

***Residency Program  
Master of Surgery (MS)  
Curriculum (Phase-B)***

***Orthopaedic Surgery***



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### 1. Introduction:

Postgraduate medical education has become an issue of global significance, appeal and dimensions. It is an important phase of medical education in which doctors go on to develop their competencies and capabilities following the completion of their basic medical qualification. This phase of training is usually commutated in accordance with specified regulation and rules.

Planning is essential for the development of any successful educational programme. The overall plan of a whole programme is usually referred to as the curriculum. There is often confusion between the terms "curriculum" and "syllabus". The syllabus refers to the content of the course whereas the curriculum encompasses learning methods, assessment method, resources and timetabling in addition to content. A curriculum is more than just a syllabus of a statement of content. It should describe the competencies to be attained by all physicians training, in terms of the specific knowledge, skills and attitudes to be acquired. Many educational strategies can be adopted successfully for a curriculum. The strategy choice will largely depend on national tradition and resources. National authority will have to make a large number of decisions on the specifics of curriculum delivery and evaluation. The University should play its scholarly role in planning and developing the curriculum that is clear, practical, comprehensive and usable by all stakeholders involved.

### Principle of the Medical Curriculum:

1. The curriculum contains the educational experiences necessary to provide a general professional education in medicine.
2. The curriculum is competency based.

3. Professionalism is emphasized throughout the continuum of the curriculum.
4. The curriculum is maintained as a contemporary, flexible and clinically relevant educational experience that is continuously improved by regular review and evaluation of the content and pedagogy.
5. The curriculum fosters independent learning, the development of self-directed learning habits, and the mastery of evidence-based medicine.
6. The curriculum contains elements that foster the development of leadership skills.
7. The curriculum promotes understanding of the influences of family, culture, community, and societal elements on health and health care delivery.
8. The curriculum emphasizes disease prevention and health promotion practices that affect the health and well being of students, physicians, patients and communities.

**Expected features of Postgraduate Medical Curriculum:**

- A progressive syllabus that has both formal and informal elements
- A recognized trainer and training unit
- Proactive supervision
- Balance of clinical duties and educational activities
- Protected time for education, and
- Defined exit outcomes

**Competency-based curriculum:**

A key trend in postgraduate medical education is a move to a model in which the emphasis has changed to focus on the product and the expected learning outcomes. In outcome based education, the learning outcomes are clearly specified and decisions about the content of training and how it is

organized, the educational strategies, the assessment procedures, and the educational environment are made in the context of the stated learning outcomes. A competency-based, outcome-oriented curriculum has become to a large extent, the standard in postgraduate medical education.

Competencies are defined as the ability to use knowledge, skills and appropriate attitudes and personal qualities to solve clinical problems in professional, ethical and proficient way for optimal patient and societal outcome.

**Orthopaedics Residency programme:**

Residents will undertake a three years intensive Phase-B training after completion of Phase-A training in order to achieve the levels of knowledge, skills and expertise required for clinical practice in the field of Orthopaedics Medicine. It is a competency-based programme emphasizing on meaningful integration and contextualization. The two years Phase-A training programme is designed to introduce and develop the broad range of core knowledge, skills, attitude and behaviors required to become a competent physician. The knowledge and skills acquired during Phase-A training are further focused and refined during phase-B training, which is a 03 year Specialty-specific training in Orthopaedic Surgery.

The teaching, learning and assessment of the curriculum is facilitated by the provision of comprehensive, educationally oriented supervision and support, which is provided to all trainee across both the phase of the programme.

**Overall Goals:**

1. To prepare cardiologists who would be able to meet and respond to the changing healthcare needs and expectation of the society.

2. To develop Orthopaedic Surgeon who posses knowledge, skills and attitudes that will ensure that they are competent to practice Orthopaedic Surgery, safely and effectively.
3. To ensure that they have appropriate foundation for lifelong learning and further fraining in their specialty.
4. To help them develop to be critical thinkers and problem solvers when managing health problems in the community they serve.

## **2. Objectives:**

The educational and training process aims to produce medical specialists who:

- Can address all aspects of the healthcare needs of patients and their families
- Have acquired and developed leadership and team working skill, especially with other healthcare professional, to deliver patient centered care.
- Maintain highest standards appropriate in their professional field and show them selves able to respond constructively to assessments and appraisals of professional competence and performance.
- Are aware of current thinking about ethical and legal issues.
- Are able to act as safe independent practitioners whilst recognizing the limitation if their own expertise and are able to recognize their obligation to seek assistance of colleagues where appropriate.
- Are aware of the procedures, and able to take appropriate action, when things go wrong, both in their own practice and in that of others.
- Will be honest and objective when assessing the performance of those they have supervised and trained

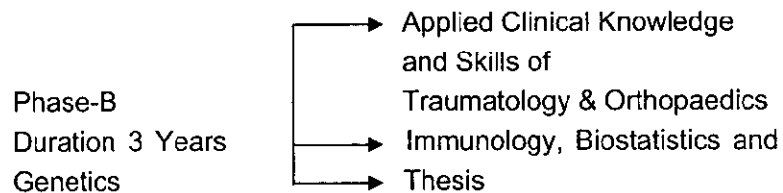
- Manage time and resources to the benefit of themselves, their patients and colleagues.
- Can take advantage of information technology to enhance all aspects of patient care.
- Can develop management plans for the "Whole patient" and maintain knowledge in other areas of medicine which impinge on their specialty of practice.
- Understand that more effective communication between them and their patients can lead to more effective treatment and care.
- Apply appropriate knowledge and skill in the diagnosis and management of patients.
- Establish a differential diagnosis for patients presenting with medical problems by the appropriate use of the clinical history, examination and investigations.
- Are competent of perform the core investigation and procedures required their specialties.
- Develop clinical practice which is based on an analysis of relevant clinical trials and to have an understanding of their research methodologies.
- Are able to apply the knowledge of biological and behavioral sciences in clinical practice
- Are able to identify and take responsibility for their own educational needs and the attainment of these needs.
- Have developed the skills of an effective teacher

## **3. Admission Requirements for Phase-B Training:**

Resident who has successfully completed phase-A training and passed Phase-A final examination are eligible for Phase-B Programme. And candidates passed FCPS Orthopaedic Surgery can be directly into Phase-B of the Residency Programme.

#### 4. Phase-B Curriculum Structure:

The training is designed to develop both the generic and specially-specific attributes necessary to practice independently as a consultant Orthopaedic Surgery. The aim is to train individuals to provide the highest standard of service to patients with Orthopaedic disorders. The development of positive attitude towards lifelong learning and the ability to adopt to future technological advances and the changing expectation of society.



#### Phase-B: Orthopaedics Specialty Training:

In-depth specialty-specific educational and training programme in this phase will make the resident competent and prepare them for the speciality qualification. It will provide educational programme covering the specialty of orthopaedic and its subspecialties, Biostatistics, Research Methodology and Medical Education along with rotation specific clinical training.

#### A. Expected Outcomes at the completion of the Phase-B Programme:

Residents of this programme will be equipped to function effectively within the current and emerging professional medical and societal contexts. At the completion of the training programme in Orthopaedics, as defined by this curriculum, it is expected that a new Orthopaedic Surgeon will have developed the clinical skills and have acquired the theoretical knowledge

for competent Orthopaedic Surgeon practice. It is expected that a new Orthopaedic Surgeon will be able to

- Utilize effective communication with patients and their families and with professional colleagues.
- Be devoted to life learning.
- Be equipped to manage both acute and chronic Orthopaedic disease.
- Identify the pathophysiology and manifestations of Orthopaedic disease and modern therapeutics which can be applied to patient diagnosis and management.
- Apply appropriate skills to perform necessary diagnostic and therapeutic decisions.
- Demonstrate a capacity to rationally analyze clinical data and published work.
- Demonstrate an understanding of and commitment to the role of research in advancing medical care of Orthopaedic disease.
- Develop a commitment to compassionate ethical professional behavior
- Identify Orthopaedic health issue of importance to the community and contribute constructively to debate about those issues.
- Apply primary and secondary prevention strategies in Orthopaedic disease.

#### B. Teaching and Learning Methods:

The bulk of learning occurs as a result of clinical experience (experiential learning, on-the-job learning) and self-directed study. The degree of self-directed learning will increase as trainees become more experienced. Teaching and learning occurs using several methods that range from formal didactic lectures to planned clinical experiences. Aspects covered will

include knowledge, skill and practices relevant to the discipline in order to achieve specific learning outcome and competencies. The theoretical part of the curriculum presents the current body of knowledge necessary for practice. This can be imparted using lectures, grand teaching rounds, clinic-pathological meetings, morbidity/ mortality review meetings, literature reviews and presentations, journal clubs, self-directed learning, conferences and seminars.

### **C. Phase-B Training Rotations:**

Orthopaedics specialty training comprises rotations in:

- General Orthopaedics 06 Months.
- General Aspect of Trauma 03 Months.
- Musculoskeletal Tumor & Infection 03 Months.
- Hand Surgery 03 Months.
- Knee 03 Months.
- Ankle & Foot Surgery 03 Months.
- Hip 03 Months.
- Shoulder & Elbow 03 Months.
- Paediatric Orthopaedic Surgery 03 Months.
- Spine Surgery 03 Months.

### **5. Record of Training:**

The evidence requires to confirming progress through training includes:

- Details of the training rotations, the training plan agreed with weekly timetables and duty rosters and numbers of practical procedures and outcomes.
- Confirmations of attendance at events in the educational programme, at departmental and inter-departmental meetings and other educational events.
- Confirmation (certificates) of attendance at subject- based/ skills-training/instructional courses.

- Recorded attendance at conference and meetings.
- A properly completed logbook with entries capable of testifying to the training objectives which have been attained and the standard of performance achieved.
- CME activity.
- Supervisor's reports on Observed performance(in the workplace)of duties, practical procedures, of presentations made and teaching activity of advising and working with others, of standards of case notes, correspondence and communication with others.

### **A. Logbook:**

Residents are required to maintain a logbook in which entries of academic/professional work done during the period of training should be made on a daily basis and signed by the supervisor. Completed and duly certified logbook will form a part of the application for appearing in phase Final Examinations.

### **B. Thesis:**

Development of research competencies forms an important part of the Residency programme curriculum as they are an essential set of skills for effective clinical practice. Undertaking research helps to develop critical thinking and the ability to review medical literature. Every Resident shall carry out work on an assigned research project under the guidance of a recognized supervisor; the project shall be written and submitted in the form of a Thesis/Research Report.

### **6. Assessment:**

The assessment for certification of the MS degree of the university is comprehensive, integrated and phase-centered attempting to identify attributes expected of specialists for independent practice and lifelong learning and covers

cognitive, psychomotor and affective domains. It keeps strict reference to the components, the contents, the competencies and the criteria laid down in the curriculum. Assessment includes both formative Assessment and summative (Phase final) Examinations.

**A. Formative Assessment:**

Formative assessment will be conducted throughout the training phases. It will be carried out for tracking the progress of residents, providing feedback, and preparing them for final assessment (phase completion exams) There will be continuous (day-to-day) and periodic type of formative assessment.

- Continuous (day-to-day) formative assessment in classroom and workplace settings provides guide to a resident's learning and a faculty's teaching/learning strategies to ensure formative lesson/training outcomes.
- Periodic formative assessment is quasi-formal and is directed to assessing the outcome of a block placement or academic module completion. It is held at the end of Block placement and Academic Module completion. The contents of such examinations include Block Units of the Training curriculum and Academic Module Units of the Academic curriculum.
- End of Block Assessment (EBA): End of Block Assessment (EBA) is a periodic formative assessment and is undertaken after completion of each training block, assessing knowledge, skills and attitude of the resident. Components of EBA are written examination, structured clinical Assessment (SCA), medical record review and logbook assessment. Unsatisfactory block training must be satisfactory completed by undergoing further training, for the block to be eligible for appearing in the next phase complete examination.

- Formative assessment for Academic modules for Biostatistics and Research Methodology and Medical Education is done in the first nine months of Phase-B training. Residents getting unsatisfactory grade must achieve satisfactory grade by appearing the re-evaluation before sitting for the Phase-B final examination for certificate.

**B. Summative Examination:**

The phase-B final Examination can be undertake only after passing the phase-A Final Examination and after successful completion of phase-B Training. The Phase-B Final Examination is considered as the exit examination.

Phase Final Examinations will have following components:

- Written examination
- Clinical examination
  - Long case (1)
  - Short cases (4)
  - SCA (12 Stations)
- Oral examination
- Thesis Evaluation

**7. Supervision and Training Monitoring:**

Training should incorporate of gradually increasing responsibility, and provide each trainee with a sufficient scope, volume and variety of experience in a range of settings that include inpatients, outpatients, emergency and intensive care all elements of work in training rotation must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure. Outpatient and referral supervision must routinely include the opportunity to personally discuss all cases. As training progresses the trainee should have the opportunity for increasing autonomy,

consistent with safe and effective care for the patient. Trainee will at all times have a named Supervisor, responsible for overseeing their education.

Supervisors are responsible for supervision of learning throughout the programme to ensure patient and / or laboratory safety, service delivery as well as the progress of the resident with learning and performance. They set the lesson plans based on the curriculum, undertake appraisal, review progress against the curriculum, give feedback on both formative and summative assessments as well as sign the logbook and portfolio. The residents are made aware of their limitations and are encouraged to seek advice and receive help at all times.

The Course Coordinator of each department coordinates all training and activities of the programme in collaboration with the Course Manager. The Course Director of each faculty directs guides and manages curricular activities under his / her jurisdiction and is the person to be reported to for all events and performances of the residents and the supervisors.

### **8. Curriculum Implementation, Review and Updating:**

Both Supervisors and Residents are expected to have a good knowledge of the curriculum and should use it as a guide for their training programme.

Since Cardiology has historically been rapidly changing specialty the need for review and up-dating of curriculum is evident. The Curriculum is specifically designed to guide an education process and will continue to be the subject of active redrafting, to reflect change in both Orthopaedic Surgery and educational theory and practice. Residents and Supervisors are encouraged to discuss the curriculum and to feedback on content and issue regarding implementation at Residency Course Director. Review will be time table to occur annually for minor changes to the curriculum. The Curriculum will be reviewed with input from the various subspecialties of Orthopaedic Surgery.

### **9. Phase-B Syllabus:**

The education process in Orthopaedic Medicine aims to provide basic knowledge, intellectual, clinical and transferable skills to produce competent specialists in Orthopaedic Surgery. These specialists will be capable of providing specialized care of the highest order to patients with Orthopaedics disorders in the community as well as clinical tertiary centers. They shall recognize the health needs of the community and carry out professional obligations ethically and keeping their standards by engaging in continuing medical education. The programme also aims to introduce the candidate to the basics of scientific medical research.



**Phase-B Content:**

**Block-1 & 2**

**General Orthopaedic:**

- Osteoarthritis
- Osteoporosis
- Metabolic bone disease
- Rheumatoid arthritis and other arthropathies (inflammatory, crystal, etc)
- Haemophilia
- Inherited musculoskeletal disorders
- Neuromuscular disorders inherited and acquired
- Osteonecrosis
- Osteochondritides
- Heterotopic ossification
- Metastases
- Investigation:
- Blood tests
- Musculoskeletal imaging: x-ray, contrast studies (myelography, arthrography), CT, MR, ultrasound, radioisotope studies
- Effects of radiation
- Bone densitometry
- Electrophysiological investigations
- Operative Topics:
- Tourniquets
- Design of theatres
- Anaesthesia - principles and practice of local and regional anaesthesia and principles of general anaesthesia.

**Infection, Thromboembolism & Pain:**

- Infection of bone, joint, soft tissue, including tuberculosis and their prophylaxis
- Sterilisation
- Thromboembolism and prophylaxis
- Behavioural dysfunction and somatization
- AIDS and surgery in high-risk patients
- Pain and pain relief
- Skin preparation
- Complex regional pain syndromes e.g. Reflex Sympathetic Dystrophy and Causalgia

**Prosthetics & Orthotics:**

- Principles of design
- Prescription and fitting of standard prostheses
- Principles of orthotic bracing for control of disease, deformity and instability

**Research & Audit:**

- Design and conduct of clinical trials
- Data analysis and statistics - principles and applications
- Principles of Epidemiology
- Audit

**Medical Ethics:**

- Duties of care
- Informed consent
- Medical negligence

**Block-3**

**General Aspect of Trauma:**

**Basic Science**

**Anatomy:**

- Applied to diagnosis and surgical treatment of common bone, joint and soft tissue injuries.
- Knowledge of those anatomical structures particularly at risk from common injuries or insurgical approaches.
- Physeal anatomy and its application to injury.

**Biomechanics:**

- Application to open reduction and internal fixation of fractures and external skeletal fixation
- Applied to fracture formation and fracture treatment both operative and non-operative
- Biomechanics of implants and fracture fixation systems, including their material

**Epidemiology and Research Methods:**

- Research and audit methods including the design of clinical trials

**Pathology:**

- Applied to fracture and soft tissue healing, including skin, muscle, tendon and neurological structures
  - Classification systems for fractures and dislocations
  - Pathology of non-union of fractures
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- Response of the body, and local musculoskeletal tissues to infection
- Systemic response of body to major injury
- Mechanisms underlying Acute Respiratory Distress Syndrome and similar life threatening conditions
- Science of fluid replacement therapy in the acutely injured including application to the treatment of burns
- Science of treatment of compartment syndrome
- Response of infants, children and the elderly to injury

**Clinical Assessment:**

- Initial clinical assessment of the patient with severe injury, including spinal cord injury, soft tissue injury, burns and head injury
- Assessment of all types of fracture and dislocation, their complications, early and late
- Identification of life threatening/limb threatening injuries. Understanding priorities of treatment

**Investigations:**

- Knowledge of the principles, application and side effects of commonly used investigations, including radiographs, CT and MRI scans, radio-isotope imaging, ultrasound scans and electrophysiological investigations

**Treatment:**

- Knowledge of different treatment options for musculoskeletal injury, both non-operative and operative. Ability to analyse the pros and cons for each method.
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- Ability to manage the overall care of the severely injured.
- Ability to undertake the complete treatment of all types of common fracture and dislocation including the bone and soft tissue treatment of open fractures and the treatment of pathological fractures.
- Where common injuries are normally treated by a sub specialist (e.g. spinal injury, arterial injury or intra cranial hemorrhage) there should be ability to manage the initial treatment of the patient and know the principles of the specialist treatment.
- Principles of reconstructive surgery for the injured, including treatment of non-union and mal-union of fractures, bone defects, chronic post-traumatic osteomyelitis and delayed treatment of nerve injury; principles of soft tissue reconstruction.
- The principles of amputation in the injured and the rehabilitation of such patients

**Block-4****Musculoskeletal Tumor & Infection****Tumors:**

- Clinical Presentation
- Imaging
- Laboratory Investigations
- Biopsy
- Differential Diagnosis
- Staging the lesion
- Principles of Management
- Methods of treatment

**Benign bone lesions:**

- Fibrous Dysplasia
- Osteoid Osteoma
- Osteblastoma (Giant Osteoid Osteoma)
- Compact Osteoma (Ivory Exostosis)
- Chondroma ( Enchondroma)
- Periosteal Chonroma
- Chondroblastoma
- Chondromyxoid Fibroma
- Osteochondroma (Cartilage- Capped Exostosis)
- Simple Bone Cyst
- Aneurysmal Bone Cyst
- Giant-Cell Tumour
- Giant Cell Sarcoma
- Eosinophilic Granuloma And Histiocytosis
- Haemangioma
- Osteolysis (Disappearing Bones)

**Primary Malignant Bone Tumors:**

- Chondrosarcoma
- Osteosarcoma

**Variants of Osteosarcoma :**

- Parosteal Osteosarcoma
- Paget's Sarcoma
- Fibrosarcoma of Bone

**Malignant Fibrous Histiocytoma:**

- Ewing's Sarcoma
- Reticulum-cell Sarcoma (Non-Hodgkin's Lymphoma)
- Multiple Myeloma
- Chordoma
- Adamantinoma

**Soft-Tissue Tumours:**

- a) Fatty Tumours
- b) Fibrous Tumours
- c) Synovial Tumours
- d) Blood Vessel Tumours
- e) Nerve Tumours
- f) Muscle Tumours

**Infection:**

- General Aspects of Infection
- Acute Haematogenous Osteomyelitis
- Subacute Haematogenous Osteomyelitis
- Multifocal Non-Suppurative Osteomyelitis
- Infantile Cortical Hyperostosis (Caffey's Disease)
- Post-Traumatic Osteomyelitis
- Postoperative Osteomyelitis
- Chronic Osteomyelitis
- Acute Suppurative Arthritis
- Gonococcal Arthritis:
- Septic Arthritis and HIV-1 Infection
- Spirochaetal Infection

- Late congenital and Acquired Syphilis
- Tuberculosis
- Brucellosis
- Mycotic Infections
- Hydatid Disease

**Block-5**

**Hand Surgery**

**Basic Science Anatomy of:**

- The wrist/MCP/PIP/DIP joints and CMC joint of the thumb.
- The flexor and extensor mechanism of the fingers including interaction between extrinsic and intrinsic mechanism.
- The posture of the thumb in pinch, power and key grip.
- The nerve supply to the hand
- The closed compartments of forearm and hand.

**Pathology:**

- An understanding of the special circumstances associated with swelling and the effects of rising pressure in a closed compartment secondary to infection and injury.
- An understanding of the special circumstances in which oedema causes fibrosis and Permanent stiffness.
- Tendon injury and healing.
- Nerve injury and healing.
- An appreciation of the imbalances and deformities associated with inflammatory arthritis.
- A classification system for congenital hand disorders

- Langers lines.
- Hand tumours (e.g. ganglion/enchondroma).
- Dupuytren's disease

**Clinical Assessment:**

- History of examination of hand and wrist in the assessment of tendons, distal radioulnar and radiocarpal joints.
- Ability to elicit median, ulnar and radial nerve function and disorders.
- Recognition of patterns of presentation of common compressive neuropathies and brachial neuralgia.
- Assessment of intrinsic and extrinsic motors in digits and recognition of common deformities and deficiencies.
- Awareness of presentation of work-related hand disorders.
- Ability to examine and assess common rheumatoid hand deformities, e.g.: inferior radioulnar subluxation and carpal translocation; MCP subluxation and ulnar drift; digital Boutonniere and swan neck; thumb Boutonniere deformity and CMC disease.
- Ability to recognise and assess focal hand swellings.

**Investigations:**

- Interpretation of plain and stress x-rays of wrist. A knowledge of other views.
- Awareness of role of MRI/bone scan/arthrography/arthroscopy.
- Place and interpretation of nerve conduction studies.

**Treatment:**

- Knowledge of a strategy of management for the osteoarthritic rheumatoid hand.
- Understanding of the place of soft tissue reconstruction, joint fusion, interposition and excision arthroplasty in the treatment of the arthritic hand and wrist.
- Knowledge of the management of stenosing tenovaginitis.
- Knowledge of the principles of treatment for common flexor and extensor tendon injuries and of the common surgical approaches to the digital flexor and extensor compartments.
- Fractures of metacarpals and phalanges.
- Familiarity with the surgical treatment of Dupuytren's disease.
- Awareness of the principles of tendon transfer for the reconstruction of median, ulnar and radial nerve palsy and familiarity with simple transfers, e.g. indicis to EPL.
- Knowledge of splinting techniques and rehabilitation principles.
- Ability to plan management for finger tip injuries and undertake closed management.
- Knowledge of surgical approach to digits with particular regard to the restoration of function and prevention of stiffness.
- Knowledge of the levels for digital amputation.
- Injuries of ulnar collateral ligament of thumb.
- Dislocations of carpus and carpal instability.

- Knowledge of closed and operative options of treatment for fractures of distal radius and common carpal injuries including scaphoid non union.
- Familiarity with the surgical treatment of common compressive neuropathy.
- Ability to manage common hand infections

**Block-6**

**Knee**

**Basic Science**

**Anatomy:**

- Knowledge of regional anatomy of the knee, including:
- Surface anatomy.
- Neural and vascular structures and their relations with particular reference to standard anterior and posterior surgical approaches.
- Bones and joints.
- Functional anatomy of ligaments and supporting muscles.
- Innervation of the knee including controlling musculature.
- The extent and function of the synovium and bursae of the knee.
- The structure and function of the menisci, and articular cartilage.

**Biomechanics:**

- The mechanics of the patello-femoral mechanism.
- The medial and lateral weight-bearing joints and their inter-relationship.

- The cruciate and collateral ligaments and other ligamentous and muscular supports.
- Menisci and articular cartilage.

**Pathology:**

- The mechanism of ligamentous, bony and combined trauma to the knee and healing potential.
- A complete knowledge of arthritides, including degenerate wear, ageing changes and traumatic damage.
- Pathology of inflammatory disease and infection affecting the knee.
- The response of synovium to debris.
- Benign and malignant conditions in the knee and surrounding structures including recognized classification where appropriate.

**Clinical Assessment:**

A sound knowledge and understanding of:

- History and examination of the knee to include relevant surrounding structures.
- The standard clinical signs of the knee and relevant adjacent structures and competent skill in describing these.
- A critical understanding of rating and outcome measures in common use.

**Investigations:**

Indications for and interpretations of:

- Radiographs – standard and specialized.
- Blood investigation.

- Aspiration
- Special investigations including CT, MRI and radioisotope scanning.
- Arthroscopy
- Biomechanical testing

**Treatment:**

A sound knowledge of conservative and surgical management, including the indications for referral to a specialist of:

- Paediatric disorders, including deformity, dislocations, epiphyseal disorders, osteochondritis and discoid meniscus.
- Adolescent disorders including patello femoral and meniscal dysfunction, osteochondritis dissecans.
- Young adult disorders including patello femoral and meniscal injuries, instability and ligament deficiency, synovial disorders, benign and malignant tumours.
- Degenerative and inflammatory arthritis, including a balanced understanding of conservative and surgical options, including osteotomy, arthrodesis and arthroplasty
- Traumatic disorders including skin and soft tissue injuries, fractures and dislocations of patella, tibia and femoral components, ligament ruptures and internal derangement of the knee. Conservative and surgical indications and detailed methods of treatment. Outcomes of conservative and operative management.
- Infections, particularly infections and inflammations of the bursae, intra-articular sepsis, prevention and management of sepsis in implant surgery.

- A sound working knowledge of the range of arthroplasties for primary and revision surgery for patello femoral, unicompartmental and total replacement of the knee with particular reference to secure bone anchorage, alignment, ligament stability and optimising range of movement; a good knowledge of post-operative complications, their prophylaxis and management
- A knowledge of the indications and techniques of revision surgery particularly for aseptic and septic loosening n/a .
- A knowledge of simple arthroscopic surgery including meniscectomy, trimming and shaving.
- An appreciation of complex arthroscopic procedures.
- An appreciation of medical and surgical techniques available to repair and replace articular cartilage.

**Block-7****Ankle & Foot Surgery****Basic Science****Anatomy:**

- Bones and articulations
- Ligamentous structures - ankle/ hindfoot/midfoot.
- Plantar fascia and MTP anatomy
- Surface markings of neural and vascular structures .
- Tendon anatomy
- Muscle compartments of the foot

**Biomechanics:**

- Function of the lower limb and foot in gait

- Ankle and subtalar joint
- Plantar fascia mechanisms
- Tendon function
- Orthoses and footwear

**Pathology:**

**Arthritides**

- Degenerative joint disease
- Rheumatoid foot disease

**Neuropathy**

- Neuropathic joint and skin changes

**Tumours**

- E.g. osteoid osteoma and plantar fibroma

**Clinical Assessment:**

- History and clinical examination of the foot and ankle in order to assess pain, joint function, deformity, nerve, muscle and tendon function.
- Ability to recognise and assess the following diseases of the ankle and foot:

**Neurological disorders:**

- Charcot joint
- Morton's neuroma.
- Nerve entrapment.
- Neurological foot deformity .

**Trauma:**

- Evaluation of skin and soft tissue injury.
- Compartment syndrome
- Recognition of all fractures and dislocations.

**Ankle and hindfoot disorder:**

- Hindfoot pain.
- Ankle instability.
- Heel pain.
- Degenerative disease of the ankle.
- Rheumatoid arthritis.
- Osteochondritis dissecans of talus.

**Forefoot disorders:**

- Hallux valgus.
- Hallux rigidus.
- Lesser toe deformities.
- Metatarsalgia.
- Inflammatory arthritis.

**Tumours:**

- Ability to recognise and assess local foot swellings.

**Diabetic foot:**

**Complex foot deformity**

- Flatfoot deformity – mobile and rigid.



- Cavus deformity.
- Residual congenital foot deformity.

**Investigations:**

**Radiograph:**

- Standard foot and ankle views.

**CT, MRI and Scintigraphy:**

- Knowledge of role of these ancillary investigations in certain specific conditions e.g. infection, tumour, tibialis posterior rupture, osteonecrosis.

**EMG:**

- Relevance to foot and ankle Disorders.

**Treatment:**

**Non-operative:**

- Knowledge of rational basis for the use of footwear modifications, orthoses and total contact casting.

**Operative:**

- Detailed knowledge of closed and operative methods for management of fractures and dislocations of ankle, hindfoot and forefoot, including knowledge of common reconstructive surgical procedures for foot deformity including hallux valgus, lesser toe deformity, acquired flat-foot, to include arthrodesis, osteotomy and soft-tissue reconstruction
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- Knowledge of common amputations through foot and ankle.
- Knowledge of common reconstructive surgical procedures for degenerative and inflammatory disorders of ankle and foot including arthrodesis, arthroplasty, excision arthroplasty procedures to first ray both proximal and distally for management of hallux valgus and rigidus.

**Block-8**

**Hip**

**Basic Science**

**Anatomy:**

- Basic knowledge of the regional anatomy of the hip including:
- Development of the hip joint
- Relationship of bony elements
- Blood supply of the femoral head
- Anatomical course of all major regional vessels and nerves
- The capsule, labrum and related ligaments
- An understanding of the action, anatomy and innervation of the regional musculature
- Detailed knowledge of the applied anatomy of common surgical approaches to the hip (medial, anterior, lateral and posterior)

**Biomechanics:**

- An understanding of the lever arms, muscles and body weight forces that produce the joint reaction force in both normal and abnormal hips.
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- An understanding of the application of these principles to the rationale of both pelvic and femoral osteotomies, and replacement arthroplasty.
- Knowledge of the tribological properties of materials used for articulating surfaces.
- Knowledge of the biocompatibility and mechanical properties of materials in common use in total hip arthroplasty.

**Pathology:**

- Basic knowledge of the pathology of pyogenic and non-pyogenic arthritis, slipped upper femoral epiphysis [SUFE], Perthes' disease and hip dysplasia.
- Mechanism and pattern of common fractures and fracture dislocations around the hip (intracapsular, extracapsular, acetabular and periacetabular, femoral head, etc).
- Knowledge of the pathology of osteoarthritis, rheumatoid arthritis and the seronegative arthritides at the hip and of osteonecrosis of the femoral head.
- Familiarity with current theories of the aetiopathogenesis of osteoarthritis.
- An understanding of the microbiological rationale for the prevention of sepsis in total hip arthroplasty.

**Clinical Assessment:**

- A sound knowledge of clinical assessment of the hip, lumbosacral spine and knee. Particular reference should be paid to the gait, the Trendelenberg sign, limb length, loss of movement and deformity at the joint.
- The trainee needs to be well informed of current opinion regarding aetiopathogenesis, clinical presentation and appropriate investigation of:
  - Proximal femoral fractures (intracapsular, extracapsular) and simple fracture dislocations of the hip.
  - Osteoarthritis and the inflammatory arthropathies.
  - Perthes' disease.
  - Slipped upper femoral epiphysis.
  - Septic arthritis.
  - Osteonecrosis.
  - Soft tissue conditions around the hip (snapping hip, gluteus medius tendonitis, etc).
- A working knowledge of the clinical presentations and investigations of:
  - The sequelae of CDH and hip dysplasia.
  - The sequelae of SUFE.
  - Juvenile chronic arthritis.
  - Non pyogenic arthritis.
  - The painful total hip replacement.

**Investigation:**

- A working knowledge of the interpretation of plain radiographs, dynamic arthrography, CT, bone scintigraphy and MRI of the hip region.
- A working classification of proximal femoral and periacetabular fractures. Also, mechanisms and classification of failure of joint replacement and of periprosthetic fractures.

**Treatment:****Non-operative**

An understanding of the principles of traction, bracing and spica immobilisation

An understanding of the non-operative aspects of the management of hip pathology

**Operative**

- A thorough knowledge of soft tissue surgery, osteotomy, arthrodesis and arthroplasty (excision and replacement). A sound knowledge of anterior, anterolateral, lateral and posterior approaches to the hip and of the complications associated with each.
- A sound knowledge of: internal fixation of proximal femoral fractures, hemiarthroplasty for intracapsular fractures, primary total hip replacement for OA and inflammatory arthropathies in the elderly, simple proximal femoral osteotomies. Familiarity with potential complications (i.e. thromboembolism, sepsis, dislocation, etc) and be aware of current opinion on the prevention and management of these complications.

- A knowledge of the indications for, and principles of, complex proximal femoral osteotomies, hip arthroscopy, reconstruction of the hip in young adults (JCA and hip dysplasia, etc), complex hip revision surgery.
- An appreciation of complex acetabular and pelvic fractures, complex periacetabular osteotomies.
- An understanding of the place of modern technologies such as, joint resurfacing procedures minimally invasive hip replacements and computer assisted implantation in the management of hip pathology and the attendant risks and complications.

**Block-9****Shoulder & Elbow****Basic Science****Anatomy:**

Basic knowledge of the regional anatomy of the shoulder including:

- Detailed anatomy of the sternoclavicular, acromioclavicular, glenohumeral and elbow joints to include the connecting bones, muscles and tendons acting across them, neurovascular supply, bursae and relationships to local structures
- Surgical approaches: deltopectoral and posterior approaches to glenohumeral joint; superior (McKenzie) approach to rotator cuff; and surgical approaches to the acromioclavicular and sternoclavicular joints.

- Structure and function of the above joints; a clear understanding of the static and dynamic stabilisers of the glenohumeral and elbow joints.

**Biomechanics:**

- Biomechanics of the shoulder and elbow to the level of the currently published specialist journals.
- Knowledge of the various types of shoulder and elbow prostheses including the factors influencing design, wear and loosening to the level of the currently published specialist journals.

**Pathology:**

- Sound knowledge of all commonly encountered benign and malignant conditions affecting the shoulder girdle, elbow and surrounding soft tissues.
- A basic understanding of the pathology of:
  - Impingement and rotator cuff disorders.
  - Instability of the shoulder and the elbow.
  - Inflammatory and degenerative conditions affecting the articular cartilage and synovium
  - Infection.
  - Adhesive capsulitis of the shoulder.
  - The pathology of the stiff elbow.
  - Disorders such as ulnar neuritis and tennis or golfer's elbow

**Clinical Assessment:**

- Detailed history and examination of the painful, stiff or unstable shoulder or elbow
- Knowledge of clinical tests used specifically to assess instability of the shoulder and elbow, rotator cuff disorders, the stiff shoulder or elbow and the use of local anaesthetic in assessment. Examples are the apprehension tests for shoulder instability, impingement signs and tests, Gerber's lift off test, Napoleon's sign, and elbow instability tests, ulnar nerve assessment.
- Knowledge of conditions causing referred symptoms to the shoulder and elbow (e.g. cervical spine diseases, entrapment neuropathies and thoracic outlet disorders).
- Knowledge to the level of a basic specialist shoulder textbook of common conditions affecting the shoulder including instability, impingement, rotator cuff tears, adhesive capsulitis, osteoarthritis, rheumatoid disease, avascular necrosis, biceps tendon disorders, fractures of the proximal humerus and clavicle, and disorders of the acromioclavicular and sternoclavicular joints and scapula.
- Knowledge to the level of a basic specialist elbow textbook of common conditions affecting the elbow including instability, osteoarthritis, rheumatoid arthritis, causes of stiffness, soft tissue problems such as medial and lateral epicondylitis, neuropathies and fractures around the elbow.

**Investigation:**

- Knowledge of plain radiographs as used to assess shoulder and elbow disorders. This should include knowledge of those special views (e.g. Modified axial, Stryker notch,
- Supraspinatus Neer outlet and cubital tunnel views) required to assess adequately the conditions which commonly affect the shoulder and elbow. The ability to recognise correctly normal and abnormal abnormalities on plain radiographs.
- Knowledge of the value of ultrasound, arthrography, CT and MRI as used to assess the shoulder and elbow. An ability to identify straightforward abnormalities on CT and MRI (e.g. full thickness and partial thickness rotator cuff tears on MRI and the pathological anatomy of fractures around the shoulder and elbow using CT).
- Knowledge of the use and abuse of arthroscopy of the shoulder and elbow including a knowledge of normal and abnormal arthroscopic findings.

**Treatment:****Non-operative**

- An ability to supervise the non-operative management of fractures, dislocations and soft tissue injuries around the shoulder and elbow.
- An in-depth knowledge of the management of straightforward fractures and dislocations of the shoulder girdle and elbow. Knowledge of the treatment options for

more complex fractures with an understanding that these might more appropriately be referred to someone with a special interest; examples of these might include four part fractures of the proximal humerus and complex intraarticular fractures of the distal humerus. An ability to recognise upper limb injuries involving injuries to the brachial plexus and refer on as appropriate.

- A knowledge of injection techniques for both the shoulder and the elbow.
- Knowledge of both the non-operative and operative treatment of common disorders such as recurrent anterior traumatic instability of the shoulder, rotator cuff impingement and small rotator cuff tears, adhesive capsulitis, acromioclavicular joint pain.

**Operative**

- A knowledge of the management of soft tissue elbow disorders such as lateral and medial epicondylitis and ulnar neuropathy.
- Knowledge of the indications, options and complications for prosthetic replacement of the shoulder and elbow. A detailed knowledge of the surgical techniques is not required.
- Knowledge of the indications and benefits of arthroscopy of the shoulder and elbow. An ability to perform an arthroscopic assessment of the shoulder is expected but a knowledge of the techniques of arthroscopic surgery procedures is not required.
- Understanding the principles of management of tumours around the shoulder and elbow.

**Block-10****Paediatric Orthopaedic Surgery****Basic Science**

- Detailed knowledge of the growth of bones, physical anatomy and its application to fracture types and pathological processes and infection in particular.
- Knowledge of the anatomy of bones and joints in the growing child and its application to growth and deformity.
- Knowledge of the neurological processes involved in the production of deformity e.g. spina bifida, cerebral palsy and muscular dystrophy

**Clinical Assessment:**

- Core knowledge should be at least that of a general orthopaedic textbook
- 'Expert' knowledge, i.e. the level of the speciality journal is required for those wishing to pursue a career in children's orthopaedics.
- The trainee must be able to clinically examine a child competently and to relate effectively with the family.
- The trainee must be able to make proper management decisions in pediatric practice and to refer appropriately for treatment.

**Investigations:**

- Knowledge of the indications for plain x-ray, arteriogram, CT, MRI and the ability to interpret the images.
  - Knowledge of the indications for the use of ultrasound and nuclear imaging.
  - Awareness of the limitations of certain investigations in pediatric practice.
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**Treatment:**

- A sound knowledge of normal variants, e.g. knock knees, bow legs and flat feet.
  - A detailed knowledge of the treatment for
  - Fractures (including non-accidental injury) and growth plate injuries and recognize the sequelae
  - Bone and joint infection.
  - Common childhood orthopaedic conditions, e.g. irritable hip, anterior knee pain.
  - A working knowledge of the treatment for
  - Slipped epiphysis
  - Perthes' disease
  - Developmental dysplasia of the hip
  - Talipes
  - Scoliosis
  - Simple foot deformities (e.g. hallux valgus, metatarsus varus).
  - Simple congenital hand abnormalities (e.g. trigger thumb).
  - Osteogenesis imperfecta
  - Skeletal dysplasias
  - Tarsal coalitions
  - Torticollis
  - Leg length discrepancy
  - A knowledge of
  - Screening services for congenital abnormalities
  - Assessment of physical disability
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**Block-11****The Spine****Basic Science****Anatomy:**

- Development of the spine, spinal cord and nerve roots.
- Surgical anatomy of the cervical, dorsal and lumbosacral spine.
- Anterior and posterior surgical approaches to the spine at each level.

**Biomechanics:**

- Basic knowledge of the biomechanics of the cervical and lumbosacral spines.
- An understanding of the biomechanics of spinal instability as applied to trauma, tumour, infection and spondylolysis/lithesis.
- Biomechanics of spinal deformity.
- A knowledge of the basic mechanics of spinal instrumentation.

**Pathology:**

- Pathophysiology of the ageing spine and degenerative disc disease.
- Acute and chronic infections of the spine.
- Pathology of spinal deformity.
- Pathology of the acutely prolapsed cervical and lumbar disc.
- Recognition of patterns of spinal injury and associated cord and nerve root damage.
- Tumours of the spine.

**Clinical Assessment:**

- A thorough knowledge of general and orthopaedic history-taking and examination.
- A knowledge of the assessment of spinal deformity.
- An understanding of the assessment of thoracic pain.
- A sound knowledge of clinical assessment of the spine for low back pain, sciatica, spinal claudication, neck pain, radiating arm pain, spinal injury and incipient myelopathy
- A knowledge of the assessment of spinal tumour.
- A basic knowledge of the assessment of a patient after failed spinal surgery.

**Investigation:**

- A thorough knowledge of the basic investigations required in spinal surgery, specifically: blood tests, plain radiographs, bone scintigraphy, discography, electrophysiological studies [including cord monitoring], CT scanning, MRI scanning
- A thorough knowledge of how each of these investigations contributes to the diagnosis and management of each of the major areas of spinal disease

**Treatment:****Non-operative**

- A knowledge of the non-surgical methods available for the treatment of low back pain, sciatica, claudication, neck pain, spinal deformity, instability, tumour, infection and fracture to include:

- Analgesics and NSAIDs, physiotherapeutic regimes, pain clinic techniques, bracing, use of radiotherapy and chemotherapy, non-operative management of spinal injuries.

**Operative**

- A sound knowledge of the indications for and operative surgical management of the acute prolapsed lumbar intervertebral disc, spinal stenosis, lumbar spinal instability due to spondylolysis/litheses
- A knowledge of the indications for, and operative surgical management of the acutely prolapsed cervical disc, cervical stenosis, spinal injury and the surgery of spinal infection
- A basic knowledge of the surgery of spinal deformity and tumours of the spine.
- Science of treatment of compartment syndrome.
- Response of infants, children and the elderly to injury.

**Clinical Assessment:**

- Initial clinical assessment of the patient with severe injury, including spinal cord injury, soft tissue injury, burns and head injury.
- Assessment of all types of fracture and dislocation, their complications, early and late.
- Identification of life threatening/limb threatening injuries. Understanding priorities of treatment.

**Investigations:**

- Knowledge of the principles, application and side effects of commonly used investigations, including radiographs, CT and MRI scans, radio-isotope imaging, ultrasound scans and electrophysiological investigations.

**Treatment:**

- Knowledge of different treatment options for musculoskeletal injury, both non-operative and operative. Ability to analyse the pros and cons for each method.
- Ability to manage the overall care of the severely injured.
- Ability to undertake the complete treatment of all types of common fracture and dislocation including the bone and soft tissue treatment of open fractures and the treatment of pathological fractures.
- Where common injuries are normally treated by a sub specialist (e.g. spinal injury, arterial injury or intra cranial haemorrhage) there should be ability to manage the initial treatment of the patient and know the principles of the specialist treatment
- Principles of reconstructive surgery for the injured, including treatment of non-union and mal-union of fractures, bone defects, chronic post-traumatic osteomyelitis and delayed treatment of nerve injury; principles of soft tissue reconstruction.
- The principles of amputation in the injured and the rehabilitation of such patients.