

## *Syllabus*

### **Course contents:**

#### **1. Basic Sciences**

- Anatomy and function of joints
- Bone structure and function
- Growth factors and fracture healing
- Cartilage structure and function
- Structure and function of muscles and tendons
- Tendon structure and function
- Metallurgy in Orthopaedics
- Stem Cells in Orthopaedic Surgery
- Gene Therapy in Orthopaedics

#### **2. Diagnostic Imaging in Orthopaedics**

**(Should know the interpretation and Clinical Correlation of the following): -**

- Digital Subtraction Angiography (DSA)
- MRI and CT in Orthopaedics
- Musculoskeletal USG
- PET Scan
- Radio-isotope bone scan

#### **3. Metabolic Bone Diseases**

- Rickets and Osteomalacia
- Osteoporosis
- Scurvy
- Mucopolysaccharoidoses
- Fluorosis
- Osteopetrosis

#### **4. Endocrine Disorders**

- Hyperparathyroidism
- Gigantism, Acromegaly

#### **5. Bone and Joint Infections**

- Pyogenic Haematogenous Osteomyelitis - Acute and Chronic
- Septic arthritis
- Fungal infections
- Miscellaneous infections
- Gonococcal arthritis
- Bone and joint brucellosis
- AIDS and the Orthopaedic Surgeon (universal precautions)
- Musculoskeletal Manifestations of AIDS
- Pott's spine
- Tubercular synovitis and arthritis of all major joints

#### **6. Poliomyelitis**

- General considerations
- Polio Lower limb and spine
- Management of Post Polio Residual Palsy (PPRP)

#### **7. Orthopaedic Neurology**

- Cerebral Palsy
- Myopathies

#### **8. Peripheral Nerve Injuries**

- Traumatic
- Entrapment Neuropathies

## **9. Diseases of Joints**

- Osteoarthritis
- Calcium Pyrophosphate Dihydrate (CPPD), Gout
- Collagen diseases

## **10. Systemic Complications in Orthopaedics**

- Shock
- Crush syndrome
- Disseminated Intravascular Coagulation (DIC)
- Acute Respiratory Distress Syndrome (ARDS)

## **11. Bone Tumors**

- Benign bone tumors
- Malignant bone tumors
- Tumor like conditions
- Metastatic bone Tumors

## **12. Miscellaneous Diseases**

- Diseases of muscles
- Fibrous Dysplasia
- Unclassified diseases of bone
- Paget's disease
- Peripheral vascular disease
- Orthopaedic manifestations of bleeding disorders

### **13. Regional Orthopaedic Conditions of Adults and Children**

- The spine
- The shoulder
- The elbow
- The hand
- The wrist
- The hip
- The knee
- The foot and ankle
- The pelvis

### **14. Biomaterials**

- Orthopaedic metallurgy
- Bio-degradable implants in Orthopaedics
- Bone substitutes
- Bone Banking

### **15. Fracture and Fracture-Dislocations**

General considerations

- Definitions, types, grades, patterns and complications
- Pathology of fractures and fracture healing
- Clinical and Radiological features of fractures and dislocations
- General principles of fracture treatment
- Recent advances in internal fixation of fractures
- Locking plate osteosyntheses
- Less Invasive Stabilisation System (LISS)
- Ilizarov technique
- Bone grafting and bone graft substitutes
- Open fractures and soft tissue coverage in the lower extremity
- Compartment syndrome
- Fractures of the upper extremity and shoulder girdle

- Fractures of the lower extremity
- Fractures of the hip and pelvis
- Malunited fractures
- Delayed union and non union of fractures
- Fractures/dislocations and fracture - dislocations of spine

## **16. Dislocations and Subluxations**

- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations

## **17. Traumatic Disorders of Joints (Sports Injuries)**

- Ankle injuries
- Knee injuries
- Shoulder and elbow injuries
- Wrist and hand injuries

## **18. Arthrodesis**

- Arthrodesis of lower extremity and hip
- Arthrodesis of upper extremity
- Arthrodesis of spine

## **19. Arthroplasty**

- Biomechanics of joints and replacement of the following joints.
- Knee
- Ankle
- Shoulder
- Elbow

## **20. Minimally Invasive Surgery (MIS)**

### **Arthroscopy**

- General principles of Arthroscopy
- Arthroscopy of knee and ankle
- Arthroscopy of shoulder and elbow

## **21. Amputations and Disarticulations**

- Amputations and disarticulations in the lower limb
- Amputations and disarticulations in the upper limb

## **22. Rehabilitation - Prosthetics and Orthotics**

### **23. Pediatric orthopaedics:**

- Fractures and dislocations in children
- Perthes' disease
- Slipped capital femoral epiphysis
- Congenital Dislocation of Hip (CDH)
- Neuromuscular disorders

## **24. Spine**

**a) Spinal trauma:** diagnosis and management including various types of fixations

- i. Rehabilitation of paraplegics/quadriplegics
- ii. Management of a paralyzed bladder
- iii. Prevention of bed sores and management of established bed sores
- iv. Exercise programme and Activities of Daily Living (ADL)
- v. Psychosexual counseling

**b) Degenerative disorders of the spine**

- i. Prolapsed Inter Vertebral Disc (PIVD)
- ii. Lumbar Canal Stenosis (LCS)
- iii. Spondylolysis/Spondylolisthesis
- iv. Lumbar Spondylosis
- v. Ankylosing Spondylitis
- vi. Spinal fusion: various types and their indications.

**25. Triage, Disaster Management, BTLS and ATLS**

**26. Recent advances in orthopaedics**

- Autologous chondrocyte implantation
- Mosaicplasty
- Video assisted Thoracoscopy (VATS)
- Endoscopic spine surgery
- Metal on metal arthroplasty of hip
- Surface replacements of joints
- Microsurgical techniques in Orthopaedics
- Designing a modern orthopaedic operation theatre
- Sterilization
- Theatre Discipline
- Laminar air flow
- Modular OTs

### ***TEACHING AND LEARNING METHODS***

- Emphasis should be given to various small group teachings rather than didactic lectures.
- CASE PRESENTATION once a week in the ward, in the outpatient department and special clinics.
- Seminars / Symposia – Twice a month; Theme based student centered
- Journal club/ Review : Twice a month
- Academic grand ward rounds: Twice a month presentation of cases by residents and clinically applicable discussions.

**ORTHO RADIOLOGY MEETS:** Twice a month discussions amongst Ortho & Radiology Residents under facilitation of faculty on various imaging modalities used and its interpretation

**ORTHO SURGICAL PATHOLOGICAL MEET:** Special emphasis on the surgical pathology radiological aspect of the case in the pathology department. The Clinician (Ortho resident) presenting the clinical details of the case, radiology PG student describes the Radiological findings and its interpretation and Pathology student describes the morbid anatomy and histopathology of the same case.

**SKILLS LAB SESSIONS:** Once a fortnight for all two years.

- **Clinical teaching** in the OPD, Emergency room, ICU, OR as per the situation.
- **Mortality & Morbidity meetings with SURGICAL AUDIT:** Once a month
- Maintenance of log book: to be signed by the faculty in charge
- The post graduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
- A post graduate student of a postgraduate degree course in broad specialities/super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the post graduate degree examination.



- Should have attended two conferences/CMEs/Workshops during his tenure as a postgraduate
- Department should encourage e-learning activities.

## **Rotations:**

### **1. Clinical postings**

A major portion of posting should be in Orthopaedics department. It should include inpatients, out-patients, ICU, trauma, emergency room and speciality clinics.

#### **Rotation of posting**

- o Inter-unit rotation in the department should be done for a period of up to one year.
- o Rotation in appropriate related subspecialties for a total period not exceeding 06 months.

#### **Clinical meetings:**

There should be intra- and inter- departmental meetings for discussing the uncommon /interesting cases involving multiple departments.

**Log book:** Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/tests/operations/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. They should be entered in a Log Book. The Log books shall be checked and assessed periodically by the faculty members imparting the training.

**During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of surgical skills laboratories in medical colleges is mandatory.**

## **ASSESSMENT**

Assessment should be comprehensive and objective assessing the competencies stated in the course. The assessment is both formative and summative. Formative is spread over the entire duration of the programme and the summative is as per university examination pattern.

**FORMATIVE ASSESSMENT, during the training, Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills,**

**interpersonal skills, professionalism, self directed learning and ability to practice in the system.**

### **General Principles**

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and clinical examination.

**Quarterly assessment during the MS training should be based on following educational activities:**

- 1. Journal based / recent advances learning**
- 2. Patient based /Laboratory or Skill based learning**
- 3. Self-directed learning and teaching**
- 4. Departmental and interdepartmental learning activity**
- 5. External and Outreach Activities / CMEs**

**The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).**

**SUMMATIVE ASSESSMENT, at the end of the course,**

### **Post Graduate Examination**

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS.**

The Post Graduate examination shall be in three parts: -

#### **1. Thesis**

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognized Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the post graduate student to the

techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

## **2. Theory:**

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period. There shall be four theory papers as follows:

**Paper I:** Basic Sciences as applied to Orthopaedics

**Paper II:** Traumatology and Rehabilitation

**Paper III:** Orthopaedic diseases

**Paper IV:** Recent advances in Orthopaedic surgery + General Surgery as applied to Orthopaedics

## **3. Practical/Clinical:**

The practical examination should consist of the following and should be spread over two days, if the number of post graduate students appearing is more than five.

1. One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
2. Short cases from various sections of the speciality (three)

#### **4. Oral/Viva-voce Examination**

- Surgical Anatomy including Osteology
- Instruments
- Radiology
- Surgical Pathology
- Orthotics and prosthetics

#### **Recommended Reading:**

##### **Books (latest edition)**

1. Campbell's Operative Orthopaedics, Vols 1,2,3 & 4
2. Mercer's Orthopaedic Surgery
3. Rockwood And Greens – Fractures In Adults, Vol 1& 2
4. Fractures In Children – Rockwood & Wilkins
5. Physiological Basis Of Medical Practice – Best And Taylor's
6. Arthroscopic Surgery Of The Knee – Johannes
7. Paediatric Orthopaedics – Tachidjian, Vol 4
8. Concise System Of Orthopaedics And Fractures – Graham Apley
9. Orthopaedics And Traumatology – Natarajan
10. Outline Of Fractures Adams, Hamblen
11. Textbook Of Orthopaedics And Trauma – Kulkarni, Vol 1
12. B.D. Chaurasia's Human Anatomy, Vol 1, Vol 2, Vol 3
13. Pharmacology And Pharmacotherapeutics – Satoskar
14. Orthopaedics Anatomy And Surgical Approaches Frederick Wreckling
15. The Art Of Aesthetic Plastic Surgery – John R Levis, Vol 1
16. Current Concepts In Orthopaedics Dr. D. K. Tareja

17. Custom Mega Prosthesis & Limb Salvage Surgery Dr. Mayilvahanan
18. Advances In Operative Orthopaedics
19. Green's Operative Hand Surgery-Vol. 1&. 2, Green, David P; Hotchkiss, Robert N
20. Tachdjian's Pediatric Orthopaedics-Vol. 1, Vol 2, Vol 3, Herring, John Anthony
21. Surgical Exposures In Orthopedics:The Anatomic Approach, Hoppenfeld, Stanley; De Boer,Piet
22. Adams's Outline Of Orthopaedics, Hamblen, David L; Simpson, Hamish R
23. Text Book Of Ilizarov Surgical Techniques Bone Correction And Lengthening, Golyakhovsky, Vladimir; Frankel, Victor H
24. Current Techniques In Total Knee Arthroplasty, Sawhney G S
25. Applied Orthopaedic Biomechanics, Dutta, Santosh; Datta,Debasis
26. Essential Orthopaedics And Trauma, Dandy, David J; Edwards, Dennis J
27. Adams's Outlines Of Fractures;Including Joint Injuries, Hamblen, David L; Simpson, A Hamish R W
28. Orthopedic Physical Assessment, Magee, David J
29. Turek's Textbook Of Orthopaedics Vol 1 & 2, Turek's
30. Orthopaedics Surgical Approach, Miller

### **Journals**

03-05 international Journals and 02 national (all indexed) journals

## **Annexure I**

### **Postgraduate Students Appraisal Form**

**Pre / Para /Clinical Disciplines**

**Name of the Department/Unit :**

**Name of the PG Student :**

**Period of Training : FROM.....TO.....**

**Sr.**

**No.**

#### **PARTICULARS**

**Not Satisfactory**

**Satisfactory**

**More Than Satisfactory**

**Remarks**

**1 2 3 4 5 6 7 8 9**

- 1. Journal based / recent advances learning**
- 2. Patient based /Laboratory or Skill based learning**
- 3. Self directed learning and teaching**
- 4. Departmental and interdepartmental learning activity**
- 5. External and Outreach Activities / CMEs**
- 6. Thesis / Research work**
- 7. Log Book Maintenance Publications Yes/ No**

**Remarks\***

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**\*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

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