

**Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE**  
**Deemed to be University**

Maduravoyal, Chennai – 600 095, Tamilnadu, India  
(An ISO 2001:2018 Certified Institution)

**University with Graded Autonomy Status**



**SYLLABUS & CURRICULUM**  
**for**  
**M.S. ORTHOPAEDICS**

**2020 onwards**

**Sponsored by**  
**Dr. M.G.R. EDUCATIONAL AND RESEARCH INSTITUTE TRUST**

## GOAL AND OBJECTIVES

**Patient care ability:** A candidate in orthopaedics surgery at the end of its 3 year course should develop proper clinical acumen to interpret diagnostic results and correlate them with symptoms. He should become capable to diagnose common clinical conditions/diseases in the specialty and to do age appropriate management effectively and without any complications and in the patient's best interest. He should be able to decide for making a referral to consultation with a more experienced colleague/professional friend while dealing with any patient with a difficult problem. He should be familiar with the treatment protocols of all orthopedic conditions and should be able to decide on the level of difficulty for appropriate referral.

**Teaching ability:** He/she should be able to teach MBBS students about the commonly encountered conditions in orthopaedics, pertaining to their diagnostic features, basic pathophysiological aspects and the general and basic management strategies.

**Research Ability:** He/she should also acquire elementary knowledge about research methodology, including record-keeping methods, and be able to conduct a research inquiry including making a proper analysis and writing a report on its findings.

**Team work:** He/she should be capable to work as a team member. He/she should develop general humane approach to patient care with communicating ability with the patients' relatives, especially in emergency situations such as in casualty department, while dealing with cancer patients and victims of accidents.

**Academic Activities:** He /She should acquire theory knowledge from the prescribed books and journals, which is the basic for application of the clinical practice. He/she should also maintain human values with ethical consideration.

## **2. SUBJECT SPECIFIC COMPETENCIES**

### **A. COGNITIVE DOMAIN**

**At the end of the M.S. Orthopaedics program, the post graduate student should be able to:**

- 1) Demonstrate sufficient understanding of the basic sciences relevant to orthopaedic speciality through a problem based approach.
- 2) Describe the Principles of injury, its mechanism and mode, its clinical presentation, plan and interpret the appropriate investigations, and institute the management of musculoskeletally injured patient.
- 3) Identify and describe the surface anatomy and relationships within of the various bones, joints, ligaments, major arteries, veins and nerves of the musculoskeletal system of the spine, upper limb, lower limb and the pelvis, chest, abdomen and head & neck.
- 4) Define and describe the pathophysiology of shock (circulatory failure).
- 5) Define and describe the pathophysiology of Respiratory failure
- 6) Describe the principles and stages of bone and soft tissue healing
- 7) Understand and describe the metabolic, nutritional, endocrine, social impacts of trauma and critical illness.
- 8) Enumerate, classify and describe the various bony/soft tissue injuries affecting the axial and appendicular skeletal system in adults and children.
- 9) Describe the principles of internal and external fixation for stabilization of bone and joint injuries.
- 10) Describe the mechanism of homeostasis, fibrinolysis and methods to control haemorrhage
- 11) Describe the physiological coagulation cascade and its abnormalities

- 12) Describe the pharmacokinetics and dynamics of drug metabolism and excretion of analgesics, anti inflammatory, antibiotics, disease modifying agents and chemotherapeutic agents.
- 13) Understanding of biostatistics and research methodology
- 14) Describe the clinical presentation, plan and interpret investigations, institute management and prevention of the following disease conditions
  - a. Nutritional deficiency diseases affecting the bones and joints
  - b. Deposition arthropathies
  - c. Endocrine abnormalities of the musculoskeletal system
  - d. Metabolic abnormalities of the musculoskeletal system
  - e. Congenital anomalies of the musculoskeletal system
  - f. Developmental skeletal disorder of the musculoskeletal system
- 15) Describe the pathogenesis, clinical features plan and interpret investigations and institute the management in adults and children in
  - a. Tubercular infections of bone and joints (musculoskeletal system)
  - b. Pyogenic infections of musculoskeletal system
  - c. Mycotic infections of musculoskeletal system
  - d. Autoimmune disorders of the musculoskeletal system
  - e. Rheumatoid arthropathy, Ankylosing spondylitis, seronegative arthropathy
  - f. Osteoarthritis and spondylosis
- 16) Describe the pathogenesis, clinical presentation, plan and interpret investigations and institute appropriate treatment in the following conditions:
  - a. Post polio residual paralysis
  - b. Cerebral palsy

- c. Muscular dystrophies and myopathies
  - d. Nerve Injuries
  - e. Entrapment neuropathies
- 17) Identify the diagnosis and describe management of musculoskeletal manifestation of AIDS and HIV infection
  - 18) Describe the aetiopathogenesis, identify, plan and interpret investigation and institute the management of osteonecrosis of bones.
  - 19) Identify situations requiring rehabilitation services and prescribe suitable orthotic and prosthetic appliances and act as a member of the team providing rehabilitation care
  - 20) Identify a problem, prepare a research protocol, conduct a study, record observations, analyse data, interpret the results, discuss and disseminate the findings.
  - 21) Identify and manage emergency situation in disorders of musculoskeletal system
  - 22) Understanding of the basics of diagnostic imaging in orthopaedics like:
    - a. Plain x-ray
    - b. Ultrasonography
    - c. Computerised axial tomography
    - d. Magnetic resonance imaging
    - e. PET scan
    - f. Radio Isotope bone scan
    - g. Digital Subtraction Angiography (DSA)
    - h. Dual energy x-ray Absorptiometry
    - i. Arthrography

- 23) Describe the aetiopathogenesis, clinical presentation, Identification, Plan investigation and institute treatment for oncologic problems of musculoskeletal system both benign and malignancies, primary and secondary.
- 24) Understand the basics, principles of biomaterials and orthopaedic metallurgy
- 25) Describe the principles of normal and abnormal gait and understand the biomedical principles of posture and replacement surgeries.
- 26) Describe social, economic, environmental, biological and emotional determinants of health in a given patient with a musculoskeletal problem.
- 27) Basic Knowledge about Tissue and Bone banking.

## **B. AFFECTIVE DOMAIN**

- ❖ Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
- ❖ Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
- ❖ Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching

### **Attitudes including Communication skills and Professionalism**

#### **a. COMMUNICATION SKILLS**

- ❖ Exhibits participation in honest, accurate health related information sharing in a sensitive and suitable manner
- ❖ Recognizes that being a good communicator is essential to practice effectively

- ❖ Exhibits effective and sensitive listening skills
  - ❖ Recognises the importance and timing of breaking bad news and knows how to communicate
  - ❖ Exhibits participation in discussion of emotional issues
  - ❖ Exhibits leadership in handling complex and advanced communication
  - ❖ Recognizes the importance of patient confidentiality and the conflict between confidentiality and disclosure
  - ❖ Able to establish rapport in therapeutic bonding with patients, relatives and other stakeholders through appropriate communication
  - ❖ Able to obtain comprehensive and relevant history from patients/relatives
  - ❖ Able to counsel patients on their condition and needs
- b. **Teamwork:** Seek cooperation. Coordination and communication among treating specialties and paramedical staff
- c. **Counseling of relatives:** regarding patients condition, seriousness, bereavement and counseling for organ donation in case of brain stem death
- d. **Leadership:** Trauma prevention, education of the public, paramedical and medical persons. **Advocacy:** with the government and other agencies towards cause of trauma care
- e. **Ethics:** The Code of Medical Ethics as proposed by Medical Council of India will be learnt and observed.

### **C. Psychomotor domain**

- 1. At the end of the first year of M.S. Orthopaedics program, the student should be able to:**
- i. Elicit a clinical history from a patient, do a physical examination, document in a case record, order appropriate investigations and make a clinical diagnosis
  - ii. Impart wound care where applicable
  - iii. Apply all types of POP casts/slabs, splints and tractions as per need
  - iv. Identify shock and provide resuscitation

- v. Perform aspiration of joints and local infiltration of appropriate drugs
- vi. Perform appropriate wound debridement
- vii. Perform arthrotomy of knee joint
- viii. Perform incision and drainage of abscess
- ix. Perform split thickness skin grafting
- x. Perform fasciotomes
- xi. Apply external fixators
- xii. Apply skeletal tractions including skull tongs
- xiii. Triage a disaster situation and multiple trauma patients in an emergency room
- xiv. Perform on bone models, interfragmentary compression screws, external fixation, Tension band wiring and Broad plating
- xv. Perform closed reduction of common dislocations like shoulder and common fractures like collar fracture, supracondylar fracture.
- xvi. Perform on a cadaver standard surgical approaches to the musculo skeletal system

**2. At the end of the second year of M.S. Orthopaedics course, the student should be able to:**

- i. Take an informed consent for standard orthopaedic procedures
- ii. Perform closed/open biopsies for lesions of bone, joints and soft tissues
- iii. Perform split thickness skin grafting and local flaps
- iv. Perform on bone models, internal fixation with k-wires, screws, plates. Dynamic hip/condylar screws/nailing.
- v. Perform sequestrectomy and saucerisation
- vi. Perform arthrotomy of joints like hip/shoulder, ankle, elbow
- vii. Perform repair of open hand injuries including tendon repair
- viii. Perform arthodesis of small joints
- ix. Perform diagnostic arthroscopy on models and their patients



- x. Perform carpal tunnel/tarsal tunnel release
- xi. Apply ilizarov external fixator
- xii. Perform soft tissue releases in contractures, tendon lengthening and correction of deformities
- xiii. Perform amputations at different levels
- xiv. Perform corrective surgeries for CTEV, DDH, perthes/ skeletal dysplasia

**3. At the end of the third year of M.S. Orthopaedics programme, the student should be able to:**

- i. Assist in the surgical management of polytrauma patient
- ii. Assist in Arthroplasty surgeries of hip, knee, shoulder and the ankle
- iii. Assist in spinal decompressions and spinal stabilizations
- iv. Assist in operative arthroscopy of various joints
- v. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow
- vi. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes
- vii. Assist in surgical operations on benign and malignant musculoskeletal tumour including radical excision and custom prosthesis replacement.
- viii. Assist in open reduction and internal fixations of complex fractures of acetabular, pelvis, IPSI lateral floating knee/elbow injuries, shoulder girdle and hand
- ix. Assist in spinal deformity corrections
- x. Independently perform closed/open reduction and internal fixation with DCP, LCP, intramedullary nailing, LRS
- xi. Assist in limb lengthening procedures
- xii. Assist in Revision surgeries
- xiii. Provide pre and post OP care

xiv. Perform all clinical skills as related to the speciality

**D. Training in research methodology medical ethics, bioethics and medicolegal aspects**

- ❖ Students should compulsorily attend the research Methodology workshop conducted by the University within first six months of the M.S course.
- ❖ Students are encouraged to attend workshops/ CME's on Bioethics conducted by the University and other reputed Institutions.
- ❖ Medical ethics, Bioethics, moral and legal issues and medical audit are part and parcel of the curriculum and syllabus.

**THEORY SYLLABUS**

**COURSE CONTENTS**

**1. BASIC SCIENCES**

Development of skeleton, histology of cartilage histology & histopathology of bone, physiology of fracture healing, delayed and non-union of bones, histology of skeletal muscle, collagen, physiology and mineralization of bone, physiology of cartilage, biophysical properties of bony and bone disease and related dysfunction of parathyroid glands.

**a. APPLIED BASIC SCIENCES**

- The course shall cover the following:
- Anatomy of the Upper Extremity, Lower Extremity and Spine
- Physiology and Biochemistry:
  - Calcium Homeostasis
  - Clinical importance of Vitamin D on
  - Parathyroid function tests
  - Acid Base Balance
  - Plasma Proteins

- Structure, function and repair of articular cartilage
- Physiology of coagulation and coagulation disorders Paratharmone
- Structure of Peripheral Nerves and peripheral nerve injuries

#### **b. PATHOLOGY**

- Infections of bone and joints
- Fracture healing
- Tumours of bone and joints
- Rickets, Osteomalacia and Osteoporosis
- Osteoarthritis, Rheumatoid arthritis
- Pathology of synovium Pathology of wound healing
- Pathology of tetanus and Gas gangrene

#### **c. MICROBIOLOGY**

- Collection and transport of specimens
- Sterilisation, disinfection and theatre sterilization
- Post operative wound infection and
- Hospital infections
- Gram Positive and Gram Negative infections
- AIDS Awareness and precautions
- Mycetic infections
- HIV

#### **d. PHARMACOLOGY**

- Non steroidal anti inflammatory durgs
- General principles of chemotherapy of infections of bones and joints
- Chemotherapy of Tuberculosis and Hansen's disease
- Chemotherapy of bone tumours
- Calcium, Phosphorus and Vitamin D

## **2. METABOLIC BONE DISEASES**

- ✓ Rickets and Osteomalacia
- ✓ Osteoporosis
- ✓ Scurvy
- ✓ Mucopolysaccharidoses
- ✓ Fluorosis
- ✓ Osteopetrosis

## **3. ENDOCRINE DISORDERS**

- ✓ Hyperparathyroidism
- ✓ Gigantism, Acromegaly

## **4. 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

## **5. Poliomyelitis**

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

## **6. Orthopaedic Neurology**

- ✓ Cerebral Palsy
- ✓ Myopathies

## **7. Peripheral Nerve Injuries**

- ✓ Traumatic
- ✓ Entrapment Neuropathies

## **8. Diseases of Joints**

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

## **9. Systemic Complications in Orthopaedics**

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

## **10. Bone Tumors**

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

## **11. Miscellaneous Diseases**

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

## **12. 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

## **13. Biomaterials**

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

## **14. 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
- ✓ 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

#### **15. Dislocations and Subluxations**

- ✓ Acute dislocations
- ✓ Old unreduced dislocations
- ✓ Recurrent dislocations

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

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

#### **17. Arthrodesis**

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

#### **18. Arthroplasty**

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

#### **19. Minimally Invasive Surgery (MIS) Arthroscopy**

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

## **20. Amputations and Disarticulations**

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

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

## **22. Pediatric orthopaedics:**

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

## **23. Spine**

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

- i. Rehabilitation of paraplegics/quadruplegics
- 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.

## **24. Triage, Disaster Management, BTLS and ATLS**



## **25. 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

## **26. 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 scans

## **27. General Surgical Principles & Allied Specialities**

- ✓ General surgery, oncology, and medicine as applicable to the musculo-skeletal disorders/disease.
- ✓ Radiology, Imaging, computed tomography and magnetic resonance imaging and interventional radiology and angiography as related to orthopaedics.

- ✓ General pathologic aspects such as wound healing and also pathology and pathogenesis of orthopaedic diseases, pharmacology, molecular biology, genetics, cytology, haematology, and immunology as applicable to orthopaedics.
- ✓ General principles of traumatology.
- ✓ Plastic surgery, Hand Surgery as applicable to orthopaedics.
- ✓ Physical Medicine and Rehabilitation. The student is expected to be familiar with this in all its aspects. Adequate exposure in the workshop manufacturing orthotics and prosthetics is mandatory, as is the assessment of the orthopaedically handicapped.
- ✓ **Radiology** : Acquire knowledge about radiology/imaging and to interpret different radiological procedures and imaging in musculoskeletal disorders.
- ✓ There should be collaboration with Radiology department for such activities.
- ✓ Psychological and social aspects: Some elementary knowledge in clinical Psychology and social, work management is to be acquired for management of patients, especially those terminally ill and disabled-persons and interacting with their relatives.

## 2. 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. 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

## **Rotations**

### **Clinical postings**

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

### **Rotation of posting**

- ✓ Inter-unit rotation in the department should be done for a period of up to one year.
- ✓ 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 program, 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.

## **BIOETHICS**

Humanity/Ethics -Lectures on humanity, personality development, team spirit, Ethical issues in patients, Doctor- patient relation-ship and interpersonal relationship.

## **STRUCTURED TRAINING PROGRAMME**

The students of M.S. Orthopedics shall be posted in rotation to all the Orthopedic Units in the department.

First year - Basic sciences

Anatomy – one hour every week in anatomy dissection hall for 6 months in the first year.

Their training shall include following postings in their Second year of the course:

- Casualty / emergency medicine for 2 weeks
- Anesthesia for 2 weeks
- Radiology including CT/MRI for 2 weeks
- Neurosurgery for 2 weeks
- Plastic surgery for 2 weeks
- Posting in artificial limb centre / physical medicine and rehabilitation for 2 weeks

### Training in teaching skills

- Bedside clinic for undergraduates for 20 hours
- Bedside clinic for first year PG by THIRD Year PG for 10 hours.
- Should have attended at least one National CME during the course
- Should have presented at least one paper in any of the Orthopedic conferences during the course.

### **Attendance, Progress and Conduct**

A candidate pursuing degree/diploma course should work in the concerned department of the institution for the full period as a full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course.

Each year shall be taken as a unit for the purpose of calculating attendance.

Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

Every candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.

**Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examination.**

**Clinical procedures, which the candidates should know**

<b>S. No</b>	<b>Name of procedure</b>	<b>As Observer</b>	<b>As first Assistant</b>	<b>Able to perform</b>
1	<b>ORTHOPAEDICS</b> Skin traction & Plaster application			Yes
2	Skeletal traction of upper Tibia, distal Tibia, lower Femoral, Olecranon, Calcaneal and Skull traction			Yes
3	Closed reduction of Fractures			Yes
4	Management of open fractures - Debridement, external fixation - Soft tissue reconstruction including bone coverage			Yes Yes
5.	Open reduction and internal fixation of Fractures and Open reduction of dislocations			
6 a)	Bone & Joint Infections Diagnostic Aspiration of joint & Arthrotomy  Drilling/ Decompression of Metaphysis			Yes  Yes
6.b)	Drainage of abscess Sequestrectomy & saucerisation Girdlestone/Excision arthroplasty of Hip			Yes Yes Yes
7.	Bone tumors Biopsy from tumor  Excision of ostochondroma Curettage & Bone grafting			Yes  Yes Yes

8.	Spine Exposure to spine by posterior, anterior and anterolateral approaches		Yes	Yes
9	CTEV- Ponsetti Method Tendo Achilles lengthening			Yes
10.	Postero-medial soft tissue re-Release Bony procedures including triple Arthrodesis			Yes Yes
11	High tibial osteotomy	Yes		
12	Tendon repair			yes
13	Cerebral Palsy/ Neuro muscular disorders -Soft tissue/ bony procedures Limbs lengthening Illizarov procedure	Yes	Yes	Yes
15	Arthrolysis of Elbow joint	Yes	Yes	
16	Amputations			Yes
17	Limbs salvage procedures		Yes	
	DESIRABLE PROCEDURES Endoscopy Arthroscopy of knee	Yes Yes	Yes	
	Joint replacement Hip joint Knee joint Peripheral nerve repair Tendon transfer procedures Spinal stabilization procedures like pedicular screw	Yes	Yes Yes Yes Yes	

**Investigations/ Tests which the candidates should Learn to Interpret**

Name of Investigations		Tests
Hematological investigations in	CBC	
		C-reactive protein,
Orthopaedic conditions like		Rheumatoid factor,
	HLA-B27,	
	Serum Electrophoresis,	
	Serum Ca, P, Alkaline phos-	
	phatase, Acid phosphatase,	
	Uric acid, Total proteins &	
	A.G. ratio	ELISA
Urine	Bence Jones proteins,	
	24hr Urinary Ca	
Radiological investigations	Plain radiography	
	CT Scan, MRI	
	Radio- isotope bone scan	
Interpretation of Histopathological slides of common Orthopaedic conditions like - Tuberculosis/sepsis		
	Myeloma	
	Osteosarcoma	
	Ewing Sarcoma	
	Giant cell tumor	

5. Evaluation of the candidates in both theory and practical aspects will help the candidate in improvement of his/her knowledge, skills and attitude.



## 6. Competency Assessment Overall

- a) Communication / commitment / Contribution /  
Compassion towards patients and Innovation 5 Marks
- b) Implementation of newly learnt techniques/skills
- Number of cases presented in Clinical Meetings/  
Journal clubs/seminars 5 Marks
  - Number of Posters/Papers presented in Conferences/  
Publications and Research Projects 5 Marks
  - No. of Medals / Certificates won in the conference /  
Quiz competitions and other academic meetings with details. 5 Marks

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**Total 20 Marks**  
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## 7. Dissertation and University Journal of Medical Sciences

- Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.
- The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.
- Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

- Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation should be written under the following headings:

- i. Introduction
- ii. Aims or Objectives of study
- iii. Review of Literature
- iv. Material and Methods
- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Four copies of dissertation thus prepared shall be submitted to the Registrar (Evaluation), six months before final examination on or before the dates notified by the University.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

Change of guide: In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university

Regarding submission of articles to the University Journal of Medical Sciences for all the PG Degree/Diploma courses, it is mandatory that the students have to submit at-least one research paper. Case Reports are not considered as Research Paper

## **8. 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 3<sup>rd</sup> academic year. An academic term shall mean six month's training period.

There shall be four theory papers, each of three hours duration. Each paper consist of 10 short essays each carry 10 marks. Total marks for each paper will be 100. Details of distribution of topics for each paper will be as follows:

<b>Paper I:</b> Basic Sciences as applied to Orthopaedics	-	100
<b>Paper II:</b> Traumatology and Rehabilitation	-	100
<b>Paper III:</b> General Orthopaedics, Joint disorders and Spine	-	100
<b>Paper IV:</b> Regional Orthopaedics and Recent advances in Orthopaedic surgery	-	100

**Note:** The distribution of chapters/Topics shown against the papers are suggestive only.

## 9. PRACTICAL EXAMINATION

LONG CASE - (1X30 MIN EXAMINATION+ 30 MIN DISCUSSION) (1 X 75 MARKS)		75 MARKS
SHORT CASE - (3X 10 MIN EXAMINATION+ 30 MIN DISCUSSION) (3 X 25 MARKS EACH)		75 MARKS
WARD ROUNDS (3 CASES X 10 MIN) (3 CASES x 10 MARKS EACH)		30 MARKS
OSCE STATIONS (4 CASES X 5 MARKS EACH)		20 MARKS
TOTAL		200 MARKS (A)
VIVA VOCE	RECENT ADVANCES + PEDAGOGY	80 MARKS (B)
	OPERATIVE ORTHOPEDICS + INSTRUMENTS	
	ORTHOTIC & PROSTHETICS	
	ORTHO RADIOLOGY + OSTEOLOGY	
LOG BOOK		20 MARKS (C)
AGGREGATE (CLINICAL + VIVA) TOTAL		300 MARKS (A+B+C)
MINIMUM REQUIRED FOR PASS (50%)		150 MARKS
DISSERTATION		APPROVED / NOT APPROVED

## 10. LOG BOOK

- ❖ The Post Graduates students shall maintain a record (Log) book of the work carried out by them and the training Program undergone during the period of training.
- ❖ The record (log) book shall be checked and assessed periodically by the faculty members imparting the training.
- ❖ Periodic review of Log book and Dissertation have to be done in the Department by guide/HOD once in every 6 months
- ❖ The post graduate students shall be required to participate in the teaching and training Program 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.

## 11. VIVA

VIVA including Competency Assessment - **80 Marks (60 + 20)**

Viva Constitutes Pedagogy, Osteology, X-rays, Instruments, Orthotics and Prosthetics, Orthopaedic pathology (Specimens and Slides) and Operative surgery.

**Pedagogy:** topic will be given to each candidate during Viva Voce. The candidate will have to speak on the topic for 8 to 10 minutes

### Log Book - 20 marks

## 12. OSCE: OSCE/OSPE - 20 marks (4 stations x 5 marks each)

1. Manned stations-Typical deformities, typical appearance of any orthopedic conditions
2. Unmanned stations- X-rays, Specimens, Instruments, Calipers etc.

Maximum marks for M.S. Orthopaedics	Theory	Practical & Viva	Grand Total
	400	300 (Practical – 200 & Viva – 100)	700

## MARKS QUALIFYING FOR A PASS

Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examination. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the degree examination.

## FORMAT OF MODEL CHECK LISTS

### Check List –I

#### Model Check-List for Evaluation of Journal Review Presentations

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have been consulted					
4.	Whether other relevant publications consulted					
5.	Ability to respond to questions on the paper / subject					
6.	Audio-Visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					
9.	Any other observation					
	<b>Total Score</b>					

## Check List - II.

### Model Check-List for Evaluation of Seminar Presentations

Name of the Student:

Name of the Faculty/Observer:

Date:

Sl. No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted					
2.	Whether cross references have been consulted					
3.	Completeness of Preparation					
4.	Clarity of Presentation					
5.	Understanding of subject					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio-Visual aids					
9.	Overall Performance					
10.	Any other observation					
	<b>Total Score</b>					

### Check List – III

### MODEL CHECK List for Evaluation of Clinical Work in Ward / OPD

(To be completed once a month by respective Unit Heads including posting in other departments)

Name of the Student:

Name of the Unit Head:

Date:

Sl. No.	Points to be considered:	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Bedside manners					
8.	Rapport with patients					
9.	Counseling patient's relatives for blood donation or Postmortem and Case follow up.					
10.	Overall quality of Ward work					
	<b>Total Score</b>					



## Check List – IV

### Evaluation form for Clinical Presentation

Name of the Student:

Name of the Faculty:

Date:

Sl. No.	Points to be considered	Poor 0	Below Average 1	Average 2	Above Average 3	Very Good 4
1.	Completeness of history					
2.	Whether all relevant points elicited					
3.	Clarity of Presentation					
4.	Logical order					
5.	Mentioned all positive and negative points of importance					
6.	Accuracy of general physical examination					
7.	Whether all physical signs elicited correctly					
8.	Whether any major signs missed or misinterpreted					
9.	Diagnosis: Whether it follows logically from history and findings					
10	Investigations required					
	▪ Complete list					
	▪ Relevant order					
10	▪ Interpretation of investigations					
	Ability to react to questioning					
11.	Whether it follows logically from history and findings					
12.	Ability to defend diagnosis					
13.	Ability to justify differential diagnosis					
14.	Others					
	<b>Grand Total</b>					

## Check List – V

### Model Check List for Evaluation of Teaching Skill Practice

Sl. No.		Strong Point	Weak Point
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequence of ideas		
5.	The use of practical examples and/or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		

## Check list VI

### MODEL CHECK LIST FOR DISSERTATION PRESENTATION

Name:

Faculty/observer:

Date:

Sl. No.	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & other faculty					
4.	Quality of protocol					
5.	Preparation of proforma					

## Checklist-VII

### Continuous Evaluation of Dissertation Work by Guide / Co-Guide

Name of the Student:

Name of the Faculty/Observer :

Date:

Sl. No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide					
2.	Regular collection of case material					
3.	Depth of analysis / discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	<b>Total Score</b>					





## LOG BOOK

**Table 3: Diagnostic and Operative procedures performed**

**Name:**

**Admission Year:**

**College:**

<b>Date</b>	<b>Name</b>	<b>ID No.</b>	<b>Procedure</b>	<b>Category O, A, PA, PI*</b>

- \* Key:** O - Washed up and observed  
A - Assisted a more senior Surgeon  
PA - Performed procedure under the direct supervision of a senior surgeon  
PI - Performed independently

## Model Overall Assessment Sheet

**Name of the College:**

**Academic Year:**

Sl. No	Faculty Member & Others	Name of Student and Mean Score									
		A	B	C	D	E	F	G	H	I	J
1											
2											
3											
4											
5											
<b>Total Score</b>											

Note: Use separate sheet for each year.



# MEDICAL ETHICS

## SENSITISATION AND PRACTICE

### INTRODUCTION

There is now a shift from the traditional individual patient, doctor relationship, and medical care. With the advances in science and technology and the needs of patient, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal (i), General Objective (ii) stated in Chapter II (pages 2.1 to 2.3), and develop human values it is urged that *ethical sensitisation* be achieved by lectures or discussion on ethical issues, clinical case discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentation, bedside rounds and academic postgraduate programs.

### Course Contents

1. Introduction to Medical Ethics
  - What is Ethics
  - What are values and norms
  - Relationship between being ethical and human fulfillment
  - How to form a value system in one's personal and professional life
  - Heteronomous Ethics and Autonomous Ethics
  - Freedom and personal Responsibility
  
2. Definition of Medical Ethics
  - Difference between medical ethics and bio-ethics
  - Major Principles of Medical Ethics 0
    - Beneficence = fraternity
    - Justice = equality
    - Self determination (autonomy) = liberty

3. Perspective of Medical Ethics
  - The Hippocratic oath
  - The Declaration of Helsinki
  - The WHO Declaration of Geneva
  - International code of Medical Ethics (1993)
  - Medical Council of India Code of Ethics
  
4. Ethics of the Individual
  - The patient as a person
  - The Right to be respected
  - Truth and Confidentiality
  - The autonomy of decision
  - The concept of disease, health and healing
  - The Right to health
  - Ethics of Behavior modification
  - The Physician – Patient relationship
  - Organ donation
  
5. The Ethics of Human life
  - What is human life
  - Criteria for distinguishing the human and the non-human
  - Reasons for respecting human life
  - The beginning of human life
  - Conception, contraception
  - Abortion
  - Prenatal sex-determination
  - In vitro fertilization (IVF), Artificial Insemination by Husband (AIH)
  - Artificial Insemination by Donor (AID),
  - Surrogate motherhood, Semen Intrafallopian Transfer (SIFT),
  - Gamete Intrafallopian Transfer (GIFT), Zygote Intrafallopian Transfer (ZIFT), Genetic Engineering
  
6. The Family and Society in Medical Ethics
  - The Ethics of human sexuality
  - Family Planning perspectives
  - Prolongation of life
  - Advanced life directives – The Living Will
  - Euthanasia
  - Cancer and Terminal Care

7. Profession Ethics
  - Code of conduct
  - Contract and confidentiality
  - Charging of fees, Fee-splitting
  - Prescription of drugs
  - Over-investigating the patient
  - Low – Cost drugs, vitamins and tonics
  - Allocation of resources in health cares
  - Malpractice and Negligence
  
8. Research Ethics
  - Animal and experimental research / humanness
  - Human experimentation
  - Human volunteer research – Informed Consent
  - Drug trials
  
9. Ethical workshop of cases
  - Gathering all scientific factors
  - Gathering all human factors
  - Gathering all value factors
  - Identifying areas of value – conflict, setting of priorities,
  - Working out criteria towards decisions

### **Recommended Reading**

Francis C.M., **Medical Ethics**, 1 Ed, 1993, Jaypee Brothers, New Delhi, p 189,

### **RECOMMENDED READING**

#### **Texts 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 J Maheshwari.
10. Outline Of Fractures Adams, Hamblen
11. Textbook Of Orthopaedics And Trauma – Kulkarni, Vol 1
12. B.D. Chaurasia's Human Anatomy, Vol1, 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,
24. Golyakhovsky, Vladimir; Frankel, Victor H
25. Current Techniques In Total Knee Arthroplasty, Sawhney G S
26. Applied Orthopaedic Biomechanics, Dutta, Santosh; Datta,Debasis
27. Essential Orthopaedics And Trauma, Dandy, David J; Edwards, Dennis J
28. Adams's Outlines Of Fractures;Including Joint Injuries, Hamblen, David L; Simpson, A Hamish R W
29. Orthopedic Physical Assessment, Magee, David J
30. Turek's Textbook Of Orthopaedics Vol 1 & 2
31. The Spine: Rothman-Simeone
32. Orthopaedics Surgical Approach, Miller

33. S M Tuli, Tuberculosis of Musculoskeletal system
34. Clinical Evaluation-Das, McRay, Sureshwar Pandey.
35. AO Manual of Internal Fixation.
36. Watson- Jones Fractures and Joint Injuries.
37. The Closed Treatment of Common Fractures - By John Charnley

### **Journals**

1. Journal of Bone and Joint Surgery (British and American)
2. American journal of Orthopaedics.
3. Clinical Orthopaedics and Related Research.
4. Orthopaedic clinics of North America.
5. TRAUMA.
6. Arthroscopy.
7. Indian Journal of Orthopaedics.
8. Journal of Arthroplasty.
9. Journal of Spine Surgery. (JSS-Australia)
10. Acta orthopædica Scandinavia
11. J. Paed. Ortho

### **ADDITIONAL READING**

1. Indian Council of Medical Research, "Ethical Guidelines for Biomedical Research on Human Subjects", I.C.M.R, New Delhi, 2000.
2. Code of Medical Ethics framed under section 33 of the Indian Medical Council Act, 1956. Medical Council of India, Kotla Road, New Delhi.
3. Francis C M, Medical Ethics, J P Publications, Bangalore, 1993.
4. Indian National Science Academy, Guidelines for care and use of animals in Scientific Research, New Delhi, 1994.
5. Internal National Committee of Medical Journal Editors, Uniform requirements for manuscripts submitted to biomedical journals, N Engl J Med 1991; 424-8

6. Kirkwood B R, Essentials of Medical Statistics , 1<sup>st</sup> Ed., Oxford: Blackwell Scientific Publications 1988.
7. Mahajan B K, Methods in Bio statistics for medical students, 5<sup>th</sup> Ed. New Delhi, Jaypee Brothers Medical Publishers, 1989.
8. Compendium of recommendations of various committees on Health and Development (1943-1975). DGHS, 1985 Central Bureau of Health Intelligence, Directorate General of Health Services, min. of Health and Family Welfare, Govt. of India, Nirman Bhawan, New Delhi. P - 335.
9. National Health Policy, Min. of Health & Family Welfare, Nirman Bhawan, New Delhi, 1983
10. Srinivasa D K etal, Medical Education Principles and Practice, 1995. National Teacher Training Centre, JIPMER, Pondicherry