



SRM

UNIVERSITY

(Under section 3 of UGC Act 1956)



MS Orthopaedics

Curriculum and Syllabus 2015

Branch Code: 53

SRM Medical College Hospital & Research Centre

SRM University

SRM Nagar, Kattankulathur

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S.NO	CONTENT	PAGE NO
1	GOALS AND OBJECTIVES	04
2	COURSE OVERVIEW.....	05
3	SYLLABUS.....	09
4	MAINTENANCE OF LOG BOOK.....	14
5	THESIS	15
6	SCHEME OF EXAMINATION	16
7	EXAMINATION AND EVALUATION.....	18
8	MODEL QUESTION PAPER	21
9	RECOMMENDED BOOKS & JOURNALS	25

M.S. ORTHOPAEDICS

1. A.GOAL

The purpose of this programme is to standardize postgraduate orthopaedics teaching on par with other universities in our country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent orthopaedics surgeons with appropriate expertise.

B. OBJECTIVES

A student upon successfully qualifying in the M.S. (Orthopaedics) examinations should

- Identify the diseases and injuries of musculo-skeletal system and obtain proper history and perform thorough clinical examination.
- Plan and interpret investigations and institute management of diseases and injuries of musculo-skeletal system.
- Acquire scientific temper for teaching and research in the discipline of orthopedics.
- Acquire skills to manage orthopaedic services.
- Organise rehabilitative services to the physically handicapped persons

2. COURSE OVERVIEW

Duration of the Course

The period of certified study and training for the Post-Graduate MS ORTHOPAEDICS shall be Three Academic years (six academic terms). The academic terms shall mean six months training period.

Commencement of Academic Session

The academic session for the Post-Graduate shall commence from May /June of the Academic Year.

Date of Examination

The students admitted up to May/June of the academic year shall be registered for that academic year and shall take up their Final Third Year regular examination in April/October of the academic year after completion of 3 years/ 36 months.

Number of Examinations

The University shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

Attendance

All students joining the postgraduate training programme shall work as full time residents during the period of training, attending not less than 80% (eighty percent) of the training during each calendar year, and will be given full time responsibility, assignments and participation in all facets of the educational process.

The period of training for obtaining the degrees shall be three completed years including the period of examination.

The residents are required to work full time in the department of Orthopaedicsurgery. They will fully participate in the day to day care of the patients in the wards, outpatient clinics and operation theaters. They will also participate in the academic and research activities of the department.

During first year the residents shall be posted mainly in Orthopaedicwards and in emergency. Under the supervision of their superior colleagues, they will be responsible for the care of the patients in the ward. During the first year of residency, they will start with his thesis work after submission of the plan. Their shall also be rotated in different surgical specialities as follows.

The residents will be rotated in each speciality namely General Surgery, Intensive Care Unit, Plastic Surgery, Neuro Surgery, Radiology, to obtain the core experience during 2nd year.

The residents should be able to describe and perform the following at the end of the Core experience. (2nd Year)

- ICU
 - (i) Identify and rectify electrolyte disturbance and acid base Imbalance
 - (ii) Cardiopulmonary resuscitation and endotracheal intubation
 - (iii) AC. & Ch. Respiratory insufficiency interpretation of bloods Gas.
 - (iv) Management of ARDS

- General Surgery
 - ✓ Triage and establishment of treatment priorities in polytrauma patient tracheostomy
 - ✓ Identification of Chest wall /lung injuries and chest tube insertion
 - ✓ Peripheral Venous cut down
 - ✓ Sub clavian and internal jugular cannular
 - ✓ CVP catheter monitoring
 - ✓ 4 quadrant abdominal tap for haemoperitoneum
 - ✓ Describe the potential complications of major intra-abdominal injuries and indication for emergency laproatomy.
 - ✓ Assessment and management of head injuries and differential diagnosis of altered level of consciousness.

➤ Plastic Surgery

- ✓ Split skin grafting
- ✓ Local skin rotation flaps
- ✓ Muscle pedicle and myocutaneous flaps
- ✓ Management of supernumery digits and syndactly

➤ Vascular Surgery

- ✓ Identification of peripheral vascular injury in limb injuries and know the indications for arterial reconstruction
- ✓ Management of deep vein thrombosis and pulmonary embolism.

➤ Neurosurgery

- ✓ To study management of Head Injuries in detail
- ✓ To assist neurosurgical operations related to head injury and other common neurosurgical disorders

➤ After 1year of orientation

- ✓ Attends orthopaedics OPD 3 day a week
- ✓ Discuss problematic cases with the consultant (s) in OPD/ward
- ✓ Attends operation room/theater 3 days a week
- ✓ Attends 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 surgeon.
- ✓ All kinds of specially prepared lectures be department. Faculty or form R.T./plastic or Neurosurgery Department.
- ✓ 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 department 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 within 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 student under guidance of faculty, which will be approved by the departmental guide and other faculty. The student 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 and the ethical considerations are also discussed in such research Programme Committee.
- (b) Once the thesis protocol is approved the student 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 student. Student will be asked to submit the thesis 6 months before the final exams.

- (d) Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.
- (e) The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical; and on the acceptance of the thesis by two examiners, the student shall appear for the final examination.

3. DETAILED SYLLABUS

A. Theory

- Metabolic Bone Diseases
- Bone Infection - pyogenic, tubercular and mycotic
- Arthritis
- Tubercular
- Non-tubercular
- Congenital Deformities
- Developmental conditions
- Diseases of Joints and Surgical treatments
- Orthopaedic Neurology
- Poliomyelitis, Cerebral palsy
- Nerve injuries (Traumatic and non-traumatic)
- Spin bifida and related disorders
- Tumors of Bone-including secondary tumors of bone
- Diseases of Muscles
- Fibrous Diseases
- Unclassified Diseases of Bone
- Paget's Diseases
- Tumours of Haemopoietic Tissue
- Histocytic Lymphoma
- Tumors Invading Bone from Overlying structures.
- Peripheral vascular diseases
- Bleeding disorders ad orthopaedic manifestation, hemoglobin opathies and its orthopaedic manifestations.
- Regional Orthopaedic Condition of Adults and children
- Spine

- Cervicobrachial Region
- The shoulder
- The Elbow
- The Hand
- The Wrist
- The Hip
- The Knee
- The Foot and the ankle
- The Pelvis
- Skin grafting & flaps
- Trauma:
- Limb Length inequality & its management
- Microsurgical techniques in orthopaedics
- Spinal cord injuries
- Orthotics and prosthetics
- AIDS related orthopaedic conditions
- Theater techniques and sterilization
- Disaster relief
- Advance trauma life support
- Fractures:
- Definitions, types, grades, patterns, complications.
- Pathology of fracture and fracture healing
- Clinical & radiological features of fractures & dislocations.
- General principles of fractures treatment
- Fractures of lower extremity
- Fractures of hip and pelvis
- Fractures of upper extremity & shoulder girdle
- Fracture & dislocation in children
- Malunited fractures
- Delayed union & non union of fractures
- Fractures, dislocation & fracture dislocations of spine
- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations
- Traumatic Disorders of joints:
- Ankle injuries
- Knee injuries
- Shoulder & elbow injuries
- Wrist and hand injuries

- Arthrodesis:
- Arthrodesis of lower extremity & hip
- Arthrodesis of upper extremity
- Arthrodesis of Spine
- Bone grafts & bone substitute (Bone Banking)
- Arthroplasty
- Biomechanics of joints and joint replacement
- Hip
- Knee
- Ankle
- Shoulder
- Elbow
- Arthroscopy
- General principles of Arthroscopy
- Arthroscopy of knee & ankle
- Arthroscopy of shoulder and elbow
- Amputations and disarticulation:

Recent Advance in Ortho:

- Stem cell / ACT
- Resurfacing arthroplasty
- Locking plates in fractures
- Spine surgeries - Disc Replacement ect.,
- Navigation in Paediatric, MIS ect.,
- Limb salvage & Tumor, Trauma, Infection.
- Principles of deformity correction & Ilizarov.

B. Practical

- ✓ Manage wound and skin graft
- ✓ Manage shock and resuscitation.
- ✓ Resuscitate injured patients
- ✓ Expose & repair the femoral, popliteal and brachial artery.
- ✓ Perform incision and drainage abscesses
- ✓ Perform biopsy-closed & open
- ✓ Perform aspiration and infiltration of all joints
- ✓ Apply all types of casts, splints and traction
- ✓ Perform closed reduction of fractures

- ✓ Recognize compartment syndrome and perform surgical decompression
- ✓ Perform open reduction / internal fixation of unreduced dislocation
- ✓ Perform internal fixation of common fractures of long bones of limbs
- ✓ Perform debridement
- ✓ Apply external fixators
- ✓ Perform arthrotomy / synovectomy of all joints
- ✓ Perform surgical decompression in case of acute osteomyelitis
- ✓ Perform sequestrectomy and Saucerisation
- ✓ Perform release operation in common entrapment syndromes and other orthopaedic problems
- ✓ Perform tendon transfer and repair open hand injuries
- ✓ Perform nerve repair
- ✓ Perform local steroid infiltrations in the soft tissues & joints.
- ✓ Perform Arthrodesis of joints
- ✓ Perform meniscectomy
- ✓ Correct common deformities of limbs by conservative/surgical procedures
- ✓ Perform amputations and disarticulations.
- ✓ Perform skin grafting and flaps
- ✓ Perform excision of benign tumor, cysts and cyst like conditions of bones and soft tissues.
- ✓ Perform limb salvage surgery in malignant bone tumours
- ✓ Perform all types of bone grafting
- ✓ Perform excision arthroplasty and hemiarthroplasty

C. TEACHING SCHEDULE FOR POST GRADUATES

Teaching Methods

- ✓ Didactic lectures
- ✓ Bed side clinics
- ✓ OPD clinics
- ✓ Journal review
- ✓ Symposia and seminar & inter department like Ortho pathology, Ortho Radiology ect.,
- ✓ CME programme, Local, State-National level – at least 1 CME / workshop during the course
- ✓ Workshop
- ✓ Standard textbooks
- ✓ Journals, periodicals
- ✓ Thesis for M.S. Course, these should be submitted before 6month to the date of Exam.

- ✓ Clinical ward work
- ✓ Out Patient Department
- ✓ Rehabilitation Orthosis, Prosthetics
- ✓ A log book is to be maintained,

***Training Programme - M.S. (Ortho)**

First year

Orthopaedics - 12 Months

Second Year

Orthopaedics - 09 Months

General Surgery - 01 Month

Plastic & Hand - 1 5 days

Rehabilitation - 1 5 days

Neuro Surgery - 15 days

Radiology - 15 days

Third year

Orthopaedics - 12 Months

**Modification as approved in 28th Academic Council meet of SRM University held on 23.03.2015.*

4. MAINTENANCE LOG BOOK

Each student should be required to maintain in log book in which following details will be entered.

- a) Investigation performed by him.
- b) Presentations in journal clubs along with title and journal & issue with title.
- c) Cases presented in clinical meetings with other departments.
- d) Presentations in departmental rotation.
- e) Schedule of interdepartmental rotation.
- f) Details of apprenticeship.
- g) Conference attended national/international.
- h) Papers presented at conference with title name of the conference, date of presentation
- i) Paper published with title, name & issue of the journal.
- j) Surgeries done and assisted.
- h) Interesting cases.

The Head of the Department should scrutinize the log book every three months and certify the work done.

At the end of the course the student should summarise the contents and get the log book certified by the Head of the Department and submit the log book at the time of the University Practical Examination for the scrutiny of the board of examiners.

4.1 It is preferable that a post graduate student during the course to present one poster presentation and /or to read one paper at a national /state conference and /or to present one research paper which can be published/accepted for publication/sent for publication during the period of his/her postgraduate studies.

5.THESIS

Every student registered as post graduate shall carry out work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be a bound volume of a minimum of 50 pages and not exceeding 75 pages of typed matter (Double line spacing and on one side only) excluding certification, acknowledgements, annexure and bibliography.

Thesis should consist of

- (a) Introduction
- (b) Review of literature
- (c) Aims and objectives
- (d) Material and methods
- (e) Result
- (f) Discussion
- (g) Summary and conclusion
- (h) Tables
- (i) Annexure
- (j) Bibliography

Four copies of thesis shall be submitted six months prior to the commencement of the theory examinations on the date prescribed by the Controller of Examinations of this University. The thesis should be approved by the Professor of that branch and the same has to be forwarded to the controller of examinations, by the head of the department through the Dean of the college.

Two copies in addition are to be submitted as an electronic version of the entire thesis in a standard C.D. format by mentioning the details and technicalities used in the C.D. format.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and clinical; and on the acceptance of the thesis by two examiners, the student shall be allowed to appear for the final examination.

EVALUATION OF THESIS :

ACCEPTED / NOT ACCEPTED

No marks will be given

6.SCHEME OF EXAMINATION - UNIVERSITY EXAMINATION PATTERN

a. Mark distribution

Theory

No Theory Exam I& II year

At the end of III year

		Hours	Marks
<u>PaperI</u>	Applied Basic Sciences	3	100
II	Traumatology - Rehabilitation	3	100
III	Orthopaedic diseases	3	100
IV	Orthopaedic and Traumatology - Recent Advance	3	100
Theory Total			400

Clinical Exam

	No of cases	Duration	Marks
1, Long case	1	1 hour	80
2, Short case	3	45 Mints	120
Total			200

***Oral and Viva - Voce**

Instruments and Operating Surgery	X-rays	Specimens & HPE	Prosthetics & Orthotics	Total
25	25	25	25	100

Total clinical and Viva Voce

300

**Modification as approved in 28th Academic Council meet of SRM University held on 23.03.2015.*

MARKS QUALIFYING FOR A PASS

MARKS QUALIFYING FOR A PASS	MAXIMUM MARKS	QUALIFYING FOR A PASS 50% MARKS
Theory Examination	400	200
Practical Including clinical and Viva voce examination	300	150

A student shall secure not less than 50% marks in each head of passing, which shall include 1.Theory, 2.Practical including clinical and viva voce examination.

**“The postgraduate medical students are required to pass theory and practical examinations separately. An examinee should obtain minimum 40% marks in each theory paper and not less than 50% marks cumulatively in all the four papers for Degree examination to be cleared as “Passed” at the said Degree examination”*

**As per Medical Council of India notification date 03.09.2014 and the same approved in the 28th Academic council meet of SRM University held on 23/03/2015*

Maximum number of candidates to be examined per day - 06

7. EXAMINATION AND EVALUATION

(1) EXAMINERS

(a) All the Post Graduate Examiners shall be recognised Post Graduate Teachers holding recognised Post Graduate qualifications in the subject concerned.

(b) For all Post Graduate Examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be External Examiners, who shall be invited from other recognised universities from outside the State and other two will be internal examiners for M.S.

(c) Under exceptional circumstances, examinations may be held with 3 (three) examiners provided two of them are external and Medical Council of India is intimated the justification of such action prior to publication of result for approval. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

(d) The guidelines regarding appointment of examiners are as follows:-

1. No person shall be appointed as an examiner in any subject unless he/she fulfills the minimum requirements for recognition as a Post Graduate teacher as laid down by the Medical Council of India and has teaching experience of 8 (Eight) years as a Lecturer / Assistant Professor out of which he has not less than 5 (Five) years teaching experience after obtaining Post Graduate degree. For external examiners, he should have minimum three years experience of examinership for Post Graduate diploma in the concerned subject. Out of internal examiners, one examiner shall be a Professor and Head of Department or Professor.
2. There shall be at least four examiners in each subject at an examination out of which at least 50% (Fifty percent) shall be external examiners. The external examiner who fulfils the condition laid down in clause - 1 above shall ordinarily be invited from another recognised university, from outside the State: provided that in exceptional circumstances examinations may be held with 3 (three) examiners if two of them are external and Medical council of India is intimated with the justification of such examination and the result shall be published in such a case with the approval of Medical council of India.
3. An external examiner may be ordinarily been appointed for not more than three years consecutively. Thereafter he may be reappointed after an interval of two years.

4. The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.
5. The same set of examiners shall ordinarily be responsible for the written, practical or part of examination.
6. There shall be a Chairman of the Board of paper – setters who shall be an external examiner and shall moderate the question papers.
7. The Head of the Department of the institution concerned shall ordinarily be one of the internal examiners and second internal examiner shall rotate after every two year.

(2) Number of candidates

The maximum number of candidates to be examined in Clinical / practical and Oral on any day shall not exceed six for M.S. degree examination.

3) Number of examinations

The university shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

(4) Master of Surgery (M.S.) Orthopaedics

M.S. examination shall consist of Thesis, Theory Papers, and clinical/Practical and Oral examinations.

(a) Thesis

Every candidate shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical; and on the acceptance of the thesis by two examiners, the candidate shall appear for the final examination.

(b) Theory

- (i) There shall be four theory papers.
- (ii) Out of these one shall be of Basic Medical Sciences and one shall be of recent advances.
- (iii) The theory examinations shall be held sufficiently earlier than the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the start of the Clinical/Practical and Oral examination.

(c) Clinical / Practical and Oral

- (i) Clinical examination for the subjects in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking independent work as a specialist/Teacher, for which candidates shall examine a minimum one long case and two short cases.
- (ii) The Oral examination shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

Evaluation of Answer Scripts

The answer books will be valued by two examiners. One of the two examiners will be from this university and the other will be from any other university. The Average of the two marks secured by the candidate will be taken into account. If the difference between two marks exceeds 20%, the answer scripts shall be valued by the third examiner. The average of the nearest two marks shall be considered as the final mark.

8. MODEL QUESTION PAPER

M.S.ORTHOPAEDIC SURGERY

Paper I - Applied Basic Sciences

Time: Three hours

Maximummarks 100

Answer ALL Question

Draw suitable diagram wherever necessary

I. ANATOMY

(4 x 5 = 20)

1. Arches of the foot.
2. Supraspinatus Muscle.
3. Ilio-tibial band.
4. Brachial Plexus.

II. PHSIOLOGY

(4 x 5 = 20)

1. Epiphysieal growth
2. Wallerian degeneration
3. Bone remodeling
4. Cartilage regeneration

III. BIOCHEMISTRY

(3 x 5 = 15)

1. Calcitonin
2. Synovial fluid
3. Fluorine

IV. PATHOLOGY

(3 x 5 = 15)

1. Bone biopsy
2. Myositis ossificans
3. Anaplasia

V. MICROBIOLOGY

(3 x 5 = 15)

1. Antibiotic resistance
2. Rheumatioid factor
3. Human immunodeficiency virus

VI. PHARMACOLOGY

(3 x 5 = 15)

1. Chemotherapy in Ewing's sarcoma
2. Intra-articular steroid
3. Immuno-modulator drugs.

M.S.ORTHOPAEDIC SURGERY

Paper II - Traumatology - Rehabilitation

Time: Three hours

Maximum marks 100

Answer ALL Question

Draw suitable diagram wherever necessary

I. Essay questions:

(2x 20 = 40)

1. Classify calcaneal fractures. How will you investigate and manage comminuted. Intra articular fracture calcaaneum in a young adult?
2. Classify epiphyseal injuries. Enumerate the complications of epiphyseal injuries and discuss their diagnosis and management.

II. Write short notes on:

(10 x 6 = 60)

1. Tension band wiring.
2. Proximal femoral nail.
3. Trans cutaneous electrical nerve stimulation. (TENS)
4. Kaplan's dislocation.
5. Minimally invasive plate osteosynthesis (MIPO)
6. Crush syndrome.
7. Mid carpal instability
8. Central fracture dislocation of hip
9. Lag screw principle
10. Skeletal traction.

M.S.ORTHOPAEDIC SURGERY

Paper III - Orthopaedics Diseases.

Time: Three hours

Maximum marks 100

Answer ALL Question

Draw suitable diagram wherever necessary

I. Essay questions: (2x 20 = 40)

1. Describe osteoarticular changes in a haemophilic. How will you manage a 35-year-old male with painful haemophilic arthritis of knee?
2. Define and Classify coxavara. How will you evaluate and manage coxavara in a ten-year-old child?

II. Write short notes on: (10 x 6 = 60)

1. Spondylo epiphyseal dysplasia
2. Solitary plasmacytoma.
3. Tarsal tunnel syndrome.
4. Maffucci's syndrome.
5. Juvenile rheumatoid arthritis
6. Torticollis
7. Triple deformity of knee.
8. Ponseti technique of CTEV correction.
9. Compound palmar ganglion
10. Vertebroplasty

M.S.ORTHOPAEDIC SURGERY

Paper IV -Orthopaedics and Traumatology, Recent Advances

Time: Three hours

Maximum marks 100

Answer ALL Question

Draw suitable diagram wherever necessary

I. Essay questions:

(2x 20 = 40)

1. Describe classification and evaluation of ligamentous injuries of the knee joint. How will you manage a chronic anterior cruciate ligament rupture in an athlete?
2. Discuss etiopathology, clinical features, evaluation and management of congenital pseudoarthrosis tibia in a four year old child.

II. Write short notes on:

(10 x 6 = 60)

1. Tension band wiring.
2. Proximal femoral nail.
3. Trans cutaneous electrical nerve stimulation. (TENS)
4. Kaplan's dislocation.
5. Minimally invasive plate osteosynthesis (MIPO)
6. Crush syndrome.
7. Mid carpal instability
8. Central fracture dislocation of hip
9. Lag screw principle
10. Skeletal traction.

9.RECOMMENDED BOOKS AND JOURNALS

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, Beaty James.H, 7th Edition, Lippincott 2010
3. Chapman Orthopaedic Surgery – Chapman, Michael.W , 3rd Edition V-1 to 4, Lippincott 2001
4. Turek's Textbook of Orthopaedics, Orthopaedics Principles and their application - Turek, Samuel, 4th Edition Vol – 1&2, Lippincott 1984
5. Hoppenfield – Surgical Exposures in orthopaedics 4th 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 nos
2. Orthopaedics Clinical of North America
3. ACTA Orthopaedic Scandinavia
4. Clinical Orthopaedics & Allied Research
5. Indian Journal of Orthopaedics.

*One secret of success in life is for a
Man to be ready for his opportunity
When it comes
- Benjamin Disraeli*

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