

JSS Academy of Higher Education & Research

(Deemed to be University)

Re-Accredited "A+" Grade by NAAC

Sri Shivarathreeshwara Nagara Mysuru - 570015, Karnataka

Regulation & Syllabus

MS ORTHOPAEDICS

2020

MS Orthopaedics

GOAL: The goal of postgraduate training in M S Orthopaedics is to contribute a competent, confident and responsible Orthopaedics surgeon in the field of Orthopaedic surgery with necessary knowledge, skills and attitude. He / She will be a lifelong learner, teacher, researcher and good clinician rendering service to the stakeholders and serve the community.

PROGRAM OUTCOMES

PO1: Demonstrate the acquisition of comprehensive knowledge in basic orthopaedics surgery concepts, their application in clinical practice and problem solving in difficult and special circumstances.

PO2: Demonstrate the acquisition of basic knowledge and understanding of muscular skeletal system.

PO3: Demonstrate an ability in deciphering the concepts of surgery, imparting knowledge and skills while teaching orthopaedic surgery to undergraduate students.

PO4: Demonstrate the acquisition of comprehensive firsthand knowledge in understanding various specific orthopaedic subspecialties to deliver necessary secondary care and be able to refer the patient to appropriate centre for further management.

PO5: Demonstrate the acquisition of skills in performing various basic orthopaedic surgical procedures independently with utmost diligence to ethics, communication and attitude while rendering service to patients.

PO6: Demonstrate the acquisition of the comprehensive knowledge and skills required to participate in various Teaching Learning methods.

PO7: Demonstrate the capability to conduct clinical and experimental research which have significant bearing on human health and patient care.

PO8: Demonstrate the capability to develop ideas and contribute towards generation of patents and copyrights related to the subject.

PO9: Demonstrate the acquisition of adequate management and leadership qualities to lead the team engaged in teaching, implementing national health programmes and research.

PO10: Demonstrate the ability to showcase/present innovations, skills at national and international levels being a lifelong learner.

Paper I:

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. Triage, Disaster Management, BTLS and ATLS

4. Biomaterials

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

5. Systemic Complications in Orthopaedics

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

CO1: Demonstrate the acquisition of comprehensive knowledge of basic sciences in understanding the pathophysiology musculoskeletal system and deciding upon appropriate management strategies for common orthopaedic problems.

CO2: Demonstrate the acquisition of knowledge in basic sciences required to take measures about natural calamities, disaster management , biohazards and environment protection.

CO3: Demonstrate the acquisition of basic understanding of diagnostic imaging pertaining to the orthopaedics

CO4: Demonstrate the acquisition of knowledge in systemic complications in orthopaedics

Paper II:

Traumatology & Rehabilitation

1. Fracture and Fracture-Dislocations of Adults and Children

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

2. Dislocations and Subluxations of Adults and Children

- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations

3. Traumatic Disorders of Joints (Sports Injuries)

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

4. Rehabilitation - Prosthetics and Orthotics

5. 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

6. Minimally Invasive Surgery

(MIS) Arthroscopy

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

C01: Demonstrate the acquisition of knowledge in understanding the principles and management of Musculoskeletal Injuries in adults and children.

C02: Demonstrate the acquisition of knowledge in diagnosis and treatment of Sports injuries of ankle, knee, shoulder, elbow, wrist and hand.

C03: Demonstrate the acquisition of comprehensive knowledge and skills related to arthroscopy

C04: Demonstrate the acquisition of knowledge regarding Orthotics and Prosthetics

C05: Demonstrate the acquisition of comprehensive knowledge in Spine injuries

C06: Demonstrate the ability to analyze the difficulties in common orthopaedic injuries and synthesize treatment plans in their management.

Paper III: Orthopaedic Diseases

1. Metabolic Bone Diseases

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

2. Endocrine Disorders

- Hyperparathyroidism
- Gigantism, Acromegaly

3. 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

4. Poliomyelitis

- General considerations
- Polio Lower limb and spine

- Management of Post Polio Residual Palsy (PPRP)

5. Orthopaedic Neurology

- Cerebral Palsy
- Myopathies

6. Peripheral Nerve Injuries

- Traumatic
- Entrapment Neuropathies

7. Diseases of Joints

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

8. Bone Tumors

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

9. Miscellaneous Diseases

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

10. 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

11. Arthrodesis

- Arthrodesis of lower extremity and hip

- Arthrodesis of upper extremity
- Arthrodesis of spine

12.Arthroplasty

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

13.Degenerative disorders of the spine

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

CO1: Demonstrate the acquisition of Basic understanding of Metabolic Bone disorders.

CO2: Demonstrate the acquisition of Basic understanding of Endocrine disorders of the Bone.

CO3: Demonstrate the acquisition of Basic understanding of Bone and Joint infections and its surgical managements.

CO4: Demonstrate the acquisition of Basic understanding of Poliomyelitis and its surgical management and rehabilitation.

CO5: Demonstrate the acquisition of Basic understanding of Orthopaedic Neurology.

CO6: Demonstrate the acquisition of Basic understanding of Peripheral Nerve injuries and its Surgical Management.

CO7: Demonstrate the acquisition of Basic understanding of Diseases of the Joints its conservative and surgical managements.

CO8: Demonstrate the acquisition of Basic understanding of Bone tumors and its management.

CO9: Demonstrate the acquisition of Basic understanding of Miscellaneous Diseases.

CO10: Demonstrate the acquisition of Basic understanding of Regional Orthopaedic Conditions and its management in Adults and children

CO11: Demonstrate the acquisition of Basic understanding of Arthrodesis

CO12: Demonstrate the acquisition of Basic understanding of Arthroplasty

CO13: Demonstrate the acquisition of Basic understanding of Degenerative disorders of the Spine

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

1. 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

2. Recent advances in Arthroscopy

3. Recent advances in Arthroplasty

4. Recent advances in Spine Surgeries

5. Recent advances in Trauma

6. Understanding of Biostatistics and research methodology

CO1: Solve problems to new situations by applying acquired knowledge, recalling facts, terms and concepts of recent advances in National health programmes.

CO2: Make inferences and find evidence to support generalizations, identifying motives or causes by seminars, journal club, reviewing articles, interdepartmental meets and symposia on recent advances in orthopaedic surgery.

CO3: Demonstrate understanding of knowledge by comparing, contrasting and interpreting the different recent advances in diagnostics & orthopaedics surgery before recommending new modalities or alternate solutions in management of diseases.

CO4: Demonstrate an attitude of lifelong learning to adapt, while defending opinions and validity of ideas in recent advances in orthopaedics surgery.

CO5: Demonstrate acquisition of knowledge to prioritize from the array of methods by deducting obsolete treatment models and recommending newer treatment modalities justifying the quality of work based on a set of criteria.

OBJECTIVES

After completion of the course the postgraduate should:

1. Have mastered most of the competencies of Orthopaedic Surgery, with cognizance of developments and advances in the field of Orthopaedic Surgery.
2. Be able to solve problems in various clinical settings by explaining the conceptual knowledge of Orthopaedic Surgery.
3. Be a researcher who states ideas and has a motive to discover the field of research in Orthopaedic Surgery.
4. Be an AVID [Advancement Via Individual Determination] teacher who shall have acquired the skills in teaching undergraduates of medical and allied professions.
5. Be able to demonstrate organizational behaviour in implementing health economics, material, personnel management, medical sociology and environmental protection.

After completing the three-year course in MS Orthopaedic Surgery the student should have achieved competency in the following:

1. Knowledge of Orthopaedic Surgery

Acquire competencies related to basic sciences and principles and practise of orthopaedic surgery, operative surgery with the recent advances.

2. Practical and Clinical skills

Acquire proficiency in clinical examination and diagnostic procedures involved in the management of diseases of various systems of the body. Acquire skills required for efficient perioperative management of patients undergoing orthopaedic surgery.

3. Organisational and problem-solving skills

Acquire knowledge and skills required in identifying situations calling for urgent or early orthopaedic surgical intervention and refer at optimum time to higher centre. Acquire problem solving methods in difficult situations and natural calamities. Demonstrate the importance of community health by effectively participating in Family Welfare and other National Health Programmes.

4. Knowledge of evidence-based medicine and medicolegal domain

Acquire knowledge to perform surgical audit on regular basis and maintain records (manual and/or electronic) for life.

5. Knowledge of preventive medicine and rehabilitation

Demonstrate sufficient understanding of basic sciences related to orthopaedic surgery to plan and advise measure for prevention and rehabilitation of patients belonging to his/her speciality.

6. Communication skills

Counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient by obtaining informed consent prior to performance of operative procedure.

7. Training skill in Research Methodology

- Acquire skills in teaching, research methodology, epidemiology & basic information technology.
- Acquire knowledge in the basic aspects of Biostatistics and research methodology.
- Has knowledge to plan the protocol of a thesis, carry out review of literature, execution of research project and preparation of report.
- Has ability to use computer applications Microsoft office (Microsoft word, excel, power point), Internet, Searching scientific databases (e.g. PubMed, Medline, Cochrane reviews).
- Acquire skills in paper & poster preparation, writing research papers and Thesis.

8. Teaching Orthopaedic Surgery:

Attain proficiency by understanding the basic methodology of teaching and develop competency in teaching medical/paramedical students using different teaching and learning methods.

9. Professionalism

- Show integrity, accountability, respect, compassion and dedication for patient care and demonstrate an acquisition of commitment to excellence and continuous professional development while choosing treatment modalities and designing research plan.
- The student should demonstrate a commitment to ethical principles relating to providing patient care, confidentiality of patient information and informed consent.
- The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities while proposing a treatment modality for orthopaedic surgical illness/diseases in the field of his/her speciality.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive domain

At the end of the M.S. Orthopaedics programme, 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.

B. Affective Domain:

1. 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.
2. 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.
3. 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 programme, the student should be able to:

1. Elicit a clinical history from a patient, do a physical examination, document in a case record, order appropriate investigations and make a clinical diagnosis
2. Impart wound care where applicable
3. Apply all types of POP casts/slabs, splints and tractions as per need
4. Identify shock and provide resuscitation
5. Perform aspiration of joints and local infiltration of appropriate drugs
6. Perform appropriate wound debridement
7. Perform arthrotomy of knee joint
8. Perform incision and drainage of abscess
9. Perform split thickness skin grafting
10. Perform fasciotomy
11. Apply external fixators
12. Apply skeletal tractions including skull tongs
13. Triage a disaster situation and multiple trauma patients in an emergency room
14. Perform on bone models, interfragmentary compression screws, external fixation, Tension band wiring and Broad plating
15. Perform closed reduction of common dislocations like shoulder and common fractures like collar fracture, supracondylar fracture.

16. 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:

1. Take an informed consent for standard orthopaedic procedures
2. Perform closed/open biopsies for lesions of bone, joints and soft tissues
3. Perform split thickness skin grafting and local flaps
4. Perform on bone models, internal fixation with k-wires, screws, plates. Dynamichip/condylar screws/nailing.
5. Perform sequestrectomy and saucerisation
6. Perform arthrotomy of joints like hip/shoulder, ankle, elbow
7. Perform repair of open hand injuries including tendon repair
8. Perform arthrodesis of small joints
9. Perform diagnostic arthroscopy on models and their patients
10. Perform carpal tunnel/tarsal tunnel release
11. Apply ilizarov external fixator
12. Perform soft tissue releases in contractures, tendon lengthening and correction of deformities
13. Perform amputations at different levels
14. 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:

1. Assist in the surgical management of polytrauma patient
2. Assist in Arthroplasty surgeries of hip, knee, shoulder and the ankle
3. Assist in spinal decompressions and spinal stabilizations
4. Assist in operative arthroscopy of various joints
5. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow
6. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes
7. Assist in surgical operations on benign and malignant musculoskeletal tumour including radical excision and custom prosthesis replacement.
8. Assist in open reduction and internal fixations of complex fractures of acetabular, pelvis, IPSI lateral floating knee/elbow injuries, shoulder girdle and hand
9. Assist in spinal deformity corrections
10. Independently perform closed/open reduction and internal fixation with DCP, LCP, intramedullary nailing, LRS
11. Assist in limb lengthening procedures
12. Assist in Revision surgeries
13. Provide pre and post OP care
14. Perform all clinical skills as related to the speciality.

Syllabus

Course contents:

1. Basic Sciences

- Anatomy and function of joints
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- Structure and function of muscles and tendons
- Tendon structure and function
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- Myopathies

8. Peripheral Nerve Injuries

- Traumatic
- Entrapment Neuropathies

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- Calcium Pyrophosphate Dihydrate (CPPD), Gout
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- Benign bone tumors
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- Unclassified diseases of bone
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- The hand
- The wrist
- The hip
- The knee
- The foot and ankle
- The pelvis

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- Old unreduced dislocations

- Recurrent dislocations

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

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- 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

- b) **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

c) Degenerative disorders of the spine

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

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- Autologous chondrocyte implantation
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- 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 – Weekly; Theme based student centered
- Journal club/ Review : Weekly
- Academic grand ward rounds: Weekly 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
- 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 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.

***District residency programme (DRP)**

Postgraduate shall undergo a compulsory residential rotation of three months in district hospital/ District health system as a part of the course curriculum in the 3rd, 4th, or 5th semester of the training. The postgraduate is termed as the district resident.

Duties of the district resident

The district resident will work under the overall guidance of the district specialists and district residency programme coordinator (DRPC). He/she would be serving in the areas pertaining to their specialty and encompass night duties.

Clinical meetings:

There will 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**

Formative assessment will be done continually during the training programme, and it applies to medical knowledge, patient care, procedural and academic skills, interpersonal relationships, professionalism, self directed learning and ability to practice in the system. The student is assessed periodically as per categories listed in postgraduate appraisal form (Annexure I)

The Internal Assessment in theory and practical examination is conducted during 1st, 2nd and 3rd year.

Quarterly assessment during the MS training will be based on:

- Case presentation, case work up, case handling/management
- Assessment in skill lab
- Journal club
- Seminars
- Interdepartmental discussions
- Attendance at Scientific meetings, CME programmes (at least 02 each)

Summative assessment

Summative assessment is done at the end of training as per the postgraduate medical education regulations 2000.

The examinations will be organised based on grading or marking system to evaluate and to certify the student's level of knowledge, skill and competence at the end of training. obtaining a minimum 50%marks in theory as well as practical separately is mandatory for passing the examination.

Essential pre-requisites for appearing for examination include:

Eligibility criteria for university examination

Candidates will be eligible to appear for the university examinations after completion of three years with the following criteria:

1. Attendance of 80% per year
2. Submission of dissertation and acceptance by the reviewers
3. One research publication based on the dissertation
4. One poster and one podium presentation at national or regional conferences, pertaining to the subject as mentioned in the syllabus.
5. Completion of the log book
6. Certification of basic course in biomedical research
7. Certification course in medical ethics

University Examination pattern:

MS(Orthopaedics) Examination	Theory	Practical	Viva-voce/ Pedagogy	Total
Maximum marks	400	200	100	700

Theory

4 papers-1 paper on each day-3 hours duration-100 marks each paper

2 long essays -20 marks each

3 short essays-10 marks each

6 short answers -5 marks each

Question papers are prepared based on the prescribed format as described in annexure 2

Post Graduate Examination

The summative examination would be carried out as per the Rules given in **POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.**

The Post Graduate examination shall be in three parts: -

Dissertation

Objectives

1. The student should be able to acquire capability in research by planning and conducting systematic scientific enquiry and data analysis and deriving conclusions.
2. Scientific data should be implemented for health improvement and safer practices.

Guide for dissertation

1. Chief guide will be allocated from the Department as per the eligibility criteria
2. Co-guides are selected from the department or from the department related to the topic of dissertation

Submission of synopsis/protocol

Synopsis of the dissertation will be submitted at the end of six months after admission to the course, in the format prescribed by the institute:

I. Synopsis in essence should consist of:

1. Introduction and objectives of the research project
2. Brief review of literature
3. Materials and methodology of work
4. Statistical analysis
5. Bibliography

II. The protocol should be presented before the department faculty prior to submission to the Institutional Research Committee (IRC) for approval

III. Protocol will be scrutinized by the IRC in terms of feasibility, statistical validity, ethical aspects etc.

IV. IRC will forward the synopsis to Institutional Human Ethics Committee (IHEC) for review

V. Following the approval by IHEC, the synopsis will be sent to external reviewers for reviewing.

VI. Once confirmation is obtained from external reviewers it is registered with the Clinical Trial Registry of India, following which the actual study is carried out.

Submission of dissertation

1. The dissertation will relate to the candidates own work on a specific research problem or a clinical case study in accordance with the approved plan
2. The dissertation shall be written in English printed or typed double spacing, on white bond paper 22x28 cm with a margin of 3.5 cm, bearing the matter on one side of paper only and neatly bound with the title, the name of the college and university printed on the format cover.
3. The dissertation shall have the following headings:
 - a. Introduction
 - b. Review of literature
 - c. Materials and methods
 - d. Observation
 - e. Discussion
 - f. Conclusion
 - g. Summary
4. References

Four copies of each dissertation shall be submitted to the Dean, through their respective Heads of Department not later than six months prior to commencement of subject specific theory exam.

5. Evaluation of dissertation
 - a. The dissertation shall be referred by the University for evaluation to external reviewers appointed by the university. The dissertations will be evaluated and reported independently to the Controller of Examinations using Proforma for Dissertation Evaluation Form and recommend whether the dissertation is
 1. Accepted as submitted

2. Accepted pending modifications as suggested
3. Not accepted for reasons specified
- b. The dissertation shall be deemed to be accepted when it has been approved by at least two external reviewers (who are not the examiners for theory and practical examination), who will allocate marks from which an average will be taken.
- c. Acceptance of dissertation is a pre-requisite for his/ her admission to the theory, practical, viva voce examination. However, if the dissertation report from one or more of the reviewers is not received by the time the postgraduate is due for examination, he/she may be permitted provisionally to appear for the examination, but the result will be withheld till the report is received. If the dissertation is rejected, then the candidate in addition to writing a fresh dissertation, shall have to appear for the examination.
- d. Where improvements have been suggested by external reviewers, the candidate shall be required to re-submit the dissertation, after making the required improvements for evaluation.
- e. If the dissertation is rejected by one of the external reviewers, it shall be referred to another external examiner whose judgement shall be final for purposes of acceptance or rejection of the dissertation.
- f. If the dissertation is rejected by the reviewers, it is returned to the candidate who must re-write and submit as a fresh dissertation and processed
- g. A candidate whose dissertation is accepted, but fails in the examination, need to appear only in the subject examination without any re-submission of dissertation.

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

1. **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)

2. 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, 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; DeBoer,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, AHamish 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

[illegible]

[illegible]

Annexure 2

MODEL QUESTION PAPER

Time :3hrs

MaxMarks:100

Long Essay:(20 marks *2)

1. Describe in brief the proximal humeral anatomy. Classify proximal humeral fracture. Discuss the management of Proximal humeral fracture in a 70 yr old osteoporotic patient.(5+5+10)
2. Describe the anatomy of Knee joint in the aspect of stability. Classify traumatic Knee instability. Discuss approach to management of knee joint dislocation with multi- ligamentous injury in a 25 year old sports person. [7+5+8]

Short Essay:(10 marks *3)

3. Classify thoracolumbar spinal injuries. Management of patient with D12 burst fracture in a 30 yr old male with incomplete cord injury (3+3+4)
4. Classify peri-prosthetic fracture around total hip arthroplasty. Management of peri-prosthetic fracture femur in an uncemented metaphyseal fit femoral stem (5+5)
5. What is dynamization? Describe its role in Orthopaedics using various implants(5+5)

Short Answers:(5marks *6)

6. Vacuum assisted closure of wound (VAC)
7. Complex Regional Pain Syndrome
8. Talar waist fracture
9. Modified Stoppa's Approach
10. Terrible triad of Elbow
11. Perilunate fracture dislocation
