**  
   *James D. Capozzi, MD; Rosamond Rhodes, PhD*

**TOPICS FROM THE OTA.ORG:**

**Basic Science & General Fracture Management**
- Concepts of Fracture Healing, Thomas A. Russell, MD
- Closed Reduction and Treatment of Common Fractures, James P. Waddell, MD
- Mechanics of Fracture Repair, Stephan M. Perren, MD
- Modern Myths Governing Fracture Care, Augusto Sarmiento, MD
- Fracture Healing by Non-operative Methods, Augusto Sarmiento, MD
- Principles of Splinting, Casting and Bracing, Loren L. Latta, PhD
- Biologic and Mechanical Adjuncts in Fractures and Nonunions, David J. Hak, MD
- Bone Grafting and Bone Grafting Substitutes, Charles N. Cornell, MD
- Fracture Healing with Plates and IM Nails, Bruce D. Browner, MD
- Fracture Healing with Plates and IM Nails, Douglas R. Dirschl, MD
- Lag-Screw Concept and Neutralization Plate, Steven A. Olson, MD
Wound Management

Fracture Classification: Closed Fractures, Christian Krettek, MD
Fracture Classification: Open Fractures, David C. Templeman, MD
Rationale and Technique of Wound Debridement, Andrew H. Schmidt, MD
Antibiotics for Fracture Care, John L. Esterhai, MD

Associated Injuries

Care of the Patient with Multiple Injuries, David C. Templeman, MD
Vascular Injuries (Evaluation), John H. Wilber, MD
Acute Compartment Syndrome, Margaret M. McQueen, MD
Compartment Syndromes, Thomas E. Whitesides, MD
# Core curriculum will be for 2 years

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Miscellaneous:

- Resident Business Meeting with the Program Director
- Medical humanities
- Professionalism
- Clinical examinations
- OITE reviews
- Communications skills
- Orthopedic knowledge online (OKU)
- Ethics
- Surgical videos demonstrations
- Reading conference
- Skills lab (Simulation)
- Histopathology quiz
- X-ray quiz
- Clinical case discussions
- How to be a health advocate
- How to reduce medical errors
- How to be a team player
- Leadership skills
- Conflict resolution
- Disclosing bad news
- Surgical navigation
- Medical records skills
- Information technology in Orthopedics / E-library
- Journal club
- Critical appraisal
- Reading conference – review of article or book chapter
- Medico-legal issues in orthopedic practice
- Patient safety in health advocacy role
- Resident well-being & stress management
- Career planning
- History of Orthopedic Medicine in Islamic Culture

Journal Club

Aside from the journal club being conducted once a month, the residents are also required to attend and participate in all journal clubs arranged by the departments where they are posted.
Courses, Conferences & Workshops

Mandatory Courses:
1. Basic surgical skills course
2. Advanced trauma life support course

Mandatory per Residency Level:

PGY1: Ortho skills block

PGY2: Basic AO trauma course

PGY3: Advanced AO trauma course

Recommended:

PGY4: Orthopedic subspecialty course

PGY5: Orthopedic review course (Miller, Main, AAOS or equivalent)

OMSB Core Program Curriculum
All residents are required to attend the OMSB core program curriculum per residency level. A completion of training certificate will not be issued unless the resident completes the core program curriculum and all other requirements. The core program curriculum includes the following:

- Medical Ethics
- Communication Skills
- Professionalism
- Evidence-Based Medicine and Literature Search
- Patient Safety and Quality Management
- Research Methodology
- Resident-As-Teacher
- Medical Writing
Simulation-Based Learning

The Orthopedics Residency Training Program has incorporated simulation-based learning in the residents’ training.

For R1 residents, there will be a one block of simulation rotation during block 7 consisting of basic Orthopedics surgical skills in the form of 16 different modules. Please refer to the rotation objectives of the Ortho Skills Simulation Rotation.

For R3 residents, there is a plan to do a one block of simulation rotation. The R3 and R4 residents are also involved in the conduction of the simulation block for the R1 residents.

For R4 & above, there will be continuous simulation training during their subspecialty rotations.
Examination Requirements

At the end of each academic year, all residents are required to sit for the OMSB end of year examination consisting of MCQs for R1-R4 residents and clinical examination (objective structured clinical exam and objective structured practical exam) for R2 to R4. The clinical examination is being conducted by members of the Education Committee and may include external examiners. The OMSB examination policy will be applied.

End of Year Exam
This examination is conducted at the end of each academic year. This includes MCQ for R1 to R4 and clinical (OSCE and OSPE) for R2 to R4.

OMSB Part 1
This is a written examination which will be taken during the second year (R2). A resident will not be able to progress to the R4 level without passing the OMSB Part 1 exam. A resident will be allowed three (3) attempts to pass this exam.

OMSB Part 2
This examination is taken after the fifth and final year (R5). This is both written and clinical. A Completion of Training Certificate is required to sit for this exam.

Arab Board
The Arab Board examination is not mandatory, but the residents are highly encouraged to take this exam.

American In-Training Exam
This is an on-line assessment examination which is being conducted annually, usually in November.

<table>
<thead>
<tr>
<th>TYPES OF EXAM</th>
<th>EXAMINEES</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of Year</td>
<td>Written</td>
<td>R1 – R4</td>
</tr>
<tr>
<td></td>
<td>Clinical</td>
<td>R2 – R4</td>
</tr>
<tr>
<td></td>
<td>OSCE / OSPE</td>
<td></td>
</tr>
<tr>
<td>OMSB Part 1</td>
<td>Written</td>
<td>R2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-requisite to progression to R4</td>
</tr>
<tr>
<td>OMSB Part 2</td>
<td>Written</td>
<td>After R5</td>
</tr>
<tr>
<td></td>
<td>Clinical</td>
<td></td>
</tr>
<tr>
<td>American In-Training Exam</td>
<td>Online</td>
<td>R2 – R5</td>
</tr>
</tbody>
</table>
**Portfolio**

A portfolio is a collection of selected resident work packaged and organized for easy review and evaluation. The portfolio will provide a framework for presenting it as evidence of the resident’s progress in training. The portfolio should include the:

- Log book
- CV and qualifications
- OMSB registration
- Record of courses, workshops and conferences attended
- Presentations made by the resident
- Publications made by the resident
- Audit activities attended
- Workplace assessment
- Annual assessment
- Letter / Certificate of appreciation

**Log Book**

1. It is mandatory for the resident to maintain a log book through the entire course of the residency program.
2. The resident should enter in the log book the following information:
   a) The operative and diagnostic experience he / she participate in both major and minor cases, and the degree of supervision:
      - Assisting senior surgeon
      - Performing a procedure under direct supervision - consultant “scrubbed” for the major part of the operation (includes performing a significant part of the operation under supervision)
      - Performing a procedure under supervision – consultant present in the theatre but not “scrubbed”
      - Performing a procedure without direct supervision
      - Supervising a more junior trainee
   b) Clinics attached and number of cases seen independently and cases observed
   c) Clinical Case presentations
   d) Papers presented, and meetings attended
3. The resident has to present the log book to the faculty member for inspection at the end of each clinical rotation.
4. The log book has to be presented to the program director during the six-monthly and annual evaluation.
### ORTHOPEDIC SURGERY MINIMUM NUMBER OF PROCEDURES

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee arthroscopy</td>
<td>30</td>
</tr>
<tr>
<td>Shoulder arthroscopy</td>
<td>20</td>
</tr>
<tr>
<td>ACL reconstruction</td>
<td>10</td>
</tr>
<tr>
<td>Total hip arthroplasty</td>
<td>5</td>
</tr>
<tr>
<td>Total knee arthroplasty</td>
<td>30</td>
</tr>
<tr>
<td>Hip fractures</td>
<td>30</td>
</tr>
<tr>
<td>Carpal tunnel release</td>
<td>10</td>
</tr>
<tr>
<td>Spine decompression / posterior spine fusion</td>
<td>15</td>
</tr>
<tr>
<td>Ankle fracture fixation</td>
<td>15</td>
</tr>
<tr>
<td>Closed reduction forearm / wrist</td>
<td>20</td>
</tr>
<tr>
<td>Ankle and hind and mid-foot arthro</td>
<td>5</td>
</tr>
<tr>
<td>Supracondylar humerus perc</td>
<td>5</td>
</tr>
<tr>
<td>Operative treatment of femoral and tibial shaft fractures</td>
<td>25</td>
</tr>
<tr>
<td>All pediatric procedures</td>
<td>200</td>
</tr>
<tr>
<td>All oncology procedures</td>
<td>10</td>
</tr>
</tbody>
</table>

Total all cases: at least 1000 but no more than 3000
**Assessment and Feedback**

To ensure that the trainee has acquired adequate knowledge and develop the expected technical skills, the performance will be monitored carefully during the entire training period. A formal face-to-face evaluation will be conducted by the supervising faculty member at the end of each block. Mid-rotation feedback is also being encouraged in all training centers. The supervising faculty is expected to provide a verbal feedback to the trainee at the mid of the rotation, and initiate any remedies to ensure the training objectives are being met.

Six-month evaluation and annual evaluation are conducted by the program director and/or assistant program directors every academic year. The Clinical Competency Committee meets prior to the six-month and annual evaluation to review each resident’s file and provide their comments and recommendations. Prior to the evaluation, the resident must have the complete OMSB-required evaluation forms through the New Innovations System, which also includes the cases logged or log book.

In addition to the OMSB standard evaluation forms, the program is utilizing surgical assessment tools to provide a more detailed, objective, comprehensive and accurate evaluation of the resident’s ability to perform various surgical procedures. The program has adopted the *Ottawa Surgical Competency Operating Room Evaluation (O-SCORE)* from the University of Ottawa, Division of Orthopaedic Surgery. The program will also be implementing the utilization of the *Trauma and Orthopaedic Surgery OCAP Procedure Based Assessment* to evaluate a resident’s performance in a particular procedure. These surgical assessment tools are now available in the New Innovations System.

Additionally, the resident will be evaluated in communication skills, research and audit. The resident will also be evaluated at the end of each year for the participation and presentation in the departmental clinical meetings, clinical conferences and seminars, group discussion, and journal clubs.
**Progression Criteria**

The following criteria are being used to evaluate a resident for his/her progression from one residency level to the next.

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory completion of rotations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Must have 75% attendance on academic teachings/activities</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Satisfactory evaluations on all rotations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Satisfactory assessment of logbook</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Must pass the End of Year examination</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Must pass the OMSB Part 1 examination</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A resident must have a complete and publishable research project at the end of R5.
Quality Assurance

Quality assurance is maintained as per the OMSB rules and regulations. Quality assurance should be monitored by both the internal and external review committees. Many other tools are being used such as:

- feedback forms
- frequent regular meetings of internal review committees
- inclusion of representatives from the residents (eg, chief resident)
- continuous written feedback from residents and external reviewers
- OMSB feedback forms for trainers and Education Committee members

Patient and Resident Safety

The Orthopedics Residency Program is responsible for training the residents the safe practice to both ensure the residents' safety and that no harm is inflicted on patients. It is also the program’s responsibility to ensure that the resident is practicing in a safe environment and he can reach for help whenever needed. This is done in coordination between different program members and postgraduate medical center offices in the different hospitals. The residents are required to adhere to universal safety precautions in addition to specific precautions required by each hospital or department.
Research

The goal of the Orthopedics Research Program is to develop resident’s fundamental research knowledge in order to advance the treatment of musculoskeletal injuries and diseases in an evidence-based medicine era. A “bench to bedside” innovation through research is a foundation to every successful orthopedic surgeon. The mentoring and development of the Orthopedics residents as potential clinical investigators broadens this fundamental mission of the departments of orthopedic surgery in the country. Orthopedic residents in the OMSB program are encouraged strongly to develop this competency in the program.

The Orthopedics research program is designed to enable the resident to develop abilities to critically evaluate medical literature, research, and other scholarly activity. Activities include instruction on experimental design, hypothesis testing, research methods, and information dissemination.

Program Structure:

The Orthopedic residents may actively participate in research at any time during their residency. This will depend on their interest, schedule and motivation. However, dedicated research time and rotation are provided during PGY2 and PGY4.

In addition to research commitments, the resident in research rotation could be scheduled to attend on-call clinical duties. This should be arranged in advance before the start of the rotation and in a joint discussion with the research supervisor and the program director. Whether the research resident is used for the requested coverage shall be determined at the discretion of the Program Director. Factors involved in such determination shall be based on the progress of the research project and the educational value of any anticipated coverage duties.

Research Project Process:

1. It is mandatory for each resident to complete at least one publishable research project, which has been approved by the research subcommittee of the program.
2. The resident should present to the chairman of the research subcommittee a proposal of his / her research project by the beginning of the 2\textsuperscript{nd} year of residency, and no later than the end of 1\textsuperscript{st} quarter of the 2\textsuperscript{nd} year.
3. The resident should identify a research project and submit a research proposal in the prescribed format as per the deadline mentioned above. The residents are encouraged to identify a research project from observing his practice, and review of the literature. He/She may seek help and guidance from his / her supervisor, trainers, and other colleagues. Each member of the research team, including the resident and the supervisor, must sign the proposal.
The research proposal must contain:
- Clear question
- Objective
- Literature review
- Proposed material and methods with explanation and justification
- Names of the research team and their roles
- Planned timeframe for conducting and reporting
- Funding sources, if any.
- Proposed plan for the potential outcome and the method of publication of the results

4. A progress report must be submitted to the chairman of the subcommittee every 3 months in writing.

5. Residents should not submit research results for publication/presentation without the prior approval of the research subcommittee in writing.

6. Upon completion of the research, a final report should be submitted to the chairman of the subcommittee. This should include main outcome, secondary outcomes, presentation / publication, difficulties encountered and the support received.

**Project Selection:**

This can be from a list, generated by the Orthopedics Research Subcommittee (attached with a Primary Investigator) or it may come from the resident’s own idea or from a trainer/mentor. The research may be:
- Clinical/human
- Animal
- Biomechanical
- Miscellaneous that is related to advancement of the musculoskeletal care
- Other research projects that involve medical education, leadership, community development and health advocacy are welcomed.

**Research Block:**

1. Following the approval of the Orthopedics Education Committee for the allocation of research block as per master rotation plan, it is the responsibility of the resident to submit in writing to the chairman of the research subcommittee the proposed utilization of the block. This should include daily timetable of activities during the whole period of the block. This timetable should include research activities, academic activities, and any other activities like agreed on-call duties and service provision. This timetable should be submitted at least 2 weeks prior to the commencement of the research block for verification and approval. A failure to do so will result in non-approval of the research block by the subcommittee.

2. At the end of the block, the immediate supervisor and the chairman of the Research Subcommittee should sign the resident block evaluation prior to submission to the New Innovations System.
3. During the research block, the resident should follow the institute policy and requirement for the provision of services and departmental activity.

**Trainee in Difficulties with Research Domain:**

The research subcommittee will review the difficulties and then meet the individual resident to discuss the difficulties he/she has encountered. The subcommittee shall strive to provide necessary support and help to the resident to complete a research project successfully. Residents who continue to perform poorly and show lack of commitment and cooperation will be reported to the Education Committee for deliberation.

**Meetings:**

Residents are encouraged to submit their project to national, regional and international meetings with approval from the principal investigator. The resident should submit a request to attend conferences to the Orthopedic Research Subcommittee for approval prior to submission to the specific conference.

The following list serves as a guideline of conferences that residents may submit to:

- GCC Orthopedics Conferences
- Annual OMSB Research Day
- Oman Orthopedic Association
- Gulf Spine Society
- AAOS - American Academy of Orthopedic Surgeons
- AOFAS - American Orthopedic Foot and Ankle Society
- ASSH - American Society for Surgery of the Hand
- AAHS - American Association for Hand Surgery
- OTA - Orthopedic Trauma Association
- SRS - Scoliosis Research Society
- MSIS - Musculoskeletal Infection Society
- ASES - American Shoulder and Elbow Society
- AANA - Arthroscopy Association of North America
- AOSSM - American Orthopedic Society for Sports Medicine
- NASS - North American Spine Society
- AANS - American Association of Neurological Surgeons
- British Orthopedic Association
- Indian Orthopedic Association
- AOSpine
- AOTrauma
- Canadian Orthopedic Association
- World Congress of Orthopedics
**Curriculum Implementation, Management and Review**

The Orthopedics Education Committee members are all responsible in implementing the curriculum. The Curriculum Subcommittee must review the curriculum regularly and do the necessary updates and revisions. Other members of the Education Committee are also encouraged to give their suggestions and inputs to the curriculum.

**Annual Program Evaluation:**

The program will be assessed once a year by the residents and faculty members through the New Innovations System. The evaluation reports will be reviewed by the Program Evaluation Committee and the Education Committee.

**Internal Review / Program Evaluation:**

The internal review is intended as a mechanism to assist the sponsor in maintaining the quality of residency program and providing the program administrators with information about the strengths and weaknesses of the program so that necessary corrective measures may be taken.

The internal review should take place yearly. Visits to individual training sites should occur when indicated. The internal review team should review all the residency education sites and elective experiences. There should be a careful assessment of the quality of the program and the degree to which it fulfills its goals and objectives.

The written report of the internal review should include the strengths and weaknesses of the program and specific recommendations for continued development and improvements. This report should be submitted to the Orthopedics Education Committee for review and approval prior to submission to the OMSB Accreditation Committee.

**Faculty and Rotation Evaluation:**

The resident is required to evaluate the supervising faculty / staff, and the rotation to ensure that the training objectives are being met. A summary of the faculty and rotation evaluation reports will be reviewed by the Program Evaluation Committee. Meeting with the trainers individually will be done by the program director to inform and discuss with them the residents’ feedback.
Exit Qualifications:

A resident will be awarded a Completion of Training Certificate upon fulfilling the program's requirements and OMSB's completion of training requirements as follows:

1. Passed all end-of-year examinations
2. Achieved satisfactory evaluations in all rotations
3. Passed OMSB Part 1 examination
4. Completed successfully the resident development program
5. Completed final in-training evaluation report (FITER)
6. Provided evidence of a research project (publishable type) during the residency
FACULTY

The Orthopedics Residency Training Program has an adequate number of qualified trainers in all our training centers.

**Khoula Hospital**
- Senior Consultants: 9
- Consultants: 5
- Senior Specialists: 13
- Specialists: 10

**Nizwa Hospital**
- Senior Consultants: 1
- Senior Specialists: 10

**Armed Forces Hospital:**
- Senior Consultants: 5
- Senior Specialists: 3
- Specialists: 6

**Sultan Qaboos University:**
- Senior Consultants: 2
- Senior Specialists: 2
- Specialists: 2

**Sohar Hospital**
- Senior Consultants: 1
- Senior Specialists: 2
- Specialists: 10

Trainers' Responsibilities:

*As per the OMSB Trainers' Manual*

TRAIINEES

Support Services

The residents are provided with the following services:

- Access to the OMSB e-library which includes textbooks and journals in different medical specialties. Currently it contains more than 120 orthopedic textbooks and more than 25 up-to-date orthopedic journals.
- Textbooks provided by OMSB to each resident
- Library in each training center
- Designated teaching / lecture rooms in each training center
- Internet services
- In house on-call rooms
- Free meals during on-calls
Grievance Policy

The OMSB grievance policy will be applied. *(Please refer to the OMSB Residents’ Manual).*

Remedial Plan

The OMSB remedial policy will be applied. *(Please refer to the OMSB Resident’s Manual).*
EDUCATIONAL RESOURCES

Training Center Facilities & Resources

Khoula Hospital
- Library with standard medical and orthopedic textbooks and journals
- Free wifi and internet
- Auditorium and seminar rooms
- Designated teaching rooms

 Armed Forces Hospital
- Library with standard medical and orthopedic textbooks and journals
- Internet
- Auditorium
- Designated teaching rooms

Sultan Qaboos University Hospital
- Library with standard medical and orthopedic textbooks
- Internet
- Auditorium and seminar rooms
- Designated teaching rooms
- Skills lab

Nizwa & Sohar Hospital Hospital
- Library with limited books and journals
- Auditorium
- Conference hall

Additionally, there is a postgraduate medical education center director and coordinator in each training center.
Suggested Reading and Teaching Materials

**TEXTBOOKS:**

1. Apley's System of Orthopedics and Fractures by Louis Solomon
2. Review of Orthopedics: An Expert Consult by Mark D. Miller
4. Rockwood & Green's Fractures in Adults, Volumes 1 & 2, by Robert Bucholz & James Heckman
5. Rockwood & Green's Fractures in Children
6. Turek's Orthopedics Principles & Their Application by Stuart Weinstein
7. Shoulder & Elbow Surgery: Operative Techniques by Robert Neviaser & Donald Lee
8. Pediatric Orthopedic Surgery: Operative Techniques by Mininder Kocher & Michael Millis
9. Lovell & Winter's Pediatric Orthopedics, by Wood W. Lovell, Robert B. Winter
10. Fractures of the Pelvis and Acetabulum, by Marvin Tile, David Helfet, James Kellam
12. On Call Orthopedics, by Dirschl & LeCroy
13. Key Techniques in Orthopedic Surgery, by Steven Stern
14. The Orthopedic Physical Exam, by Bruce Reider
15. A-Z of Musculoskeletal and Trauma Radiology, by James Murray, Erskine Holmes
17. Instructional Course Lectures, by Mary O'Connor & Kenneth E gol
18. Master Techniques in Orthopedic Surgery: Fractures, by Donald Wiss
20. Master Techniques in Orthopedic Surgery: The Elbow, by Bernard Morrey
21. Master Techniques in Orthopedic Surgery: The Shoulder, by Edward Craig
22. Master Techniques in Orthopedic Surgery: The Foot and Ankle, by Harold Kitaoka
23. Master Techniques in Orthopedic Surgery: The Wrist, by Richard Gelberman
25. Master Techniques in Orthopedic Surgery: Reconstructive Knee Surgery, by Douglas Jackson

**JOURNALS:**

1. Journal of the American Academy of Orthopedic Surgeons
2. The Journal of Bone and Joint Surgery
3. Journal of Arthroplasty
4. Journal of Arthroscopy and Joint Surgery
5. Journal of Foot & Ankle Surgery
6. Journal of Shoulder & Elbow Surgery
7. Journal of Hand Surgery
8. Journal of Spine Surgery
9. Journal of Pediatric Orthopedics
10. Journal of Orthopedic Trauma
11. Hand Clinics of North America
13. Clinical Orthopaedics and Related Research

WEBSITES:

1. American Academy of Orthopedics Surgeons (AAOS) website
2. Wheeless' Textbook of Orthopedic (Duke University) website
3. Myorthoevidence.com
OMSB RULES & REGULATIONS

RESIDENT’S ON-CALL POLICY

1. Resident duty hours are limited to a maximum of eighty (80) hours per week when averaged over a four-week period. The resident will have one day in seven free from all patient care and educational obligations, averaged over four weeks.
2. The Resident must not take more than one in-house call every four (4) days and maximum of six (6) in-house calls per block.
3. The weekend call must not exceed twice each block and each weekend call must be one day long – 24 hours – only.
4. The Resident’s shift must not exceed 24 hours.

LEAVE SYSTEM

The OMSB rules and regulations regarding leaves will be applied.

<table>
<thead>
<tr>
<th>LEAVE TYPE</th>
<th>ALLOWED DAYS</th>
<th>RULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Leave</td>
<td>30 days</td>
<td>Annual leave can be taken as a whole block or in parts for two consecutive weeks, but in two different blocks. The first week of the two-week annual leave should be take on the last week of the block and the second part of the two-week leave must be taken on the first week of the succeeding block; i.e. last week of block 1 and first week of block 2. Annual Leave which is not utilized within the year shall not be transferred to the following year.</td>
</tr>
<tr>
<td>Scientific Leave</td>
<td>10 days</td>
<td>Residents may be granted a leave for scientific purposes (attending scientific conferences and seminars, specialty examinations, etc.), not exceeding 10 days during each academic year, provided that he/she presents a proof of attending the activity; e.g. certificate of attendance, exam certificate, etc.</td>
</tr>
<tr>
<td>Sick Leave</td>
<td>7 days</td>
<td>When the residents reports to work from sick leave, they must submit the signed leave form, return from leave form and medical certificate (from an authorized hospital) within two weeks from reporting to work from sick leave.</td>
</tr>
<tr>
<td>Type</td>
<td>Duration</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Maternity Leave</td>
<td>50 days</td>
<td>The resident will be granted a leave of 50 days from the day of giving birth. She must inform the person in-charge of the master rotation schedule of her expected date of delivery as soon as it is known, no later than the 16th week of gestation. A pregnant resident should be excused from on-call duty and/or night shifts after the 34th week of gestation, and should not be required to make up for on-calls.</td>
</tr>
<tr>
<td>Emergency Leave</td>
<td>7 days</td>
<td>The Resident should have valid and convincing reasons for taking an emergency leave. A maximum of 7 days will be permitted for emergency leave. Emergency leaves will be allowed under the following circumstances: 1. Death of first degree (parents, siblings, spouse, children, grandparents, immediate Uncles &amp; Aunts), 2. Dealing with natural disaster, accidents, &amp; fires that prevent the Resident from reaching the designated rotation.</td>
</tr>
<tr>
<td>Compensation Leave</td>
<td>10 days</td>
<td>The resident is entitled to a maximum of 10 days leave to compensate days worked during public holidays. Regular on-call or weekend duty does not qualify as part of the compensation leave. The resident must submit a letter signed by the Program Director or Assistant Program Director, in addition to, the rotation supervisor of the affected rotation which proves that he/she worked during public holidays within two (2) weeks from the public holiday.</td>
</tr>
</tbody>
</table>

If a resident exceeds the maximum number of allowed leaves, his/her training period shall be extended for an equivalent period to compensate for this before he/she is awarded a Certificate of Completion of Training.
RESIDENT GRIEVANCE POLICY

1. A resident may file a grievance if a reasonable basis exists to support allegations that he/she has been treated contrary to the existing policies governing the residency program.

2. The resident may file with the chairman or program director any alleged grievance in writing within 10 days of the date on which the alleged grievance occurred. The written complaint should be as specific as possible regarding the action that precipitated the grievance: date, place, people involved, including witnesses, if any.

3. The chairman or program director shall appoint an ad hoc committee to review and investigate the grievance, negotiate, and try to resolve it. The ad hoc committee shall respond to the grievance in writing within 15 days of the receipt of complaint. The response shall outline the actions that will or will not be taken to resolve the grievance.

4. The resolution of the ad hoc committee should be discussed in the Education Committee meeting.

5. The Education Committee will make a consensus on the final decision to take in response to the resident’s grievance in writing within one month from the date of the ad hoc committee sends their resolution report. The Education Committee’s response must be copied to the OMSB Executive President.

6. If a resident is dissatisfied with the Education Committee’s resolution, he/she may request a second appeal in writing to the OMSB Vice President for Academic Affairs within 10 days of receiving the Education Committee’s resolution.

7. The Vice President for Academic Affairs will forward the grievance case to the OMSB Education Advisory Committee for review and investigation. The Education Advisory Committee will write a resolution to the grievance within 15 days from the date of the resident sends his/her second appeal.
## EDUCATION COMMITTEE MEMBERS

<table>
<thead>
<tr>
<th></th>
<th>NAME</th>
<th>POSITION</th>
<th>HOSPITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dr. Ahmed Saif Nasser Al Jahwari</td>
<td>Program Director</td>
<td>AFH</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Abdullah Ali Marzooq Al Ajmi</td>
<td>Associate Program Director</td>
<td>Khoula Hospital</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Ahmed Ali Hamed Al Rashdi</td>
<td>Associate Program Director</td>
<td>AFH</td>
</tr>
<tr>
<td>4</td>
<td>Dr. Ahmed Yaseen Mohammed Al Hadeethi</td>
<td>Acting Associate Program Director</td>
<td>SQUH</td>
</tr>
<tr>
<td>5</td>
<td>Dr. Tariq Amin Sheikh</td>
<td>Member</td>
<td>Khoula Hospital</td>
</tr>
<tr>
<td>6</td>
<td>Dr. Sultan Mohamed Juma Al Maskari</td>
<td>Member</td>
<td>SQUH</td>
</tr>
<tr>
<td>7</td>
<td>Dr. Narayan Ramachandran Swamy</td>
<td>Member</td>
<td>AFH</td>
</tr>
<tr>
<td>8</td>
<td>Dr. Yaqoub Sulaiman Salim Al Mufargi</td>
<td>Member</td>
<td>AFH</td>
</tr>
</tbody>
</table>
## ORTHOPEDICS SUBCOMMITTEES

### PROGRAM EVALUATION COMMITTEE

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Sultan Al Maskari</td>
<td>Chairman</td>
</tr>
<tr>
<td>Dr. Narayan Ramachandran</td>
<td>Deputy Chairman</td>
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<tr>
<td>Dr. Abdullah Al Ajmi</td>
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<tr>
<td>Dr. Ahmed Al Wahaibi (Resident)</td>
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### CLINICAL COMPETENCY COMMITTEE

<table>
<thead>
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<tbody>
<tr>
<td>Dr. Ahmed Al Jahwari</td>
<td>Chairman</td>
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<tr>
<td>Dr. Kamran Saeed</td>
<td>Deputy Chairman</td>
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<tr>
<td>Dr. Sultan Al Maskari</td>
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<tr>
<td>Dr. Ahmed Al Rashdi</td>
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<tr>
<td>Dr. Yousef Al Weshahi</td>
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### CURRICULUM SUBCOMMITTEE

<table>
<thead>
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<tbody>
<tr>
<td>Dr. Kamran Saeed</td>
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<tr>
<td>Dr. Ahmed Al Rashdi</td>
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<tr>
<td>Dr. Yaqoub Al Mufargi</td>
<td>Member</td>
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<tr>
<td>Dr. Samuel Johnson</td>
<td>Member</td>
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<tr>
<td>Dr. Sultan Al Kalbani</td>
<td>Member</td>
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<tr>
<td>Dr. Hassan Al Lawati</td>
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<tr>
<td>Dr. Said Al Hasani</td>
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### EXAMINATION SUBCOMMITTEE

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<td>Dr. Ahmed Al Rashdi</td>
<td>Deputy Chairman</td>
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<tr>
<td>Dr. Ahmed Yaseen</td>
<td>Member</td>
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<tr>
<td>Dr. Jatinder Singh Luthra</td>
<td>Member</td>
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<tr>
<td>Dr. Said Al Kalbani</td>
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</table>
EDUCATIONAL SUPERVISORS:

1. Dr. Mohamad Kasim Mohamad Al Lami – Khoula Hospital
2. Dr. Said Sulaiman Musabah Al Kalbani – Armed Forces Hospital

CAREER ADVISORS:

1. Dr. Ahmed Ali Hamed Al Rashdi
2. Dr. Ghassan Abdul Latef Wannas Al Yassari
APPENDIX II:

ORTHOPEDICS TRAINERS

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<td>Dr. Ghassan Abdul Latef Wannas Al Yassari</td>
<td>Khoula Hospital</td>
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<td>2</td>
<td>Dr. Kamran Saeed</td>
<td>Khoula Hospital</td>
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<td>3</td>
<td>Dr. Renjit Kumar Jayachandran</td>
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<td>Dr. Jacob Varughese</td>
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<td>Dr. Masoud Ali Masoud Al Riyami</td>
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<td>Dr. Abdullah Mohamed Masoud Al Harthy</td>
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<td>Dr. Subhash Burad</td>
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<td>Dr. Kishore Kumar Mollahalli</td>
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