(a) *Pediatric orthopaedics-* The student should be exposed to all aspects of congenital and developmental disorders such as CTEV (club-Foot), developmental dysplasia of hip, congential 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-* This 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 audiovisual 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

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 lingthening, 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 reease, dilwyn-ewan's procedure, triple arthrodesis, JESS fixator, ilizoror fixator application.

DURATION OF TRAINING AND ROTATION PROGRAMMES (WARD/OT/OPD)

FIRST YEAR

– Spends 6 (six) months 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/Anesthesia.
- 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 other 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 yrs:

- 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
- 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
- Surgicopathological 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 methology / 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 4 (Four) month of admission after it is scrutinized by departmental faculty. It is to be approved by the central thesis committee of the institute/college if such committee does exist, and the ethical considerations are also discussed in such Research Programme Committee.

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

(c) Three/six monthly progress 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.

Teaching Methods:

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. *Surgicopathological Conference:* Special emphasis is made on the surgical pathology and the radiological aspect of the case in the pathology department such exercises help the ortopaedics/ Pathology/Radiology Residents.
8. *Combined Round/Grand Round:* These exercises are to be done for the hospital once/wk 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 a 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 & Calipers 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.

Final Examination & Examiners:

The oral, clinical and Practical Examination:

One or 2 centers 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 University 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 there hours duration. Each paper will have 8-10 short question from the curriculum.

   Paper I Basic Sciences related to Orthopedics.

Paper II Principles and Practices of orthopaedics.

Paper III Recent advances in orthopaedics & trauma surgery.

Paper IV General Surgical Principles & allied specialties.

2. Practical Examination –

(b) Identification of Surgical Pathology, excised specimens & discussion, reading X-rays & CT Scan/MRI, identification of Instruments & discussion, identification of braces & calipers & discussion thereon.

(c) 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.

EXAMINERS/ Final Examinations:

(a) There shall be four examiners including two external and two internal. One of the internal examiners will be the Head of Department and he she shall be chairman/Convener. The second internal examiner shall be next senior most member of faculty of the department provided he/she is eligible for such duty. The necessity of an external examiner is to maintain the standard of the examination at the National level. All examiners must be a full time teacher with requisite experience as per MCI guidelines. Hony teacher with previous full time experience (of 10 years standing) may only be made examiners if there does not exist nay a full time qualified faculty under the same university/ college. No Hony. Faculty shall be made a chairman/convener of the examination.

(b) The external examiners will be asked to send two sets of question papers for the theory examination. There will be 2 external examiners from a different university so that the number of questions available, will be double the which will be given to the student in the moderate papers. The Chief internal examiner or Chairman/Convener will moderate it and finally make two sets of question paper, containing 8-10 shorts questions. He/she shall send both sets of such papers to the university and university will decide to give one of the sets to the students.

(c) All examiners shall be jointly responsible for the examination. In presence of the external examiners, the Chairman and the internal examiner shall make the necessary arrangements for conducting the final examination. Not more than 4 students will be evaluated/examined per day in any Center. For different College/Institution, separate examination center/examiners may be arranged/appointed for convenience and proper administration of the final examination. While preparing the final results, formative assessment of the students shall be taken into consideration and the results will be sent to the university under seal cover.

Syllabus for individual papers:

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, dysplasias, 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 & orthopedic 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.

I. Orientation program: in ward, OPD, OT, Emergency (6 months) II. DISCIPLINE TRAINING (During – 2 ½ yrs) A. Ward Round daily (Patient care/Teaching) B. OPD – Case base learning & Patient care C. Demonstration of operative procedures in OT & Trauma Management in causality D. Case-presentation/discussion (Afternoon special clinics) E. Journal Club Weekly	Common Foundation Course 6 month.

	F. Seminar weekly including presentation of thesis progress	
	G. Surgicopathological conference - monthly	
	H. Radiology Conference – weekly	
	I. Thesis submission after final presentation	
III.	Attendance of State, Zonal/National levelconferences /workshops/symposium during (2^{nd} – 3^{rd} yr.)	Final exams.

ORTHOPAEDIC SURGERY

RECOMMENDED READING ORTHOPAEDIC SURGERY

Title of the book	Author	Publisher
Watoson Jones-Fractures And Joint Injuries	J.N. Wilson	Churchill Livingstone
Fractures, Dislocations and Sprains	Kay & Conwell	C.V. Mosby
Outlines of Fractures	Crawford Adams	Churchill Livingstone
Closed Treatment of Fractures	H.John Charnley	Churchill Livingstone
Outlines of Orthopaedics	Crawford Adams	Churchill Livingstone
Mercer's Orthopaedics Surgery	Duthie	Edward Arnold
Fundamentals of Orthopaedic Surgery	Philip Wiles	Churchill Livingstone
Paediatric Orthopaedic And Fractures	WJ Sherrad	Butterworth
Orthopaedic Diseases	Aegerter and Kirkpatrick	Saunders
Tumours and Tumourous Conditions of Bone and Joints	Jaffe	Lea Febiger
Campbell's Operative Orthopaedics	A H Crenshaw	C V Mosby
Extensive Exposure	A K Henry	Churchill Livingstone
Hand book of Physical Medicine	Krusen	Kottae Ellwood
Rehabilitation Medicine	Howard & Rusk	
Electrodiagnosis	Sidney Licht	
Kinesiology	Rach & Bruke	

JOURNALS

Indian Journal of Orthopaedics.

Journal of Bone and Joint Surgery (British & American Volumes).

Orthopaedic Clinics of North America.

Clinical Orthopedics and Related Research

Yearbook of Orthopaedics.

British journal of Rheumatology and Physical Medicine.

Journal of rehabilitation, Bombay.

OTOLARYNGOLOGY (ENT) — M S

I.	Orientation programme: in ward, OPD, OT, Emergency	Common Foundation Course 6 month; Assessment (5%)
	Posting (1 month) ICU posting (2 weeks by rotation).	
	Protocol for thesis submission	
	DISCIPLINE TRAINING (during – 2 ½ yrs)	
	A. Ward Round daily (Patient care/Teaching)	
	B. OPD – Case base Learning & Patient care	1 year Assessment (5%)
	C. Demonstration of operative procedures in OT and Cadaveric dissections in the laboratory (Temporal bone & head and Neck dissection)	
	D. Case-presentation/discussion (Afternoon special clinics)	1½ year Assessment (5%)
	E. Journal Club Weekly	
	F. Seminar weekly including presentation of thesis progress	2 years Assessment (5%)
	G. Surgicopathological conference, weekly	
	H. Radiology Conference – monthly	2.5 years assessment (5%)
II.	Thesis submission after final presentation	
III.	Audiovestibular/experimentalLabs (ABR;ENG;Animal). Exposure during 2nd-3rd yr.	Formative = 25% Assessment
IV.	Attendance of State,Zonal/National level Conferences/Workshops/symposium during (2nd-3rd yr)	Final exams. Summarative = 75%
V.	Community service-patient care camp/Awareness camps on ear diseases/Head-neck oncology (especially or preventive otolaryngology during 2nd-3rd year).	