

**ALL INDIA INSTITUTE OF
MEDICAL SCIENCES, RAJKOT
*GUJARAT.***



**Department of Orthopaedics
PG CURRICULUM**

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Preamble

The purpose of PG education is to create specialists who would provide high quality health care and advance the cause of science through research & training. A postgraduate undergoing training MS in Orthopaedics should be trained to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal systems. She/he should be able to provide competent professional services to trauma and orthopaedic patients at a primary/ secondary/tertiary healthcare centre. The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by various subject-content specialists. The Reconciliation Board of Academic Committee has attempted to render uniformity without compromise to purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

Goals and Objectives

Major Goal: Patient care Ability: A postgraduate 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 from history taking and become capable to diagnose the common clinical conditions/ disease in the specialty and to manage them effectively with success without making any serious complications and sincerely to take such accurate decision, for the patient’s best interest including making a referral to consultation with a more experienced colleague/professional friend while dealing with any patient with a difficult condition. Teaching ability: He/she also should be able to teach an MBBS student about the commonly encountered conditions in orthopaedics pertaining to their diagnostic features, basic pathophysiological aspect 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 patient’s relatives especially in emergency situation such as in causality department while dealing with cancer patients and victims of accident. He/she should also maintain human values with ethical consideration.

Objectives: A postgraduate at the end of a 3-year P.G. degree course should acquire the following:



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

2. Clinical decision-making ability & management expertise: Diagnose conditions from history taking, clinical evaluation and investigations and develop expertise to manage medically as well as surgically the commonly encountered, disorders and disease in different areas as follows:

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

(b) 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 chemotherapy need to be familiar to him.

(c) Management of Trauma- Trauma in this country is one of the main causes of morbidity and mortality in our demographic statistics. The student is expected to be fully 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.

(d) Sports Medicine- 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. Sports medicine not only encompasses diagnostic and therapeutic aspects of athletic injuries but also their prevention, training schedules of personnel & their selection.

(e) 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 orthopedically handicapped.

(f) Orthopedic Neurology- The student should be exposed to all kinds of nerve injuries as regards their recognition & management cerebral palsy and acquired neurologic conditions such as post-polio residual paralysis also need to be emphasized in their entirety.

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



- (h) Basic sciences in Orthopaedics- These deals with some of the fundamentals in orthopaedics such as the structure and function of bone cartilage etc, and their metabolic process. In addition, the student learns about implants in orthopaedics and their metallurgy.
- (i) Radiology- Acquire knowledge about radiology/imaging and to interpret different radiological procedures and imaging in musculo-skeletal disorders. There should be collaboration with Radiology department for such activities.
- (j) Psychologic and social aspect- 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.
3. Teaching: Acquire ability to teach an MBBS student in simple and straightforward language about the common orthopaedic ailment/disorders especially about their signs/symptoms for diagnosis with their general principles of therapy.
4. Research: Develop ability to conduct a research enquiry on clinical materials available in Hospital and in the community.
5. 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.
6. Preventive Aspect: Acquire knowledge about prevention of some conditions especially in children such as poliomyelitis, congenital deformities, cerebral palsy and common orthopaedic malignancies.
7. Identification of a special areas within the subject: To further develop higher skills within the specialty in a specialized are such as Arthroplasty, Neurology, Arthroscopy oncology, spine surgery, hand surgery and Rheumatology, identify some area of interest during the residency and do fellowship/ senior residency programme in one of such areas.
8. Presentation of Seminar/paper: Should develop public speaking ability and should be able to make presentation on disease-conditions/research topics to fellow colleagues in a Seminar/meeting/ conference using audio-visual aids.
9. Research writing: Should be capable to write case-reports and research papers for publication in scientific journals.
10. Team work: Team spirit in patient management, working together in OPD, OT, ward and sharing responsibility with colleagues such as doctor, nurses and other staff are essential. Resident has to develop these attributes through different mechanism of infection.



11. Practical training: A Junior Resident doctor, pursuing a P.G. Degree course is expected to perform major and minor surgical procedures independently as well as under supervision of a faculty member/senior resident. She/he should be able to do many major procedures independently such as:
(Few examples only given):

- Closed reduction of fractures
- External fixation of compound fractures
- Debridement of crush injuries
- Amputations
- Internal fixation of common simple fractures
- Polio surgery such as TA lengthening, steindler's procedure etc
- Intra-articular injections
- Steroid injections for various painful conditions
- Sequestrectomy in chronic osteomyelitis
- Corrective POP casts for club foot & other congenital deformities
- Biopsy from a mass

He/she should be able to do the following operations under supervision/guidance of senior colleagues/faculty member (Few examples only given):

- Internal fixation of simple fractures such as fracture of both bones of forearm, supracondylar fracture humerus, malleolar fractures, femur shaft fractures, per trochanteric fractures etc.
- Polio surgery such as Jone's procedure Campbell's procedure, triple arthrodesis, lambrinndi procedure etc.
- Club foot surgery such as postero-medial soft tissue release, dilwyn-ewan's procedure, triple arthrodesis, JESS fixator, ilizarov fixator application.

Syllabus/ Curriculum

Course contents:

1. Basic Sciences

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



2. Diagnostic Imaging in Orthopaedics (Should know the interpretation and Clinical Correlation of the following): -

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

3. Metabolic Bone Diseases

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

4. Endocrine Disorders

- Hyperparathyroidism
- Gigantism, Acromegaly

5. Bone and Joint Infections

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

6. Poliomyelitis

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

7. Orthopaedic Neurology

- Cerebral Palsy
- Myopathies

8. Peripheral Nerve Injuries

- Traumatic
- Entrapment Neuropathies

9. Diseases of Joints

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



10. Systemic Complications in Orthopaedics

- Shock
- Crush syndrome
- Disseminated Intravascular Coagulation (DIC)
- acute respiratory distress syndrome (ARDS)

11. Bone Tumors

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

12. Miscellaneous Diseases

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

13. Regional Orthopaedic Conditions of Adults and Children

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

14. Biomaterials

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

15. Fracture and Fracture-Dislocations

General considerations

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



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

16. Dislocations and Subluxations

- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations

17. Traumatic Disorders of Joints (Sports Injuries)

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

18. Arthrodesis

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

19. Arthroplasty

- Biomechanics of joints and replacement of the following joints.
- Hip
- 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. Paediatric orthopaedics:

- Fractures and dislocations in children
- Perthes' disease
- Slipped capital femoral epiphysis
- Developmental Dysplasia of Hip (DDH)
- Neuromuscular disorders

24. Spine:

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



- Rehabilitation of paraplegics/quadruplegics
- Management of a paralyzed bladder
- Prevention of bed sores and management of established bed sores
- Exercise programme and Activities of Daily Living (ADL)
- Psychosexual counselling

b) 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.

25. Triage, Disaster Management, BTLS and ATLS

26. Recent advances in orthopaedics

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

Broad Syllabus for Paper I, II, III, IV

Paper-I:

Basic Sciences:

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

Paper-II:

Principles & Practice of orthopaedics:

Bone Infections (Pyogenic, tuberculosis syphilis, mycotic infections, salmonella & brucellar osteomyelitis), congenital deformities (upper & lower extremities, spine and general defects), developmental conditions (osteogenesis imperfecta, dysplasia, hereditary multiple exostosis etc.)



diseases of the joints (osteoarthritis, Rheumatoid arthritis, neuropathy joints, ankylosing spondylitis, sero-negative spondyloarthropathy, traumatic arthritis etc.) orthopaedic neurology, tumors of bone.

- Disease of muscle fibrin disease peripheral vascular diseases
- Disorders of hand & their management

Paper-III:

Trauma surgery & Recent advances in orthopaedics

- General principles of fracture management fractures of lower extremity, fractures of pelvis and hip, fractures of upper extremity and shoulder girdle, fractures and dislocations in children, malunited fractures, delayed union and non-union of fractures, acute dislocations, old unreduced dislocations, recurrent dislocations.
- Arthroscopy, LASER, Endoscopic minimally invasive spine surgery, allografts & bone banking Ilizarov & bone transport, chemotherapy of cancers.

Paper-IV:

General surgical Principles & orthopaedic surgery

General surgery, oncology, and & Medicine as applicable to the Musculo-skeletal disorders/disease. Radiology, Imaging – computed tomography and magnetic resonance imaging, (MRI) and interventional radiology and angiography as related to orthopaedics.

General pathologic aspects such as wound healing and also pathology and pathogenesis of orthopaedic disease, pharmacology, molecular biology, genetics, cytology, haematology, and immunology as applicable to orthopaedics.

General principles of traumatology and also neck injury.

Plastic surgery as applicable to orthopaedics.

Competency Based Theory and Practical Curriculum

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 Musculo skeletally 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. Counselling of relatives: regarding patient's condition, seriousness, bereavement and counselling 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 fasciotomies
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 approach 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. Dynamic hip/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 osteotomes 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.

Teaching – Learning Methodology

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

- 1. Journal club:** 1 hrs duration –Paper presentation/discussion – once per week (Afternoon).
- 2. Seminar:** One seminar every week of one hour duration (Afternoon)



- 3. Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar/as per need.
- 4. Case presentation** in the ward and the afternoon special clinics (such as scoliosis/Hand clinics). Resident will present a clinical case for discussion before a faculty and discussion made pertaining to its management and decision to be recorded in case files.
- 5. Case Conference-** Residents one expected to work-up one long case and three short cases and present the same to a faculty member and discuss the management in its entirety on every Monday afternoon.
- 6. X-Ray Classes-** Held twice weekly in morning in which the radiologic features of various problems are discussed.
- 7. Surgico pathological Conference:** Special emphasis is made on the surgical pathology and the radiological aspect of the case in the pathology department such exercises help the Orthopaedics/ Pathology/Radiology Residents.
- 8. Combined Round/Grand Round:** These exercises are to be done for the hospital once week or twice/ month involving presentation of usual or difficult patients. Presentations of cases in clinical combined Round and a clinical series/research data on clinical materials for benefit of all clinicians/Pathologists/ other related disciplines once in week or forthrightly in the Grand round.
- 9. Community camps:** For rural exposure and also for experiences in preventive aspect in rural situation/ hospital/school, patient care camps are to be arranged 2-3/ year, involving residents/junior faculty.
- 10. Emergency situation:** Casualty duty to be arranged by rotation among the PGs with a faculty cover daily by rotation.
- 11. Afternoon clinics:** Scoliosis Clinic- Held once a week. Residents work up the cases of spinal deformity and present them to a faculty member and management plan recorded in case file. Hand Clinic- Held once a week. All the cases of hand disorders are referred to the clinic and discussed in detail. CTEV Clinic- Held once week corrective casts are given and the technique learnt by the residents. Surgical management in also planned & recorded in case file. Polio- Clinic- Held once a week, Various braces & Callipers are prescribed and surgical management planned.
- 12. Besides clinical training** for patient care management and for bed side manners: Daily for ½ to one hour's during ward round with faculty and 1-2 hours in the evening by senior resident/faculty on emergency duty, bed side patient care discussions are to be made.



13. Clinical teaching: In OPD, ward rounds, emergency, ICU and the operation theatres: Residents/Senior Residents and Faculty on duty in respective places – make discussion on clinical diagnosis/surgical procedures/treatment modalities, including postoperative care and preparation of discharge slip.

14. Clinical interaction with physiotherapist: Clinical interaction with physiotherapist pertaining to management of the patients in post-op mobilization.

15. Research Methodology: Course and Lectures are to be arranged for the residents for language proficiency by humanity teachers besides few lectures on human values and ethical issues in patient care.

16. Writing Thesis: Thesis progress is presented once in 3 months and discussion made in the department. Guides/co- guides are to hear the problems of the candidate; can provide assistance to the student. Progress made or any failure of the candidate may be brought to the notice of college Dean/Principal.

Teaching & Training Schedule

- **First 6 (six) months:** Spends in orientation programme including exposure to casualty
 - Learns bedside history taking in ward, OT exposures, casualty, ICU requirement and their visit to related disciplines such as physical medicine and rehabilitation/Anaesthesia.
 - Care of indoor (medical; preoperative and postoperative) patients for a minimum period of 6 months and learn techniques of traction would care and splintage.
 - Attends operation theatre and emergency operations for acclimatization.
 - Assists ward rounds and visits other wards with senior colleagues to attend call/consultations from another department.
 - Participates in the teaching sessions in ward for bedside clinical in the weekly afternoon seminar/ journal club.

After 6 months of orientation during 2 ½ years:

- Attends orthopaedics OPD 3 day a week
- Discuss problematic cases with the consultant (s) in OPD/ward
- Attends operation room/theatre 3 days a week
- Attend 2 morning rounds/ week



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- Care of the indoor patients on beds allotted to him/her.
- Attends the weekly Journal Club and seminar and presents the same by rotation
- Attends scoliosis, polio, hand, CTEV, arthritis clinics and presents cases participates in discussions including therapy-planning etc.
- During the 2 ½ years, the resident must attend the combined teaching
- Programme of the department of surgery, Neurosurgery and Medicine i.e., clinical meetings, CPC's of students and staff of the whole hospital
- Surgico-pathological conference in Pathology Department, with surgeons.
- All kinds of specially prepared lectures by department. Faculty or from R.T./plastic or Neurosurgery Departments.
- Visits by rotation the Rural Clinic for community exposures/work experience.
- Does 24 hours-emergency duty once a week/ as per roster of the department.
- Attends lectures by visiting faculty to the department/college from India/abroad.
- Attends/participate/present papers in state/zonal national conferences.
- Actively participate/help in organization of departmental workshop, courses in specialized areas like Arthroplasty, Arthroscopy, Spine, Hand surgery from time to time.

Research methodology / reporting on research: Learns the basics in research methodology and make the thesis protocol with the 4 months of admission.

- Problem oriented record keeping including use of computer.
- Use of medical literature search including through Internet use, in the library.
- Attends bio statistics classes by arrangement.
- Research Report – writing including preparation of Protocol for Research/Thesis.
- Writing an abstract/short paper/presentation style (slide-making & audiovisual aids).
- Preparation of a report on a research project/Thesis.

Humanity/Ethics:



– Lectures on humanity including personality development, team spirit and ethical issues in patient care and human relationship including, public relations, by Psychologist and public relation officers are to be arranged by the department/college.

Presentation for the Thesis work:

(a) Selection of thesis topic: Subject of thesis will be selected by the candidate under guidance of faculty, which will be approved by the departmental guide and other faculty. The candidate will be asked to submit the protocol within 3 (Three) months of admission after it is scrutinized by departmental faculty. It is to be approved by IRC, IEC SAC and the central thesis committee of the institute/college if such committee does exist.

(b) Once the thesis protocol is approved the candidate starts his research work under direct supervision of guide and co-guides.

(c) Three monthly progresses of the thesis will be checked to know the outcomes/or difficulties faced by the candidate. Candidate will be asked to submit the thesis 6 months before the final exams. At the discretion of director/thesis committee one month extension may be given to a candidate for submission of the protocol and the final thesis for any valid reason for the delay

Assessments: Formative and Summative

Assessment will be comprehensive and objectively assessing the competencies stated in the course. The assessment is both formative and summative. Formative (Internal assessment) is spread over the entire duration of the programme and tentatively will be conducted at the end of each year in the training. Exam at the end of 1st and 2nd year will contribute 25 % each towards the internal assessment marks and pre final will contribute 50% of total internal assessment marks. Formative assessment marks would make up 25% of the final MS orthopaedics marks. Summative assessment will be as per AIIMS Rajkot* recommendation and will happen at the end of the course. Theory and practical exam will contribute in same proportion towards the final score for both formative and summative assessment.

*This is a proposed pattern for assessment for approval. Changes can be made on later date if deemed suitable as per AIIMS Rajkot curriculum committee recommendation.

The oral, clinical and Practical Examination:



ALL INDIA INSTITUTE OF MEDICAL SCIENCES,
AIIMS Rajkot, Gujarat.
Department of Orthopaedics



One or 2 centres depending on local university rules. Not more than 4 P.G. students should be subjected to practical exam in a day during the examination.

Results of the examination will be declared as pass/failed/pass with distinction (Grade/marks may also be given, if necessary, as per AIIMS, Rajkot Rules). While doing so, both, formative and summative assessment will be taken into consideration.

The Examination for the degree (MS-Orthopaedics) shall consist of

1. Theory exams: papers

2. Practical Exams: - clinical, Oral, instruments/specimen/specimen/X-rays.

1. Theory: There shall be four papers: Each being of three hours duration. Each paper will have 8-10 short question from the curriculum.

Paper I Basic Sciences related to Orthopaedics.

Paper II Principles and Practices of orthopaedics (Cold orthopaedics).

Paper III Recent advances in orthopaedics & trauma surgery.

Paper IV General Surgical Principles & allied specialties.

2. Practical Examination –

(a) Identification of Surgical Pathology, excised specimens & discussion, reading X-rays & CT scan/MRI, identification of Instruments & discussion, identification of braces & callipers & discussion thereon.

(b) Clinical Patient presentation/discussion:

(i) One long case: The long case will be structured comprising – history taking, clinical examination, investigations, decision making, proposed treatment modalities, ethical justification and personal attributes.

(ii) Three short cases: The short cases will also be structured in which only one particular system may be considered and therapy decision/discussion, made.



Model Paper

M.S. ORTHOPAEDIC SURGERY

Paper I - Applied Basic Sciences

Time: Three hours

Maximum marks: 80

Answer ALL Question

1. Define Osteoporosis as per WHO criteria. How would you investigate and manage a 47-year-old post-menopausal female who has bone pain and T score of minus 4.0? (20 marks)

2. Describe the function of parathyroid gland and skeletal changes that occurs as a result of hyperparathyroidism. Discuss the uses and limitations of investigations used in hyperparathyroidism. (20 marks)

3. **Write a short note on:** (10 marks each)
 - a) Brodie's abscess
 - b) Ideal amputation stump
 - c) Imaging of CDH
 - d) Fat embolism



M.S. ORTHOPAEDIC SURGERY

Paper II – Principles and practice of Orthopaedics

Time: Three hours

Maximum marks:80

Answer ALL Question

1. Describe the clinical presentation, differential diagnosis, histology and management of Ewing's sarcoma. (20 marks)
2. Enumerate the causes of Pott's paraplegia. Discuss the current concept in management of Pott's paraplegia in 12-year-old boy. (20 marks)

II. Write short notes on: (10 marks each)

- a) Stages of TB hip in children
- b) Radial club hand
- c) Diagnostic criteria for rheumatoid arthritis
- d) Tendon transfer for high radial nerve palsy



M.S. ORTHOPAEDIC SURGERY

Paper III – Trauma surgery & Recent advances in orthopaedics

Time: Three hours

Maximum marks: 80

Answer ALL Question

Write short notes on:

(10 marks each)

- a) Fracture of Calcaneus: Classification and management
- b) Role of MRI in orthopaedics.
- c) Surgical approaches to thoracic and lumbar spine.
- d) Role of arthroscopy in frozen shoulder.
- e) Stanmore triangle of shoulder instability.
- f) Mallet finger.
- g) Triple deformity of knee.
- h) Intrinsic plus hand.



M.S. ORTHOPAEDIC SURGERY

Paper IV -General surgical principle & allied specialities

Time: Three hours

Maximum marks:80

Answer ALL Question

II. Write short notes on:

(10 marks each)

- a) Role of 3D printing in Orthopaedics.
- b) Cementing techniques in THA.
- c) Negative pressure wound therapy.
- d) Autologous chondrocyte implantation.
- e) Tension band principle.
- f) Thoracic outlet syndrome.
- g) Locking plate principle.
- h) Debridement

Recommended & Reference text books

Core Books:

1. Apley's System of Orthopaedics & Fractures – Solomon Louis, 9th Edition, Hodder Arnold 2010
2. Campbell's Operative Orthopaedics – Canale Terry.S, 12th Edition, Elsevier 2003
3. Mercer's Orthopaedics Surgery – Duthied , Robert.B , 9th Edition, Jaypee 2003
4. Hamilton Bailey Demonstration of Clinical Signs & Symptoms – Lumley, John S.P, Arnold 2001
5. Snell Richard Clinical Anatomy by Regions 9th Edition, Lippincott 2012



6. Pye's Surgical Handicraft – Varghese Publishing Author :- Kyle.J – 22nd Edition, 1996
7. Stewart's Manual
8. Clinical orthopaedic Examination – Mc Rae, 6th Edition, Elsevier 2010

Reference Books:

1. Rockwood & Green – Fractures in Adults, Bucholz , Robert.w, 7th Edition, Lippincott 2012
2. Rockwood & Green – fractures in Children, BeatyJames.H, 7th Edition, Lippincott 2010
3. Chapman Othopaedic Surgery – Chapman, Michael.W , 3rd Edition V-1 to 4, Lippincott 2001
4. Turek's Textbook of Othopaedics, Othopaedics Principles and their application - Turek, Samuel, 4th Edition Vol – 1&2, Lippincott 1984
5. Hoppenfied – Surgical Exposures in orhopaedics4th Edition, Lippincott 2009
6. Mc Rae – Surgical Exposures 2003
7. Insall& Scott – surgery of the Knee, Scott Norman.W, 5th Edition, Elsevier 2012
8. Miller & Cole Textbook of Arthroscopy – Miller Mark.D, Saunders 2004
9. Tachdjian Paediatric Orthopaedics – Herring, John Anthony. 3rd Edition vol 3, Saunders 2014

Journals:

1. JBJS – American & British
2. Orthopaedics Clinical of North America
3. ACTA Orthopaedic Scandinavia
4. Clinical Orthopaedics& Allied Research
5. Indian Journal of Orthopaedics.