

PG CURRICULUM FOR M.S. (ORTHOPAEDICS) UNIVERSITY OF DELHI

OBJECTIVES OF THE COURSE:

At the end of the postgraduate course in Orthopaedics, the student should have acquired the following:

1. Cognitive knowledge: Describe applied anatomy, embryology, physiology, pathology, clinical presentation, diagnostic procedures, possible management options (non-surgical, surgical, rehabilitative, preventive) pertaining to musculo-skeletal system.
2. Clinical decision making ability and expertise for management: Diagnose the musculo-skeletal disease process from history, clinical examinations, interpretation of diagnostic tests and formulate an individualized management path for the patient and follow the same.
3. Teaching: Acquire ability to teach an MBBS student in simple and straight forward language about the common orthopaedic disorders (etiopathology, clinical presentation, diagnosis, management)
4. Research: Develop ability to conduct research on the clinical material available
5. Patient Doctor Relation: Develop ability to communicate with the patient and the relatives pertaining to the disease, available treatment options, risks and benefits of the treatment and prognosis.
6. Preventive aspects: Acquire knowledge and pursue the prevention of orthopaedic disorders like osteomalacia, osteoporosis etc, also prevention of development and progression of deformities and the complications thereof following poliomyelitis, cerebral palsy, congenital defects, pott's and rheumatoid etc.
7. Follow guidelines: Should follow hygiene and cleanliness to decrease infection, use proper hospital waste management guidelines, judicious use of available drugs, careful handling of instruments (surgical instruments, arthroscope, microscope, image intensifier etc).
8. Presentation of seminar / paper: Should develop public speaking ability and should be able to make presentation on orthopaedic disorders/ research topics to fellow colleagues using audiovisual aids in seminar/ conference.
9. Research writing: Should develop acumen to write paper for publication in scientific journals
10. Team work: Team spirit should be developed both as a member or leader of the team to work and share responsibility both medical personnel and paramedics (nurses and other staff)
11. Identification of special interest within the subject: Identify special area(s) of interest e.g. arthroplasty, arthroscopy, hand surgery, oncology, spine, sports medicine, pediatric orthopaedics etc.

DURATION OF COURSE: 3 YEARS

PRACTICAL TRAINING:

A postgraduate student is expected to perform minor and major orthopaedic procedures either independently or under supervision, such as (only few examples):

1. Closed reduction of fractures and dislocations
2. Application of plaster slabs, casts, splints and braces; corrective casts for club foot and other deformities
3. Manage shock, resuscitation, electrolyte imbalance

4. Debridement of open wounds, open fractures, crush injuries, bed sores
5. Skin grafting
6. Incision & drainage of abscess
7. Perform release of compartments in compartment syndrome
8. Joint aspiration & intra-articular injections
9. External fixation of open fractures and unstable pelvic fractures
10. Amputations
11. Arthrotomy in septic arthritis and surgical decompression in acute osteomyelitis
12. Internal fixation of simple fractures, e.g. fracture of forearm, inter-trochanteric femur, shaft femur, bimalleolar fracture etc.
13. Biopsy from a mass
14. Steroid injections in various painful conditions
15. Sequestrectomy in chronic osteomyelitis
16. Deformity correction surgery of foot e.g. PMSTR in clubfoot, Jone's and Steindler's in PPRP, triple arthrodesis

CLINICAL PROGRAM:

During first six months of residency, the student is expected to:

1. Attend a basic surgical skill laboratory and resuscitation course (to be organized by the institution)
2. Attend a course of research methodology and how to pursue a thesis (to be organized by the institution)
3. Learn bedside history taking and clinical examination in ward and emergency; appropriate use of splints and traction, dressing of infected and surgical wounds etc.
4. Learn proper record keeping- clinical examination notes, progress notes, neural charts, interdepartmental referral notes, drug prescription, consent form for various surgeries, tabulation of investigations, medico legal documentation, pre-operative preparation orders, post-operative notes in details, discharge slip preparation, resuscitation and death notes etc.
5. Be present in ward rounds and grand rounds, also attend call from other departments with senior colleagues
6. Learn and perform closed reduction of common fractures and dislocations under supervision, application of plaster slab and cast, and give necessary advice to patients managed on out-patient basis.
7. Attend operation theatre, learn to scrub and assist in cases.
8. Attend OPD, examine patients and put clinical notes and advise accordingly, under supervision of faculty.
9. Be familiar with digital camera, computer and internet; to take clinical and surgical photographs and videos, to make audiovisual presentations, to search references on internet, to keep data and record in digital format and analyze data for research work.
10. Participate regularly in academic activities in the department
11. Start thesis work under allotted faculty member.

After 6 months till end of 3 years, the student is expected to:

1. Attend OPD, operation theatre, ward rounds, emergency duties, specialty clinics as per departmental schedule

2. Attend and / or present seminar, journal club, case conference / difficult case, death and complication meet, surgical – pathological – radiological conference regularly as allotted
3. Get actively involved in diagnosis and treatment of patients in ward and emergency
4. Assist or perform under supervision surgical work wherever necessary
5. Attend/ participate / present scientific paper in national/zonal/state conferences
6. Actively participate / help in organization of departmental courses and workshops
7. Maintain log book properly and get it verified time to time
8. Submit thesis progress report six monthly and complete thesis work in time

METHODS OF TRAINING AND TEACHING:

The following learning methods are to be used for the teaching of the postgraduate students:

1. **Journal Club:** One hour duration, once per week. It should cover recent papers published in reputed journals on a particular topic.
2. **Seminar:** One hour duration, once per week. The topic should be prepared by the resident under supervision of faculty.
3. **Case presentation:** Clinical case presentations by the postgraduate student before faculty. Should preferably involve one long case or two short cases in each class.
4. **Case Conference / Difficult case:** One hour duration, once per week. Residents are expected to work-up properly one long case with difficult diagnosis or management and present the same to a faculty member.
5. **Surgical- pathological – radiological conference:** Cases with relevant surgical pathology and radiology should be discussed in detail with help of other departments.
6. **Death and Complication Meet:** The whole department should organize a death and complication meet at the last working day of every month. All deaths occurred in emergency and wards, all complications occurred during the management process should be discussed in necessary details and the necessary steps to prevent them may be outlined wherever possible.
7. **Combined Round/Grand Round:** These exercises are to be done once or twice per week involving presentation of all inpatient cases. The work up and management plan should be discussed.
8. **Post Emergency Day Round:** The resident should collect the overall data of all patients attending to the Orthopaedic emergency. He should collect relevant radiographs and clinical data of all patients admitted in emergency. Any important patient not admitted should also be included. All these data should be briefed (in necessary details) to the faculty in-charge.
9. **Clinical teaching:** In OPD, ward rounds, emergency and the operation theatres: the resident should make discussion on clinical diagnosis/surgical procedures/treatment modalities with senior resident or faculty on duty. The resident should get well versed in preoperative preparation, postoperative care, maintenance of case records and preparation of discharge slip and other necessary paper work. The resident should also interact with physiotherapist pertaining to management of patients.
10. **Research methodology:** A course on research methodology, ethical issues in patient care, biostatistics, evidence based medicine and language proficiency etc are to be arranged by the institute.

Sample of Academic Curriculum:

- Monday: Case conference/difficult case/surgical-pathologic- radiologic conference
- Tuesday: case presentation
- Wednesday: Seminar
- Thursday: case presentation
- Friday: Journal club
- Death and complication meet on the last working day of every month

CURRICULUM

Basic Sciences:

- Development of skeleton & mineralization of bone
- Soft tissue anatomy, histology, physiology, injury and repair: meniscus, articular cartilage, muscle, tendon, ligament, nerve
- Bone: histology & histopathology of bone, physiology of fracture healing, delayed and non-union of bones, biophysical properties of bone, bone grafting, bone graft extenders and substitutes
- Biomechanics: gait, hip & knee arthroplasty, cerebral palsy
- Pathological tests for orthopaedic disorders, tissue diagnosis, synovial fluid analysis, molecular diagnostic methods
- Imaging: application of USG, CT scan, MRI, nuclear medicine in orthopaedics
- Ethics in orthopaedics, evidence based practice, outcome assessment, use of biostatistics
- Clinical examination: hip, spine, knee, shoulder, elbow, wrist and hand, ankle and foot, deformity, neurological examination
- Orthoses for orthopaedic disorders
- Surgical approaches
- Electrodiagnosis
- Biomaterials in orthopaedics
- Minimal access surgery, computer assisted surgery

Infections:

- Pyogenic – osteomyelitis- acute and chronic, septic arthritis, infection in presence of implant and prosthesis
- Tuberculosis – spine, hip, knee and other sites, medical, non-operative and operative treatment, paraplegia care with care of bladder, late onset paraplegia;
- syphilis, mycotic infections, salmonella & brucella osteomyelitis,
- Transient synovitis, conditions that mimic osteomyelitis

Metabolic bone disorders:

- Calcium, phosphate and vitamin D metabolism
- Rickets, osteomalacia, renal bone disease, hyperparathyroidism
- Osteoporosis
- Osteopetrosis
- Paget's disease

Musculoskeletal oncology:

- Evaluation and staging
- Benign and malignant bone and soft tissue tumors
- Principles of surgical treatment, options of limb salvage surgery
- Chemotherapy and radiotherapy
- Metastatic bone disease- diagnosis

Arthritis:

- Osteoarthritis
- Rheumatoid arthritis
- Ankylosing spondylitis
- Sero-negative spondyloarthropathy
- Crystal arthropathy- gout and pseudogout
- Neuropathic joints
- Traumatic arthritis

Joint reconstruction:

- Osteotomies around hip and knee
- Arthrodesis: shoulder, hip, knee, elbow, wrist, ankle, subtalar; indications and technique
- Arthroplasty: bearing surfaces, total hip & knee replacement, basics of replacement of other joints, partial joint replacement, surface replacement, basics to complications and treatment of arthroplasty

Sports Medicine:

- Principles of arthroscopy
- Shoulder instability: acute, recurrent, surgical stabilization
- Rotator cuff tear
- Lateral and medial epicondylitis, elbow injuries
- Ligament and meniscal injuries of knee, diagnosis and management of ACL and PCL deficient knee
- Management of osteochondral defects
- Recurrent patellar dislocation
- Ankle ligament injuries
- Tendo achiles rupture, quadriceps tendon rupture, rupture of muscles
- Tendonitis, displacement of tendons
- Stress fracture

Pediatric Orthopaedics:

- Congenital and developmental disorders: Congenital talipes equino varus, congenital vertical talus, developmental dysplasia of hip, coxa vara, Sprengel's shoulder, torticollis, Madelung deformity, Pseudoarthrosis of tibia & clavicle, congenital deficiency of limbs
- Connective tissue: osteogenesis imperfecta, Marfan syndrome, Ehler Danlos syndrome
- Genetic : neurofibromatosis, skeletal dysplasias, Duchene's muscular dystrophy
- Neuromuscular disorders: Cerebral palsy, myelomeningocele, post-polio residual deformity, diagnosis and treatment especially deformity correction

- Perthes' disease, slipped capital femoral epiphysis
- Osteochondritis at various sites
- Angular and rotational deformities of lower limb and deformity correction
- Juvenile rheumatoid arthritis. Hemophilic arthropathy
- Obstetric palsy of brachial plexus

Nontraumatic disorders:

- Muscle contractures: quadriceps, deltoid, gluteus maximus
- Snapping syndromes: hip, knee, scapula, shoulder
- Tendinitis and bursitis
- Synovitis and synovectomy
- Avascular necrosis of femoral head: etiopathology, diagnosis, management
- Transient osteoporosis of hip, protrusion acetabuli

Traumatology:

- Polytrauma and multiply injured patient care
- Basic splintage and transportation techniques, ATLS
- Complications of fracture: especially compartment syndrome, fat embolism, crush syndrome, neurovascular injury, myositis ossificans, reflex sympathetic dystrophy
- Principles of closed treatment of fractures
- Principles of fracture fixation – external and internal; implants, instruments and prosthesis, plating and nailing
- Open fracture management, common flaps in open tibial fractures
- Pathological fractures
- Amputations and prosthetics
- Fractures and dislocations in children: physal injuries, operative principles in children, fractures around elbow: supracondylar, medial and lateral condyle capitellum; pulled elbow, forearm and distal radius fractures, fracture of neck, shaft and distal femur, proximal and distal tibial physes
- Fractures in adults: scapulothoracic dissociation, fracture clavicle, fractures of proximal humerus, shaft and distal humerus, Monteggia and Galeazzi fractures, fractures of capitellum, coronoid, olecranon, radial head, forearm, distal radius, scaphoid, metacarpal and phalanges, fracture of neck, intertrochanteric, subtrochanteric, shaft and distal femur, fracture patella, fracture of tibial plateau, shaft and pilon.
- Pelvic, acetabular and sacral fractures
- Management of malunion (especially cubitus varus and valgus, neglected Monteggia injury, distal radius) and nonunion (especially infected nonunion)
- Management of acute dislocation and fracture dislocations: sternoclavicular and acromioclavicular joint, shoulder, elbow, terrible triad, radial head, perilunate, sacroiliac, hip, knee, floating knee injury, patella, ankle.
- Management of chronic unreduced dislocations: hip, shoulder, elbow

Spine:

- Fractures and dislocations of spine, non-operative and operative treatment
- Various spinal instrumentations
- Management of Pott's spine
- Paraplegia care, bladder rehabilitation

- Congenital anomalies of upper cervical spine, Kippel Feil syndrome
- Scoliosis: infantile, juvenile, adolescent, neuromuscular
- Scheuermann disease
- Spondylolysis, spondylolisthesis
- Low back pain, prolapsed intervertebral disc
- Degenerative cervical and lumbar spine, lumbar canal stenosis
- Spine in ankylosing spondylitis and rheumatoid arthritis
- Tumors of the spine- primary and metastatic

Hand:

- Basics of microsurgery
- Flexor and extensor tendon injuries
- Fracture and dislocation in hand
- Diagnosis and management of peripheral nerve injuries
- Reconstruction of upper limb in nerve injuries: brachial plexus, radial, ulnar and median nerves
- Injuries of wrist: scaphoid fracture and nonunion, perilunar instability
- Disorders of wrist: Keinbock's disease, DRUJ reconstruction, arthritic wrist
- Volkmann ischemic contracture
- Carpal tunnel syndrome and other compression neuropathies
- Rheumatoid hand management
- Dupuytren's disease
- Tenosynovitis, DeQuervian disease, trigger finger
- Hand infections
- Tumor and tumor like conditions of hand
- Congenital hand anomalies

Foot and ankle:

- Fractures of calcaneus, talus, Lisfranc's and Copart's fracture dislocations, metatarsal fractures
- Management of sciatic and peroneal nerve injury
- Flat foot, tarsal coalition
- Hallux valgus and other hallux disorders
- Claw toe, hammer toe, mallet toe, bunion, bunionette
- Diabetic foot and other neuropathic foot disorders
- Pes cavus
- Tarsal tunnel syndrome, Morton's metatarsalgia
- Painful heel, plantar fasciitis
- Ingrown toe nail
- Tendonitis: tendo achilles, tibialis anterior and posterior

THESIS:

All students should be allotted one of the faculty of the department eligible under university to pursue a research thesis. A thesis orientation program should be organized by the institute to sensitize the students about making a research protocol, research methodology, use of

medical literature, use of biostatistics. The thesis should be cleared by ethical and thesis committee of the institute.

Every six months, the student should give a thesis progress report to the department. Guide and co-guide(s) should discuss the progress report, identify the difficulties and provide assistance to the student to overcome them. The student should complete the thesis in stipulated time and submit his thesis to the university in time. Failing to submit progress report or thesis in time should be brought to the notice of Dean/Principal.

The completed thesis must be submitted in time to the university and must be accepted by reviewers under university. If the thesis is rejected, the student has to improve upon the suggestions given by the reviewers and resubmit it within stipulated time. Failing to get the thesis accepted automatically disqualifies the student from appearing in the final examination.

Guidelines for writing thesis:

Title: Should be brief, clear and focused on the relevance of topic

Introduction: Should state purpose of study, mention lacunae in existing knowledge and the study hypothesis

Review of literature: Should be relevant, complete and up to date

Materials and methods: Should include type of study, details of study design, selection and exclusion criteria's of subjects, procedure performed if any in detail, procedure of data collection & assessment of outcome and statistical methods employed.

Observations: Should be organized, presented in appropriate graphical methods and tables, analyzed correctly and interpreted statistically

Discussion: Observations should be analyzed in light of current literature; should try to answer older concerns and raise new questions wherever possible; should enlist strength and weakness of the study.

Conclusion: The findings of thesis should be enlisted with a message.

Bibliography: Should be arranged properly in Vancouver format

Appendix: All proformas used to be appended

Master chart: Detailed chart of all subjects on an excel sheet

LOG BOOK:

The student should maintain a log book during his/ her training indicating duration of postings, work done in wards, OPDs, operation theatres and emergencies. It should indicate the surgeries and procedures assisted and performed by the candidate, teaching programs (seminar, journal club etc) attended and presented.

The purpose of logbook is to,

1. Help maintain a record of work done during training
2. Enable the faculty to have a first hand information about the candidates work
3. Use it to assess the clinical and surgical experience by the student periodically

The log book should be maintained on daily basis and should be verified by the senior resident or faculty. Every monthly the log book should get signed by the head of unit. At the end of tenure it should be signed by the Head of Department.

Proforma for logbook

PERSONAL DETAILS							
Name:							
Date of Joining:							
Address:							
Title of thesis:							
Guide and Co-guides:							
Details of postings:							

EMERGENCY / ROUTINE ORTHOPAEDIC OPERATIONS							
Sl no	Date	Pts name, age, sex, CR no	Diagnosis	Procedure	Performed under supervision/ assisted	Remark	Signature of senior surgeon

CLOSED TREATMENT OF FRACTURE AND DISLOCATIONS							
Sl no	Date	Pts name, age, sex, CR no	Diagnosis	Procedure	Outcome	Remark	Signature of SR/ faculty

CLINICAL CASE PRESENTATION / CASE CONFERENCE							
Sl no	Date	Pts name, age, sex, OPD/CR no	Diagnosis	Remarks	Signature of faculty		

SEMINAR / JOURNAL CLUB/SURGICAL-PATHOLOGICAL-RADIOLOGICAL CONFERENCE							
Sl no	Date	Topic	Presenter	Moderator	Signature of faculty		

MEETING/CONFERENCE/CME/ COURSE ATTENDED							
Date	Meeting/conference/CME/course	Place	Remarks				

PAPER/POSTER PRESENTED/PUBLISHED							
Sl no	Date	Title	Presented/ published at				