



ASIA PACIFIC ORTHOPAEDIC ASSOCIATION

Curriculum of Orthopaedics and Traumatology

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FOREWORD

Dear Colleagues,

It is with great pleasure that we unveil the APOA Orthopaedics and Traumatology Curriculum, a culmination of dedicated efforts and collaboration within our diverse member countries. Our primary objectives for orthopaedic resident's training in the region revolve around achieving a standardized level of clinical competency in patient care and upholding a higher standard of ethics and professionalism. The curriculum is crafted to integrate a well-structured training system, emphasizing the development of comprehensive skills and knowledge essential for orthopaedic practice.

It is essential to emphasize that the competence levels outlined in this curriculum represent the minimum standards required at the conclusion of residency training. However, we acknowledge the variations that may exist among individual member countries based on their unique practices. This curriculum serves as a reference, providing a standardized model that can be adapted, modified, or enhanced according to the specific capacities and needs of each country.

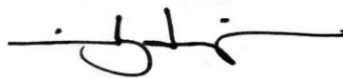
We extend our heartfelt gratitude to the ASEAN Orthopaedic Association for graciously allowing us to use their curriculum as an example. This collaboration signifies the spirit of unity and cooperation that underlies our shared commitment to advancing orthopaedic education in the Asia Pacific region.

We express our deepest thanks to the members of the APOA Education Committee, APOA Executive Committee and APOA Councillors, as well as all APOA Sectional Chairs and members of the Executive Committees of APOA Sections for their invaluable contributions throughout the preparation of this curriculum. It is through the collective dedication of these individuals that we have reached this significant juncture.

Sincerely,



Prof. Dr. Ellewellyn G. Pasion
President, APOA
(2022 – 2024)



Prof. Dr. Onder Aydingoz
Chair, APOA Education Committee
(2022 – 2024)



INTRODUCTION

The Asia Pacific Orthopaedic Association (APOA) is committed to fostering the highest standards of orthopaedic education and patient care throughout the Asia Pacific region. To achieve this goal, APOA Education Committee developed a comprehensive curriculum with the help of APOA Sections. This curriculum, which will be updated regularly in parallel with the developments and new practices in the field of orthopaedics and traumatology, aims to guide equipping orthopaedic residents with the essential knowledge and skills required for their future practice, providing a strong foundation for their professional growth and success.

In the curriculum, knowledge and skills are evaluated using a grading system that reflects progressive levels of proficiency and application (See page 3). It is important to note that not all subjects will have both knowledge and skills grades, as some subjects may be more relevant to one aspect than the other. Therefore, grades for knowledge and skills have been provided whenever they are relevant to the specific subject.

However, we also recognize that education goes beyond mere knowledge and technical expertise. Attitude, an often overlooked yet vital element, plays a significant role in shaping the future of our residents. While it may be challenging to quantify and grade attitude using conventional measurement methods, we firmly believe that it is an essential aspect of resident education. Attitude encompasses a wide range of interpersonal and professional skills, and its impact on patient care and collaborative relationships cannot be overstated. By incorporating correct role modeling and fostering an environment conducive to personal growth, we can facilitate the development of positive attitudes among our residents.

Here are some key components that we can aim to address during their education:

Work ethics: A strong understanding of work ethics is crucial in professional life and their trainers should be good role models for the residents in this respect.

Establishing rapport: Residents should learn to build trust and establish a positive connection with patients, colleagues, mentors, and other healthcare providers. Effective communication and interpersonal skills are crucial in this regard.

Clarifying patient's agenda: Residents should understand the importance of actively listening to patients, addressing their concerns, and ensuring that their needs and expectations are met.

Addressing emotions: Sensitivity and empathy towards patients and their family members during emotionally challenging situations are essential. Residents should be trained to recognize and manage emotions effectively.

Understanding patient's perceptions: Residents should develop the ability to understand patients' perspectives on their illness or medical condition. This understanding can help tailor treatment plans and enhance patient satisfaction.

Involving patients in decision making: Residents should strive for shared decision making, where patients are actively engaged and empowered to participate in their healthcare choices. This approach promotes patient autonomy and improves outcomes.

Awareness of patient's context: Residents should be encouraged to consider the social, cultural, and economic factors that may influence patients' health and healthcare decisions. This broader perspective fosters patient-centered care.

In addition to patient interactions, we also emphasize the importance of cultivating positive relationships with colleagues from other departments, and other healthcare providers. The ability to work collaboratively as a part of a multidisciplinary team is vital in delivering comprehensive patient care.

Furthermore, we acknowledge the significance of a resident's ability to navigate the operating theatre environment. The effective coordination and communication within the surgical team contribute to the overall success of surgical procedures and patient outcomes. Residents should be trained to handle the complexities and challenges of the operating theatre with professionalism and efficiency.

While it may be challenging to quantitatively assess attitude using conventional grading methods, we firmly believe that through dedicated education and appropriate role modeling, residents can improve and refine their attitudes over time. By integrating these principles into our curriculum, we aim to instill a sense of professionalism, empathy, and patient-centered care among our residents.

We hope that this curriculum serves as a foundation for fostering well-rounded orthopaedic and traumatology professionals who not only possess exemplary knowledge and technical skills but also demonstrate the highest standards of attitude, professionalism, and work ethics.

COMPETENCE LEVELS

CLINICAL KNOWLEDGE (K)		
LEVELS	What is required?	Description
1	Basic knowledge	Residents are expected to possess basic knowledge about the subject matter. They should have a foundational understanding of the core concepts, principles, and terminology associated with the subject.
2	Comprehensive knowledge	This level requires residents to demonstrate comprehension and assimilation of the knowledge acquired. They should be able to explain and interpret the underlying principles, theories, and scientific basis of the subject.
3	Ability to apply the knowledge	At this level, residents should demonstrate the ability to apply their knowledge accurately and effectively in clinical practice. They should be able to appropriately apply their theoretical understanding to diagnose, manage, and treat orthopaedic conditions.

CLINICAL SKILLS (S)		
LEVELS	What is required?	Description
1	To know	Residents should have the theoretical knowledge about the skill. They should have an understanding of the steps, principles, and techniques involved in the procedure.
2	To observe	This level emphasizes the ability to recognize and comprehend the practical application of the skill. Residents should observe the performance of the skill and be capable of understanding the skill's execution, outcomes, and potential complications.
3	To assist	In addition to competencies of Level 2, a resident at this level should take part as an assistant in the performance of the skill.
4	To perform with guidance	Residents at this level are able to perform the skill under the guidance and supervision of an experienced orthopaedic surgeon. The supervisor gives instructions and interferes as needed.
5	To perform without guidance	This level represents a high level of competence and independence. Residents should be proficient in performing the skill autonomously, without the need for any instructions or interventions from the supervisor. They should have the necessary expertise to manage the procedure.

I. BASIC SCIENCE

1. Concepts Related to Musculoskeletal Tissues	K	S
a. Bone metabolism		
I. Types of bone	3	
II. Cellular biology of bone	3	
III. Bone matrix	3	
IV. Bone healing	3	
V. Bone remodeling	3	
VI. Bone circulation	3	
VII. Tissues surrounding bone	3	
VIII. Types of bone formation	3	
1. Endochondral		
2. Intramembranous		
3. Appositional		
IX. Distraction osteogenesis	3	
b. Conditions of bone mineralization, bone mineral density and bone viability		
I. Normal bone metabolism	3	
1. Calcium		
2. Phosphate		
3. Parathyroid hormone		
4. Vitamin D		
5. Calcitonin		
6. Other hormones affecting bone metabolism: estrogen, steroids, thyroid hormone, growth hormone and growth factors		
7. Interactions: calcium and phosphate metabolism		
8. Bone mass regulation		
9. Bone aging		
10. Bone loss		
II. Conditions of bone mineralization	3	
1. Hypercalcemia		
2. Hypocalcemia		
3. Related to renal function		
4. Hypophosphatemia		
5. Osteomalacia		
III. Conditions of bone mineral density	3	
1. Osteoporosis		
2. Increased osteodensity		
a. Osteopetrosis		
b. Osteopoikilosis		
c. Paget's disease of bone		
IV. Conditions of bone viability	3	
1. Osteonecrosis		
2. Osteochondrosis		
V. Miscellaneous	3	
1. Disorders of collagen metabolism		
a. Osteogenesis imperfecta		
b. Scurvy		
2. Idiopathic transient osteoporosis of hip		
3. Marrow packing disorders		
4. Lead poisoning		
c. Joints	3	
I. Hyaline cartilage structure and function		
II. Composition of hyaline cartilage		
III. Layers of articular cartilage		
IV. Lubrication and wear mechanism		
V. Damage and healing		
VI. Aging cartilage		

<ul style="list-style-type: none"> VII. Cartilage in osteoarthritis VIII. Non-inflammatory arthritis <ul style="list-style-type: none"> 1. Osteoarthritis <ul style="list-style-type: none"> a. Cartilage in osteoarthritis b. Synovium c. Synovial fluid 2. Neuropathic arthropathy 3. Hemochromatosis arthropathy 4. Hypertrophic osteoarthropathy IX. Inflammatory arthritis <ul style="list-style-type: none"> 1. Rheumatoid arthritis 2. Juvenile idiopathic arthritis 3. Relapsing polychondritis 4. Systemic lupus erythematosus 5. Polymyalgia rheumatica 6. Seronegative spondyloarthritis 7. Ankylosing spondylitis 8. Reactive arthritis 9. Psoriatic arthropathy 10. Enteropathic arthritis 11. Crystal arthropathy 12. Hemarthrosis X. Infectious arthritis <ul style="list-style-type: none"> 1. Bacterial 2. Fungal 3. Tuberculosis 4. Acute rheumatic fever 5. Lyme disease 6. Whipple disease 7. Viral 		
<ul style="list-style-type: none"> d. Neuromuscular and connective tissues <ul style="list-style-type: none"> I. Skeletal muscle <ul style="list-style-type: none"> 1. Non-contractile elements 2. Contractile elements 3. Types of muscle fibers 4. Muscle contraction and motor unit 5. Types of contractions 6. Energetics of muscle contraction 7. Agents affecting impulse transmission 8. Athletes and training 9. Anabolic steroids and growth hormone 10. Nutrition 11. Muscle injury 12. Delayed-onset muscle soreness (DOMS) 13. Denervation 14. Effect of limb mobilization II. Nervous system <ul style="list-style-type: none"> 1. Organization of nervous system and spinal cord anatomy 2. Injury to nervous system 3. Spine and spinal trauma 4. Spinal cord monitoring 5. Nerve repair III. Connective tissues <ul style="list-style-type: none"> 1. Skin 2. Tendons 3. Ligaments 4. Intervertebral disc 	3	

2. Orthopaedic Biology	K	S
a. Cellular and molecular biology I. Chromosomes II. Genetics III. Immunity	2	
b. Infection and microbiology I. Soft tissue infection 1. Necrotizing soft tissue infection 2. Surgical site infection 3. Certain soft tissue infections a. Bite infections b. Paronychia c. Septic bursitis d. Tetanus e. Fungal infections	3	
II. Bone infections 1. Acute osteomyelitis 2. Subacute osteomyelitis 3. Chronic osteomyelitis 4. Peri-implant infections 5. Posttraumatic infections 6. Imaging in osteomyelitis 7. Empirical treatment 8. Certain types of osteomyelitis a. Salmonella osteomyelitis b. Pseudomonas osteomyelitis c. Bartonella henselae (cat scratch fever) d. TB osteomyelitis e. Syphilitic osteomyelitis f. Fungal osteomyelitis g. Chronic sclerosing osteomyelitis of Garre h. Chronic regional multifocal osteomyelitis (CRMO)	3	
c. Septic arthritis	3	
d. Occupational risk of infection in orthopaedic practice I. HIV infection II. Hepatitis III. Others	3	
e. Antibiotics I. Prophylaxis II. Mechanism of action of antibiotics III. Antibiotic indications and side effects	3	

3. Perioperative Management in Orthopaedic Surgery	K	S
a. Shock	3	
b. Bleeding, hemostasis and thromboprophylaxis	3	
c. Perioperative problems	3	
I. Cardiac disease	2	
II. Pulmonary complications (Acute Respiratory Distress Syndrome)	3	
III. Fat embolism syndrome	3	
IV. Thromboembolic disease	3	
V. Renal and urologic issues	2	
VI. Gastrointestinal motility problems	2	
VII. Hepatic issues	2	
VIII. Neurological problems	2	
IX. Special anesthesia issues		
1. Obstructive sleep apnea	1	
2. Cervical and lumbar problems	3	

3. Malignant hyperthermia	2	
X. Wound healing	3	
1. Granulation tissue		
2. Diabetes mellitus		
3. Smoking		
4. Glucocorticoids		
5. Nutrition		

4. Biomaterials and Biomechanics	K	S
a. Basic concepts	2	
I. Scalar and vectoral quantities		
II. Newton's law		
III. Other concepts		
1. Work		
2. Energy		
3. Force		
4. Piezoelectricity		
b. Biomaterials	3	
I. Materials and structures		
II. Strength of materials		
III. Young modulus		
IV. Orthopaedic structures		
1. Bone		
2. Ligaments and tendons		
3. Bone tendon interface		
4. Articular cartilage		
5. Metal implants		
6. Total hip replacement		
7. Total knee replacement		
c. Biomechanics	3	
I. Bone		
II. Joint		
1. Kinesiology		
2. Lubrication		
3. Friction coefficient		
4. Joint reaction force		
5. Stability		
III. Hip		
IV. Knee		
1. Patellofemoral joint		
2. Tibiofemoral joint		
V. Ankle		
VI. Foot		
VII. Shoulder		
VIII. Elbow		
IX. Wrist		
X. Hand		
XI. Spine		
1. Spinal stability		
2. Functional spinal unit		
3. Spinal motion		
4. Kinematics		

5. Diagnostic Tests	K	S
a. Imaging and special studies		
I. Radiation safety	3	
II. Nuclear medicine	2	

III.	Arthrography	3	
IV.	MRI	3	
V.	CT scan	3	
VI.	Ultrasound	2	
VII.	Measurement of bone density (non-invasive)	2	
VIII.	Vascular studies	3	
b.	Electrodiagnostic studies	2	
	I. Nerve conduction studies		
	II. Electromyography		

II. GENERAL ORTHOPAEDICS

	K	S
1. Basic Science		
a. Endocrine and metabolic disorders affecting musculoskeletal system	3	
b. Musculoskeletal inflammatory disorders (autoimmune)	3	
c. Musculoskeletal degenerative disorders	3	
d. Osteonecrosis	3	
e. Musculoskeletal infections	3	
f. Neuromuscular disorders	3	
g. Hematological disorders involving the musculoskeletal system	3	
h. Musculoskeletal issues and concerns in pregnancy	3	
2. Clinical Assessment		
a. History taking	3	5
b. Clinical evaluation	3	5
c. Differential diagnosis	3	5
3. Imaging and Diagnostic Tests		
a. Appropriate diagnostic evaluation with required laboratory and radiography	3	5
b. Interpreting results	3	5
4. Principles and Techniques of General Orthopaedic Basic Surgery		
a. Prophylactic and therapeutic antibiotherapy	3	
b. Tourniquet	3	5
c. Diathermy	3	
d. Sterilization	3	
e. Surgical instruments	3	
f. Sutures and needles	3	
g. Bone grafts and bone substitutes including allografts	3	
h. Wound management	3	5
i. Surgical drains	3	5
j. Local block for surgery	3	5
k. Skin and skeletal traction applications	3	5
l. Incisions and drainage – debridement of infected tissue	3	5
m. Principle of three point fixation in application of casts	3	5
n. Principles and techniques of amputation surgery	3	5
5. General Orthopaedic Problems Including Presentation, Radiologic Characteristics and Natural History, Formulating Appropriate Investigation and Management Options		
a. Musculoskeletal infections and principles of treatment		
I. Acute osteomyelitis	3	
II. Chronic osteomyelitis	3	
III. Septic arthritis	3	
IV. Gonococcal arthritis	3	
V. Tuberculosis of bones and joints	3	
VI. Mycotic infection of bones and joints	2	
VII. Necrotising soft tissue infection	3	
VIII. Gas gangrene	3	
IX. Tetanus	3	
X. Diabetic foot	3	
XI. Bites – human or animal	3	
XII. Incision and drainage: debridement of infected tissue	3	
XIII. Post-surgical infection	3	
XIV. Peri-implant infections	3	
XV. Blood transmitted diseases (HIV, HBV, HCV, etc.)	3	
XVI. Prevention of retroviral transmission	3	
b. Endocrine and metabolic disorders		
I. Calcium metabolism disorders	3	
II. Osteoporosis/osteomalacia	3	
III. BMD assessment and principles of osteoporosis treatment	3	
IV. Chronic steroid usage	3	
V. Hyperparathyroidism – primary / renal osteodystrophy	3	
VI. Gout arthritis	3	

c. Neuromuscular disorders (contracture – post CVA and head/spinal injury)	3	
d. Myositis ossificans and heterotopic ossification	3	
6. Management of Acute and Chronic Pain		
a. Peri-operative pain control - opioids, regional blocks and epidural anaesthesia	3	
b. Non-steroidal anti-inflammatory agents including COX inhibitors	3	
c. Physical and local treatment for chronic pain	3	
7. General Principles of Medical Research and Application in Clinical Practice		
a. Evidence based orthopaedics/level of evidence and surgical guidelines	3	
b. Medical/scientific writing	2	2
c. Critical appraisal of journal articles	1	
d. Research ethics	3	
e. Personal and professional integrity	3	
8. Role of Physiotherapy, Orthotics & Prosthetics and Their Clinical Applications		
a. Physiotherapy/rehabilitation	3	
b. Occupational therapy	2	
c. Orthotics	3	
d. Prosthetics	3	
9. Fragility Fractures		
a. Background: epidemiology, pathophysiology, fracture cascade, management gaps	2	
b. Recognition and diagnosis: risk factors determination, secondary causes	3	5
c. Principles of surgical management: timing of surgery, use of special implants for osteoporotic fractures, bone fillers	3	4
d. Non-pharmacologic management	3	
e. Pharmacologic management	3	4
f. Rehabilitation	3	
g. Prevention strategies (nutrition, lifestyle changes, FLS, fracture and fall prevention)	3	
h. Monitoring: efficacy, complications, subsequent fractures, treatment duration, compliance	3	
i. Complications: atypical fractures (diagnosis & treatment)	3	
10. General Surgical Techniques		
a. Tourniquet application	3	5
b. Draping and sterility	3	5
c. Positioning and its rationale	3	5
11. Incision and Drainage/Debridement of Infected Tissue		
a. Arthrotomy	3	5
b. Debridement in osteomyelitis/sequestrectomy	3	5
12. Management of Ulcers and Chronic Wounds	3	5
13. Flaps: Principles of Wound Cover with Flaps	2	2
14. Tendon Lengthening/Tendon Transfer	2	4
15. Bone Graft and Technique		
a. Cancellous iliac crest graft	3	5
b. Vascularised fibula graft	2	2
c. Allografts and bone substitutes	3	3
16. General Amputations		
a. Ray amputation in foot	3	5
b. Foot amputation	3	5
c. Below knee	3	5
d. Above knee	3	5
e. Hip disarticulation	3	5
f. Upper extremity amputations	3	4
g. Finger amputations (hand and foot)	3	5
17. Muscle Biopsy	3	5
18. Fragility Fracture Surgical Strategies		
a. Use of arthroplasty in osteoporotic hip fractures	3	5
b. Fixation of fragility fractures (use of special implants)	3	5
c. Surgical and medical management of atypical fractures	3	4

III. TRAUMA

1. Clinical Assessment (Trauma/Polytrauma)	K	S
a. Comprehensive clinical assessment of the trauma/polytrauma patient (primary and secondary survey) including triage, working within a multidisciplinary trauma team and prioritization of care (ABC's)	3	3
b. Assessment of open and closed fractures and dislocations, their early and late complications	3	4
c. Identification of life threatening / limb threatening injuries	3	5
d. Understanding priorities of treatment	3	3
e. Special considerations in pregnancy	3	3

2. Management	K	S
a. Treatment of fractures and dislocations		
I. Closed treatment of fractures and dislocations	3	5
II. Surgical treatment of fractures and dislocations	3	5
III. Minimally invasive surgical approaches	3	3
IV. Biomechanics of implants and fracture fixation systems in particular the principles of lag screw fixation, plate fixation, bridge plating, buttress plating, external fixation, three-point nail fixation and interlocking nail fixation	3	3
b. Treatment of other special orthopaedic trauma conditions		
I. Ability to co-manage the overall care of the severely injured, within a multidisciplinary team	3	4
II. Ability to manage open fractures	3	5
III. Ability to diagnose and treat compartment syndrome and crush injuries	3	4
IV. Ability to undertake the treatment of pathological fractures	2	3
V. Principles of reconstructive surgery for the injured, including treatment of nonunion and malunion of fractures, bone regeneration, chronic post-traumatic osteomyelitis and delayed treatment of nerve injury; principles of soft tissue management including common flaps	2	3
VI. Management of traumatic amputation of the injured patient	3	5
VII. The principles of rehabilitation of the injured patient	3	5

3. Basic Surgical Skills	K	S
a. Incision & closure of skin and subcutaneous tissue	3	4
b. Knot tying	3	5
c. Hemostasis	3	5
d. Tissue handling & retraction	3	5
e. Use of drains	3	5
4. Clavicle		
a. Non-surgical treatment of closed fractures	3	5
b. ORIF	3	4
5. Shoulder		
a. Closed management of shoulder dislocation and proximal humerus fracture	3	4
b. Open reduction for shoulder dislocation	3	4
c. Fixation of acromio-clavicular joint dislocation	3	4
d. ORIF of proximal humerus fracture	3	4
6. Humerus		
a. Non-surgical strategies for treatment of humeral shaft fractures	3	4
b. ORIF for diaphyseal fracture	3	4
c. ORIF for nonunion of diaphyseal fracture	3	4
7. Elbow		
a. Closed reduction of dislocation	3	5

b. Open reduction of dislocation	3	4
c. ORIF of fracture/dislocation	3	4
d. ORIF of radial head and neck fractures	3	4
e. ORIF of supracondylar fractures	3	4
f. ORIF of intercondylar fractures	3	4
8. Forearm - Fasciotomy for Compartment Syndrome	3	4
9. Fracture of the Distal Radius		
a. Strategies for non-operative management	3	5
b. External fixation	3	5
c. Percutaneous fixation	3	4
d. ORIF	3	5
10. Fracture, Shaft of Radius/Ulna		
a. Closed treatment	3	5
b. External fixation	3	5
c. Percutaneous fixation	3	4
d. ORIF	3	5
11. Pelvis		
a. Closed reduction & external fixation application for fracture/dislocation	3	4
b. ORIF for fracture/dislocation	3	3
c. Acetabular fracture ORIF	3	3
12. Hip		
a. Dislocation		
I. Closed treatment	3	5
II. Open reduction of femoral head	3	3
b. Femoral neck fracture		
I. Closed reduction fixation	3	4
II. Open reduction and fixation	3	3
III. Hemiarthroplasty	3	3
IV. Total hip arthroplasty	3	3
c. Intertrochanteric fracture		
I. Closed/ORIF	3	3
II. Arthroplasty	3	3
d. Subtrochanteric fracture		
I. Intramedullary fixation	3	3
II. Plate fixation	3	3
13. Femur		
a. Shaft fractures		
I. Intramedullary nailing	3	4
II. Plate and screw fixation	3	4
III. External fixation	3	4
b. Supracondylar femoral fracture		
I. Distal femoral locking plate ORIF	3	4
II. Intramedullary nailing (retrograde, closed or open)	3	4
14. Knee		
a. Closed reduction of knee dislocation	3	4
b. ORIF for intra-articular distal femur fracture	3	3
c. Closed treatment of patellar dislocation	3	4
d. Open treatment of patellar dislocation	3	4
e. ORIF, patella fracture	3	4
f. ORIF, tibial plateau fracture	3	3
g. External fixation, tibial plateau fracture	3	4
15. Tibia and Fibula		
a. External fixation for diaphyseal fracture	3	4
b. Intramedullary nailing for diaphyseal fracture	3	3
c. Reduction under anesthesia and casting for diaphyseal fracture	3	4
d. Plating, tibial shaft	3	3
e. Fasciotomy for compartment syndrome	3	4

16. Tibial Non-Union		
a. Bone transport	3	3
b. Internal fixation with or without bone grafting	3	4
17. Ankle Fracture Dislocation		
a. Reduction under anesthesia and cast	3	4
b. ORIF	3	4
18. Pilon Fracture		
a. ORIF	3	3
b. Initial external fixation management	3	4
19. Achilles Tendon Rupture		
a. Open repair	3	3
b. Percutaneous technique	3	3
c. Non-surgical treatment	3	4
20. Calcaneus Fracture		
a. Non-surgical treatment	3	4
b. Reduction under anesthesia and/or pinning + cast	3	4
c. ORIF	3	3
21. Talar/Subtalar/Midtarsal Fracture/Dislocation		
a. Nonsurgical treatment	3	4
b. Reduction under anesthesia + fixation + cast	3	4
c. ORIF	3	3
22. Metatarsal/Phalangeal Fracture		
a. Non-surgical management	3	4
b. Reduction under anesthesia + fixation + cast	3	4
c. ORIF	3	3

IV. PEDIATRIC ORTHOPAEDICS

1. Basic Science	K	S
a. Knowledge of normal growth and development of a child including developmental milestones, common torsional and angular deformities and effects of puberty	3	
b. Knowledge of genetic basis of common orthopaedic disorders (e.g. chromosomal disorders, autosomal dominant and sex-linked disorders, skeletal dysplasias)	1	
c. Knowledge of bone growth, endochondral and intramembranous ossification, normal physal anatomy, fracture patterns and pathological processes affecting the growth	3	
d. Knowledge of the mechanisms, patterns, assessment, management and potential complications of common paediatric fractures and dislocations	3	
e. Knowledge of the pathophysiology of deformities in neuromuscular disorders (e.g., spina bifida, cerebral palsy, muscular dystrophy)	2	
f. Knowledge of the normal gait patterns and assessment of limping child	3	

2. Clinical Assessment and Decision Making	K	S
a. Ability to take a thorough history, examine the patient competently and communicate with the child and family effectively	3	
b. Ability to make proper management decision in children and refer appropriately when necessary	3	

3. Investigations	K	S
a. Knowledge of the indications for common imaging modalities in children such as plain x-ray, arthrogram, ultrasound, nuclear imaging, CT scan, and MRI and the ability to correlate clinically	3	
b. Knowledge of basic laboratory investigations and the ability to correlate clinically	3	
c. Knowledge of limitations of certain investigations in children	3	

4. Pathophysiology, Incidence, Clinical Characteristics, Diagnostic Features, Principles Management, Potential Complications and Prognosis of the Following:	K	S
a. Congenital disorders of the upper limb		
I. Sprengel's deformity	1	1
II. Congenital trigger thumb	3	5
III. Polydactyly	3	4
IV. Syndactyly, camptodactyly, clinodactyly	2	3
V. Ankylosis of the elbow, radioulnar synostosis, dislocation of the radial head	2	3
VI. Radial club hand	1	1
b. The child's hip		
II. Developmental dysplasia of the hip	3	3
III. Perthes disease	3	3
IV. Transient synovitis of the hip	3	
V. Slipped capital femoral epiphysis	3	4
VI. Septic arthritis	3	5
c. Congenital disorders of the lower limb		
I. Leg deformities: torsional and angular deformities (normal vs pathologic)	3	4
II. Limb deficiencies (e.g. proximal femoral focal deficiency, fibular hemimelia)	2	3
III. Leg length discrepancy	3	3
IV. Congenital dislocation of the knee	2	2
V. Blount's disease	3	3
d. The child's foot		
II. Clubfoot	3	4

II.	Flat feet (flexible and rigid) normal vs pathologic	3	3
III.	Pes cavus and cavovarus feet	2	3
IV.	Vertical talus	2	2
e.	Miscellaneous congenital disorders		
I.	Congenital muscular torticollis	3	3
II.	Constriction band syndrome	2	1
III.	Arthrogryposis	2	2
IV.	Marfan's syndrome	1	2
V.	Ehlers-Danlos syndrome	1	1
VI.	Trisomy 21 (Down's) syndrome	2	2
f.	Skeletal dysplasias		
I.	Osteogenesis imperfecta	3	3
II.	Achondroplasia and hypochondroplasia	2	2
III.	Hereditary multiple exostosis	3	3
IV.	Multiple epiphyseal dysplasia	2	2
V.	Osteopetrosis	1	2
VI.	Spondyloepiphyseal dysplasia	2	2
VII.	Mucopolysaccharidosis	1	2
g.	Metabolic and endocrine disorders		
I.	Rickets (all forms)	3	4
II.	Hypophosphatasia	1	2
III.	Hypoparathyroidism and hyperparathyroidism	1	2
IV.	Hypothyroidism	1	2
h.	Osteochondroses		
I.	Osgood Schlatter's disease	3	3
II.	Kohler's disease	3	3
III.	Sever's disease	3	3
IV.	Freiberg's disease	3	3
V.	Osteochondritis dissecans	3	3
i.	Bone tumours (see oncology section)		
j.	Infections of bones and joints		
I.	Osteomyelitis - acute and chronic	3	5
II.	Acute pyogenic arthritis	3	5
III.	Tuberculous arthritis	3	3
IV.	Arthritis associated with viral disease	3	2
V.	Fungus infections of joints	2	2
k.	Joint disorders		
I.	Arthritis of childhood	3	3
II.	Hemophilic arthropathy	1	2
III.	Discoid meniscus	2	4
IV.	Popliteal cyst	2	3
V.	Recurrent subluxation/dislocation of the patella	2	3
l.	Neuromuscular disorders		
I.	Cerebral palsy	3	4
II.	Spina bifida (meningocoele and myelomeningocoele)	2	3
III.	Spinal dysraphism	2	1
IV.	Duchenne muscular dystrophy	1	1
V.	Spinal muscular atrophy	1	1
VI.	Poliomyelitis	2	2
VII.	Peroneal muscular atrophy (Charcot-Marie-Tooth disease)	2	3
m.	The child's spine		
I.	Nonstructural scoliosis	3	
II.	Congenital scoliosis - kyphosis	2	2
III.	Adolescent kyphosis (Scheuermann's disease)	3	2
IV.	Atlanto-axial instability	2	1
V.	Spondylolysis and spondylolisthesis	3	3
VI.	Idiopathic scoliosis (infantile, juvenile and adolescent)	3	3
VII.	Neuromuscular (paralytic) scoliosis	2	2

VIII.	Scoliosis in neurofibromatosis	2	2
IX.	Intervertebral disc calcification	2	
X.	Discitis	2	1
XI.	Herniated intervertebral disc	3	1
XII.	Slipped vertebral apophysis	2	
n.	Fractures and dislocations in children		
I.	Non-accidental injuries	3	4
II.	Acute fractures and dislocations of extremities	3	4
III.	Fractures involving the physis	3	4
IV.	Incomplete fractures (buckle and greenstick)	3	5
V.	Malunion/nonunion	3	4
o.	Birth Injuries		
I.	Obstetric brachial plexus injury	3	3
II.	Birth fractures	3	5

	K	S
5. Manipulation and Closed Reduction of Simple Paediatric Fractures and Application of Cast	3	5
6. Application of Skin and Skeletal Traction	3	5
7. Closed Reduction and Percutaneous Pinning of Fractures	3	5
8. Open Reduction and Internal Fixation of Selected Fractures	3	3
9. Surgical Management of Osteomyelitis and Septic Arthritis	3	5

10. Paediatric Hip	K	S
a. Application of Pavlik harness for DDH	3	5
b. Arthrography, adductor tenotomy, closed reduction and application of spica for DDH	3	3
c. Open reduction, varus derotation osteotomy of the femur, pelvic osteotomies for DDH (Salter, Pemberton, Dega, Chiari)	2	3
d. Trochanteric advancement/epiphysiodesis	1	2
e. Femoral and/or pelvic osteotomies for Perthes disease	2	3
f. Pinning for SCFE	3	4
g. Femoral osteotomies for SCFE	2	2

11. Surgery for the Lower Extremities	K	S
a. Serial casting for congenital hyperextension of the knee	2	3
b. Capsular release and quadriceps lengthening of congenital knee dislocation	2	1
c. Surgery for congenital dislocation of the patella	1	1
d. Surgery for recurrent dislocation of the patella	1	2
e. Epiphysiodesis for limb length discrepancy	3	4
f. Limb lengthening procedures	2	3
g. Synovectomy	2	3
h. Release of circumferential constricting band	1	2

12. Pediatric Foot	K	S
a. Ponseti management for clubfoot	3	5
b. Posteromedial release of clubfoot	2	2
c. Surgical treatment for resistant clubfoot (Dwyer osteotomy, Evans osteotomy, triple arthrodesis, talectomy)	1	1
d. Triple arthrodesis	1	2
e. Reconstruction of cavovarus foot	2	3
f. Reconstruction for adolescent hallux valgus	2	2
g. Amputation of polydactyly	3	3
h. Reconstruction of polydactyly	1	2
i. Release of syndactyly	1	2

13. Surgery for Neck and the Upper Extremities	K	S
a. Release for congenital muscular torticollis	2	3
b. Release of congenital trigger thumb	3	4
c. Amputation and reconstruction for polydactyly	2	4
d. Release and reconstruction of syndactyly	1	2
e. Reconstruction for radial club hand	1	1

14. Cerebral Palsy and Its Sequelae	K	S
a. Soft tissue release (lengthening, recession)	3	4
b. Open reduction and reconstruction of dislocated hip	2	3
c. Iliopsoas recession	2	2
d. Split tendon transfers (tibialis posterior and tibialis anterior)	2	3
e. Combined one stage correction of spastic dislocated hip	1	2
f. Subtalar arthrodesis	1	2
g. Calcaneal osteotomy	1	2

15. Neuromuscular/Paralytic Disorders	K	S
a. Muscle biopsy	2	2
b. Soft tissue release	2	3
c. Tendon transfers	2	2
d. Osteotomies for deformities (e.g. genu recurvatum)	2	2
e. Rotational osteotomy of the humerus	1	1
f. Reconstruction for obstetric brachial plexus injury	1	1

16. Paediatric Spine	K	S
a. Atlanto-axial fusion	1	1
b. Bracing for scoliosis	3	4
c. Surgery for idiopathic scoliosis	2	3
d. Surgery for neuromuscular and congenital scoliosis	2	1

17. Fractures and Dislocations in Children	K	S
a. Closed reduction and percutaneous pinning of supracondylar fracture	3	5
b. Closed/open reduction of Monteggia fracture	3	4
c. Closed reduction of forearm and wrist fractures	3	5
d. Closed intramedullary nailing of fractures of the middle third of the forearm	3	5
e. Open reduction of chronic Monteggia fracture-dislocation	2	2
f. Closed reduction and percutaneous pinning of lateral condylar fractures	3	5
g. Open reduction and fixation for neglected elbow fractures (medial or lateral condyle)	2	2
h. Closed/open reduction of radial neck fractures	3	3
i. Open reduction of chronic posterior dislocation of the elbow in children	1	1
j. Open reduction and internal fixation of displaced medial epicondyle fractures	3	4
k. Open reduction and internal fixation with bone grafting for nonunion	3	4
l. Osteotomies for established cubitus valgus secondary to nonunion or growth arrest	2	2
m. Open reduction and internal fixation of physeal fractures of phalanges and metacarpals	2	2
n. Osteotomies for cubitus varus	2	3
o. Conservative management of shaft and proximal end of the humerus	3	5
p. Percutaneous pinning of fractures of the shaft and proximal end of the humerus	3	4
q. Closed/open reduction and fixation of hip fractures	3	3
r. Spica cast application for femoral shaft fractures	3	5
s. Flexible intramedullary nail fixation for femoral/tibial fractures	3	5

t.	Closed/open reduction and fixation of fractures of the distal femoral physis	3	3
u.	Open reduction and fixation of tibial tuberosity/spine fracture	2	2
v.	Open reduction and internal fixation of distal tibial and fibular epiphyseal fractures	3	4
w.	Open reduction and internal fixation of triplane fractures	3	4
x.	Open reduction and internal fixation of Tillaux fracture	3	4
y.	Excision of osteochondral fragments of the talus	2	2
z.	Physeal bar resection	2	2

V. SPINE

1. Basic Science	K	S
a. Anatomy		
I. Surgical anatomy of the cervical, thoracic, and lumbosacral spine	3	
II. Anterior and posterior surgical approaches to the spine at various levels	2	

2. Biomechanics	K	S
a. Importance of coronal and sagittal alignment	3	
b. Basic biomechanics of spinal instrumentation	2	
c. Biomechanics of spinal instability as applied to various clinical conditions	3	
d. Biomaterials		
I. Knowledge on materials of spinal instrumentation	2	
II. Knowledge on materials of interbody cages	2	
III. Knowledge on spinal biologics and biology of spinal fusion	2	

3. Investigations and Intra-operative Neuromonitoring	K	S
a. Basic investigations for spine problems such as blood tests, plain radiographs, CT scan, MRI scan, bone scan, PET scan, BMD, and EMG-NCV	3	
b. Clinical correlation and interpretation of investigations	3	5
c. Intra-operative neuromonitoring	1	2

4. Treatment: Non-operative Methods for the Treatment of Spinal Pain, Sciatica, Claudication, Spine Deformity, and Instability	K	S
a. Analgesics, and NSAIDs	3	5
b. Physical therapy	3	3
c. Acute and chronic pain management	3	3
d. Use of orthosis	3	3

5. Treatment: Principles of Operative Management	K	S
a. Consent taking and medicolegal issues	3	4
b. Indications and treatment principles in acute spinal injury i.e., decompression and/or instrumentation	3	
c. Indications and treatment principles in acute herniated lumbar disc, lumbar stenosis, and spondylolisthesis	3	
d. Indications and treatment principles in cervical myelopathy	3	
e. Indications and treatment principles in spine tuberculosis i.e., anterior debridement, posterior decompression, and instrumentation	3	
f. Indications and treatment principles in mild and moderate kyphotic deformity	2	
g. Indications and treatment principles in tumours of the spine	2	
h. Indications and treatment principles of open and closed biopsy of the spine, and lumbar facet injection	3	

6. Spine Trauma	K	S
a. Spinal cord Injury: assessment and management	3	3
b. ATLS principles in management of spinal injuries	3	3
c. Cauda equina syndrome	3	2
d. Conus medullaris syndrome	3	2
e. Cervical fractures and dislocations: classification, assessment, and management	3	3
f. Thoracic and lumbar fractures/dislocations: classification, assessment, and management	3	4
g. Spine rehabilitation:		
I. Rehabilitation in spinal cord injury	3	3
II. Orthosis for spinal injuries	3	3

7. Spinal Infections	K	S
a. Tuberculous spondylitis: pathogenesis, assessment, and management	3	3
b. Pyogenic spondylitis: pathogenesis, assessment, and management	3	3
c. Fungal spondylitis	1	1
d. Surgical site infection	3	3

8. Degenerative and Related Disorders	K	S
a. Anatomy of disc and pathophysiology of disc degeneration	3	
b. Axial back pain: pathoanatomy, pain generators, and clinical approach	3	4
c. Cervical radiculopathy: pathoanatomy, clinical approach, and management	3	3
d. Cervical myelopathy: pathoanatomy, clinical approach, and management	3	3
e. Lumbar radiculopathy: pathoanatomy, clinical approach, and management	3	3
f. Lumbar spinal stenosis: pathoanatomy, clinical approach, and management	3	3
g. DISH	2	2
h. OPLL	2	2

9. Spine Deformity	K	S
a. Idiopathic scoliosis	3	3
b. Congenital scoliosis	2	2
c. Neuromuscular scoliosis	2	2
d. Neurofibromatosis	2	2
e. Scheuermann's disease	2	2
f. Ankylosing spondylitis	2	2
g. Early onset scoliosis	3	2

10. Spinal Congenital Anomalies	K	S
a. Klippel-Feil syndrome	1	1
b. Spine deformity in myelodysplasia	1	1
c. Diastematomyelia	1	1
d. Early onset spondylolisthesis	2	2

11. Spine Deformity with Skeletal Dysplasia	K	S
a. Achondroplasia	1	1
b. Spondyloepiphyseal dysplasia	1	1
c. Hypochondroplasia	1	1
d. Diastrophic dysplasia	1	1
e. Kniest's dysplasia	1	1
f. Larsen syndrome	1	1

12. Metabolic Disease	K	S
a. Osteoporosis and vertebral fragility fractures		
I. Definition	3	
II. Clinical and radiological assessment	3	4
III. Medical management of osteoporosis	3	4
IV. Surgical management of vertebral fragility fractures	2	3
b. Osteomalacia	2	2
c. Rickets	2	2
d. Hyperparathyroidism	2	2

13. Spinal Metastatic Disease	K	S
a. Pathology of metastatic spine disease	3	
b. Diagnosis (classification system)	3	
c. Treatment algorithm	3	
d. Pain management	2	2
e. Medical management	2	2
f. Radiation therapy	1	1
g. Surgical treatment	2	3

14. General Surgical Skills	K	S
a. Anterior cervical procedure	2	2
b. Posterior cervical procedure	2	3
c. Anterior thoracic procedure	2	2
d. Posterior thoracic procedure	3	3
e. Anterior lumbar procedure	2	2
f. Posterior lumbar procedures	3	4
g. Anterior iliac crest bone graft harvesting	3	4
h. Posterior iliac crest bone graft harvesting	3	4
i. Transpedicular biopsy	3	3

15. Cervical Spine Surgical Procedures	K	S
a. Applications of Gardner-Well or Crutchfield tongs	2	3
b. Closed reduction of cervical fracture, subluxation/dislocation with tongs traction	3	3
c. Halovest application	2	3
d. Anterior cervical decompression and fusion	2	2
e. Cervical laminectomy	2	2
f. Cervical laminoplasty	2	2
g. Posterior cervical fusion		
I. Gallie fusion	2	2
II. C1/2 transarticular screw	2	2
III. C1 lateral mass-C2 pedicle screw fixation	2	2
IV. Triple wire fusion	1	1
V. Lateral mass screws and rods	2	2
VI. Pedicle screws and rods	2	2

16. Thoracic Spine Surgical Procedures	K	S
a. Posterior thoracic fusion for deformity, degenerative disorders, infection, etc.	3	3
b. Thoracic pedicle screw insertion	3	3
c. Thoracic laminectomy	3	3
d. Osteotomies		
I. Ponte osteotomy	1	2
II. Pedicle subtraction osteotomy	1	2
III. Posterior vertebral column resection	1	1

17. Lumbar Spine Surgical Procedures	K	S
a. Lumbar pedicle screw insertion	3	3
b. Posterior lumbar fusion (PLIF, and TLIF)	3	2
c. Posterior lumbar fusion (posterolateral fusion)	3	2
a. Lumbar decompression:		
II. Discectomy	3	3
III. Laminectomy	3	3
IV. Medial facetectomy	3	3
b. Osteotomies		
I. Ponte osteotomy	1	3
II. Pedicle subtraction osteotomy	1	1

VI. UPPER LIMB/HAND

1. Anatomy	K	S
a. Bones of the hand, elbow and shoulder joint	3	
b. Flexor and extensor tendons	3	
c. Muscles of the hand and upper limb & compartments	3	
d. Brachial plexus and nerve supply of the upper limb	3	
e. Vascular system of the upper limb and hand	3	
f. Flexor and extensor mechanism of the fingers including interaction between extrinsic and intrinsic mechanism	3	
g. Wrist, MCP, PIP, DIP joints and the CMC joint of the thumb	3	
h. Rotator cuff muscles and periscapular muscles	3	
i. Elbow flexor, extensor mechanism	3	

2. Trauma	K	S
a. Fingertip/nail bed injuries	3	
b. Tendon injury and healing	3	
c. Nerve injury and healing	3	
d. Bony injury – distal radius fracture, scaphoid fracture, metacarpal fractures, phalangeal fractures, carpal bones dislocation and instabilities	3	
e. Compartment syndrome	3	
f. Brachial plexus injury	3	
g. Principles of replantation	3	
e. Bone injury – proximal humerus fracture, scapular fracture, clavicle fracture, humerus shaft fracture, distal humerus fracture, radius fracture, ulnar fracture	3	
f. Ligament injury – shoulder dislocation, AC dislocation, elbow dislocation, forearm instability	3	

3. Pathological & Inflammatory Conditions	K	S
a. Common hand infections	3	
b. Rheumatoid arthritis of hand, elbow and shoulder	3	
c. Tumours of the hand & upper limb	3	
d. Congenital disorders of hand and upper limb	3	
e. Tendon injury of the shoulder, elbow – rotator cuff disease, lat. & med. epicondylitis	3	

4. Clinical Assessment	K	S
a. History taking and examination of hand and wrist	3	5
b. Ability to elicit median, ulnar and radial nerve function and disorders	3	5
c. Assessment of tendons	3	5
d. Assessment of distal radioulnar and radiocarpal joints	3	5
e. Recognition of patterns of presentation of common compressive neuropathies of the upper extremity, including brachial plexus problems	3	5
f. Assessment of intrinsic and extrinsic muscles in digits and recognition of common deformities and deficiencies	3	5
g. Awareness of cumulative trauma disorders and work-related problems	3	5
h. Ability to examine and assess common rheumatoid hand deformities	3	5
i. History taking and examination of elbow and shoulder	3	5
j. Assessment of shoulder function (ROM, specific tests for rotator cuff & instability)	3	5
k. Assessment of elbow function (ROM, specific tests for biceps, extensor, flexor muscles)	3	5

5. Investigations	K	S
a. Knowledge and interpretation of plain and stress views of the hand/wrist, elbow and shoulder joint	3	5
b. The role of MRI, bone scan, arthrography and arthroscopy in the assessment of hand & upper extremity problems	3	5

6. Treatment of Carpal Fracture/Dislocation	K	S
a. Reduction under anesthesia with casting	3	4
b. Reduction under anesthesia with percutaneous wires	3	4
c. ORIF	3	4

7. Treatment of Scaphoid Fractures	K	S
a. Non-operative management	3	5
b. Operative management	3	4

8. Treatment of Metacarpal Fractures	K	S
a. Non-operative management	3	5
b. Operative management	3	5

9. Treatment of Phalanges/IPJ/MCP Fracture Dislocation	K	S
a. Non-operative management	3	5
b. Operative management	3	5

10. Treatment of Infection	K	S
a. Drainage of hand abscess	3	5
b. Drainage of tendon sheath	3	5

11. Tendon Repair	K	S
a. Extensor	3	5
b. Flexor	3	3

12. Treatment of Wrist Pathologies	K	S
a. Carpal tunnel release	3	5
b. De Quervain's release	3	4
c. Ganglion cyst excision	3	5
d. Distal ulna shortening	3	3

13. Treatment of Hand Pathologies	K	S
a. Excision of cysts	3	5
b. Trigger finger release	3	5
c. Trigger thumb release	3	5

14. Treatment of Elbow Fracture and/or Dislocation	K	S
a. Non-operative management	3	5
b. Operative management	3	5

15. Treatment of Shoulder Fracture	K	S
a. Management of proximal humerus fracture	3	5
b. Management of AC dislocation	3	5

16. Shoulder Arthroscopy	K	S
a. Diagnostic	3	5
b. Acromioplasty and rotator cuff repair	3	4
c. Labral repair	3	4

17. Elbow Arthroscopy	K	S
a. Diagnostic	3	4
b. Tennis elbow surgery	3	4
c. Stiff elbow release	3	3

VII. HIP

1. Basic Science	K	S
a. Knowledge of metabolic, degenerative, infectious and neoplastic diseases that affect the hip joint	2	4
b. Knowledge of the materials used in hip replacement and their biomechanics related to implant longevity and alignment	3	5

2. Clinical Assessment	K	S
a. The resident must be able to make proper management decisions in hip disorders and to refer appropriately for treatment	3	5
b. The resident must be able to make a rational choice of implants and different types of hip prostheses for any particular condition and age of patient with reference to reported studies or established registries	3	5

3. Investigations	K	S
a. Knowledge of the indications for plain x-ray, arthrogram, CT scan, MRI and the ability to interpret the hip images	3	5
b. Knowledge of the indications for the use of ultrasound and nuclear imaging in hip disorders	3	4
c. Preoperative planning and templating for hip arthroplasty	3	5

4. Pathophysiology, Incidence, Types, Clinical Characteristics, Diagnostic Features, Principles of Management and Prognosis	K	S
a. Diseases of joints		
I. Osteoarthritis hip	3	5
II. Rheumatoid hip	3	5
III. Hip dysplasia	3	4
IV. Protrusio hip	3	4
V. Idiopathic osteonecrosis of hip	3	5
VI. Post traumatic arthritis of hip	3	4
b. Bone and joint infections		
I. Acute osteomyelitis	3	5
II. Chronic osteomyelitis	3	4
III. Suppurative arthritis	3	5
IV. Gonococcal arthritis	3	4
V. Reiter's syndrome	3	4
VI. Tuberculosis of bones and joints	3	4
VII. Mycotic infection of bones and joints	3	5
VIII. Implant infections	3	4
c. Osteonecrosis of hip secondary to pathologies viz. sickle cell disease	3	5

5. Hip	K	S
a. Hip arthrodesis – methods and current indications	3	3
b. Hip arthroscopy - diagnostic and therapeutic	3	5
c. Arthrotomy for septic hip	3	5
d. Total hip replacement	3	5
e. Partial hip replacement	3	5
f. Girdlestone arthroplasty	3	5
g. Revision hip replacement	3	4
h. Hip disarticulation	3	5

VIII. KNEE

1. Basic Science	K	S
a. Knowledge of metabolic, degenerative, infectious and neoplastic diseases that affect the knee joint	2	4
b. Knowledge of the materials used in knee replacement and their biomechanics related to implant longevity and alignment	3	4

2. Clinical Assessment	K	S
a. The resident must be able to make proper management decisions in knee disorders and to refer appropriately for treatment	3	5
b. The resident must be able to make a rational choice of implants and different types of knee prostheses for any particular condition and age of patient with reference to reported studies or established registries	3	5

3. Investigations	K	S
a. Knowledge of the indications for plain x-ray, arthrogram, CT scan, MRI and the ability to interpret the knee images	3	5
b. Knowledge of the indications for the use of ultrasound and nuclear imaging in knee	3	4
c. Preoperative planning and templating for knee arthroplasty	3	5

4. Pathophysiology, Incidence, Types, Clinical Characteristics, Diagnostic Features, Principles of Management and Prognosis	K	S
a. Diseases of joints		
I. Osteoarthritis	3	5
II. Rheumatoid arthritis	3	5
III. Palindromic rheumatism	3	4
IV. Neuroarthropathy (Charcot joint)	3	3
V. Hemophilic arthritis	3	3
VI. Post traumatic arthritis	3	5
VII. Psoriatic arthritis	3	5
b. Bone and joint infections		
I. Acute osteomyelitis	3	5
II. Chronic osteomyelitis	3	4
III. Suppurative arthritis	3	5
IV. Gonococcal arthritis	3	4
V. Reiter 's syndrome	3	4
VI. Tuberculosis of bones and joints	3	4
VII. Mycotic infection of bones and joints	3	4
VIII. Implant infections	3	4
c. Osteonecrosis	3	5

5. Knee	K	S
a. Arthrodesis	3	4
b. Arthroscopy, diagnostic	3	5
c. Arthroscopy, therapeutic	3	5
d. Arthrotomy	3	5
e. Unicondylar knee replacement	3	5
f. Primary total knee replacement	3	5
g. Revision total knee replacement	3	4
h. Knee disarticulation	3	4

IX. FOOT & ANKLE

1. Basic Science	K	S
a. Functional anatomy & biomechanics of the foot & ankle	2	
b. Radiological examination including MRI, CT and ultrasound	3	
c. Structure and function of bone & cartilage	3	
d. Structure and function of tendon and ligaments	3	
e. Orthotics and prosthetics	2	

2. Assessment	K	S
a. History taking and physical examination of foot & ankle	3	5
b. Diagnostic imaging	3	5
c. Decision making	2	5

3. Management: Conservative and Operative Management	K	S
a. Surgical approaches to foot & ankle	3	4
b. Hallux valgus		
I. Conservative management	3	5
II. Operative management of hallux valgus	3	3
c. Hallux rigidus		
I. Conservative management	3	5
II. Operative management of hallux valgus	3	3
d. Gastrocnemius & Achilles tendon tightness and contracture		
I. Conservative management	3	4
II. Operative management	3	4
e. Achilles tendinopathy – insertional & non-insertional		
I. Conservative management	3	4
II. Operative management – open debridement and gastrocnemius release/recession	3	3
f. Osteoarthritis of tibio-talar joint		
I. Conservative management	3	4
II. Operative management – tibio-talar fusion (open or arthroscopic & arthroscopic debridement)	3	3
III. Operative management – total ankle arthroplasty	2	2
g. Diabetic foot		
I. Assessment to identify neuropathic and non-neuropathic ulcers	3	3
II. Conservative management – off-loading – including total contact cast and other off-loading devices	3	2
III. Surgical management		
1. Toe disarticulation and ray amputation	3	4
2. Forefoot, midfoot & Syme amputation	3	4
3. Below knee (transtibial) and above knee (transfemoral) amputation	3	5
IV. Charcot foot & ankle		
1. Diagnosis of Charcot foot from sepsis	3	4
2. Staging of Charcot foot – Eichenholtz staging	3	2
3. Conservative management	3	4
V. Management of the amputee		
1. Prosthetics and orthotics – including assessment of fitting of prosthetics	3	2
2. Follow-up of amputees	3	4
h. Pes cavus		
I. Conservative management	3	2
II. Surgical management	2	3
i. Pes planus	3	2

I. Conservative management	3	2
II. Surgical management	2	3
j. Plantar fasciitis		
I. Conservative management	3	2
II. Surgical management	3	3
k. Talar osteochondral lesions		
I. Conservative management	3	4
II. Surgical management	2	3
l. Lesser toe disorders		
I. Conservative management	3	4
II. Surgical management	3	4
m. Operative management of septic arthritis	3	5
n. Ankle sprains		
I. Conservative management – physiotherapy and taping	3	5
II. Operative management – anatomic repair	3	4

X. SPORTS INJURIES

1. Basic Science	K	S
a. Applied anatomy and kinematics	3	
b. Injury and healing process of musculoskeletal tissues	3	
c. Ligamentous and joint injuries	3	
d. Principles of arthroscopy	3	

2. Basic Skills	K	S
a. History taking and physical examination	3	5
b. Open repair of uncomplicated muscle, tendon and ligament injuries	3	5
c. Synovectomy, arthroscopic and open repair	3	4
d. Joint debridement	3	5

3. Shoulder Joint	K	S
a. Fractures and dislocations	3	4
b. Rotator cuff tendinitis and tears	2	3
c. Shoulder pain	3	
d. Shoulder aspirations/injections	3	5
e. Open repair of ligaments and tendons around shoulder joints	3	3
f. Open drainage of shoulder	3	5
g. Open ligament reconstructions around the shoulder	2	3
h. Diagnostic shoulder arthroscopy	3	3
i. Arthroscopic procedures and reconstructions of shoulder	2	2

4. Elbow Joint	K	S
a. Fractures and dislocations	3	4
b. Ligamentous injuries and instabilities	2	3
c. Elbow pain	3	
d. Elbow joint aspiration/injection	3	5
e. Open repair of ligaments around elbow joint	2	3
f. Diagnostic elbow arthroscopy	3	3
g. Arthroscopic procedures of elbow	1	2

5. Hip Joint	K	S
a. Muscle and tendon injuries around the hip	3	3
b. Intra-articular conditions	3	3
c. Femoroacetabular impingement	3	3
d. Hip joint aspiration/injection	3	5
e. Open repair of injured muscles and tendons around the hip joint	2	4
f. Diagnostic hip arthroscopy	2	2
g. Arthroscopic procedures of hip	2	2

6. Knee Joint	K	S
a. Acute dislocation of knee and patella	3	3
b. Ligamentous injuries and instabilities		
I. Acute	3	4
II. Chronic	2	3
c. Knee pain	3	
d. Meniscus injuries and conditions	3	4

e. Osteochondral fracture	3	3
f. Articular cartilage conditions	3	4
g. Knee aspiration/injection	3	5
h. Open drainage of knee	3	5
i. Diagnostic knee arthroscopy	3	5
j. Arthroscopic procedures and reconstructions of knee	3	3
k. ACL reconstruction, all variants	3	3
l. Arthroscopic retinacular release	2	3
m. Arthroscopic meniscectomy/meniscal repair	3	5
n. Arthroscopic removal of loose bodies	3	4
o. Patellar management	2	4

7. Ankle Joint	K	S
a. Fracture and dislocation	3	5
b. Ligamentous injuries and instabilities		
I. Acute	3	4
II. Chronic	3	3
c. Ankle pain	3	
d. Arthroscopic procedure of the ankle	2	3
e. Repair of injured ligaments and tendons	2	3
f. Repair of Achilles tendon rupture	3	5

XI. MUSCULOSKELETAL TUMOURS

1. Basic Science	K	S
a. Epidemiology of common musculoskeletal tumours	3	
b. Patho-anatomy and pathophysiology of musculoskeletal tumours and the response of the musculoskeletal system	2	
c. Cellular and molecular biology of musculoskeletal tumours	1	
d. Tissues and materials used in reconstruction of bone and soft tissue defects after tumour resection	2	
e. Materials and design of braces and prosthetic limbs used after limb amputations for musculoskeletal tumours	2	

2. Clinical Assessment	K	S
a. Perform a complete clinical examination on a patient with a musculoskeletal tumour and to relate effectively and professionally with the patient and family members	3	5
b. Distinguish between an aggressive and a non-aggressive lesion based on objective clinical parameters	3	5
c. Make proper management decisions based on sound orthopaedic oncology principles and to make timely and appropriate consultations with and referrals to allied oncologic subspecialties, e.g. pathology, pediatric oncology, medical oncology, radiation oncology, interventional radiology	3	5

3. Investigations Including Imaging and Tissue Diagnosis	K	S
a. Indications for basic laboratory investigations	3	
b. Indications for staging studies, both local and systemic, including the plain x-ray, CT scan, MRI, total body bone scan (TBBS), PET scan and must have the ability to interpret the corresponding imaging results	3	
c. Indications for different types of biopsy, i.e. closed, including core and needle biopsies, and open biopsy	3	
d. Correlate pathology with clinical course	3	

4. Common Systems of Musculoskeletal Tumour Staging	K	S
a. Enneking musculoskeletal tumour staging system		
I. Malignant tumours	3	
II. Benign bone tumours (latent, active, aggressive)	3	
b. TNM staging system of the American Joint Commission on Cancer	3	

5. Principles and Techniques of Biopsy of Musculoskeletal Tumours	K	S
a. Pre-biopsy evaluation and strategy	3	
b. Principles of biopsy of bone and soft tissue tumours	3	
c. Anatomical considerations for biopsy placement	3	
d. Techniques of open and closed biopsy	3	
e. Principles of frozen section	1	
f. Handling and transport of biopsy specimen	3	
g. Interpretation of histopathologic findings, including tumour margin and tumour necrosis	3	
h. Principles of appropriate immunohistochemical staining for specific tumours	1	

6. Primary Benign and Malignant Bone and Soft Tissue Tumours (Based on the WHO Classification of Bone & Soft Tissue Tumours), Including Presentation, Radiologic Characteristics and Natural History, Formulating Appropriate Investigation and Management Options	K	S
a. Bone tumours		
I. Chondrogenic tumours (chondroma, chondrosarcoma)	2	
II. Osteogenic tumours (osteosarcoma)	2	
III. Fibrogenic tumours	2	
IV. Fibrohistiocytic tumours	1	
V. Ewing sarcoma/primitive neuroectodermal tumour (PNET)	2	
VI. Hematopoietic tumours (multiple myeloma/lymphoma)	2	
VII. Giant cell tumours	2	
VIII. Notochordal tumours	1	
IX. Vascular tumours	1	
X. Myogenic, lipogenic, neural and epithelial tumours	1	
XI. Tumours of undefined neoplastic nature (ABC/UBC)	2	
XII. Congenital and inherited syndromes	1	
XIII. Undifferentiated high-grade pleomorphic sarcoma	1	
b. Soft tissue tumours		
I. Adipocytic tumours	2	
II. Fibroblastic/myofibroblastic tumours	2	
III. So-called fibrohistiocytic tumours	1	
IV. Smooth-muscle tumours	1	
V. Pericytic tumours (perivascular)	1	
VI. Skeletal-muscle tumours	2	
VII. Vascular tumours	2	
VIII. Chondro-osseous tumours	2	
IX. Nerve sheath tumours (neurofibroma/schwannoma)	2	
X. Tumours of uncertain differentiation	2	
XI. Undifferentiated/unclassified sarcomas	2	
1. Tumours of joints (diffuse giant cell tumour of the tendon sheath; synovial chondromatosis)	2	
2. Metastatic bone tumours (see also spinal metastatic disease)	2	

7. Concept of Surgical Margins	K	S
a. Concept of compartments	3	
b. Tumour behavior and margin	3	
c. Classification of surgical oncologic margins (intralesional, marginal, wide, radical)	3	
d. Surgical margin and local recurrence	3	
e. The role of chemotherapy and radiotherapy	2	

8. General Principles of Medical and Radiation Treatment	K	S
a. Principles of radiation therapy		
I. Role of radiation therapy in musculoskeletal tumours	2	
II. Types of radiation therapy	1	
III. Complications and management of complications of radiation therapy	1	
b. Principles of medical management and chemotherapy		
I. Role of medical management and chemotherapy	2	
II. Agents commonly used and their mechanisms of action	1	
III. Complications of medical and chemotherapy and their management	1	
c. Concept of counseling for cancer patients		
I. Breaking the news/disclosure	3	
II. Discussion of the stages, options for treatment and prognosis of disease	3	

9. Biopsy of Musculoskeletal Tumours	K	S
a. Closed core and needle biopsy	3	4
b. Open biopsy	3	4

10. Benign Soft Tissue Tumour	K	S
a. Excision biopsy	3	5
b. Marginal excision of benign soft tissue tumour	3	5

11. Benign Bone Tumour	K	S
a. Intralesional curettage	3	4
b. Extended curettage and adjuvant treatment	3	4
c. Excision of benign bone tumour	3	4

12. Soft Tissue Sarcoma	K	S
a. Wide resection	2	3
b. Reconstruction of soft tissue defect	2	3

13. Malignant Bone Tumour	K	S
a. Wide resection	2	3
b. Reconstruction of bony defect	2	3

14. Major Amputations in Oncology	K	S
a. Hip disarticulation	3	3
b. Hindquarter amputation	3	3
c. Forequarter amputation	3	3
d. Above the knee amputation	3	4
e. Below the knee amputation	3	4

15. Metastatic Bone Disease	K	S
a. Nailing	2	3
b. Plating and cementation	2	3
c. Endoprosthetic reconstruction	2	3

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