

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY
No. 69, ANNA SALAI, GUINDY, CHENNAI – 600 032.

M.D. / M.S.

POST GRADUATE DEGREE COURSES



SYLLABUS AND CURRICULUM
2021 - 2022

M.S. ORTHOPAEDICS

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI

MS ORTHOPAEDICS

1. GOALS 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 basics for application of the clinical practice.

He/she should also maintain human values with ethical consideration.

2. COMPONENTS OF THE POST GRADUATE CURRICULUM:

Cognitive knowledge: Describe embryology, applied anatomy, physiology, pathology, clinical features, diagnostic procedures and the therapeutics including preventive methods (medical/surgical) pertaining to musculoskeletal system.

Skills: Diagnose conditions from history taking, clinical evaluation and investigations and to develop expertise to manage medically as well as surgically the commonly encountered disorders and diseases in different areas.

Teaching: Acquire ability to teach the MBBS students in simple and straightforward language about the common orthopaedic ailments/disorders, especially about their signs/symptoms for diagnosis with their general principles of therapy.

Research: Develop ability to conduct a research enquiry on clinical materials available in hospital and in community. Students should compulsorily attend the research Methodology workshop conducted by the University within first six months of the M.D course.

Training in Medical Audit management, Health economics, Health information system, basics of statistics, exposure to Human behavior studies, knowledge of phamaco economics and introduction to non linear mathematics

Attitude including communication skills: What is informed consent? What is its relevance?

How would you declare the news of a dead patient to the relatives?

How would you explain the complications of a surgical procedure and its significance? How much one should inform to patient about the disease?

Patient doctor relation: Develop ability to communicate with the patient and his/her relatives pertaining to the disease condition, its severity and options available for the treatment/therapy.

Preventive Aspect: Acquire knowledge about prevention of common conditions especially in children such as poliomyelitis, con-genital deformities, cerebral palsy and common orthopaedic malignancies.

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.

3. THEORY SYLLABUS:

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.

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

Parathormone, Hyperparathyroidism, Gigantism, Acromegaly Structure of

Peripheral Nerves and peripheral nerve injuries

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

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
Mycotic infections
HIV

Pharmacology

Non steroidal anti inflammatory drugs
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

General Surgery

Hemorrhage, shock and blood transfusion
Fluid, electrolyte and acid base balance Bone
grafting
Tumours, cysts and sinuses

Gangrene Wound

infections

Venous thrombosis Lymphatics
and Lymph nodes

Traumatology

1. Fractures and dislocations: This shall include the mechanism of violence causing the injury, pathology of fracture healing- signs and symptoms – the mechanics of displacement of fragments – reduction, maintenance of reduction of fractures and dislocations by various methods – study of complications of osteoarticular injuries and their treatment and rehabilitation.

They shall work in the orthopedic out patient department and 24 hours fracture service and obtain proficiency in First Aid emergency management of fractures and dislocations – Resuscitation and management of multiple injuries. They will also be made conversant with various splints and their uses.

2. Contusions and other soft tissue injuries – sprains of ligaments of various joints – mechanism of production, their pathology, symptomatology and management.

3. Peripheral nerve injuries and spinal cord injuries – mechanism of production – symptomatology – patho physiology, investigation including electrodiagnosis – physiotherapeutic management – surgical treatment – splinting and bracing – rehabilitation

4. Triage, Disaster Management, BTLS and ATLS

General Orthopedics :

The study of General orthopedics shall include all the diseases that affect the locomotor system including:

1. Deformities – congenital and acquired including their management
2. Osteo articular tuberculosis – Incidence, bacteriology, pathology, symptomatology, investigations and management, both conservative and surgical.
3. Infections: Bacteriology – pathology – clinical features and management in acute, subacute and chronic infections of bone.
4. Arthritis – includes the study of various types of arthritis including infective, rheumatoid, metabolic and degenerative conditions – patho physiology, investigations and management including arthroplasty.
5. Tumors of bone and joints
6. Neuromuscular disorders
7. Metabolic disorders of the skeletal system

The course requires the candidates to attend the orthopedic wards and out patient department and shall have performed the common orthopedic procedures during the period of study and learn the principles of all tractions procedures.

Physical Medicine and Rehabilitation :

Principles of Physical therapy including exercise therapy, electro therapy, prescription of splints and braces

Principles of occupational therapy Principles of

electro diagnosis Rehabilitation of

paraplegics/quadriplegics Management of a

paralyzed bladder

Prevention of bed sores and management of established bed sores

Exercise programme and Activities of Daily Living (ADL) Psychosexual

counseling

Prosthesis and Orthotics :

Principles of amputation surgery – rehabilitation of the amputee – examination and prescription for orthosis and prosthesis – check up and fitting

The concept of Total Rehabilitation including Medical, Educational, Vocational and Social Rehabilitation.

4. PRINCIPLES & PRACTICE OF ORTHOPAEDICS INCLUDING RECENT ADVANCES

Bone infections (Pyogenic, tuberculosis, syphilis, mycotic infections, salmonella & brucella osteomyelitis), congenital deformities (upper & lower extremities, spine and general defects), developmental conditions (osteogenesis imperfecta, dysplasias, hereditary multiple exostosis etc.) diseases of the joints (osteoarthritis, rheumatoid arthritis, neuropathic joints, ankylosing spondylitis, sero-negative spondylo arthropathy, traumatic arthritis etc.) orthopaedic neurology, tumors of bone. Disorders of hand & their management.

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

Pediatric orthopaedics- The student should be exposed to all as-pects of congenital and developmental disorders such as CTEV (club-Foot), development dysplasia of hip, congenital deficiency of limbs. Perthe's disease and infections, and also to acquire adequate knowl-edge about the principles of management of these disorders.

Orthopaedic oncology- The resident is expected to be familiar with the tumours encountered in orthopaedic practice. The recent trends towards limb salvage procedures and the advances in chemo-therapy need to be familiar to him.

Management of Trauma- The student is expected to be duly conversant with trauma in its entirety. In any type of posting after qualification the orthopaedic surgeon would be exposed to all varieties of acute trauma. Hence, it is his responsibility to be able to recognize, assess and manage it including the medico legal aspects.

Sports Medicine including arthroscopy : A lot of importance is being given to sports medicine especially in view of the susceptibility of the athlete to injury and his failure to tide over them. Sport medicine not only encompasses diagnostic and therapeutic aspects athletic injuries but also their prevention, training schedules of personnel and their selection.

Orthopaedic Neurology: The student should be exposed to all kinds of nerve injuries with

regard to their recognition & management of cerebral palsy and acquired neurological conditions such as post polio residual paralysis and peripheral nerve injuries also need to be emphasized in their entity.

Spine Surgery -The student is expected to be familiar with various kinds of spinal disorders such as scoliosis, kyphoscoliosis, spinal trauma, PIVD, infections (tuberculosis and pyogenic), & tumours regarding their clinical presentations and management.

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.

5. 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, PET Scan, Radio-isotope bone scan 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.

BIOETHICS :

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

6. TEACHING LEARNING METHODS:

The teaching and training of the students shall include graded responsibility in the management and treatment of patients entrusted to their care; participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds, and Clinico- Pathological Conferences; practical training in Diagnosis and treatment; training in the Basic Medical Sciences, as well as in allied clinical specialties.

The following teaching learning methods are recommended.

1. Lectures
2. Case based discussion
3. Bed side clinics
4. Teaching on ward rounds
5. Symposia
6. Seminars
7. Journal clubs

7. STRUCTURED TRAINING PROGRAMME:

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

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

Surgery	-	1 month
Physical Medicine and Rehabilitation	-	1 month
Pediatric Orthopedics	-	1 month

During IInd year, the Students are encouraged to undergo special postings for learning new advanced techniques / procedure / skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

Clinical procedures, which the candidates should know

<i>Sl. No.</i>	<i>Name of procedure</i>	<i>As Observer</i>	<i>As first Assistant</i>	<i>Able to perform</i>
1	ORTHOPAEDICS 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	Bone & Joint Infections Diagnostic Aspiration of joint & Arthrotomy Drilling/ Decompression of Metaphysis Drainage of abscess Sequestrectomy & Saucerisation Girdlestone/Excision arthroplasty of hip			Yes Yes Yes Yes
7	Bone tumors Biopsy from tumor Excision of osteochondroma Curettage & Bone grafting			Yes Yes Yes
8	Spine Exposure to spine by posterior, anterior and anterolateral approaches		Yes	
9	CTEV- Ponsetti Method Tendo Achilles lengthening			Yes Yes

Sl. No.	Name of procedure	As Observer	As first Assistant	Able to perform
10	Postero-medial soft tissue release Bony procedures including triple Arothrodosis			Yes Yes
11	High tibial osteotomy	Yes		
12	Tendon Repair			Yes
13	Cerebral Palsy / Neuro muscular disorders – Soft tissue / bony procedures and triple arthrodesis		Yes	Yes
14	Limbs lengthening / Ilizarov procedure	Yes	Yes	
15	Arthrolisis of Elbow joint	Yes	Yes	
16	Amputations			Yes
	Limbs salvage procedures		Yes	
	DESIRABLE PROCE- DURES Endoscopy Arthroscopy of knee Joint replacement Hip joint Knee joint Peripheral nerve repair Tendon transfer procedures Spinal stabilization proce- dures like pedicular screw	Yes Yes Yes Yes	 Yes Yes Yes Yes Yes Yes	

INVESTIGATIONS/ TESTS WHICH THE CANDIDATES SHOULD LEARN TO INTERPRET

<u>Name of Investigations</u>		<u>Tests</u>
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

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 0 - 5 Marks

b) Implementation of newly learnt techniques/skills 0

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

Total 20 Marks

PG CLINICAL COURSES

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

Log Book - 20 marks

ASSESSMENT SCHEDULE IS AS FOLLOWS

Year of study	Period				Total Max.20 marks
I year	Upto Dec	10 marks	Upto June	10 marks	20 Marks
II year	Upto Dec	10 marks	Upto June	10 marks	20 Marks
III year	Upto Oct	10 marks	Upto Feb	10 marks	20 Marks
	AVERAGE				20 marks

7.DISSERTATION AND UNIVERSITY JOURNAL OF MEDICAL SCIENCES

As per the 49th SAB Resolution under Point No. 2 and in the 52nd SAB it was reiterated regarding the topic for dissertation

The topic for the dissertation should be registered and sent to the University after Ethics Committee approval before 31st of December of the first Post Graduate Year. Only one change of topic with proper justification from the Head of the Department is permitted before 31st March of the first Post Graduate Year. The change of dissertation title will not be permitted after 31st March of the First Post Graduate Year. This modification in regulation will be scrupulously followed from the academic year 2015-16 admission onwards.

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties 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 Postgraduate Degree Examination.

As per MCI Clause 14 (4)(a), thesis shall be submitted atleast 6 Months before the Theory and Clinical/Practical Examination.

A candidate shall be allowed to appear for the Theory and Practical/Clinical Examination only after the acceptance of the Thesis by the Examiners.

The periodical evaluation of dissertation/log book should be done by the guide / HOD once in every six months. The HOD should ensure about the submission of dissertation within the stipulated time.

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 EXAMINATION :

- 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

Question paper Pattern:

Paper I : Write notes on

- | | | |
|----|--------------|------------|
| 1. | Anatomy | 4 x 5 = 20 |
| 2. | Physiology | 4 x 5 = 20 |
| 3. | Biochemistry | 3 x 5 = 15 |
| 4. | Pharmacology | 3 x 5 = 15 |
| 5. | Pathology | 3 x 5 = 15 |
| 6. | Microbiology | 3 x 5 = 15 |

Total = 100 marks

Paper II, III & IV :

8. Elaborate on : 2 x 15 = 30

9. Write notes on 10 x 7 = 70

Total = 100 marks

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		80 MARKS (B)
	OPERATIVE ORTHOPEDICS		
	ORTHOTIC & PROSTHETICS		
	ORTHO RADIOLOGY		
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 Programme 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

11.VIVA

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

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

2 manned stations-Typical deformities, Typical appearance of any orthopedic conditions

2 Unmanned stations- X-rays, Specimens, Instruments, Calipers etc.

13.REFERENCE BOOKS:

1. Mercer's orthopaedics surgery, Duthie, Edward Arnold
2. Campbell's Operative Orthopaedics, Canale and Beaty
3. Outline of orthopaedics, Crawford Adams, Churchill Livingstone
4. Closed treatment of fractures, H. John Charnley, Churchill Livingstone
5. Apley's
6. Text book of orthopaedics, Samuel Turek
7. Campbell's Operative Orthopaedics, Canale and Beaty
8. AO Principles of internal fixation
9. AO Principles of external fixation
10. Chapman's Orthopaedics
11. Watson Jones fractures and joint injuries, J.N. Wilson, Churchill Livingstone
12. Fractures in adults and children, Rockwood, Greens
13. Campbell's Operative Orthopaedics, Canale and Beaty
14. Campbell's Operative Orthopaedics, Canale and Beaty
15. AO Spinal fixation
16. Tumours and tumorous conditions of bones and joints, Jaffe, Lea Febiger
17. Clinical Evaluation – DAS, McRay, Panday
18. SM TULI Tuberculosis of musculoskeletal system
19. Limb reconstruction procedures
20. Orthopedic pathology – Bullough
21. Neglected fractures – Anil Jain
22. Pediatric Orthopedics –Staheli
23. Lovell & Winter Pediatric Orthopedics

**** Note : The editions are as applicable and the latest editions shall be the part of the syllabi.**

14. JOURNALS

1. Indian journal of orthopaedics
2. Journal of bone and surgery (British and American volumes)
3. Orthopaedics clinics of North America
4. Clinical orthopaedics and related research Yearbook of orthopaedics
5. Journal of rehabilitation INJURY
6. Journal of Arthroplasty
7. Journal of Arthroscopy
