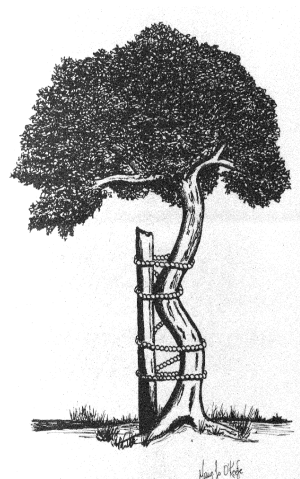


**CURRICULUM/STATUTES &
REGULATIONS
FOR
5 YEARS DEGREE PROGRAMME
IN
ORTHOPAEDICS
(MS ORTHOPAEDICS SURGERY)**



**Department of Orthopaedic Surgery & Traumatology
Liaquat University of Medical & Health Sciences Jamshoro**

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GENERAL STATUTES

1. Nomenclature of the Proposed Course

The name of degree program shall be MS Orthopaedic Surgery. This name is well recognized and established for more than a century worldwide.

2. Course Title:

Master of Orthopaedics / MS-Orthopaedic Surgery

3. Course Overview

Residency program known as a curriculum for MS Orthopaedic Surgery is designed as “a course with specific pre-defined competencies to be inculcated in residents”. This dynamic and congruent curriculum is like ACGME, Score of America (Surgical clinical on resident education) America Royal college of England and other medical universities of Pakistan and according to category III qualification by PMDC. This includes almost all aspects of the six basic competencies similar Score viz, patient care, medical knowledge, professionalism, system-based practice, practice-based learning and improvement, interpersonal and communication skills. As such systems will bring uniformity in the competencies acquired by the residents in their respective programs across the national and international gamut of academics. This competency-based structured resident programs stand with multi-faceted assessment techniques for target oriented successful outcome. The multiple work based on formative and summative assessments ensure the trainees for better understanding of their weaknesses and strengths. The candidates have the opportunity to come up to the mark by consulting their mentors and supervisors. While the strengths of resident are seen as a motivational tool.

The competency based resident training is controlled and measured through structured programmed divided into 1st, 2nd, 3rd, 4th and 5th calendar years and the clinical training starts from 1st year. It is divided into two phases. The first phase comprises of two years training with a set of defined competencies including basic clinical training in Orthopaedic Surgery and proposed research work. The candidates must attend four mandatory workshops (1) orientation of computer and internet (2) Research Methodology / synopsis and thesis writing (3) communication skills and 4) BLS (Basic Life Support) have to get through a “mid-term” / summative assessment commonly known as the Intermediate Module (IMM).

The second phase includes another period of three years training for more advance Orthopaedic surgery. The candidate shall undergo clinical training to achieve educational objectives of MS Orthopaedic Surgery (knowledge & skills) along with rotation in relevant fields. Research component and thesis writing shall be completed over the five years

duration of the course. The trainees are awarded a degree once the training is completed, and the candidates are passed through the final assessment examination.

4. Training Centers

Department of Orthopaedic Surgery & Traumatology (accredited by LUMHS) and affiliated/constituents institutes of this university recognized by PMDC, Islamabad.

5. Duration of Course

The duration of MS Orthopaedic Surgery course shall be five (5) academic years with structured training in a recognized department under the guidance of an approved supervisor.

6. Admission Criteria

For admission in MS Orthopaedic Surgery Degree course, the candidate shall be required to have:

- MBBS degree
- Completed one-year House Job with experience in Orthopaedic Surgery/Allied Surgical discipline in the given order of preference.
- Registration with PMDC
- Passed Part-I examination conducted by the University & aptitude interview by the Institute concerned through chairman and Dean of surgery.

7. Induction

The induction in MS Orthopaedic Surgery Degree Course, will be only for eligible candidates.

Admission process will start on 5th April and 5th October twice every year.

8. Commencement of Academic Session

After enrolment of eligible candidate, the academic sessions shall start from 1st January and 1st July every year.

9. Dates of Examinations

Shall be April and October of every year

10. Attendance

All candidates joining the MS-Orthopaedic Surgery Degree Course shall work full time residents during the period of training, attending not less than 80% (eighty percent) of the training during each calendar year to mark his/her eligibility for further progression.

11. Registration and Enrollment

- Total number of students enrolled for the course must not exceed 2 per supervisor/ per session.
- The maximum number of residents with a supervisor at a given point of time (inclusive of residents in all years/phases of MS training), must not exceed 8.
- Beds to resident ratio at the approved teaching hospital shall be according to international standard.
- The University will approve supervisors for MS courses, and supervisor should not be less than associate Professor/assistant Professor with five-year teaching experience.
- Candidates selected for the courses after their enrollment at the relevant / affiliated / constituent institutions shall be registered with LUMHS as per prescribed Registration Regulation.

12. Themes and Targets

Components of MS Orthopaedic Surgery Curriculum

- Up-dated theoretical knowledge
- Practical and clinical skills
- Thesis / Research Skills
- Attitude including communication skills.
- Training in re-search methodology

13. Credit Hours / Carnegie Unit

The residents are full time engaged in studies including.

- 3 hours in class per week and
- 24-36 hours interactive learning per week during ward rounds, OPD, accident and emergency, OT and homework studies. Hence this degree course falls from 300-400 credit hours in 05 years.

14. Accreditation Related Resources

A). Faculty

Properly qualified and sufficient number of faculty to supervise residents at all levels and in all aspects of the specialty in consonant with the requirements of Pakistan Medical and Dental Council (PMDC), Islamabad.

The faculty of LUMHS is very concern with professional mission to achieve the goals of standard effective medical education at all levels and specialties of scholarship. The LUMHS qualification stands at sufficiently high level of knowledge, clinical judgment, technical skills and ethics through the process of education, evaluation examinations and feedback mechanism.

B). Number and variety of patients.

The good number and variety of patients catered by 1500 bedded tertiary care hospital of this university remain available to this program with all teaching facilities to meet educational needs of the MS Orthopaedics Surgery residents and other students as well.

C). Adequate Space

Including classrooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab are available in surgery department.

D) Information Resources

Computers and Audio-visual equipment's are available.

E). Library

Departmental libraries have latest editions of recommended books, reference books and latest journals (National and International).

F). Other Requirements

- Accreditation of Orthopaedics Surgery training program can be suspended on temporary or permanent basis by the University authorities on the submission of Advance Study Board with the solid reasons as if the program does not comply with requirements for residents training as laid out in this curriculum.
- Program should be presented with structured plan / annual teaching and training calendar for implementation of curriculum in training of residents by chairman of Orthopaedics Surgery through concerned Dean.
- Programs should have documentation of residents for training activities with evaluation on monthly basis, the logbook must be signed by supervisor monthly.
- To ensure standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary.

GOALS OF THE COURSE

The goals of five years MS program in Orthopaedic Surgery are to train residents to;

1. Clearly apply standards of latest knowledge and skills in practicing Orthopaedic Surgery at secondary and tertiary care levels independently as demanded for post graduate courses in Pakistan by P.M.D.C, Islamabad and other International medical registering authorities.
2. Understand Basic Sciences relevant to the surgical diseases and their management.
3. Have aware of the latest development in the field of surgery.
4. Have good orientation in re-search methodology.
5. Have acquired skills in educating medical and paramedical professional.

OBJECTIVES

MS Orthopaedic Surgery training includes cognitive (knowledge), affective (attitudinal) and psychomotor (skill and behavioral) objectives to enable residents for:

- Access and apply relevant knowledge to clinical practice:
 - Maintain currency of knowledge
 - Apply scientific knowledge in practice.
 - Appropriate to patient need and context.
 - Critically evaluate new technology
- After completion of training, every MS (Orthopaedic Surgery) awarded trainee should become a fully trained up-dated professional a good teacher, researcher and consultant clinician in field of Orthopaedic Surgery.
- Safely and effectively performs appropriate surgical procedures:
- Learn basic techniques in surgery, start; learning as 2nd assistant then progress to 1st assistant and then perform surgical procedures independently under supervision.
- Attend and assist all surgical patients who require admission both elective and emergency. Assist all emergency surgical procedures, both minor and major.
- Consistently demonstrate sound surgical skills with scientific relevance.
- Demonstrate procedural knowledge and technical skill appropriately at the level of training.
- Demonstrate manual dexterity required to carry out procedures.
- Adapt the skills in context of each patient and procedure and maintain and acquire new skills.
- Approach and carry out procedures with standard care of safety for patient, self and others.
- Critically analyze their own clinical performance for continuous improvement
- Design and implement effective management plans:
- Recognize the clinical features, accurately diagnose and manage surgical problems.
- Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination.
- Formulate a differential diagnosis and definitive diagnosis based on investigative findings.
- Manage patients in ways that demonstrate sensitivity to their physical, social, cultural and psychological needs.
- Recognize disorders of the organ systems and differentiate those amenable to surgical treatment.
- Effectively manage and care the patients with trauma including multiple system trauma.

- Effectively recognize and manage complications.
- Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities
- Carefully process and interpret the investigations in making decision.
- Manage complexity and uncertainty.
- Consider all issues relevant to the patient.
- Identify risk and calculate with NSQP risk calculator / ASA Score
- Assess and implement a risk management plan.
- Critically evaluate and integrate new technologies and techniques.
- Organize diagnostic testing, imaging and consultation as needed:
- Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner.
- Appraise and interpret appropriate diagnostic imaging and investigations to have foolproof diagnosis.
- Critically evaluates the advantages and disadvantages of different investigative modalities.
- Communicate effectively:
- Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated with surgery in ways that encourage their participation in informed decision making.
- Communicate with the patient (and their family) the treatment options including benefits and risks of each.
- Communicate with and co-ordinate health management teams to achieve an optimal surgical environment.
- Initiate the resolution of misunderstandings or disputes.
- Modify communication to accommodate cultural and linguistic sensitivities of the patient.
- Recognize the value of knowledge and research and it's application to clinical practice:
- Assume responsibility for self-directed learning.
- Critically appraise new trends in Orthopaedic Surgery
- Facilitate the learning of others.
- Appreciate ethical issues associated with Orthopaedic Surgery:
- Consistently apply ethical principles

- Identify ethical expectations that impact on medico-legal issues.
- Recognize the current legal aspects of informed consent and confidentiality.
- Be accountable for the management of patients.

Professionalism by:

- Employing a critically reflective approach to Orthopaedic Surgery
- Adhering with current regulations concerning workplace harassment
- Carrying out self and peer reviewed audit regularly
- Acknowledging and in sighting into their own limitations
- Acknowledging and learning from mistakes
- Present cases of clinical interest in clinical society meetings; organize unit symposium and seminar on a regular basis.
- To attend surgical conference national as well as regional and present papers in these conferences.
- Maintain a logbook from day one of work done on a day-to-day basis attested by supervisor.
- Attends inter departmental meetings like radiology, oncology and pathology department.
- Attend Weekly Journal Clubs, Monthly Symposium, Tumour Board Radiological and Pathological meetings.
- Monthly once Internal Assessment Theory Examination is conducted once and every month.
- The residents should also be required to participate in the teaching and training program of undergraduate students.
- In addition, the head of the Department shall involve their post-graduate students in Seminars, Journal Clubs, Group discussions and participation in clinical, Clinico-pathological conferences.
- Every resident student should be encouraged to present short title papers in conferences and to make improvements on it and submit them for publication in reputed medical journals. Motivation by the heads of Departments is essential in this area to sharpen the research skills of the post-graduate students.
- Work in collaboration with members of an interdisciplinary team where appropriate:
- Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type of surgery.

- Develop a care plan for a patient in collaboration with members of an interdisciplinary team.
- Employ a consultative approach with colleagues and other professionals.
- Recognize the need to refer patients to other professionals.
- Management and Leadership
 - Effective use of resources to balance patient care and system resources.
 - Identify and differentiate between system resources and patient needs.
 - Prioritize needs and demands dealing with limited system resources.
 - Manage and lead clinical teams.
 - Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team.
 - Maintain clinically relevant and accurate contemporaneous records.
 - Health advocacy:
 - Promote health maintenance of patients.
 - Advocate for appropriate health resource allocation.

CORE COMPETENCIES

The curriculum outlined here is intended to ensure that you have a clear understanding of the overall learning goals of MS Orthopaedic residency. Surgical care of adults occurs across a continuum from preventive care of healthy adults to care for the dying. The core competencies that internists must develop during training are outlined below:

- 1. Patient Care:** Residents are expected to provide patient care that is compassionate, appropriate, and effective for the promotion of health, prevention of illness, and treatment of disease.
- 2. Surgical Knowledge:** Residents are expected to demonstrate knowledge of surgical, clinical and social sciences and to be able to apply their knowledge to patient care and the education of others.
- 3. Systems-Based Practice:** Residents are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve and optimize health care.
- 4. Practice-Based Performance Improvement:** Residents are expected to be able to use scientific evidence and methods to investigate, evaluate, and improve patient care practices.
- 5. Professionalism:** Residents are expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, an understanding and sensitivity to diversity and a responsible attitude toward their patients, their profession, and society.
- 6. Interpersonal and Communication Skills:** Residents are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.

CORE COMPETENCIES

Details of the Six Core Competencies of Curriculum of MS Orthopaedic

COMPETENCY NO. 1

PATIENT CARE (PC)

- Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s). (PC1) Collects accurate historical data.
- Uses physical exam to confirm history.
- Does not rely exclusively on documentation of others to generate own database or differential diagnosis
- Consistently acquires accurate and relevant histories from patients.
- Seek and obtains data from secondary sources when needed.
- Consistently performs accurate and appropriately thorough physical exams
- Uses collected data to define a patient's central clinical problem(s)
- Acquires accurate histories from patients in an efficient, prioritized, and hypothesis-driven fashion.
- Performs accurate physical exams that are targeted to the patient's complaints.
- Synthesizes data to generate a prioritized differential diagnosis and problem list.
- Effectively uses history and physical examination skills to minimize the need for further diagnostic testing.
- Obtains relevant historical subtleties, including sensitive information that informs the differential diagnosis.
- Identifies subtle or unusual physical exam findings.
- Efficiently utilizes all sources of secondary data to inform differential diagnosis.
- Role models and teaches the effective use of history and physical examination skills to minimize the need for further diagnostic testing.

Develops And Achieves Comprehensive Management Plan for Each

Patient. (PC2)

- Care plans are consistently inappropriate or inaccurate.
- Does not react to situations that require urgent or emergent care.
- Does not seek additional guidance when needed Inconsistently develops an appropriate care plan.
- In consistently seeks additional guidance when needed
- Consistently develops appropriate care plan.
- Recognizes situations requiring urgent or emergent care.
- Seeks additional guidance and/or consultation as appropriate.
- Appropriately modifies care plans based on patient's clinical course, additional data, and patient preferences.
- Recognizes disease presentations that deviate from common patterns and require complex decision- making.
- Manages complex acute and chronic diseases.
- Role models and teaches complex and patient-centered care.
- Develops customized, prioritized care plans for the most complex patients, in incorporating diagnostic uncertainty and cost effectiveness principle

Manages Patients with Progressive Responsibility and Independence. (PC3)

- Assume responsibility for patient management decisions.
- Consistently manages simple ambulatory complaints or common chronic diseases.
- Consistently manages patients with straight forward diagnoses in the in patient setting.
- Unable to manage complex in patients or patients requiring intensive care.
- Requires indirect supervision to ensure patient safety and quality care.
- Provides appropriate preventive care and chronic disease management in the ambulatory setting.
- Provides comprehensive care for single or multiple diagnoses in the in-patient setting.
- Under supervision, provides appropriate care in the intensive care unit Initiates management.
- Plan for urgent or emergent care.
- Independently supervise care provided by junior members of the physician-led team.
- Independently manages patients across in patient and ambulatory clinical settings who have a broad.
- Spectrum of clinical disorders including undifferentiated syndromes.
- Seeks additional guidance and/or consultation as appropriate.
- Appropriately manages situations requiring urgent or emergent care.
- Effectively supervises the management decisions of the team.
- Manages unusual, rare, or complex disorders.

Skill in performing procedures. (PC4)

- Does not attempt to perform procedures without sufficient technical skill or supervision.
- Willing to perform procedures when qualified and necessary for patient care.
- Possesses basic technical skill for the completion of some common procedures.

- Possesses technical skill and has successfully performed all procedures required for certification.
- Maximizes patient comfort and safety when performing procedures.
- Seeks to independently perform additional procedures (beyond those required for certification) that are anticipated for future practice.
- Teaches and supervises the performance of procedures by junior members of the team.

Requests and provides consultative care. (PC5)

- Is responsive to questions or concerns of others when acting as a consultant or utilizing consultant services.
- Willing to utilize consultant services when appropriate for patient care.
- Consistently manages patients as a consultant to other physicians/health care teams.
- Consistently applies risk assessment principles to patients while acting as a consultant.
- Consistently formulates a clinical question for a consultant to address.
- Provides consultation services for patients with clinical problems requiring basic risk assessment.
- Asks meaningful clinical questions that guide the input of consultants.
- Provides consultation services for patients with basic and complex clinical problems requiring detailed risk assessment.
- Appropriately weighs recommendations from consultants in order to effectively manage patient care.
- Switches between the role of consultant and primary physician with ease.
- Provides consultation services for patients with very complex clinical problems requiring extensive risk assessment.
- Manages discordant recommendations from multiple consultant.

Patient Care PC-1

How To Teach

- Discussions in ward rounds to teach history taking.
- Discussions in ward rounds to teach physical examination.
- Demonstration in ward rounds to teach history taking.
- Demonstration in ward rounds to teach physical examination.
- Discussions in wards of short cases.
- Discussions in wards of long cases.
- Simulated patient (in order to simulate patients symptoms or problems).
- Should write a summary (synthesize a differential diagnosis).

How To Assess

- Discussions in ward rounds to assess history taking.
- Discussions in ward rounds to assess physical examination.
- Short cases assessment through long cases.
- Confirmation of physical findings by supervisor.
- Confirmation of history by supervisor.
- OSPE

Patient Care PC-2

How To Teach

- Resident should write management plan on history sheet and supervisor should discuss management plan.
- Resident should write investigation a plans, should be able to interpret with help of supervisor
- Should be taught prioritization of care plans in complex patient by discussion.

How To Assess

- Long cases and short cases to assess the clear concepts of management by the trainee.

Patient Care PC-3

How To Teach

- Discuss thoroughly the management side effects / interactions / dosage / therapeutic procedures and intervention.

How To Assess

- Long case
- Short case

OSPE

- Simulated patient
- Stimulated chart recall
- Logbook
- Portfolio
- Internal assessment record

Patient Care PC-4

How To Teach

- Supervisor should ensure that the resident has complete knowledge about the procedures.
- Trainee should observe procedures.
- Should perform procedures under supervision.
- Should be able to perform procedures independently.
- Videos regarding different procedures.

How To Assess

- OSPE
- Logbook/portfolio
- Direct observation

Patient Care PC-5

How to Teach

- All consultations by the trainees should be discussed by the supervisor.

How to Assess

- Consultation record of the logbook.
- Feedback by other department regarding consultation.

COMPETENCY NO. 2

ORTHOPAEDICS KNOWLEDGE (SK)

Clinical knowledge (SK1)

- Possesses sufficient scientific, socioeconomic, and behavioral knowledge required to provide care for common surgical conditions and basic preventive care.
- Possesses the scientific, socioeconomic, and behavioral knowledge required to provide care for complex surgical conditions and comprehensive preventive care.
- Possesses the scientific, socioeconomic, and behavioral knowledge required to successfully diagnose and treat surgically uncommon, ambiguous and complex conditions. Knowledge of diagnostic testing and procedures. (MK2)
- Consistently interprets basic diagnostic tests accurately.
- Does not need assistance to understand the concepts of pre-test probability and test performance Characteristics.
- Fully understands the rationale and risks associated with common procedures.
- Interprets complex diagnostic tests accurately.
- Understands the concepts of pre-test probability and test performance characteristics.
- Teaches the rationale and risks associated with common procedures and anticipates potential complications when performing procedures.
- Anticipates and accounts for pitfalls and biases when interpreting diagnostic tests and procedures.

- Pursues knowledge of new and emerging diagnostic tests and procedures.

Orthopaedic Knowledge (SK-1, SK-2)

How to Teach

- Books etc
- Articles
- CPC (Clinic Pathological Conference)
- Lecture
- Videos
- SDL (Self Directed Learning)
- PBL (Problem Based Learning)
- Teaching experience with surgical student
- Read procedural knowledge.

How To Assess

- MCQs
- SEQs
- Viva
- Videos
- Internal assessment

COMPETENCY NO. 3

SYSTEM BASED PRACTICE (SBP)

- Works effectively with in an inter professional team (e. g. peers, consultants, nursing, Ancillary professionals, and other support personnel) (SBP1).
- Recognizes the contributions of other inter professional team members.
- Does not frustrate team members within efficiency and errors.
- Identifies roles of other team members and recognize how/when to utilize them as resources.
- Does not requires frequent reminders from team to complete physician responsibilities (e.g. talk to family, enter orders)
Understands the roles and responsibilities of all team members and uses them effectively.
- Participates in team discussions when required and actively seek input from other team members.
- Understands the roles and responsibilities of and effectively partners with, all members of the team.
- Actively engages in team meetings and collaborative decision-making.
- Integrates all members of the team into the care of patients, such that each is able to maximize their skills in the care of the patient.
- Efficiently coordinates activities of other team members to optimize care.
- Viewed by other team members as a leader in the delivery of high-quality care.

Recognizes system error and advocates for system improvement.

(SBP2)

- Does not ignore a risk for error within the system that may impact the care of a patient.
- Does not make decisions that could lead to error which are otherwise corrected by the system or supervision.
- Does not resistant to feedback about decisions that may lead to error or otherwise cause harm.
- Recognizes the potential for error within the system.
- Identifies obvious or critical causes of error and notifies supervisor accordingly.
- Recognizes the potential risk for error in the immediate system and takes necessary steps to mitigate that risk.
- Willing to receive feedback about decisions that may lead to error or otherwise cause harm.
- Identifies systemic causes of surgical error and navigates them to provide safe patient care.
- Advocates for safe patient care and optimal patient care systems
- Activates for mal system resources to investigate and mitigate real or potential surgical error.
- Reflects upon and learns from own critical incidents that may lead to surgical error.
- Advocates for system leadership to formally engage in quality assurance and quality improvement activities.
- Viewed as a leader in identifying and advocating for the prevention of surgical error.
- Teaches others regarding the importance of recognizing and mitigating system error.

**Identifies Forces that Impact the Cost of Health Care, and
Advocates for, and practices cost-effective care. (SBP3).**

- Does not ignore cost issues in the provision of care.
- Demonstrates effort to overcome barriers to cost-effective care.
- Has full awareness of external factors (e.g. socio-economic, cultural, literacy, insurance status) that impact the cost of health care and the role that external stakeholders (e.g. providers, suppliers, financiers, purchasers) have on the cost of care.
- Consider limited health care resources when ordering diagnostic or therapeutic interventions.
- Recognizes that external factors influence a patient's utilization of health care and does not act as barriers to cost-effective care.
- Minimizes unnecessary diagnostic and therapeutic tests.
- Possesses an incomplete understanding of cost-awareness principles for a population of patients (e.g. screening tests).
- Consistently works to address patient specific barriers to cost-effective care.
- Advocates for cost-conscious utilization of resources (i.e. emergency department visits, hospital readmissions).
- Incorporates cost-awareness principles into standard clinical judgments and decision-making, including screening tests.
- Teaches patients and health care team members to recognize and address Common barriers to cost-effective care and appropriate utilization of resources Actively participates in initiatives and care delivery models designed to overcome or mitigate barriers to cost-effective high-quality care.

Transitions Patients Effectively Within and Across Health Delivery Systems. (SBP4)

- Regards need for communication at time of transition
- Responds to requests of care givers in other delivery systems.
- Inconsistently utilizes available resources to coordinate and ensure safe and effective patient care within and across delivery systems
- Written and verbal care plans during times of transition are complete.
- Efficient transitions of care lead to only necessary expense or less risk to a patient (e.g. avoids duplication of tests readmission).
- Recognizes the importance of communication during times of transition.
- Communication with future caregivers is present but with lapses in pertinent or timely information.
- Appropriately utilizes available resources to coordinate care and ensures safe and effective patient care within and across delivery systems.
- Proactively communicates with past and future caregivers to ensure continuity care.
- Coordinates care within and across health delivery systems to optimize patient safety, increase efficiency and ensure high quality patient outcomes.
- Anticipates needs of patient, caregivers and future care providers and takes appropriate steps to address those needs Role models and teaches effective transitions of care.

How To Teach

- Lecture/ orientation session.
- Various system/policies should be identified and discussed with the residents.

- Examples:
- Zakaat
- Admission procedure
- Bait-ul-Mall
- Discharge procedure.
- Consultation procedure
- Shifting of patients according to SOPS
- Preferably a manual should be designed regarding various systems existing in the Hospital for the resident.
- Cost effectiveness/availability of medicine
- Avoidance of unnecessary tests because of limited health resources.
- Direct observation by the supervisor during ward rounds
- Feedback
- Assessment during case discussion

COMPETENCY NO. 4

PRACTICE BASED LEARNING (PBL)

Monitors Practice with A Goal for Improvement. (PBLI 1)

- Willing to self-reflect upon one's practice or performance.
- Concerned with opportunities for learning and self-improvement.
- Unable to self-reflect upon one's practice or performance.
- Avails opportunities for learning and self-improvement.
- Consistently acts upon opportunities for learning and self-improvement.
- Regularly self-reflects upon one's practice or performance and consistently acts upon those reflections to improve practice.
- Recognizes sub-optimal practice or performance as an opportunity for learning and self-improvement.

- Regularly self-reflects and seeks external validation regarding this reflection to maximize practice improvement.
- Actively engages in self-improvement efforts and reflects upon the experience

Learns and Improves Via Performance Audit. (PBLI2)

- Regards own clinical performance data
- Demonstrates inclination to participate in or even consider the results of quality improvement efforts.
- Adequate awareness of or desire to analyze own clinical performance data.
- Participates inequality improvement projects.
- Familiar with the principles, techniques, or importance of quality improvement.
- Analyzes own clinical performance data and identifies opportunities for improvement.
- Effectively participates inequality improvement project.
- Understands common principles and techniques of quality improvement and appreciates the responsibility to assess and improve care for a panel of patients Analyzes own clinical performance data and actively works to improve performance.
- Actively engages in quality improvement initiatives.
- Demonstrates the ability to apply common principles and techniques of quality improvement to improve care for a panel of patients.
- Actively monitors clinical performance through various data sources.
- Is able to lead a quality improvement project.
- Utilizes common principles and techniques of quality improvement to continuously improve care for a panel of patients.

Learns and Improves Via Feedback. (PBLI3)

- Does not resist feedback from others.
- Often seeks feedback.
- Never responds to unsolicited feedback in defensive fashion.
- Temporarily or superficially adjusts performance based on feedback.
- Does not solicit feedback only from supervisors.
- Is open to unsolicited feedback.
- Solicits feedback from all members of the inter professional team and patients.
- Consistently incorporates feedback.
- Performance continuously reflects incorporation of solicited and unsolicited feedback.
- Able to reconcile disparate or conflicting feedback.

Learns and Improves at The Point of Care. (PBLI4)

- Acknowledges uncertainty and does not revert to reflexive patterned response when inaccurate.
- Seeks or applies evidence when necessary.
- Familiar with strengths and weaknesses of the surgical literature
- Has adequate awareness of or ability to use information technology.
- Does not accept the findings of clinical research studies without critical appraisal Can translate surgical information needs into well-formed clinical questions independently.
- Aware of the strengths and weaknesses of surgical information resources and utilizes information technology with sophistication.
- Appraises clinical research reports, based on accepted criteria.
- Does not “slow down” to reconsider an approach to a problem, ask for help, or seek new information.
- Routinely translates new surgical information needs into well-formed clinical questions.
- Utilizes information technology with sophistication.

- Independently appraises clinical research reports based on accepted criteria.
- Searches surgical information resources efficiently, guided by the characteristics of clinical questions.
- Role models how to appraise clinical research reports based on accepted criteria.
- Has a systematic approach to track and pursue emerging clinical question?

Practice Based Learning (PBL1, PBL2, PBL3, PBL4)

How to Teach

- Discussions about problem cases
- Should discuss errors and omissions.

How to Assess

- Feedback
- 360e valuation
- Research article presentation.
- Journal club presentation.
- CPC presentation
- Ward presentation
- Quality improvement of projects

COMPETENCY NO. 5

PROFESSIONALISM (PROF)

- Has professional and respectful interactions with patients, caregivers and members of the inter professional team (e.g. peers, consultants, nursing, ancillary professionals and support personnel). (PROF1)
- Consistently respectful interactions with patients, caregivers and members of the inter professional team, even in challenging situations.
- Is available and responsive to needs and concerns of patients, caregivers and members of the inter professional team to ensure safe

and effective care Emphasizes patient privacy and autonomy in all interactions.

- Demonstrates empathy, compassion and respect to patients and caregivers in all situations.
- Anticipates, advocates for, and proactively works to meet then needs of patients and caregivers.
- Demonstrates are responsiveness to patient needs that's upper self-interest.
- Positively acknowledges input of member so the inter professional team and incorporates that input into plan of care as appropriate.
- Role models compassion, empathy and respect for patients and caregivers.
- Role models appropriate anticipation and advocacy for patient and care giver needs.
- Fosters collegiality that promotes a high-functioning inter-professional team.

Teaches Others Regarding Maintaining Patient Privacy and Respecting Patient Autonomy accepts Responsibility and Follows Through On Tasks. (PROF2)

- Demonstrates responsibilities expected of a physician professional.
- Accepts professional responsibility even when not assigned or not mandatory.
- Completes administrative and patient care tasks in timely manner in accordance with local practice and/or policy.
- Completes as signed professional responsibilities without questioning or need for reminders.
- Prioritizes multiple competing demands in order to complete tasks and responsibilities in a timely and effective manner.
- Willing ness to assume professional responsibility regardless of the situation.
- Role models prioritizing multiple competing demands in order to complete tasks and responsibilities in a timely and effective manner.

- Assists others to improve their ability to prioritize multiple, competing tasks.

Responds to each patient's unique characteristics and needs.

(PROF3)

- Willing to modify care plan to account for a patient's unique characteristics and needs.
- Is sensitive to and has basic awareness of differences related to culture, ethnicity, gender, race, age and religion in the patient/care giver encounter.
- Seeks to fully understand each patient's unique characteristics and needs based upon culture, ethnicity, gender, religion, and personal preference.
- Modifies care plan to account for a patient's unique characteristics and needs with complete success.
- Recognizes and accounts for the unique characteristics and needs of the patient/care giver.
- Appropriately modifies care plan to account for a patient's unique characteristics and needs.
- Role models' professional interactions to negotiate differences related to a patient's unique characteristics or needs.
- Role models consistent respect for patient's unique characteristics and needs.

Exhibits Integrity and Ethical Behavior in Professional

Conduct. (PROF4)

- Has a basic understanding of ethical principles, formal policies and procedures, and does not intentionally disregard them?
- Honest and forthright in clinical interactions, documentation, research, and scholarly activity
- Demonstrates accountability for the care of patients.
- Adheres to ethical principles for documentation, follows formal policies and procedures, acknowledges and limits conflict of interest,

and upholds ethical expectations of research and scholarly activity.

- Demonstrates integrity, honesty, and accountability to patients, society and the profession.
- Actively manages challenging ethical dilemmas and conflicts of interest.
- Identifies and responds appropriately to lapses of professional conduct among peers' group.
- Assists others in adhering to ethical principles and behaviors.
- Including integrity, honesty, and professional responsibility
- Role models integrity, honesty, accountability and professional conduct in all aspects of professional life
- Regularly reflects on personal professional conduct.

Professionalism (PROF1, PROF2, PROF3 AND PROF4)

How To Teach

1. Should be taught during ward rounds.
2. By supervisor
3. Through workshop

How To Assess

1. Punctuality
2. Behavior
3. Direct observation during ward rounds
4. Feedback

Competency No.6 INTERPERSONAL AND COMMUNICATION

SKILL (ICS)

- Communicates effectively with patients and caregivers. (ICS1)
- Does not ignore patient preferences for plan of care.
- Makes attempt to engage patient in shared decision-making.
- Does not engage in antagonistic or counter-therapeutic relationships with patients and care givers.
- Engages patients in discussions of care plans and respects patient preferences when offered by the patient, and also actively solicit

preferences.

- Attempts to develop therapeutic relationships with patients and care givers which is often successful.
- Defers difficult or ambiguous conversations to others.
- Engages patients in shared decision making in uncomplicated conversations.
- Requires assistance facilitating discussions in difficult or ambiguous conversations.
- Requires guidance or assistance to engage in communication with persons of different socioeconomic and cultural backgrounds.
- Identifies and incorporates patient preference in shared decision making across a wide variety of patient care conversations.
- Quickly establishes a therapeutic relationship with patients and caregivers, including persons of different socioeconomic and cultural backgrounds.
- Incorporates patient-specific preferences in to plan of care.
- Role models effective communication and development of therapeutic relationships in both routine and challenging situations
- Models' cross-cultural communication and establishes therapeutic relationships with persons of diverse socioeconomic backgrounds.

Communicates Effectively In Inter Professional Teams (e.g peers, Consultants, Nursing, Ancillary Professionals And Other Support Personnel). (ICS2)

- Does not use unidirectional communication that fails to utilize the wisdom of the team.
- Does not resist offers of collaborative input.
- Consistently and actively engages in collaborative communication with all members of the team.
- Verbal, non-verbal and written communication consistently acts to facilitate collaboration with the team to enhance patient care.
- Role models and teaches collaborative communication with the team to enhance patient care, even in challenging settings and with conflicting team member opinions.

Appropriate Utilization and Completion of Health Records. (ICS3)

- Health records are organized and accurate and are not superficial and does not miss key data or fails to communicate clinical reasoning.
- Health records are organized, accurate, comprehensive, and effectively communicate clinical reasoning Health records are succinct, relevant, and patient specific.
- Role models and teaches importance of organized, accurate and comprehensive health records that are succinct and patient specific.

Interpersonal and Communication Skill (ISC1, ICS2 AND ICS3)

How to Teach

- Teaching through communication skills by supervisor
- Through workshop

How to Assess

1. Direct observation
2. Feedback.
3. 360-degree evaluation
4. History taking
5. CPC presentation
6. Journal Club Presentation
7. Article Presentation
8. Consultation
9. OPD Working
10. Counselling sessions
11. OPSE
12. VIVA

Structure of Training	1 st & 2 nd Year
Topics	Practical Procedures

a. History of Orthopedics b. Professional Values, Student – Teacher relationship. c. Laws of Biomechanics d. Orientation of OPD, A&E, OT, Wards and learning resources. e. History taking, data extraction and recording, documentation and presentation. f. Examination of swelling, wounds, deformities. g. Examination of Joints with special reference to measurement of range of movements. h. Examination of Muscle power, tone and function. i. Examination of sensory and motor nerves. j. Interpretation of X-rays, CT scan, Ultrasound, MRI and Bone Scans. k. Application and removal of Splints and POP casts. l. Application of Traction. m. Administration of Injections / Aspirations. n. Understanding of Common Medicines used in the department. o. Application and removal of sutures and dressings. p. Writing investigation requests, calls to other departments, patient progress notes, patient shifting instructions, discharge certificates and Death Reports. q. Preoperative preparation, per operative conduction and postoperative care of patients. r. Ward Management.	PATIENT MANAGEMENT Elicit a pertinent history Communicate effectively with patients, families and the health team (observed) Perform a physical examination. Order appropriate investigations. Interpret the results of investigations. Assess fitness to undergo surgery. Decide and implement appropriate treatment Postoperative management and monitoring Maintain accurate and appropriate record
GENERAL SURGERY – TRAUMA 6 Months a) Triage and establishment of treatment priorities in victims of multiple injuries, mass accidents and disasters. b) Technical competence in the following: - Cricothyrotomy (Needle and surgical) - Tracheal intubations (Oral)	PRE-OPERATIVE PREPARATION FOR VARIOUS SURGICAL PROCEDURES Use of aseptic techniques obscure Positioning of patient for diagnostics and operative procedures (variety) Identification and appropriate Use of common surgical Instruments, suture material obscure and appliances APPLICATION ORTHOPAEDIC SURGICAL PROCEDURES Application and removal of splints and POP cast Application of traction Administration of intra-articular injection and aspiration understanding of commonly used in department. Controlling hemorrhage Debridement, wound excision, Closure/suture of wound (excluding repair of special tissues Like nerves and tendons) Venesection Subcutaneous lumps Swellings Ganglion/Cysts (surface surgery)

- Needle and chest tube insertion for the establishment of underwater drainage. - Peripheral venous cut down - Subclavian and internal jugular puncture - Central venous pressure and Swan Ganz catheter monitoring - Needle pericardiocentesis. - Application and removal of pneumatic anti-shock garments - Peritoneal lavage, mini laparotomy c) Chest wall, pleural space and lung injuries including principles of respiratory support and the indications (and not the technical abilities) of performing emergency thoracotomy. d) Non-operative management of major intra-abdominal injuries and later potential complications and indications for performing emergency laparotomy. e) Major blood loss, electrolyte and acid base imbalance, acute renal failure, acute adrenal insufficiency. f) Non-surgical management of ileus, bowel obstruction, diaphragmatic hernia and massive haemoperitoneum. g) The acute surgical abdomen. B. MINOR ROTATIONS One-month rotation in each of the disciplines specified below. However, in the event of any particular discipline not being available, the duration can be increased accordingly. 1. <u>ICU (Intensive Care Unit)</u> a) Cardiac disease, infarcts, cardiac failure, arrhythmia's, ECG (EKG) interpretation. b) Conduct advanced cardiopulmonary resuscitation (CPR)	Knotting Metabolic response of Surgery Shock & Blood Transfusion Wounds, Tissue repair & Scars Basic Surgical Skills & Anastomosis Surgical Infections Surgical Audit & Ethics Patient Safety PERI-OPERATIVE CARE Use of ventilators Wound healing and Peri-operative Complication CPR CV lines Fluid and electrolyte balance Monitoring devices Inotropic agents Care of unconscious patient Replacement of nutrition ANESTHESIA Airway maintenance and passing of endotracheal tube. IPPR and other methods of ventilation Local anesthesia Regional anesthesia Lumber puncture and spinal anesthesia Principles of general anesthesia Communicate effectively with patients, families & the health team (Observed)
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c) Acute and chronic respiratory insufficiency, interpretation of blood gas analysis and its use in patient management. d) Common metabolic disorders, basic metabolic and nutritional requirements including parenteral nutrition (TPN) e) Electrolyte disturbances and acid base imbalance. f) Use of blood component therapy and coagulopathies. g) Overwhelming sepsis including the use of antimicrobial agents. h) Advanced techniques of monitoring. 2. <u>PLASTIC SURGERY</u> a) <i>General:</i> - Principles of incisions designing - Soft tissue handling - Methods of skin closure, skin grafting and skin flaps - Assessment of wound healing. - Technical Competence in split thickness skin grafting, local flaps and tendon repair - Introduction to or advancement of abilities in micro-surgery. b) <i>Hand:</i> i) Injuries - Establishment of treatment priorities in both major and minor hand injuries, lacerations and soft tissue defects - Principles of management of tendon injuries; extensor and flexor, acute and chronic. - Principles of management of vascular and nerve injuries of the hand.	
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ii) Rheumatoid Arthritis. The path mechanics and principles in reconstruction of articular and skeletal deformities. iii) Neuro-Muscular. Biomechanics and pathogenesis. c) <i>Burns:</i> - Assessment and management of thermal burns including inhalation burns, Evaluation of the depth and extent of the burns, - Fluid and electrolyte management, - Antibiotics - Surgical principles. 4. <u>NEURO- SURGERY</u> Basic knowledge of the anatomy and physiology of the central and peripheral nervous system. a) Performance and interpretation of neurological examination. b) Indications and limitations of non-invasive and invasive investigative techniques. c) Assessment and management of head injuries and appropriate differential diagnoses of altered level of consciousness. d) Patho-anatomy, assessment and methods of investigation of injuries to the spinal cord, nerve roots. e) Management of injuries to the spinal cord, nerve roots and their prognosis. f) Assessment and management of spinal cord tumors, primary and secondary and tumor-like conditions. g) Assessment and management of degenerative disorders of the spinal cord and peripheral nervous system.	
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h) Assessment and management of peripheral nerve injuries. 5. <u>RADIOLOGY.</u> a) Principles of general radiological interpretation. b) Principles of radiological investigation of trauma, indications and interpretation of specialized techniques (eg angiography, computerized tomography, arthrography). c) Interpretation and pathophysiologic correlation of radiography of arthritic disorders, infection, tumors, metabolic and reactive disorders. d) Pediatric musculoskeletal radiology. e) Techniques and interpretation of radiological investigation of spine injuries and disorders including myelography, computerized tomography and MRI if available. f) Principles of isotope scanning (Nuclear Medicine) and ultrasonography. 6. <u>VASCULAR SURGERY:</u> Assessment and management of vascular injuries of limbs 7. ORTHOPEDIC TECHNOLOGY (Physiotherapy, Orthotics and Prosthetics) a) Principles of physiotherapy b) Principles of assessment of physical disability. c) Materials used in Orthotics and Prosthetics. d) Preparation of stump for prosthesis. e) Gait Training for paraplegics. f) Prescribing prosthetics and orthotics. g) Different types of walking aids. h) Wheel chair	
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HEAD & NECK	
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Elective Neurosurgery

Ear & Orbit

Cleft Lip & Plate Development

abnormalities of Face

Mouth & Jaws

Nose & Sinus

Pharynx Larynx & Neck Oropharyngeal

Cancer

Disorders of the Salivary Glands

3rd4th & 5th Year Residents:

TOPICS	PRACTICAL PROCEDURES
Adult Orthopaedics	Paediatrics Orthopaedics
1. Trauma 2. Hand 3. Neuromuscular 4. Joints 5. Tumors 6. Infection 7. Spine 8. Foot and Ankle 9. Amputations, Prosthetics and Orthotics 10. Sports Medicine 11. Pain 12. Metabolic Disorders	1. Criteria for Acceptable Performance 2. General Affections of Bones 3. Infections of Bones and Joints 4. Affections of Joints 5. Affections of Nervous System 6. Affections of Muscle 7. The Spine 8. Congenital Disorders of the Upper Limb 9. Congenital Disorders of the Lower Limb 10. Traumatic Disorders 11. Miscellaneous Congenital Disorders

ADULT ORTHOPAEDICS OBJECTIVES

1. TRAUMA OBJECTIVES

The trainee, upon completion of the rotation indicated / assigned, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the Supervisor or his/her designate. This will be done by direct questioning or observation of clinical practice in the following areas:

A. GENERAL

Cognitive

- Initial management of major multiple system trauma
- Establishment of treatment priorities
- Systemic effects of trauma
- Patterns of injury
- Major bleeding
- Assessment and management of major multiple extremity injuries
- *See also Core Objectives – Surgery Rotation*

B. FRACTURES

B.1 General

a. Cognitive

- Definition, classification
- Biomechanics and mechanism of production
- Principles of management, reduction, maintenance and mobilization, methods of achieving these principles by closed means and indication for surgical management.

b. Technical

- Application of principles of surgical management of simple fractures
- Surgical management of moderately complex fractures
- Applications of external fixation
- Surgical management of complex fractures

B.2 Healing

a. Cognitive

- Histochemical, physical and radiological events
- Factors affecting fracture healing.
- Clinical and radiological assessment of union, delayed union and non-union

C. COMPLICATIONS

C.1 **Skin and muscle**

a. *Cognitive*

- Classification of open fracture
- Assessment and management of Types 1 and 2 open fractures
- Assessment and investigation of infection
- Indication for amputation.

b. *Technical*

- Surgical management of Type III injuries.

C.2. **Vascular**

a. *Cognitive*

- Awareness, assessment and investigative techniques of the ischemic limb
- Impending compartment syndrome, pathophysiology, assessment, initial management, indications for surgery

b. *Technical*

- Fasciotomy
- *See also Core Objectives – Vascular Rotation*

C.3 **Nerve Injury**

a. *Cognitive*

- Awareness, assessment and investigative techniques
- *See also Neuromuscular Disorders Objectives*

b. *Muscle/Tendon Injury*

- Awareness assessment
- *See also Soft Tissue Injury Objectives*

C.4 **Associated Injuries**

a. *Cognitive*

- Awareness of common associated injuries and patterns

C.5 **Early Fat Embolism Syndrome**

a. *Cognitive*

- Clinical and radiological assessment
- Differential diagnoses, management including respiratory support
- Recognition, assessment, investigation and management of traumatically induced coagulopathies
- *See also Core Objectives – ICU and Trauma*

C.6 **Deep Venous Thrombosis / Thrombo- Embolism**

C.7 **Late Delayed Union & Non-Union**

a. *Cognitive*

- Definition, clinical and radiological assessment, classification and non-operative management
- Indications for surgery
- Principles for use of internal fixation
- Types and techniques of bone grafting

b. *Technical*

- Surgical management using internal fixation, bone grafts
- Use of electrical stimulation both internal and external

C.8 **Malunion**

a. *Cognitive*

- Definition, criteria of an acceptable position
- Factors influencing remodeling and predictability
- Biomechanical and pathological effects of malposition

b. *Technical*

- Surgical revision of single plane malunion
- Surgical revision of complex fractures, malunions and osteotomies

C.9 **Others (e.g. Joint Stiffness, Contractures, Osteoporosis, Algodystrophy)**

a. *Cognitive*

- Definition, clinical assessment non-operative management
- Indications for surgery & the principles

b. *Technical*

- Surgical soft tissue releases

D. **PATHOLOGIC FRACTURES**

a. *Cognitive*

- Definition, etiology, natural history
- Assessment clinically and radiologically, non-operative management
- Indications for surgery
- Adjunctive methods of management of open reduction, internal fixation

b. *Technical*

- Management of complex fractures by internal fixation, amputation, excision and prosthetic replacement.

E. **SOFT TISSUE INJURIES**

a. *Cognitive*

- Histological and histochemical events in normal and abnormal healing
- Assessment of mild, moderately severe and major injuries
- Indications for surgery, timing of surgery

- Selection of incisions, handling of tissues
- Indications, timings and methods of wound closure, simple, local flaps and Z-plasties.
- Principles of methods of closure of soft tissue defects, use of local flaps and free flaps
- Assessment of infected and ischemic wounds
- Recognition and assessment of myositis ossificans

b. *Technical*

- Management of wound healing by secondary intention
- Surgical excision

F. JOINT INJURIES

F.1 Closed

a. *Cognitive*

- Classification of ligament injuries, clinical and radiological assessment, non-operative management, indications for surgery
- Principles of operative management.

b. *Technical*

- Surgical repair of simple (single) injuries.
- Surgical management of complex acute injuries and late reconstruction.

F.2 Open

b. *Technical*

- Assessment and management of simple lacerations into joints, use of suction irrigation techniques
- Major surgical joint debridement

F.3 Articular Cartilage

a. *Cognitive*

- Classification, assessment, natural history
- Use of continuous passive movement devices

b. *Technical*

- Arthrotomy for excision of loose bodies or replacement
- Internal fixation / Repair
- Surgical management of complex injuries

G. UPPER LIMB

G.1 Shoulder (Including Scapula, Sternoclavicular Joint, Clavicle and Acromio-clavicular Joint)

a. *Cognitive*

- Clinical and radiological assessment

- Classification
- Complications and associated injuries
- Principles of operative management and indications for surgery

b. *Technical*

- Operative management including techniques of open reduction.
- Non-operative management of fractures of the scapula – body, acromion, coracoid, glenoid.

G.2 **Glenohumeral Joint**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Prognostic factors
- Indications for surgery
- Ability to choose appropriately between the various forms of operative management.
- Indications and contraindications

b. *Technical*

- Operative management of traumatic instability
- Operative management of complex, multi-axial instability
- Non-operative management – closed reduction

G.3 **Proximal Humerus**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Neer28)
- Complications and associated injuries
- Indications for surgery
- Indications for prosthetic replacement

b. *Technical*

- Open reduction/internal fixation
- Prosthetic replacement
- Non-operative management

G.4 **Humeral Shaft**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Reduction, internal fixation
- Non-operative management

G.5 **Distal Humerus**

a. *Cognitive*

- Clinical and radiological assessment
- Classification and mechanisms
- Types of complications and their management
- Indications for open reduction

b. *Technical*

- Techniques of open reduction/internal fixation of simple fractures (unicondylar)
- Open reduction/internal fixation of complex supracondylar and T-fractures
- Closed treatment.

G.6 **Elbow Dislocation**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and their management
- Indications for surgery

b. *Technical*

- Open reduction
- Closed reduction.

G.7 **Olecranon**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Indications for surgery

b. *Technical*

- Open reduction/internal fixation
- Non-operative management

G.8 **Radial Head and Neck**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and management of non-operative treatment
- Indications for surgery

b. *Technical*

- Open reduction/internal fixation
- Radial head excision

G.9 **Combined Forearm and Elbow**

a. *Cognitive*

- Clinical and radiological assessment
- Classification – (Monteggia)

b. *Technical*

- Surgical management.

G.10 **Radius and Ulna-Shaft**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and management
- Indication and techniques of non-operative treatment
- Indications, Principles, Approaches & Techniques of surgical management

b. *Technical*

- Open reduction/internal fixation
- Operative management of complex cases
- Complications of non-union, malunion, synostosis

G.11 **Distal Radius and Ulna**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Colles', Smith's, Barton's)
- Indications & Complications of surgery

b. *Technical*

- Operative management
- Surgical management malunion
- Non-operative management

G.12 **Distal Radioulnar Joint**

a. *Isolated Cognitive*

- Clinical and radiological assessment
- Complications
- Indications for surgery

b. *Technical*

- Operative treatment

- Surgical management of late instability
- Non-operative management

G.13 **Combined**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Galeazzi)
- Complications
- Indications for surgery

b. *Technical*

- Operative management of simple injuries
- Operative management of complex injuries and late instability
- Non-operative management

G.14 **Carpal**

a. *Cognitive*

- Clinical and radiological assessment
- Classification and patterns of injury and late instability
- Complications and their management
- Indications for surgery
- Clinical assessment, methods of investigation, non-operative and operative management of late carpal instability

b. *Technical*

- Operative management of simple injuries
- Operative management of complex injuries
- Closed treatment.

G.15 **Hand**

- See Adult Hand Objectives – Trauma

H. **SPINE AND PELVIS**

H.1 **Spine (General)**

a. *Cognitive*

- Knowledge of spinal anatomy, including blood supply to the spinal cord
- Pathology of spinal injury
- Complete neurological examination and its interpretation
- Patterns of neurological deficit
- Complications and associated injuries
- Radiological evaluation including myelography, CT scanning.
- Functional assessment following spinal injury.
- Anticipated functional capacity.

- Bracing
- Team approach to spinal injuries

H.2 **Cervical Spine**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Neurological evaluation
- Patterns of neurological injury
- Methods of investigation
- Non-operative management – orthotics
- Indications for surgery
- Knowledge of anterior approaches and instrumentation (not to include technical ability).

b. *Technical*

- Closed reduction of fractures and fracture dislocations
- Operative management of acute fractures and fracture dislocation to include decompression (posterior)
- Applications of halo and halo traction vest
- Stabilization of late instability

H.3 **Thoracic and Lumbar**

a. *Cognitive*

- Clinical and radiological assessment
- Classification and 2 and 3 column concepts and relationship to treatment and prognosis
- Neurological evaluation
- Patterns and neurological injury
- Indications for non-operative management, both skeletal and neurological
- Knowledge of types of surgical approaches and their indications
- Knowledge of types of instrumentation and fusion
- Post-operative care. Rehabilitation
- Functional assessment
- Knowledge of complex anterior approaches and instrumentation (not to include technical ability)

b. *Technical*

- Non-operative management
- Operative treatment to include laminectomy, posterior fusion, posterior instrumentation.

- *See also Adult Objectives – Spine*

H.4 **Pelvis (General)**

a. *Cognitive*

- Complete knowledge of pelvic anatomy – skeletal, vascular, visceral and neurological
- Classification and its relationship to stability, treatment and prognosis
- Clinical assessment including associated injuries
- Complications
- Radiological assessment, plane films, special views, special techniques (urological and vascular)
- Indications for surgery

b. *Technical*

- Non-operative management (general, pelvic and complications)
- Surgical management of simple fractures.
- Operative management of moderately complex fractures including internal and external fixation.
- Management of complications

H.5 **Acetabulum**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Judet-Letournel²¹)
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Open reduction and internal fixation
- Arthrotomy for osteochondral loose fragments
- Late reconstruction
- Non-operative management (including traction)

H.6 **Hip Dislocation**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for operative management

b. *Technical*

- Open reduction of simple dislocations for failed closed reduction
- Arthrotomy for osteochondral loose fragments

- Open reduction of complex dislocations
- Late reconstruction
- Non-operative management including closed reduction

H.7 **Femur Intracapsular**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Pauwels, Garden)
- Complications and associated injuries
- Indications and principles for surgical treatment

b. *Technical*

- Endoprosthesis replacement
- Late reconstruction
- Non-operative treatment

H.8 **Femur Extracapsular**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (Evans, Boyd & Griffin, Tronzo)
- Complications and associated injuries
- Indications for surgical management.

b. *Technical*

- Open reduction/internal fixation of four-part fractures
- Surgical management of non-union
- Late reconstruction and osteotomy
- Non-Operative management
- Open reduction/internal fixation of two-part and three-part fractures.

H.9 **Subtrochanteric**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (e.g. Fielding)
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Open reduction/internal fixation of non-comminuted fractures.
- Surgical management of complex fractures
- Indications for grafting, special devices
- Non-Operative management

H.10 **Femur Shaft**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery, Internal and External fixation
- Indications for grafting
- Post-operative management

b. *Technical*

- Operative management (types of internal fixation)
- Operative management of complications, delayed union, malunion, non-union (osteotomy, bone grafting)
- Non-Operative management (traction, spica, cast, cast bracing)

H.11 **Distal Femur**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (supracondylar, T-condylar and bi-condylar)
- Complications and associated injuries
- Indications for surgery with types and principles

b. *Technical*

- Operative management of simple fractures
- Operative management of complex fracture, complications, delayed union, non-union, malunion
- Non-Operative management

H.12 **Knee Ligaments & Dislocations**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Associated injuries and complications
- Indications for surgery
- Recognition and classification of late instability

b. *Technical*

- Operative management of acute injuries
- Non-Operative management (therapy and bracing)
- Early and late ligament reconstruction
- Non-Operative management (cast, cast bracing, function bracing)

H.13 **Patella Fractures & Dislocations**

a. *Cognitive*

- Clinical and radiological assessment
- Operative management of acute injuries (ORIF, patellectomy, retinacular repair)
- Patella stabilization
- Non-operative management

H.14 **Menisci**

a. *Cognitive*

- Clinical and radiological assessment
- Role of Arthroscopy And MRI
- Associated injuries and complications
- Indications for surgery

b. *Technical*

- Operative management (including operative arthroscopy)
- Non-Operative management
- Diagnostic arthroscopy
- *See also Joint Injuries and Sports Medicine*

H.15 **Tibial Plateau**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management of simple injuries (ORIF, bone grafting)
- Complex injuries, late reconstruction and reconstruction for complications
- Non-Operative management

H.16 **Tibial Shaft**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery – Types, principles and methods

b. *Technical*

- Operative management of acute injuries (ORIF)
- Operative management for complications (delayed union, non-union, malunion, single plane)

- Surgical reconstruction complex osteotomies
- Non-Operative management

H.17 **Distal Tibia**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery – Types, principles and methods

b. *Technical*

- Operative management of acute injuries (simple)
- Operative management of acute simple and complex injuries (ORIF)
- Late reconstruction for complications.
- Non-Operative management

H.18 **Ankle Fractures**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management of complex including trimalleolar fractures
- Operative management of late reconstruction for delayed union, non-union, malunion
- Non-Operative management
- Operative management of simple fractures

H.19 **Ligament Injuries & Dislocations**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management of acute injuries
- Reconstruction for late ligament instability
- Non-Operative management

H.20 **Foot – Tarsals (Fractures & Dislocations)**

a. *Cognitive*

- Clinical and radiological assessment
- Classification (e.g. Talus-Hawkins)
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management of acute injuries
- Operative management of acute complex injuries
- Late reconstruction for complications (non-union, malunion, delayed union and avascular necrosis)
- Non-Operative management

H.21 **Sub-Talar Dislocation**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management of acute dislocations and chronic instability
- Operative management of late complications (including triple arthodesis)
- Closed treatment

H.22 **Calcaneus Fractures**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management by manipulation
- Operative management by open reduction and internal fixation
- Non-Operative management not requiring manipulation

H.23 **Tarsal Fractures**

a. *Cognitive*

- Clinical and radiological assessment
- Classification

- Complications and associated injuries

b. *Technical*

- Operative management
- Non-Operative management

H.24 **Tarsal Metatarsal Dislocation**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management
- Non-Operative management

H.25 **Metatarsal & Phalangeal Fracture**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery

b. *Technical*

- Operative management
- Non-Operative management

2. **HAND OBJECTIVES**

The objectives of hand surgery training in a general Orthopaedic training programme are two-fold:

1. The preparation of candidates for specialized training in hand surgery.
2. Clinical competence in common “minor” hand surgery procedures, traumatic and reconstructive.

It should be realized that the ability of any individual programme to teach this material may vary and may have to rely upon outside assistance, for example, a plastic surgery training unit.

The trainee upon completion of the rotation indicated will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the Supervisor / Co- Supervisor. This will be done by direct questioning, or observation of clinical practice in the following areas:

A. GENERAL

a. Cognitive

- Detailed knowledge of anatomy and functional anatomy of the hand and wrist
- Technique of physical examination of the hand to include detailed neurological examination, long tendon function, deformities and contractures, assessment of functional disability.
- Knowledge and clinical assessment of the hand and hand function in specific conditions (cerebral palsy, stroke, rheumatoid arthritis, congenital anomalies, Dupuytren’s contracture)

B. TRAUMA

a. Cognitive

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Indications for surgery
- Detailed knowledge of post-operative care and rehabilitation
- Knowledge of, but **not** technical competence for complications, delayed union, non-union, malunion.

b. Technical

- Operative management of common, “minor hand injuries, simple fractures
- Non-operative management (including the causes of deformity and methods of splintage)

- Technical competence in closed reduction and the use of percutaneous fixation pins

B.1 **Dislocations & Ligament Injuries**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Complications and associated injuries
- Knowledge of the causes of irreducibility
- Indications for surgery
- Methods of splintage
- Rehabilitation and post-operative care
- Knowledge, but **not** technical competence, of operative management of late deformity and instability.

b. *Technical*

- Operative management of acute injuries
- Non-operative management

B.2 **Open Injuries**

a. *Cognitive*

- Clinical and radiological assessment
- Assessment of tissue viability
- Principles of methods of closure
- Rehabilitation

b. *Technical*

- Operative management of appropriate soft tissue injuries
- Amputation levels and technique
- Technical competence in simple closure, delayed closure, local flaps, Z-plasties
- Assessment of priorities for repair of associated injuries (nerve, vascular, tendon, bone)

B.3 **Tendon**

a. *Cognitive*

- Clinical and radiological assessment of tendon injury
- Function
- Deformity
- Knowledge of late reconstruction

b. *Technical*

- Indications for operative management of acute injuries
- Methods of arthrodesis
- Repairs of extensor tendons and flexor tendons in zones 4,5

B.4 **Massive Combined Injuries**

a. *Cognitive*

- Clinical and radiological assessment
- Indications for surgery
- Assessment of tissue viability and function
- Establishment of treatment priorities
- Knowledge of principles of advanced reconstruction and rehabilitation

b. *Technical*

- Debridement and amputation levels
- Initial wound management

C. **Rheumatoid Arthritis & Osteoarthritis**

a. *Cognitive*

- Clinical and radiological assessment in mechanisms and pathogenesis of hand deformities
- Indications for surgery
- Assessment of function and disability
- Principles of hand rehabilitation

b. *Technical*

- Operative management of common soft tissue and bony procedures for the arthritic patient (e.g. synovectomy, wrist fusion, etc)
- Non-operative management (including splintage)

D. **Congenital Anomalies**

a. *Cognitive*

- Clinical and radiological assessment
- Classification
- Indications for surgery
- *See also Pediatrics Section*

b. *Technical*

- Operative management of minor anomalies

E. **Paralytic**

a. *Cognitive*

- Clinical and functional assessment
- Principles and techniques of splintage
- Principles of tendon transfer
- Indications for surgery

b. *Technical*

- Surgical reconstruction of selected common problems (e.g., radial nerve palsy)

F. **Infections**

a. *Cognitive*

- Clinical and radiological assessment
- Non-operative management

b. *Technical*

- Technical competence in the management of paronychia, pulp space infection, septic tenosynovitis
- Operative management of infection of fascial spaces (mid-palmar, thenar, hypothenar, subaponeurotic)
- Indications and techniques of amputation

G. **Tumors**

a. *Cognitive*

- Clinical and radiological assessment
- Methods of investigation
- The assessment and staging of neoplasms.
- Functional assessment

b. *Technical*

- Technique of open biopsy
- Levels and technique of amputation

3. **NEUROMUSCULAR OBJECTIVES**

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the Chief of Service, Programme Director or his/her designate. This will be done by direct questioning, or observation of clinical practice in the following areas:

A. **BRAIN**

Cognitive

- Knowledge of the anatomy, physiology and pathology of those traumatic, vascular and degenerative conditions causing, presenting as, or altering musculoskeletal function including control of sensory & motor function (head injuries, cerebral palsy, stroke, co-ordination (Fiedreich's ataxia), psychomotor disturbances and psychic regional pain)
- Detailed neurological examination of higher centers as they pertain to musculoskeletal function.
- Non-operative management of deformity, spasticity by injection techniques
- Principles of surgical management (tendon transfer, osteotomy, arthrodesis)
- Surgical management of deformity, spasticity by tendon transfer, osteotomy, arthrodesis, neurectomy)

B. **SPINAL CORD**

B.1 **Anatomy**

a. Cognitive

- Gross, microscopic – (including tracts) electron microscopic, embryology of CNS

B.2 **Physiology**

a. Cognitive

- Neural transmission
- Control and feedback from higher centers

B.3 **Pathology**

a. Cognitive

- Gross & microscopic features of congenital, traumatic, vascular, neoplastic and degenerative conditions including natural history

B.4 **Clinical Picture**

a. Cognitive

- Methods of presentation, clinical findings, methods of investigation – radiological (myelographic, tomographic, computerized tomography, magnetic resonance imaging) and electrophysiological (evoked potentials)
- Detailed clinical assessment and investigative techniques
- Principles of surgical management

b. *Technical*

- Non-operative management of weakness, deformity or spasticity by orthotics or injection techniques
- Surgical management by tenotomy, tendon transfer, arthrodesis

C. **PERIPHERAL NERVOUS SYSTEM**

C.1 **Anatomy**

a. *Cognitive*

- Gross (including surface anatomy, areas of possible entrapment, brachial and lumbosacral plexuses) and microscopic features.

C.2 **Physiology**

a. *Cognitive*

- Neural transmission and factors altering the rate of transmission, the effects of ischaemia, anesthetic compression, response to injury and the gamma system
- Phasic activity and synergism, prime movers
- Retraining and rehabilitation

C.3 **Pathology**

a. *Cognitive*

- Gross, microscopic and ultramicroscopic response to injury, degenerative disorders, neoplasms

C.4 **Clinical Picture**

a. *Cognitive*

- Methods of presentation, physical findings
- Performance of detailed neurological examination on a segmental or peripheral nerve basis
- Clinical classification of nerve injuries (according to Seddon and Sunderland)
- The use and interpretation of electrophysiological testing
- Establishment of treatment plan
- Indications for surgery
- Knowledge of peripheral nerve repair (using magnification techniques (loupes, operating microscope))

b. *Technical*

- Operative management neurolysis, epineurolysis, nerve transfer

- Non-operative management (orthotics, therapy)
- Release of simple entrapment syndromes (carpal tunnel)

D. MUSCLE

D.1 Anatomy

a. Cognitive

- Gross (including all muscles, classification of types of muscles, microscopic and ultramicroscopic)

D.2 Physiology

a. Cognitive

- Neuromuscular transmission, muscle contraction, electrical simulation, strength duration testing and muscle types
- *See also Sports Medicine Objectives*

D.3 Pathology

a. Cognitive

- Gross, microscopic and ultramicroscopic features of all inflammatory, dystrophic, degenerative & neoplastic conditions
- *See also Pediatric Objectives*

D.4 Clinical Picture

a. Cognitive

- Methods of presentation and physical findings, strength grading
- Clinical assessment, strength grading, long tendon imbalance, secondary deformities, tendonesis and contractures

b. Technical

- Principles of surgical management – pre-requisites for successful tendon transfer
- Operative management of simple tendon transfer
- Operative management of complex neuromuscular disorders

4. JOINTS OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical & technical competence as determined by the Chief of Service, Programme Director or his/her designate. This will be done by direct questioning, or observation of the clinical practice in the following areas:

A. GENERAL

A.1 Anatomy

- Gross, microscopic, ultramicroscopic including articular cartilage and synovium
- Surgical approaches

A.2 Physiology

- Joint lubrication, cartilage metabolism, formation and components of joint fluid.

A.3 Pathology

- Response of synovium to injury, effect of joint effusions on cartilage metabolism, supporting capsule and ligaments (joint stability), long tendon function and balance, (biomechanics of production of deformity)
- Synovial fluid analysis.
- Pathophysiology of synovial changes and articular cartilage damage - inflammatory, degenerative, metaplastic, bleeding disorders and villonodular synovitis

A.4 Clinical Evaluation

- History applied general physical examination, detailed examination of all joints including functional disability rating.
- Formation of a differential diagnosis of swollen painful joint
- Principles for non-surgical management.

A.5 Investigative Techniques

- Arthrography, joint aspiration, arthroscopy, radionuclide scans
- Synovial fluid analysis
- Imaging – CT scan, MRI

A.6 Pharmacology

- Non-steroidal anti-inflammatory medications, steroids, anti-metabolites, radioisotopes
- Including mechanisms of action, indications, complications, side effects, metabolism and dosage

A.7 Orthotic Principles

- Principles of construction and use of resting and dynamic splints

A.8 **Role of Surgery**

- Principles of synovectomy, joint realignment, stabilization, balance of long tendon function, osteotomy, arthrodesis, arthroplasty

B. **INFECTION**

a. *Cognitive*

- Differential diagnosis (including most likely infective organism), methods of staining and culture.
- Antibiotic management (both initial blind/ best guess and specific)
- Indications for surgery
- Investigation, diagnosis and surgery in Acute and chronic Septic arthritis
- Principles of arthrodesis
- Investigation, differential diagnosis and indications for surgery in infected arthroplasty or revision surgery for arthroplasty following sepsis
- Knowledge of Joint replacement (not the technical competency)

b. *Technical*

- Major joints debridement
- Arthrodesis of major joints
- Arthrotomy, arthrocentesis, arthroscopic lavage, establishment of suction irrigation

C. **INFLAMMATION (Rheumatoid and Sero-negative)**

General

- Pathology of inflammatory joint disease
- Radiological classification of inflammatory joint disease
- Principles of non-surgical and surgical treatment

UPPER EXTREMITIES

C.1 **Hand**

- See Adult Hand Objectives

C.2 **Wrist**

a. *Cognitive*

- Pathomechanics of joint deformity
- Non-operative management (Orthotics, therapy)
- Indications for surgery
- Detailed radiological evaluation (including carpal indices)

b. *Technical*

- Arthrodesis
- Implant arthroplasty.
- Excision of distal ulna

C.3 **Elbow**

a. *Cognitive*

- Pathomechanics, clinical and radiological evaluation of deformity
- Indications for surgery - including debridement, synovectomy, and arthroplasty (not to include technical ability)

b. *Technical*

- Surgical management including joint debridement, synovectomy, radial head excision.
- Surgical management of joint arthroplasty (not to include technical ability))
- Non-operative management
- Excision rheumatoid nodules
- Ulnar nerve transposition

C.4 **Shoulder**

a. *Cognitive*

- Indications for surgery
- Indications for arthrodesis and arthroplasty

b. *Technical*

- Synovectomy and stabilization
- Arthroplasty, non-constrained both hemiarthroplasty and total replacement
- Arthrodesis
- Diagnostic arthroscopy
- Excision distal clavicle
- Non-operative management

C.5 **SPINE**

a. *Cognitive*

- Awareness of cervical instability, classification
- Indications for surgery
- Knowledge, but not technical competency, in surgical stabilization, including adjunctive methods, methyl- methacrylate, internal fixation devices

b. *Technical*

- Halo application and management of halo-vest
- Non-operative management (types of cervical orthoses and their efficiency, including halo)
- *See also Adult Spine Objectives*

LOWER LIMB

C.6 **Foot**

- *See Adult Foot Objectives*

C.7 **Ankle**

a. *Cognitive*

- Indications for surgery – debridement, synovectomy, arthrodesis
- Indications for total ankle arthroplasty, not the technical ability

b. *Technical*

- Diagnostic arthroscopy
- Synovectomy and arthrodesis
- Non-operative management (orthotics)

C.8 **Knee**

a. *Cognitive*

- Indication of surgery
- Role of arthroscopy
- Indications and methods of Arthrodesis
- Total joint replacement, types and principles, not the technical ability

b. *Technical*

- Synovectomy
- Arthrodesis
- Total joint replacement
- Arthroscopic management
- Non-operative treatment (Radioisotopic synovectomy)

C.9 **Hip**

a. *Cognitive*

- Indications for surgery (including cemented vs non-cemented arthroplasty)

b. *Technical*

- Total hip arthroplasty
- Indications for revision surgery for total joint replacement
- Technique of revision THR without severe bone loss
- Non-operative management.

REACTIVE AND METAPLASTIC

(Villonodular Synovitis)

(Synovial Chondromatosis)

a. *Cognitive*

- Investigative techniques (arthrography, diagnostic arthroscopy, synovial biopsy)

b. *Technical*

- Excision of pedunculated lesions
- Joint debridement, synovectomy, removal of loose bodies

TUMOURS (Synovioma and Synovial Sarcoma)

- See Adult Tumour Objectives

TRAUMA

- See also Trauma – Joint Objectives

5. TUMOUR OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor / co-supervisor. This will be done by direct questioning, or observation of the clinical practice in the following areas:

A. TUMOURS AND REACTIVE LESIONS

a. Primary Cognitive

- Definitions and terms (neoplasia, carcinoma, sarcoma, cyst, reactive lesion, hyperplasia, dysplasia)
- Theories of aetiology, pathogenesis, control of growth, methods of spread of neoplasms in general (local-systemic-privilege of joint) and of sarcomas in particular
- Clinical presentation of bone pain, systemic manifestations, limb locations, spine locations
- Epidemiology (geographical, social, risk factors)
- Methods of investigation (lab-discriminating tests)
 - Radiological, scan, ultrasound, CT, MRI, skeletal survey, xerogram, tomograms, arteriograms
 - Classification by cell or origin of primary tumours and reactive lesions of bone and primary soft tissue tumours
- Principles of technique of biopsy
- Principles of action of adjunctive methods of treatment
 - Local
 - Cryotherapy
 - Caustic agents
 - Radiotherapy
 - Systemic
 - Chemotherapy
 - Immunotherapy
 - Regional Techniques and their indications, timing and complications
 - Clinical, pathological and radiological picture of tumours and reactive lesions of bone and soft tissue tumours including incidence, epidemiology, natural history and prognosis
 - Technique of closed and open biopsy (including needle, trephine biopsy, ie spine)
 - Knowledge of the techniques and significance of staging (Enneking)
 - Methods of investigation – indications of each study, what each shows and usefulness
 - Principles of surgical management (margins, types of resection and compartments in different anatomical locations)

b. Cognitive

- Knowledge but not technical competence in the surgical management of major surgical ablative therapy and reconstruction.
- Limb sparing surgery, allograft considerations, implant considerations, regional adjuvant techniques
- Knowledge of the methods of reconstruction – allograft, autograft, custom prostheses, rotation plasty, amputations, arthrodesis

c. Technical

- Surgical management of intra-compartmental soft tissue tumours
- Surgical management of bone tumours in the distal extremities

B. Metastatic Tumours to Bone

a. Cognitive

- Knowledge of the most common primary tumours metastasizing to bone
- Work-up for a tumour of unknown origin
- Radiological picture of metastatic bone disease and its differential diagnosis
- The investigation of a lytic lesion in bone
- Management of complications of metastatic bone disease (hypercalcaemia)
- Knowledge of methods of spine decompression and stabilization

b. Technical

- Open reduction /internal fixation of pathological fractures
- Non-operative management of pathological fractures

6. INFECTION OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor or his/her designate. This will be done by direct questioning, or observation of the clinical practice in the following areas:

A. GENERAL

A.1 Definitions and Terms

- Pus
- Sequestrum
- Involucrum

A.2 Actiology and Classification

- Bacterial (acute, chronic), Tuberculosis
- Viral

A.3 Pathogenesis

- Haematogenous, inoculation (compound wound), direct spread, septic arthritis, osteomyelitis (vertebral, girdle and extremities) and periprosthetic (acute and chronic)

A.4 Clinical Picture

- Acute – subacute – chronic
- Differential diagnosis
- Discriminate between bone and joint clinical signs

B. INVESTIGATIONS

B.1 Laboratory and Bacteriology

- Haematology (CBC, ESR)
- Bacteriology, technique of staining and staining characteristics
- Methods of culture, pathology, gross and microscopic treatment of specimens
- Detailed knowledge of the organisms found to produce musculoskeletal infections, their incidence, frequency, methods of spread, methods of culture, microscopic characteristics, predilection for specific sites, tissue and conditions, pathogenesis of infection, mechanisms of spread

B.2 Imaging

- Radiology – early and late changes
- Radioisotope – Tc/gallium/indium
- CT and MRI

B.3 Biopsy

- Principles of biopsy (fine needle, core needle, arthrocentesis, arthroscopy, open biopsy)

C TREATMENT

C.1 General Principles

- Antibiotic selection
- Mechanism of action
- Pharmacology (including complications)
- Indications for surgery

C.2 Pharamacology of Antimicrobial Agents

- Mechanisms of action, spectrum, dose and administration, metabolism, specific variations and their use to specific conditions (renal failure), complications

C.3 Prognosis and Complications

- Nosocomial infections
- Hospital bacteriological environment
- Altered host resistance
- Development of organism resistance, precautions

D. SPECIFIC

D.1 Osteomyelitis

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Methods of clinical laboratory and radiological investigations
 - Complications
- b. Technical
 - Non-operative management
 - Simple surgical drainage
 - Complex surgical drainage, debridement
 - Adjunctive methods – management – (Intracavitary antibiotics)
 - Major bone resections and reconstruction

D.2 Septic Arthritis

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Methods of clinical, laboratory and radiological investigations
 - Complications
- b. Technical
 - Non-operative management

- Indications for surgery
- Simple surgical drainage
- Complex surgical drainage
- Arthrocentesis, arthroscopy
- Late reconstruction for complications – instability, major joint destruction

D.3 Compound Fractures

- a. Cognitive
 - Clinical and radiological assessment
 - Assessment and classification of soft tissue wound, associated injuries, bony injuries
 - Initial non-operative management (culture, wound care, tetanus prophylaxis, antibiotics)
- b. Technical
 - Operative management – Type I and II
 - Operative management of Type III (soft tissue wound, neurovascular injury, fracture)
 - Methods of fixation (including internal, external, external fixators)
 - Technique of open cancellous grafting (Papineau)
 - Surgical management of established infections and other complications (delayed union, non-union)
 - Soft tissue coverage, local & myocutaneous flaps, resection and reconstruction
 - Amputation

D.4 Total Joint Replacement

- a. Cognitive
 - Clinical and radiological evaluation (including radioisotope scans)
 - Differential diagnosis
 - Methods of culture
 - Antibiotic therapy (including antibiotic cement)
 - Indications for surgery
- b. Technical
 - Operative management (debridement, suction, irrigation)
 - Operative management (implant removal, direct exchange of wound care, late reconstruction)
 - Aspiration techniques

D.5 Trophic Ulcerations (Neurovascular)

- a. Cognitive
 - Prevention (of diabetic foot)
 - Clinical and radiological assessment
 - Differential diagnosis
 - Methods of investigation (bone, scan, gallium scan tomography, wound culture, sinogram)
 - Causative agent

- Antibiotic management
- b. Technical
 - Operative management – debridement
 - Amputation

D.6 Immune Compromised Conditions

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis – likely causative organisms
 - Investigative techniques
 - Methods of wound culture
 - Antibiotic therapy
 - Indications for surgery
- b. Technical
 - Operative management

D.7 Tuberculosis

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis
 - Methods of culture
 - Technique of aspiration biopsy of peripheral lesions, spinal lesions
 - Anti tuberculosis therapy
 - Indications of surgery
 - Atypical infections
- b. Technical
 - Aspiration spinal biopsy, open biopsy and debridement
 - Resection
 - Amputation
 - Arthrodesis

E. REGIONAL

E.1 Spine

- a. Cognitive
 - Radiological assessment
 - Differential diagnosis
 - Methods of spread
 - Pathogenesis
 - Antibiotic therapy

- Indications for surgery
- Principles of operative management, anterior and anterolateral, decompression, debridement, and fusion.
- b. Technical
 - Aspiration biopsy
 - Methods of bracing

F. PREVENTION

F.1 Patient

- Immune compromise (disease or drugs)

F.2 Hospital

- Ward environment
- O.R. environment
- Skin preparation
- Draping technique

F.3 Surgeon

- Communicable disease
- Gown and glove technique
- Tissue management
- Wound care

7. SPINE OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor or his/her designate. This will be done by direct questioning or observation of the clinical practice in the following areas:

A. SPINE DISEASE

A.1 General

- a. Cognitive
 - Detailed knowledge of the embryology of the spine especially as it pertains to pathological processes (deformities, infections, tumours)
 - Gross anatomy of the spinal column, spinal cord, their blood supply, both intrinsic and extrinsic
 - Functional and microscopic anatomy of the spinal cord
 - Detailed knowledge of the biomechanics of the spine and its abnormalities
 - Non-operative management, various types of braces and their efficacy
 - Role of physiotherapy
- b. Fractures
 - See Adult Trauma - Spine

A.2 Cervical Spine

- a. Cognitive
 - Detailed knowledge of the biomechanics of the motion segment (normal and pathological)
 - Clinical and radiological assessment
 - Classification
 - Detailed neurological examination
 - Methods of investigation
 - Non-operative management (medication, cervical orthoses, physiotherapy, functional assessment)
 - Indications of surgery
 - Detailed knowledge of pathogenesis, results, complications of management
- b. Technical
 - Laminotomy and disc excision
 - Anterior approaches cervical discectomy and fusion (not necessarily in antero-lateral approaches – or odontoid)

A.3 Degeneration and Instability of the Cervical Spine

- a. Cognitive
 - Clinical and radiological assessment
 - Classification (cervical segmental instability, cervical myelopathy, radiculopathy, vertebral foraminosis)

- Complications
- Non-operative management
- Detailed knowledge of pathogenesis and limitations of methods of investigation
- Indications for surgery
- b. Technical
 - Posterior and anterior fusion techniques (not in Laminectomy, Laminoplasty or Extensive anterior decompression)
 - Results and complications

A.4 Thoracic Discs

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis
 - Classification
 - Neurological examination
 - Non-operative management (medication, bracing, physiotherapy, other adjunctive pain treatments)
 - Indications for surgery
 - Investigation methods (myelography, electrophysiology, tomography and discography)
 - Knowledge but not technical competence of more complex problems
 - Results and complications
 - Management of complications
- b. Technical
 - Chymopapin
 - Minimally invasive techniques
 - Foraminotomy
 - Laminectomy
 - Disc excision

A.5 Mechanical Instability (Spondylolytic or Degenerative)

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Complications and associated conditions
 - Pathophysiology
 - Methods of investigation
 - Non-operative management (spinal orthoses, physiotherapy)
- Advanced non-operative management

- Indications for surgery
- Knowledge of more complex approaches including anterior (but not technical competence)
- Results and complications
- b. Technical
 - Basic techniques

A.6 Degeneration Etc. (Spinal Stenosis, Central and Lateral)

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Detailed knowledge of the pathogenesis
 - Associated conditions
 - Methods of investigation (myelography, electrophysiology, discography)
 - Non-operative management
 - Indications for surgery
 - Results and complications
- b. Technical
 - Operative management (foraminotomy, laminectomy, lateral recess release, fusion)

A.7 Infection

- a. Cognitive
 - Diagnosis
 - Classification
 - Investigation
 - Basic treatment
 - Knowledge of operative approaches (but not technical competence in surgical treatment)

A.8 Biopsy

- a. Cognitive
 - Awareness
- b. Technical
 - Competence in closed biopsy techniques

A.9 Tumours

- a. Cognitive
 - X-ray assessment of disease states
 - Knowledge of operative approaches
 - Knowledge of methods of surgical treatment (but not technical competence of surgical treatment)

A.10 Deformity

a. Cognitive

- Clinical and radiological assessment
- Pathogenesis
- Natural history
- Neurological examination
- Non-operative management
- Indications for surgery
- Exposure to technique (but not necessarily technical competence of surgical treatment)

B. SPINE TRAUMA

See Trauma objectives – Spine

8. FOOT AND ANKLE OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor or his/her designate. This will be done by direct questioning or observation of the clinical practice in the following areas:

A. GENERAL

A.1 Anatomy

- Detailed knowledge of the anatomy of the normal foot (including embryology and radiological anatomy)
- Recognition of common foot patterns and their predisposition to symptoms (variations of normal anatomy)

A.2 Biomechanics

- Detailed knowledge of the biomechanical analysis of the normal foot and its function.
- Predisposing biomechanical factors to symptomatology

A.3 Clinical Evaluation

- The ability to conduct a thorough clinical evaluation (including biomechanical evaluation, stress mats, neurovascular examination)

A.4 Investigative Technique

- Detailed knowledge of the normal and radiological appearance, electrophysiological investigation and ankle arthroscopy

B. ANKLE

B.1 Trauma

- See Trauma – Fractures and Dislocations

B.2 Osteochondritis Dissecans

a. Cognitive

- Clinical and radiological assessment
- Differential diagnosis
- Classification
- Aetiology
- Non-operative management
- Indications for surgery

b. Technical

- Arthroscopy
- Operative management (including the indications for arthroplasty, arthrodesis)

B.3 Rheumatoid Arthritis

- See Joint objectives – Inflammation (Rheumatoid)

C. SUBTALAR COMPLEX

C1 General

- Detailed knowledge of the anatomy (including talocalcaneonavicular joint, both gross and radiological)
- Biomechanical (long muscle control, function, predisposition to pathological states)
- Orthotics – detailed knowledge of the orthotic management of subtalar conditions.

C.2 Hypermobility Pes Planus

a. Cognitive

- Clinical and radiological assessment
- Non-operative treatment
- Indications for surgery

b. Technical

- Operative management (stabilization, osteotomy, arthrodesis)

C.3 Spastic Flat Foot

a. Cognitive

- Clinical and radiological assessment
- Classification
- Non-operative management
- Indications for surgery

b. Technical

- Operative management

C.4 Trauma

- See also Trauma

C.5 Lateral Process Fracture

a. Cognitive

- Clinical and radiological assessment
- Non-operative management
- Indications for surgery

b. Technical

- Operative management

D. TARSAL AND TARSOMETATARSAL

D.1 Pes Cavus

a. Cognitive

- Clinical and radiological assessment
- Aetiology
- Associated conditions

- Non-operative management
- Indications for surgery
- b. Technical
- Operative management

D.2 Degenerative

- a. Cognitive
 - Clinical and radiological assessment
 - Non-operative management
 - Indications for surgery
- b. Technical
 - Operative management

E. METATARSOPHALANGEAL

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Biomechanical causes
 - Non-operative management
 - Indications for surgery
- b. Technical
 - Technical competence in realignment procedure, exostectomy and pseudarthrosis (excision arthroplasty)
 - Osteotomy and implant arthroplasty

F. SESAMOIDS

- a. Cognitive
 - Clinical and radiological assessment
 - Non-operative management (orthotics)
 - Indications for surgery
- b. Technical
 - Realignment procedures and excision

G. NEUROMA

- a. Cognitive
 - Assessment and Non-operative management
 - Indications for surgery
- b. Technical
 - Competence in decompression and neurectomy

H. TOES

- a. Cognitive
 - Clinical and radiological assessment
 - Biomechanical forces contributing to deformity
 - Non-operative treatment
- b. Technical
 - Competence in interphalangeal fusion
 - Tendon transfers
 - Tenotomy

I. SPECIFIC CONDITIONS

A. Neuropathic (Diabetic Charcot)

- a. Cognitive
 - Clinical and radiological assessment
 - Neurological and vascular evaluation
 - General methods of foot care and precautions
 - Causes of ulceration and deformity
 - Non-operative management (healing cast technique, orthotics, General foot care of skin lesions)
 - Indications for antibiotics
 - Special investigative methods (bone scan, tomography)
- b. Technical
 - Competence in debridement of calluses and minor ulcerations
 - Debridement and amputations
 - Arthrodesis
 - Exostectomies
 - Management of complex combined neuropathic changes

B. Rheumatoid

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis
 - Pathogenesis of deformity
 - Complications
 - Non-operative management (orthotics, therapy)
- b. Technical
 - Competence in management of minor deformities, nodules
 - Operative management (arthrodeses, arthroplasty – excisional and interpositional) osteotomies and realignment procedures

9. AMPUTATIONS, PROSTHETICS AND ORTHOTICS OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor or his/her designate. This will be done by direct questioning or observation of the clinical practice in the following areas:

A. AMPUTATIONS

GENERAL

A.1 Conditions

Detailed knowledge of the congenital conditions requiring amputation are, ischaemia, due to disease and vascular injuries, tumour, infection, trauma and the specific indications required for each.

A.2 Limb Assessment

Knowledge and clinical competence in the assessment of the limb with reference to viability of the stump and successful eradication of disease.

A.3 Patient Assessment (Psychological Status) – Social, Psychological and Economics Impact. Ability to co-operate with occupational therapist, physiotherapist and rehabilitation team. Ability to use a prosthetic appliance functionally (intelligence, cardiopulmonary status, motivation).

A.4 Team Approach – Contributions and Roles played by the Prosthetist, Physiotherapist, Occupational Therapist, Psychologist and Social Worker.

A.5 Surgical Principles

Levels of amputation, optimal stump length, technical considerations for standard amputations, recognition and management of complications, post-operative care (types of dressings, ie immediate vs early fitting), management of stump oedema, haematoma, infection, necrosis, contractures, neuromas and phantom pain.

B. PROSTHETICS

GENERAL

B.1 Material

Knowledge of the materials used in the formation of the various components of the prosthesis, their benefits, shortcomings and alternative materials available.

B.2 Functional Assessment

Knowledge and functional assessment of the demands placed on the prosthesis related to patient age, size, sex, vocation and the ability to alter various prosthetic components for best function.

B.3 Socket

Knowledge of the methods of socket fitting, difficulties with variation in stump size and length, special conditions and the assessment of stump symptoms with their reference to socket fitting.

B.4 Suspension

Knowledge of the standard methods of prosthetic suspension, various alternatives available and the ability to choose from these for the most functional prosthetic fitting.

B.5 Joint

Knowledge of the standard types of joints used in prosthetic fittings, their benefits, shortcomings, alternative joints available and the ability to choose from these alternatives.

B.6 Cosmetics

Knowledge of the methods of cosmetic covering of prostheses.

B.7 Fitting

Knowledge of the methods of prosthetic fitting, balancing, alignment and ability to relieve stump socket symptoms due to these causes.

Knowledge of the above general components to allow correct prosthetic prescription for each of the standard lower extremity amputation levels.

Knowledge of the major contact and pressure areas in the lower extremity stump for each phase of gait.

B.8 Upper Extremity

Knowledge of the above general components to allow correct prosthetic prescription for best function prosthesis.

Knowledge and clinical ability to assess the causes of limited function relative to prosthetic fitting or components.

C. ORTHOTICS

GENERAL

C.1 Orthotic Principles

Knowledge of the aims of orthotic fitting – stability, control of motion, prevention of deformity, maintenance of alignment and the basic methods by which these are achieved.

C.2 Materials

Knowledge of the materials commonly used in orthoses, their benefits, drawbacks and alternative materials available.

C.3 Assessment

Knowledge and clinical ability to assess the biomechanical problem at hand, the function deficiency and apply basic orthotic principles for their correction.

C.4 Fitting

Knowledge of the techniques of orthotic fitting.

C.5 Prescription

Knowledge of the above general components to allow correct orthotic fitting and the assessment of function of the orthosis.

D. REGIONAL

D.1 Lower Extremity

a. Cognitive

- Post-operative management including immediate prosthetic fitting
- Detailed knowledge of prosthetic prescribing and supervision of rehabilitation
- Assessment of complications of amputation surgery for toes, trans metatarsal, below knee, above knee amputations, (chronic stump pain, stump ulceration, neuroma, stump overgrowth, hypertrophic new bone, ankle disarticulation (Syme40 & Boyd5), knee disarticulation and hip disarticulation)

b. Technical

- Management of complications
- Hip disarticulation
- Hemipelvectomy
- Amputations of toes, transmetatarsal, below knee, above knee (including assessment of neurovascular status, potential viability of the stump, selection of types, location of flaps)
- Musculotendinous reinsertion, (“myoplasty, myodesis”)

D.2 Upper Extremity

a. Cognitive

- Occupational and physiotherapy
- {Prescription of prosthetic appliances
- Post-operative management of the stump
- Prescription fitting

b. Technical

- Shoulder disarticulation and fore-quarter amputation
- Amputations of the finger or ray amputation
- Amputations through the wrist, forearm, elbow disarticulation, upper arm (including care of the stump)

10. SPORTS MEDICINE OBJECTIVES

The trainee, upon completion of the rotation indicated, will demonstrate a satisfactory level of knowledge, clinical competence and technical competence as determined by the supervisor or his/her designate. This will be done by direct questioning or observation of the clinical practice in the following areas:

A. GENERAL

A.1 Anatomy

Detailed knowledge of applied functional anatomy to athletic performance.

A.2 Physiology

Detailed knowledge of the concept of fitness, especially with reference to cardiopulmonary conditioning and exercise physiology. Muscle metabolism, function (slow twitch, fast twitch, neuromuscular conduction, glycogen metabolism) and training (aerobic and anaerobic).

Osteopenia (secondary to amenorrhoea).

A.3 Pathophysiology

Inflammatory process (with special reference to repetitive injuries and stresses).

A.4 Biomechanics

Involving specified function, ie walking, running, throwing, swimming. Development and use of protective equipment and safe surroundings.

A.5 Pharmacotherapeutics

Use and abuse of drugs in relation to sports (injury management, performance enhancing)

A.6 Team Approach

Awareness that the contemporary setting involves a sophisticated team of experts including physicians, physical educationalists, physiotherapists, nutritionists, physiologists, engineers, nutritionists.

B. UPPER LIMB

B.1 Shoulder – Impingement Syndromes (Rotator Cuff)

- a. Cognitive
 - Clinical and radiological assessment
 - Classification
 - Complications and associated conditions
 - Non-operative management (physiotherapy, injection techniques)
 - Indications for surgery
 - Investigative techniques (injection, arthrography, arthroscopy)
- b. Technical
 - Surgical decompression of impingement
 - Operative repair of tears, acute and chronic

B.2 Biceps Tendon

- a. Cognitive
 - Clinical and radiological examination
 - Non-operative management (injection techniques, physiotherapy)
 - Indications for surgery
- b. Technical
 - Surgical management of instability, chronic inflammation and rupture

B.3 Instability (Glenohumeral)

- See Adult Trauma

B.4 Elbow – Epicondylitis

- a. Cognitive
 - Clinical and radiological assessment
 - Non-operative management (physiotherapy, medication, injection therapy)
 - Indications for surgery
 - Differential diagnosis
 - Investigative techniques (arthrography, electrophysiology)
- b. Technical
 - Surgical management (muscle slide, tendon lengthening and repair)

B.5 Instability Medial (Throwing)

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis
 - Non-operative management
 - Indications for surgery
 - Biomechanical analysis
 - Investigative techniques
- b. Technical
 - Operative management

C. LOWER LIMB

C.1 Foot

- a. Cognitive
 - Clinical and radiological assessment of foot pain (including stress fractures, tendinitis, tibialis posterior)
 - Differential diagnosis
 - Primary non-operative treatment

- Detailed knowledge of the biomechanics of running, normal and pathological (planovalgus, pes cavus concerning pre-disposition)
- Non-operative management (footwear, special orthotics, training schedules)
- b. Technical
 - Operative management
 - See also Foot and Ankle Objectives

C.2 Ankle

- See Adult Trauma

C.3 Achilles Tendon

- a. Cognitive
 - Assessment (Thompson test⁴¹)
 - Differential diagnosis (“plantaris pop”)
 - Non-operative management (rest, medication, therapy)
 - Indications for surgery
- b. Technical
 - Surgical repair of acute ruptures
 - Surgical reconstruction for late rupture

C.4 Lower Leg

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis – “shin splints” (compartment syndrome, vascular insufficiency, stress fracture, tendinitis, periostitis)
 - Techniques of investigation (compartment pressure studies, bone scan, vascular assessment)
 - Non-operative management
 - Indications for surgery
- b. Technical
 - Operative management

D. KNEE

D.1 Meniscus and Ligament

- See Joint and Trauma Objectives

D.2 Patella

- a. Cognitive
 - Clinical and radiological assessment (malalignment, instability, abnormal tracking)
 - Non-operative management (activity schedules, bracing, physiotherapy, medication)
 - Indications for surgery
 - Overuse syndrome (patellar tendinitis, iliotibial band friction syndrome)
 - Biomechanical principles, predisposition

- Methods of management (including training techniques)
- b. Technical
 - Methods of investigation (including diagnostic arthroscopy)
 - Operative management (arthroscopic shaving, realignment, stabilization, Maquet procedure²³, Elmslie-Trillat¹⁰, patellectomy)

E. HIP

E.1 Stress Fractures

- a. Cognitive
 - Clinical and radiological assessment
 - Differential diagnosis of groin pain (with special reference to overuse syndromes)
 - Associated conditions
 - Investigative techniques (bone scan, arthrography, arthroscopy)
 - Non-operative management (medication, physiotherapy, orthotics)
 - Indications for surgery
- b. Technical
 - Diagnostic Surgery

E.2 Muscle Tendon (adductor Tendinitis, Pubic Symphysitis, Hip Pointer)

Cognitive

- Clinical and radiological assessment
- Differential diagnosis
- Associated conditions
- Non-operative management

F. SPINE

Cognitive

- See under Spine
- Detailed knowledge of biomechanics of the spine and brachial plexus (with special reference to sports injuries)
- Predisposing condition (congenital anomalies)
- Special precautions
- Non-operative management (training techniques, orthotics, physiotherapy)
- Advice re: risk of injury, participation

11. PAIN OBJECTIVES

General

- Definition of chronic pain syndromes.
- Theories of the mechanisms – central (Melzak) – peripheral.
- Role of endogenous opiates (endorphins).
- Psychological factors.
- Clinical picture
- Investigation
- Principles of management.

II. PAEDIATRIC ORTHOPAEDICS

AFFECTIVE OBJECTIVES

While the cognitive and technical objectives are listed under specific conditions, the affective objectives for paediatric orthopaedics may be stated generally as follows:

Upon completion of the core curriculum in paediatric orthopaedics, the trainee will have demonstrated to the satisfaction of the orthopaedic faculty by his behavior that he appreciates the;

1. Unique psychological and emotional aspects of illness or injury in children
2. Differences in diagnosis, treatment, and prognosis in children's disorders imposed by the physic.
3. Unique role played by the family of the child with illness or injury.

1. CRITERIA FOR ACCEPTABLE PERFORMANCE

Cognitive Objectives

The criteria of acceptable performance for the cognitive objectives in paediatric orthopaedics in an average score (over four years) in paediatric orthopaedics on the Orthopaedic In-Training Examination at the fiftieth percentile or higher.

In addition, there should be a consensus of the faculty, based on observations made in day-to-day contact throughout the residency years, that the trainee is able to apply his knowledge of paediatric Orthopaedics effectively in the practice of orthopaedics.

2. GENERAL AFFECTIONS OF BONE

A. Development Disorders

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to:

1. **Define**
 - a. Dysplasia
 - b. Dystrophy
 - c. Dysostosis
2. Classify the epiphyseal, physeal, metaphyseal, and diaphyseal dysplasias, eg. Rubin³¹ or Mckusich.
3. The trainee should have an understanding of the interpretation of radiographs and knowledge of the reference source to assist in the classification of the diagnosis.
4. Identify each of the following conditions, pointing out the distinguishing clinical, radiological and laboratory features giving the prognosis.
 - a. Acrocephalosyndactyly
 - b. Multiple epiphyseal dysplasia
 - c. Achondroplasia

- d. Melorheostosis
- e. Metaphyseal dysostosis
- f. Metaphyseal dysplasia
- g. Osteopetrosis
- h. Osteogenesis imperfecta
- i. Englemann's Disease
- j. Osteopoikilosis
- k. Diastrophic dwarfism
- l. The mucopolysaccharidoses
- m. Spondyloepiphyseal dysplasia
- n. Enchondromatosis
- o. Hypophosphatasia
- p. Dysplasia epiphysealis hemimelica

B. Metabolic and Endocrine Disorders

1. Slipped Capital Femoral Epiphysis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List predilected age group, sex, body types, and the incidence of bilaterality in slipped capital femoral epiphysis.
2. Describe the theories of aetiology.
3. List the expected clinical and roentgenographical features encountered with the following types of slipped epiphysis:
 - a. pre-slip
 - b. acute slip of 25%
 - c. acute slip of 50%
 - d. acute slip of 75%
 - e. chronic slip of 50%
4. Describe the optimal operative treatment for each of the above slipped capital femoral epiphyses.
5. Discuss the complications of slipped capital femoral epiphysis and its treatment.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Plan a corrective osteotomy of the proximal femur.

2. Demonstrate the ability to manage an acute slipped capital femoral epiphysis by traction and pinning in situ.

2. Rickets

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to

1. List the types of rickets and the specific aetiology of each.
2. Describe the characteristic clinical, radiological, laboratory, and pathological findings in each type of rickets.
3. Discuss the management of a given patient with rickets.

3. Renal Osteodystrophy

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to:

1. Describe the initial pathologic lesion in renal osteodystrophy.
2. List the characteristic clinical, radiological and laboratory features of renal osteodystrophy.
3. Discuss the management of a given patient with renal osteodystrophy.

4. Hypophosphatasia

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the metabolic defect, genetics, clinical, radiological and laboratory characteristics of hypophosphatasia.

5. Hypoparathyroidism

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to:

1. Describe the clinical and laboratory findings in idiopathic hypoparathyroidism.
2. Give the primary feature that distinguishes hypoparathyroidism.

6. Hypothyroidism

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to:

1. Discuss the aetiology and the clinical, radiological and laboratory findings in Cretinism.
2. Discuss the management and prognosis of a given patient with Cretinism.

C. Circulatory Disorders

1. Osteonecrosis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references, will be able to:

1. Define osteonecrosis as to pathogenesis.
2. Given a specific history, physical examination, and x-rays, identify, outline a rational plan of management, and give the prognosis for:
 - a. Osgood-Schlatter's Disease
 - b. Kohler's Disease
 - c. Sever's Disease
 - d. Freiberg's Infarction
 - e. Scheuermann's Disease
 - f. Calve's disease (not an osteonecrosis)
 - g. Panner's Disease
 - h. Blount's Disease
 - i. Legg-Calve-Perthes Disease
 - j. Osteochondritis dissecans
3. List the causes of aseptic necrosis of the capital femoral epiphysis in children.
4. Describe the types of Legg-Calve Perthes according to Catterall and Herring including at least two characteristics of each type of their prognostic significance.
5. Describe the pathological stages of coxa plana and correlate each stage with its radiological appearance.
6. Discuss the operative and non-operative management of Legg-Calve Perthes

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Describe the various orthoses available and prescribe and check out an orthoses for use in the ambulatory treatment of unilateral coxa plana.
2. Perform an arthroscopy or arthrotomy of the knee and remove a loose body.

2. Sick Cell Disease

Core Objective

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Classify a given primary tumour (benign or malignant) according to the AFIP fascicle in the following series:
 - a. osteogenic
 - b. chondrogenic
 - c. collagenic

- d. myelogenic
2. Recognize a given bone or soft somatic tissue tumour by clinical, radiological, and pathological examination.
3. Stage a tumour.
4. Outline the management and prognosis of the above tumour, and give the rationale for the plan chosen including indications for limb salvage or amputation.
5. Demonstrate knowledge of principles of radiotherapy and chemotherapy for malignant tumours.
6. Describe the clinical, radiological and pathological features, prognosis and management of:
 - a. eosinophilic granuloma
 - b. Hand-Schuller-Christian Disease
 - c. Letter-Siwe Disease
 - d. Gaucher's Disease
 - e. Chondroblastoma
 - f. Fibrous dysplasia
 - g. Unicameral bone cyst
 - h. aneurysmal bone cyst
 - i. Fibrous cortical defect
 - j. Non-ossifying fibroma
 - k. Chondromyxoid fibroma
 - l. Enchondroma
7. Discuss the biopsy techniques and pre-requisites for a satisfactory biopsy.
8. Discuss the common metastatic bone tumours in children.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of his supervisor, his ability to:

1. Excise a benign tumour
2. Inject a bone cyst

3. INFECTIONS OF BONES AND JOINTS

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the pathogenesis of haematogenous osteomyelitis.
2. List the characteristic clinical, radiological, radio-isotopic, laboratory and pathological features in acute, subacute, chronic and residual osteomyelitis.

3. Prescribe an appropriate course of antibiotic therapy for a given patient with acute osteomyelitis.
4. List the indications for operative treatment of acute and chronic osteomyelitis.
5. Discuss the management of a given patient with one of the following complications of osteomyelitis:
 - a. fracture
 - b. pyarthrosis
 - c. growth disturbance

Technical

Upon completion of core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Treat a case of acute osteomyelitis.
2. Understand the principles and techniques of treatment of chronic osteomyelitis including the Papineau technique.

4. AFFECTIONS OF JOINTS

A. Arthritis

1. Pyogenic

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the pathogenesis and pathological changes occurring in the joints of infants and children with acute pyogenic arthritis.
2. Describe the bacteriological, clinical, laboratory, and radiological characteristics of acute septic arthritis.
3. Describe the management and list possible complications of acute pyogenic arthritis.
4. List factors that may affect the prognosis of acute septic arthritis in children.
5. List the conditions to be considered in the differential diagnosis of a child with an acutely painful joint and the plan by which you would reach a specific diagnosis.
6. Discuss the clinical, radiological, laboratory, and bacteriological characteristics of inflammatory conditions of the intervertebral disc.
7. Discuss the management and prognosis of a given paediatric patient with an inflammatory condition of the intervertebral disc.
8. Discuss foreign bodies and nail puncture wounds in the aetiology of septic arthritis.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Aspirate the hip joint.
2. Incise and drain the affected hip joint of a patient with pyogenic arthritis.

2. **Rheumatoid**

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the clinical, laboratory, radiological and prognostic differences between rheumatoid arthritis in adults and children.
2. Outline an approach to the management of a given child with monarticular rheumatoid arthritis, including the indications for:
 - a. specific drug therapy
 - b. splints, casts, and traction
 - c. physical therapy
 - d. surgery
 - e. ophthalmology consultation

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Make and apply appropriate splints to immobilize specified joints in a patient with arthritis.
2. Aspirate any joint illustrating anatomical landmarks.

3. **Haemophilia**

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the congenital disorders of coagulation that may be associated with recurrent haemarthrosis and indicate the distinguishing genetic, laboratory and clinical characteristics of each.
2. Discuss the management of a given child with an acute haemophilic haemarthrosis, including:
 - a. Type, amount and duration of replacement therapy
 - b. Use of traction, splints and casts
 - c. Indications for aspiration
3. Discuss the management of a given child with chronic haemophilic arthropathy, including the indications for:
 - a. home maintenance therapy

- b. use of traction, splints, and casts
- c. operative treatment
- 4. Discuss the specific indications and contraindications for, expected results from, and coagulation management of:
 - a. synovectomy of the knee joint
 - b. replacement of the knee joint
 - c. excision of pseudotumour
- 5. Discuss the previous high incidence of H.I.V. infection in haemophiliac patients and the precautions to be taken during invasive procedures.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

- 1. Demonstrate various traction and casting techniques to correct a knee flexion contracture in a patient with haemophilia.
- 2. Knowledge of orthotics and techniques to arrest a flexion contracture of the knee or elbow.
- 3. Set up continuous passive motion equipment for post-haemarthrosis of knee.

4. Tuberculosis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

- 1. List the distinctive clinical, laboratory (including bacteriology and analysis of the synovial fluid), radiological, and pathological features of tuberculous arthritis in peripheral joints.
- 2. Discuss the pathogenesis, clinical, radiological, and pathological findings in spinal tuberculosis (Pott's disease) with and without Pott's paraplegia.
- 3. Describe the management of a child with tuberculous arthritis of the hip or spine, including:
 - a. type and duration of drug therapy
 - b. indications for casting
 - c. types of operative treatment, with indications for each

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

- 1. Perform a needle biopsy of a vertebral lesion.

B. Discoid Meniscus

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. (a) Discuss the embryology of the knee joint.
(b) Describe the altered anatomy in the knee and mechanism by which it produces a “discoid” lateral meniscus according to Kaplan.
2. List the clinical and pathological findings encountered in a “discoid” lateral meniscus.
3. Discuss the operative treatment of a “discoid” lateral meniscus with emphasis on technical differences between excision of a “non-discoid” and “discoid” menisci, including arthroscopic differences.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to :

1. Perform a diagnostic arthroscopy of the knee in a teenage patient.

D. Popliteal Cyst

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to :

1. Discuss the aetiology and natural history of popliteal cysts in children (as opposed to adults).
2. Describe the possible anatomical relationships between popliteal cysts and the adjacent bursae, muscles and joint.
3. Discuss the indications for non-operative and operative treatment of a popliteal cyst.
4. Give a differential diagnosis of swelling behind the knee and how to differentiate.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Aspirate and inject a popliteal cyst.

D. Transient Synovitis of the Hip

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss possible aetiologies of transient synovitis of the hip.
2. Describe the clinical, laboratory and radiological findings and differential diagnosis of transient synovitis of the hip.
3. Discuss the treatment of transient synovitis of the hip.

5. AFFECTIONS OF THE NERVOUS SYSTEM

A. Cerebral Palsy

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Classify cerebral palsy according to the aetiology and site of neuropathological changes and discuss the clinical findings in each.
2. Given a patient with cerebral palsy, discuss the principles upon which the total care of the patient will be based.
3. Discuss appropriate non-operative and/or operative management of a given patient with cerebral palsy.
4. List the indications, advantages, disadvantages, post-operative management, and unique complications of each of the following types of surgery in cerebral palsy:
 - a. neurectomy
 - b. tendon or muscle lengthening
 - c. tendon transfer
 - d. arthrodesis
5. List the commonly encountered hand, wrist, elbow, spine, hip, knee, ankle and foot deformities in cerebral palsy and discuss the management of each – alone or in combination.
6. Discuss the pathogenesis and management of the subluxed hip in the cerebral palsy child.
7. Understand the progression and management principles of scoliosis in the cerebral palsy patient.
8. Discuss the principles of seating the non-ambulatory cerebral palsy child.
9. Discuss the pathogenesis and treatment of pelvic obliquity.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Perform a tendon transfer or lengthening for correction of a spastic deformity.
2. Perform a subtalar arthrodesis.
3. Perform a femoral osteotomy.

B. Spinal Dysraphism

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the incidence and natural history of myelomeningocele, according to Sharrad¹⁵ and to Smith.
2. Describe the genetics and list theories of aetiology of spinal dysraphism indicating the strengths and weaknesses of each.
3. Describe the pathological features of spinal dysraphism.

4. Describe the most likely deformity of the hip, knee, ankle, foot and toes resulting from neurosegmental lesions at levels L1, L2, L3, L4, L5, S1, S2, S3 and indicate the reasons for each deformity.
5. List the spinal levels of involvements by myelomeningocele in order of frequency according to Sharrard.
6. Describe, for each of the following deformities, the pathogenesis, segmental level, indications, and contraindications to non-operative and operative management and methods to retain management gains:
 - a. equinovarus foot
 - b. equinovalgus foot
 - c. planovalgus foot
 - d. hyperextension deformity of the knee
 - e. paralytic dislocation of the hip
 - f. knee flexion deformity
 - g. pelvic obliquity
 - h. lumbar lordosis
 - i. paralytic scoliosis
 - j. calcaneus foot
7. Discuss the incidence, prevention and treatment of each of the following complications of myelomeningocele:
 - a. trophic ulceration
 - b. neuropathological arthropathy
 - c. non-union of attempted arthrodesis
 - d. fractures and epiphyseal separations
 - e. pelvic obliquity
8. Understand the ambulatory and mobility devices available for the myelomeningocele child.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Apply a cast to the limb of a given patient with sensory deprivation of the limb.
2. Prescribe and check an orthosis for deformity in the paraparetic child

C. Diastematomyelia

Educational Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the pathological, clinical and radiological findings in diastematomyelia.

2. Discuss the management of a given patient with a slowly progressive neurological deficit in one lower limb caused by diastematomyelia.
3. Discuss tight filum terminale with regards to investigation, differential diagnosis and management.

D. Friedreich's Ataxia

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Give the pathogenesis and mode of inheritance and describe the pathological changes in the spinal cord and cerebellum in Friedreich's ataxia.
2. Describe the clinical findings in classical Friedreich's ataxia.
3. Discuss the management of the orthopaedic problem in a give patient with Friedreich's ataxia.

E. Peripheral Nerve Disorders

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the types of inheritance of Charcot-Marie-Tooth disease.
2. Discuss the clinical, electromyographic, and pathological findings in Charcot-Marie-Tooth disease.
3. Discuss the prognosis and management of a given patient with Charcot-Marie-Tooth disease.

F. Poliomyelitis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the clinical and laboratory features of poliomyelitis that are important in its differential diagnosis.
2. Describe the clinical stages of poliomyelitis.
3. Describe the pathological findings in poliomyelitis.
4. Discuss the non-operative management of a given patient with:
 - a. acute, and
 - b. convalescent

Poliomyelitis, including indications for the use of bed rest, splints, braces, muscle strengthening exercises, and timing of ambulation.

5. List the indications for operative treatment in a patient with residual poliomyelitis.
6. Describe a rational plan of reconstructive surgery in a given patient with residual poliomyelitis affecting either the limbs or the spine or both.

G. Neurofibromatosis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the clinical manifestations and pathological findings encountered in neurofibromatosis involving the following tissues:
 - a. cutaneous
 - b. subcutaneous
 - c. nervous
 - d. skeletal
 - e. vascular
 - f. lymphatic
2. Discuss the possible relationships with neurofibromatosis in patients who have as the primary manifestation:
 - a. hypertrophy of an upper limb
 - b. leg length inequality
 - c. scoliosis
 - d. congenital pseudarthrosis of the tibia

H. Spinal Atrophy

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the pathological, clinical and laboratory findings encountered in spinal atrophy.
2. Discuss the management of a given patient with spinal atrophy.
3. Discuss the management of spinal curvature in the child with spinal muscular atrophy.

6. AFFECTIONS OF MUSCLE

A. Muscular Dystrophy

1. Pseudohypertrophic muscular dystrophy.
2. Facioscapulohumeral (Landouzy-Dejerine) muscular dystrophy
3. Scapulohumeral (Erb) muscular dystrophy
4. Myotonic dystrophy
5. Congenital myopathies

B. Myotonia Congenita

C. Myositis Ossificans Progressive

D. Bacterial Myositis

E. Progressive Systemic Sclerosis (scleroderma)

F. Dermatomyositis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the mode of inheritance, clinical manifestations, laboratory and electromyographical findings, pathological changes and management of a given patient with one of the following conditions affecting skeletal muscle:
 - a. pseudohypertrophic muscular dystrophy
 - b. facioscapulohumeral (Landouzy-Dejerine) muscular dystrophy
 - c. limb girdle muscular dystrophy
 - d. myotonia congenital
 - e. myositis ossificans progressiva
 - f. bacterial myositis

7. THE SPINE

A. Scoliosis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to :

1. Discuss three possible aetiological factors in “idiopathic” scoliosis.
2. Classify, list the differences in curve pattern, sex distribution, incidence, management and prognosis in:
 - a. idiopathic scoliosis
 - b. congenital scoliosis
 - c. paralytic scoliosis
3. Demonstrate his ability to measure accurately scoliotic curves according to the methods of Cobb.
4. List the factors of prognostic significance in “idiopathic” scoliosis.
5. Discuss the cause(s), significance, and measurement of vertebral rotation in scoliosis.
6. List the characteristics of a structural scoliotic curve.
7. List the indications for spinal instrumentation in the treatment of scoliosis.
8. List the indications for spinal fusion in the treatment of scoliosis.
9. Given a pre-operative patient with scoliosis and appropriate x-rays, select the proper fusion area, give the optimal method of correction and outline the studies necessary for adequate evaluation of respiratory function.

10. List the indications and contraindications for use of the Milwaukee Brace and the lower profile brace in the treatment of scoliosis.
11. List the complications of the non-operative management of scoliosis, and means to avoid them.
12. Discuss the pseudarthrosis following spinal fusion, including causes, recognition, and management.
13. Discuss the natural history of the untreated spinal curvature.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to :

1. Apply a body cast. Perform a subtalar arthrodesis.
2. Prescribe and check out an appropriate orthosis for use in the management of a given patient with scoliosis.

B. Congenital Disorders

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the aetiological, clinical and radiological manifestations, and management of
 - a. Klippel-Feil syndrome
 - b. Kyphosis (congenital)
2. Discuss the possible aetiologies, clinical and pathological findings, and management of muscular torticollis

C. Scheuermann's Disease

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the possible aetiological factors in Scheuermann's diseases.
2. List the distinguishing clinical and radiological features encountered in Scheuermann's disease of:
 - a. thoracic spine
 - b. lumbar spine
3. Discuss the management and prognosis of a given patient with Scheuermann's disease.

8. CONGENITAL DISORDERS OF THE UPPER LIMB

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Classify congenital skeletal limb defects according to Frantz and O'Rahilly¹⁴ and according to the New International Classification (Swanson³⁹).

2. Given one of the following disorders of the upper limb, the trainee will be able to identify and/or classify the defect, describe the clinical and pathological features, outline a rational plan for management, and write an appropriate prosthetic prescription (in indicated):

- 1) Sprengel's deformity
- 2) Cleidocranial dysostosis
- 3) Pseudarthrosis of the clavicle
- 4) Ankylosis of the elbow
- 5) Radioulnar synostosis
- 6) Dislocation of the radial head
- 7) Madelung's deformity
- 8) Polydactyly
- 9) Syndactyly
- 10) Camptodactyly
- 11) Clasped thumb
- 12) Macrodactyly
- 13) Clinodactyly
- 14) Brachydactyly
- 15) Symphalangism
- 16) Trigger finger or thumb
- 17) Poland's syndrome
- 18) Reduction deformities (including club hand, phocomelia, amputations, etc)
- 19) Brachial plexus palsy

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Perform the necessary operative procedures for correction of a given patient with a simple accessory digit, trigger finger or thumb.

9. THE LOWER LIMB

A. Foot Deformities

1. Pes Planus

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the important clinical and radiological features in the differential diagnosis between a relaxed flexible flatfoot deformity secondary to ligamentous laxity and one associated with a short tendo Achilles.

2. Describe the pathology in one type of flatfoot deformity caused by each of the following:
 - a. primary ligamentous laxity
 - b. primary osseous abnormality (tarsal coalition)
 - c. primary joint abnormality (eg rheumatoid arthritis)
 - d. primary muscle pathology (eg cerebral palsy)
3. Describe the differential clinical and radiological features in each of the above types of flatfoot.
4. Describe the management (non-operative, operative, or both) of a given patient with one of the above types of flatfoot deformity.

2. **Pes Cavus**

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the specific neuromuscular lesions that may lead to a cavus deformity of the foot and describe the operative approach to each.

B. Leg Deformities

1. **Torsional**

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the normal torsional development of the femur and tibia from the pre-natal period until growth is complete.
2. Describe the postural attitudes associated with the development of abnormal femoral and tibial torsion.
3. Describe how hip rotation is altered by femoral anteversion and retroversion.
4. Describe the clinical and radiological techniques for the measurement of femoral torsion.
5. Describe the clinical techniques for measuring and recording abnormal tibial torsion.
6. List the acquired conditions attributed to increased femoral anteversion.
7. Discuss the indications for exercises, splinting and osteotomy in the treatment of abnormal femoral and tibial torsion.

2. **Angular**

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the normal variation in the femoral neck shaft angle between birth and old age.
2. Classify congenital coxa vara according to Amstutz¹, describe the pathological, clinical and radiological features of each.
3. Describe the management of a given child with congenital coxa vara.
4. List the causes of acquired coxa vara in children.
5. Describe the physiological angulation at the knee (genu varum, valgum) from birth through to adolescence.
6. Describe the techniques for measurement and recording of angulation at the knee.
7. Discuss the management of a given patient with genu varum or valgum.

3. Leg Length Inequality

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Specify the growth contributions of proximal and distal femur and tibia.
2. List factors to consider in the evaluation of leg length inequality, with the significance of each.
3. Discuss the indications, results and complications of:
 - a. epiphyseal plate stimulation
 - b. surgical lengthening of a limb
 - c. surgical shortening of a limb
 - d. epiphyseal plate arrest
 - e. epiphyseal plate stapling
 - f. resection of a bony bridge across the epiphyseal plate
4. Given a patient with leg length inequality:
 - a. Makes a growth prediction, using the Green-Anderson or Moseley methods.
 - b. Read scanograms and skeletal age films, using the Greulich-Pyle atlas.
 - c. Outline a plan of management of the leg length discrepancy specifying the reasons for the plan chosen.
 - d. Understand the principle of lengthening through the callus.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Perform an epiphyseodesis in the lower limb of a given patient.
2. Appreciate the concept of limb lengthening using the Ilizarov or Orthofix techniques

C. Congenital Disorders

1. Torsional

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the pathogenesis of talipes equinovarus.
2. List the pathological findings in ligaments, muscles and bones in talipes equinovarus.
3. Discuss the aetiology, management and prognosis of talipes calcaneovalgus.
4. List the major elements of the foot deformity in talipes equinovarus.
5. Describe in detail the management of talipes equinovarus in a neonate by each of the following techniques:
 - a. strapping
 - b. splinting
 - c. casting
6. List the characteristic radiological findings of an incompletely corrected talipes equinovarus in the older child.
7. List the indications for and describe the techniques of operative treatment of talipes equinovarus in a given patient under the age of six months.
8. Describe the operative approach to each of the following patients with talipes equinovarus:
 - a. Six-year-old with 150 fixed forefoot adduction.
 - b. Seven-year-old with fixed heel varus of 100
 - c. Sixteen-year-old male with 100 fixed heel varus and 150 fixed equines
9. List three permanent stigmata of congenital talipes equinovarus.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Correct the deformities in a given patient with talipes equinovarus by non-operative methods.
2. Prescribe appropriate orthosis to maintain correction in patients with talipes equinovarus.

2. Metatarsus Varus

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the types of metatarsus varus and discuss the management and prognosis of a given patient with either variety.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Correct a given metatarsus varus deformity by serial cast application.

3. Tarsal Coalition

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the most common tarsal coalitions in order of frequency.
2. Describe the radiological techniques for demonstration of the above coalitions.
3. Describe the usual clinical findings in patients with symptomatic tarsal coalitions.
4. Discuss the management of a given child with a symptomatic tarsal coalition.

4. Developmental (Congenital) Dislocation of the Hip

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the genetic, hormonal, mechanical factors that have been incriminated in the aetiology of developmental (congenital) dislocation of the hip.
2. Demonstrate the clinical findings in development (congenital) dislocation of the hip in the neonate and discuss the relative importance of each in the diagnosis.
3. List the radiological findings (including arthrography) in development (congenital) dislocation of the hip in the neonate and in the older child.
4. List the normal value for the acetabular index and C-E angle at a given age.
5. Describe the expected gross pathological findings in development (congenital) displacement of the hip in a patient:
 - a. 18 months of age or under
 - b. over 18 months of age
6. Discuss the management of unilateral developmental (congenital) displacement of the hip in a given child under the age of 18 months.
7. Discuss the management of unilateral developmental (congenital) displacement of the hip in a given patient between 18 months and 6 years of age.
8. List the complications of development (congenital) displacement of the hip and its treatment and discuss the management of a given patient who has developed one of the complications.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Obtain and maintain reduction of a given developmental (congenital) displacement of the hip by non-operative methods.

5. Congenital Dislocation of the Knee

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. List the possible aetiological factors in congenital dislocation of the knee including genu recurvatum.
2. Describe the optimum management of a given patient with congenital dislocation of the knee.

6. Vertical Talus

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the pathogenesis of congenital vertical talus and describe the gross pathological findings.
2. List the clinical and radiological findings that distinguish congenital vertical talus from the other types of flatfoot.
3. Describe the management of a given child with congenital vertical talus including:
 - a. indications, techniques, and prognosis of non-operative treatment
 - b. indications for operative treatment
 - c. type of staging and procedures

7. Proximal Femoral Focal Deficiency

(See Leg Deformities – Angular)

8. Reduction Deformities

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the principles involved in the selection of the operative procedures for the reconstruction of a lower limb deformity caused by absence (partial or complete) of the femur, tibia or fibula.

9. Coxa Vara

(See Leg Deformities – Angular)

10. Pseud arthrosis of the Tibia

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Describe the radiological and pathological findings in congenital pseudarthrosis of the tibia.

2. Describe operative techniques that have been used successfully to obtain union in the treatment of congenital pseudarthrosis of the tibia with the efficacy of each.
3. Understand the principles of the electrical stimulation of bone healing in pseudarthroses of the tibia.
4. Discuss microvascular bone transplants in the treatment of congenital pseudarthrosis of the tibia.
5. Discuss the orthotic management of congenital pseudarthrosis of the tibia.

10. TRAUMATIC DISORDERS

A. Epiphyseal Plate Injury

Epiphyseal Plate Injury

The trainee will be expected to have a basic knowledge of the anatomy, histology and physiology of the growth plate and its reactions to injury and disease including the ability:

1. Give a classification of the growth plate injuries and their treatment.
2. Discuss the prognosis of growth plate injury and types of growth disturbance.
3. Discuss the apophyseal injuries especially as related to sports injuries.
4. Explain the development of epiphyseal bars and methods of treatment.
5. Discuss the relative growth contributions of the major epiphyseal plates and their influence on fracture management.

Differences in Fractures Between Children and Adults

The trainee will be expected to be able to discuss in detail the anatomical and physiological differences in fractures and dislocations between children and adults with the implications on treatment including the ability to:

1. Discuss the complications of fractures and dislocations in general as related to children.
2. Discuss the effects of remodeling on fracture management.
3. Discuss the effects of fractures on growth on long bones and appropriate treatment to ensure limb length equality.
4. Discuss pathological fractures in children and how they differ from similar fractures in adults.

Birth Fractures

The trainee will have a good understanding of birth presentation predisposed to the fractures of long bones as well as those disease entities with a high incidence of fractures at parturition including the ability to:

1. Discuss the treatment and management of birth fractures.

2. Classify birth fractures and discuss the incidence and management of specific fractures of clavicle, humerus and femur.
3. Discuss associated soft tissue birth trauma, eg brachial plexus, spinal cord injury.

Fractures in Child Abuse

The trainee will be expected to familiar with the signs and symptoms of trauma secondary to child abuse.

1. Discuss the management of the abuse child (including legal responsibility)
2. Discuss the radiological features of the abused child.
3. Discuss the epidemiology and prevalence of child abuse.

Fractures and Dislocations of Specific Bones and Joints in Children

The trainee will be expected to have knowledge of the types and treatment of fractures and dislocations of each bone and joint with particular emphasis on complications and differences in management from the comparable adult injury.

A. Hand

The trainee should be able to discuss fractures of the phalanges, metacarpals and carpal bones including the management of intra-articular and epiphyseal injuries including the ability to:

1. Discuss the avulsion injuries of the paediatric hand and their treatment.
2. Discuss dislocation of the finger joints in children and their management.

B. Wrist

The trainee will be expected to discuss the various types of epiphyseal injuries around the wrist including complications and management; and should be able to:

1. Discuss the concept of the periosteal jinge in the treatment of fractures of children.
2. Discuss of treatment of torus and greenstick fractures in children

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Reduction and plaster immobilization of a Type I or II epiphyseal injury distal radius.
2. Reduction and plaster immobilization of displaced (bayonet apposition) distal radius and ulna metaphyseal fractures.

C. Forearm Fractures in Children

The trainee should be expected to understand the biomechanics and treatment of fractures of the distal, middle and proximal third of the radius and ulna including the ability to:

1. Discuss the cause and management of the Monteggia²⁵ fracture dislocation and its equivalents in children.
2. Discuss proper casting techniques and limb positioning for optimum treatment of various forearm fractures.
3. Discuss treatment of malunion of fractures of the forearm.

Technical

Upon completion of his core curriculum in paediatric arthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Reduce greenstick fracture midshaft radius and ulna.
2. Reduce displaced fracture midshaft radius and ulna by closed or open means.

D. Fractures and Dislocations about the Elbow.

The trainee will be expected to understand the anatomy and epiphyseal development in the region of the elbow as well as the ability to:

1. Discuss the complications of elbow trauma in children.
2. Discuss fractures of the distal humerus at various ages.
3. comment upon the investigation of elbow injuries.
4. Discuss vascular complications following elbow trauma.
5. Comment upon the treatment of complications of the supracondylar fracture in children.
6. Contrast clinically and radiologically between the various fractures encountered about the elbow.

Technical

Upon completion of his core curriculum in paediatric arthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to perform:

1. Reduction and plaster immobilization of:
 - a. supracondylar fracture humerus (including percutaneous pinning)
 - b. dislocation of the elbow
 - c. insertion of traction pin in ulna for traction treatment of supracondylar fracture Monteggia fracture-dislocation.
2. Open reduction and fixation of medial and lateral epicondylar fractures.
3. The application of Dunlop's traction with and without skeletal traction.
4. Compartment pressure monitoring.

E. Fractures of Humeral Shaft and Shoulder.

The trainee will be expected to understand the biomechanics and management of fractures of the shaft and proximal humerus in the child including the ability to:

1. Discuss the epiphyseal plate injuries about the proximal humerus including methods of reduction.
2. Discuss the relative growth contributions of the proximal humerus and its influence on treatment.
3. Discuss fractures of the clavicle and acromioclavicular joint in children; aetiology and management.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to carry out:

1. Proper application of Figure of Eight bandage for fractured clavicle.
2. Application of Navy Sling or Velpeau bandage.
3. Reduction and plaster immobilization of displaced fracture of proximal humerus.

F. Spinal Injury in Children

The trainee will be expected to be able to discuss the approach of spinal injury in children re: diagnosis and management, but in particular, the differences between adult and paediatric injury. The trainee will also be expected to:

1. Discuss cervical spine injury in children and its relation to congenital abnormalities.
2. Explain the differences in anatomy of the cervical spine between infants and adults and its influence on spinal injury.
3. Explain rotatory subluxation and facet dislocation and underlying mechanisms predisposing the child to these injuries.
4. Discuss pathological fractures of the spine in children.
5. Describe and discuss the features of spondylolysis in the child including treatment.

G. Pelvic Fractures in Children

The trainee will be expected to have an understanding of the biomechanics and types of pelvic fractures characteristic in childhood including associated soft tissue trauma. The trainee will also be expected to be able to:

1. Discuss apophyseal avulsion injuries about the pelvis.
2. Explain methods of investigation and pelvic fractures and associated trauma.
3. Classify fractures of the pelvis in children
4. Discuss the investigation and diagnosis of associated adjacent soft tissue injury.

H. Fractures and Dislocations about the Hip in Children

The trainee will be expected to know the anatomy and development of the hip with particular emphasis on the blood supply to the femoral head at various ages as well as be able to:

1. Classify fractures of the head and neck of the femur in childhood including a discussion of management.
2. Discuss acute dislocations of the hip in childhood.
3. Discuss the management of complications of fracture dislocation of the hip with particular reference to cox vara and avascular necrosis.
4. Discuss the Type I fracture of the proximal femoral physis with respect to aetiology, diagnosis, management and prognosis.

I. Fractures of the Femoral Shaft

The trainee will be expected to understand the anatomy, vasculature and biomechanics of the femur that predispose it to injury in childhood and as well to be able to:

1. Discuss the emergency management of fractured femurs in children.
2. Discuss the traction treatment of femoral fractures in children of different ages and complications to be avoided.
3. Explain the problems encountered in managing subtrochanteric fractures in children.
4. Discuss the indications and complications of intramedullary rodding in children.

Technical

Upon completion of his core curriculum in paediatric arthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Demonstrate proper application of:
 - a. thomas splint
 - b. skin traction techniques for management of fractured femur – distal and proximal
 - c. insertion of traction pin to distal femur

J. Fractures about the Knee in Children

The trainee will have good understanding of the anatomy of the knee area, predisposing the child to specific injury. In addition, the resident will be expected to:

1. Discuss the types and management of epiphyseal injuries of the distal femur and proximal tibia in children and their prognosis.
2. Explain the differences in cruciate injuries between children and adults.
3. Discuss avulsion injuries about the knee.
4. Discuss referred pain about the knee.
5. Discuss osteochondral fractures of the knee.

K. Fractures and Dislocations of the Patella in Children

The trainee will be expected to understand the influence of developmental anatomy on patella stability and be able to:

1. Discuss chondromalacia patellae.
2. Discuss operative and non-operative management of patella instability.
3. Discuss osteochondral fractures secondary to patella dislocations.

L. Fractures of the Tibia and Fibula

The trainee is expected to know the influence of growth of one paired bone on the other as well as the types of fractures encountered in the tibia and fibula. The trainee will also be expected to:

1. Describe and discuss toddler's fractures.
2. Discuss fractures involving the epiphyseal plate in the distal fibula and tibia.
3. Discuss fractures of the tibia and fibula with regard to varus and valgus angulation.
4. Discuss stress fractures.

5. Discuss fractures of the distal tibia in children including the triplane and Tillaux fracture.

Technical

Upon completion of his core curriculum in paediatric arthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Demonstrate closed reduction and plaster fixation of:
 - a. fractured tibia and fibula
 - b. fractured proximal tibia
 - c. type II growth plate injury of the distal tibia
2. Perform open reduction and internal fixation of growth plate injury where indicated.

M. Fracture and Dislocation of the Foot

The trainee is expected to know the ossification pattern of the bone of the feet together with the types of fractures characteristic of each bone. As well, the trainee should be able to:

1. Discuss injuries of the talus in children together with the blood supply of the talus.
2. Classify fractures of the calcaneus.
3. Discuss avulsion fractures about the foot.
4. Discuss osteochondral fractures of the talus.
5. Discuss accessory bones of the foot.

N. Pathological Fractures

The trainee understands the types of paediatric conditions predisposing to pathological fractures including:

- a. tumours and cysts
- b. myelomeningocele
- c. osteogenesis imperfecta
- d. stress fractures
- e. disuse osteoporosis
- f. osteomyelitis
- g. fibrous dysplasia

11. MISCELLANEOUS CONGENITAL DISORDERS

A. Constricting Bands

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the pathogenesis and gross pathological findings of congenital constricting bands.
2. List the indications for surgical excision of congenital constricting bands.

Technical

Upon completion of his core curriculum in paediatric orthopaedics, the trainee will have demonstrated, to the satisfaction of an attending orthopaedic surgeon, his ability to:

1. Perform a Z-plasty to release a skin contracture.

A.1 Congenital Amputation

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Discuss the aetiology of congenital amputations.
2. Discuss the principles of prosthetic management of infant and child with upper extremity and lower extremity congenital amputations.

B. Arthrogryposis

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

1. Give the evidence supporting primary muscle and primary central nervous system aetiologies of arthrogryposis.
2. List the clinical features of arthrogryposis.
3. Discuss the optimal management of a given child with arthrogryposis.

C. Marfan's Syndrome

D. Ellis-van Creveld Syndrome

E. Nail-Patella Syndrome

F. Ehlers-Danlos Syndrome

G. Trisomy-21 (Down's Syndrome)

H. Turner's Syndrome

I. Klinefelter's Syndrome

J. Mucopolysaccharidoses

K. Achondroplasia

L. Larsen's Syndrome

M. Klippel Trenaunay Weber

Core Objectives

Cognitive

After studying specified material, the trainee, without aid of references will be able to:

Define, discuss the genetics, clinical and radiological features, laboratory abnormalities, management and prognosis in Marfan's Syndrome, Ellis-van Creveld Syndrome, Nail-Patella Syndrome, Ehlers-Danlos Syndrome, Trisomy-21 (Down's Syndrome), Turner's Syndrome, Klinefelter's Syndrome, mucopolysaccharidoses and achondroplasia.

METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged. Following teaching modalities will be employed:

1. Lectures
2. Seminar Presentation and Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Clinical-pathological Conferences
6. SEQ as assignments on the content areas
7. Skill teaching in ICU, Operation Theatres, emergency and ward settings
8. Attend genetic clinics and rounds for at least one month.
9. Attend sessions of genetic counseling
10. Self-study, assignments and use of internet
11. Bedside teaching rounds in ward
12. OPD & Follow up clinics
13. Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

1. Clinical Case Conference

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Surgeon on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

2. Monthly Student Meetings

Each affiliated medical college approved to conduct training for MS Orthopaedics Surgery will provide a room for student meetings/discussions such as:

- a. Journal Club Meeting
- b. Core Curriculum Meetings
- c. Skill Development

a. Journal Club Meeting

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

b. Core Curriculum Meetings

All the core topics of Orthopaedics Surgery should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

c. Skill Development

Two hours twice a month should be assigned for learning and practicing clinical skills.

List of skills to be learnt during these sessions is as follows:

1. Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures

integral to the discipline (pg.34-43) (mentioned in the Log Book).

2. Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.
3. Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision making.
4. Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
5. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming familiar with Project Professionalism Manual Residents should have instruction and experience with patient counseling skills and community education.
6. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
7. Residents should have experience in the performance of Orthopaedics Surgery related clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards
8. Each resident will manage at least the following essential surgical cases and observe and participate in each of the procedures, preferably done on patients under supervision initially and then independently (pg.34-43)

3. Annual Grand Meeting

Once a year all residents enrolled for MS Orthopaedics Surgery should be invited to the annual meeting at LUMHS. One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making. The research work done by residents and their literary work may be displayed. In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

Matching Educational Methods to objectives

Educational Method	Types of Objectives				
	Cognitive: Knowledge	Cognitive: Problem Solving	Affective Attitudinal	Psychomotor: Skills or Competence	Psychomotor: Behavior or Performance
Readings	+++	+	+	+	
Lectures	+++	+	+	+	
Programmed learning	+++	++		+	
Discussion	++	++	+++	+	+
Reflection on experience			+++	+++	+++
feedback on Performance	+	++	++	+++	+++
Small group learning	++	++	++	+	+
Problem –Based learning	++	+++	+		+
Team – based learning	+++	+++	++	+	+
Learning Projects	+++	+++	+	+	+
Role Model		+	++	+	++
Demonstration	+	+	+	++	++
Role-Plays	+	+	++	+++	+
Artificial models and simulation	+	++	++	+++	+
Standardized Patients	+	++	++	+++	+
Real-life Experiences	+	++	++	+++	+++
Audio and Video review of learner Behavioral / environmental Interventions*	+		+	+	+++
OPD					+++
Ward round					+++
O.T operation Theater					+++

Note: blank recommended; + = appropriate in some cases usually as an adjunct to other method; ++ = good match ; +++ =excellent match (consensus rating by author and editor).

*Removal of barriers to performance; provision of resource that promote performance; reinforcement that promote performance

EVALUATION & ASSESSMENT STRATEGIES

Assessment

It will consist of action and professional growth oriented student-centered integrated assessment with an additional component of informal internal assessment, formative assessment and measurement-based summative assessment.

Student-Centered Integrated Assessment

It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate it, encourages students to 'own' the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

In the proposed curriculum, it will be based on:

- Self-Assessment by the student
- Peer Assessment
- Informal Internal Assessment by the Faculty

Self-Assessment by the Student

Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

Peer Assessment

The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to the prescribed guidelines and should be nonjudgmental in nature. This will enable students to become good mentors in future.

Informal Internal Assessment by the Faculty

There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.

It will include:

- a. Punctuality
- b. Ward work
- c. Monthly assessment (written tests to indicate particular areas of weaknesses)
- d. Participation in interactive sessions

Formative Assessment

Will help to improve the existing instructional methods and the curriculum in use

Feedback to the faculty by the students:

After every three months students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

Summative Assessment

It will be carried out at the end of the programme to empirically evaluate cognitive, psychomotor and affective domains in order to award diplomas for successful completion of courses.

RESEARCH WORK

A) Synopsis & Research Protocols

Every postgraduate candidate of MS / MD, M.Ph courses shall have to submit the Research Protocol Synopsis within six months of admission.

The synopsis shall not include research work for which a degree has already been conferred in this or any other University or DAI's (Degree Awarded Institutions).

The synopsis /Research Protocol shall be approved by the advanced Studies & research Board.

GUIDE LINES FOR SYNOPSIS WRITING

Synopsis is a short summarized document that focuses a briefed information of the research with conducting material & methods for post graduate residents to have scientific plan of work as to deliver inference & conclusion.

Components of a Synopsis

The following components should be provided in a synopsis of post graduate research projects.

1) Title Page or Page 1:

There should be the following information on the first page of synopsis.

- I. Title
- II. Name of the Student
- III. Name of Supervisor
- IV. Place of Work

A title page of the synopsis should include title of the research project, name of the student (with qualifications), name of the supervisor(s), place of work and date (month and year) of submission.

2) Topic

The topic for research should be selected carefully. It should be specific and worded to show the nature of work involved as far as possible.

3) Introduction

It should provide a brief description to introduce the area of the proposed research work.

- Why your project is important
- Where it is used? Applications
- What will you talk about
- Problems and shortcoming of their work
- How your work is different and better than others.

= Objectives

- Broad objectives as visualized to be achieved should be clearly outlined and these should be itemized. These objectives will indicated the major aspects of the study to be undertaken.

= Operational Definition:

- It is definition of a term specially telling how it will be measured examples:

Efficacy: These can be measured:

- I. Time taken in relief of symptoms which be pain, fever, cough, heartburn etc.
- II. Taking into account number of side effects.
- III. Time taken by complete recovery

Student is requirement to specify how he /she will measure efficacy.

= **Hypothesis:**

- A hypothesis is a statement showing expected relation between 2 variables. A hypothesis is needed in the following study designed:
- All interventional studies
- Cohort
- Case Control
- Compressive Cross Sectional

4) **Review of Literature**

- What other people had to say this topic(s) (be sure to cite your references, and quotes as appropriate)
- What other people did on this topic or related topics
- Student must study at least 10 original research papers before writing of synopsis.

5) **Materials and Methods**

A plan of work describing the various aspects of the study in a logical sequence along with the methodologies to be employed, are the most important aspects of any research plan.

Study design: Mention the name of the appropriate study design.

Setting: Name and place where the research work is to be conducted.

Duration of Study: How long will the study take with date

Sample Size: How to many patients will be included. If there are groups, How many per group?

Sampling Technique: Type of sampling technique

Sample Selection:

Inclusion Criteria: on what basis will patients be inducted in the study?

Exclusion Criteria: on what basis will patients be excluded from the study?

Date Collection Procedure: A detail account of hoe the researchers will perform research; how he / she will measure the variable.

It includes: Identification of the study variables

Methods of collection data

Data collection tools (proforma /questionnaire)

Data Analysis Procedure: relevant details naming software to be used, which descriptive statistics and which test of significance if and when required, specifying variables where it will be applied.

Outcomes of Utilization: Describe in which way the expected results of your study can be useful in designing and delivery of health care system.

6) **Place of Work and Facilities Available.**

In order to complete the proposed research some specialized facilities may be required. Therefore it is important to identify the place where the research work will be undertaken and whether the resources and facilities required for doing the research are available.

7) **References**

- ❖ Synopsis should contain at the end a list of references. All references in the text must be in and at the end must be in Vancouver style and number of citations should not be less than fifteen (15) out of which 5 references must be from book. References should include a number of books, list of articles published in research journals.
- ❖ Webpage do not count. Wikipedia is not appropriate.
- ❖ Cite the papers / Books that you used

Citation in Text:

- ❖ A number is allocated to a source in the order in which it is cited in the text. If the source is referred again, the same number is used.
- ❖ Use Arabic numerals (1,2,3,4,5,6,7,8,9)

Reference at the end:

In Vancouver style.

Examples:

Journal: AuthorAA, Author BB, Author CC, Author DD. Title of article, Abbreviated title of journal. Date of publication YYYY month; volume number (issue number): page number

****Petitti DB, Crooks VC, Buckwalter JG, Chiu V. Blood pressure levels before dementia. Arch Neurol. 2005 jan; 62(1):112-6.**

Book: Author AA, Title of book. # edition [if not first]. Place of publication: Publisher; year of publication, Page number

****Carlson BM. Human embryology and developmental biology. 4th ed. St. Louis: Mosby; 2009 541 p.**

it will be difficult to define an overall length for a synopsis for the post graduates in such different field of study. Whereas it should be concise as far as possible and avoid repetitions, it should also provide sufficient details on the various aspects mentioned above to show that the research involved has been well understood and planned, and it is of an acceptable academic merit. The total length of synopsis may run from 1500 to a few thousand words.

Data Collection Instrument:

The researcher must attach, as an annex, the Performa or questionnaire with the help of which he / she intends to collect data. The Performa questionnaire must match the objectives and must not contain irrelevant section like inclusion and exclusion criteria etc.

Additional Requirement:

1: Font Shape: Time New Roman

2: Font Size

Main heading: 14 bold and underline

1st subheading: 12 bold

2nd subheading: 12 bold and italic

3: Line Space: 1.5

4: Paragraph Spacing: 0

5: Character Spacing: *Normal*

Research supervisors are requested to make sure that the synopsis submitted by their research students follows the format of warning the synopsis.

6: Margins:

At least 3.17-3.81cm on the left hand side, 2-2.54 cm at the top and bottom of the page and 1.27 – 1.90 cm at the outer edge. The best position for the page number is at top center.

A) The Thesis

The thesis submitted by MD / MS candidate shall comply with the following conditions.

- a) It shall form a distinct contribution to the knowledge and efforts evidence of originality, shown by the discovery new facts, by the exercise of independence critical judgment and / or by the invention of new methods of investigations.
- b) It shall be written in English and the presentation shall must be satisfactory for publication. Thesis will go through plagiarism software before forwarding to the experts for approval.
- c) Any part of thesis which has been published by the submission of the thesis may be appended at the end of the thesis.
- d) The thesis shall be typed on A4 size (11.69” x 8.27”) paper width margins of 1 – ½” on the left and 1 “to the right, top and bottom of each page. The thesis shall be hard bound with the black cloth cover and golden lettering on the front and the back.
- e) The thesis shall be a bound volume of minimum of 100 pages and not exceeding 150 pages of types matter (Double line spacing and on one side only) excluding certification, acknowledgements.

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 final theoretical and clinical / practical examination.

The thesis shall be a bound volume of a minimum of 100 pages and not exceeding 150 pages of typed matter (Double line spacing and on one side only) excluding certification, acknowledgements,

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) References

Four copies of thesis shall be submitted six months prior to the commencement of the final 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.

Examinations

I). MS – PART – I

1). All candidates admitted in MS Orthopaedics Surgery course must have passed Part-I examination.

2) The examination shall be held on biannual basis.

3) For Part-I examination the candidate must submit duly filled, prescribed Admission Form to the Controller of Examinations

4) The examination shall have two components:

- Paper-I BCQs Basic Science 100 Marks
- Paper-II BCQs Orthopaedics Surgery 100 Marks

5) Subjects shall be applied Basic Sciences (Anatomy, Physiology, Biochemistry, Pathology, Pharmacology), Behavioral Sciences and Biostatistics & Research Methodology and Orthopaedics Surgery (Basic principle's & specific)

6) The candidate must secure 60 marks in each paper to pass part – I examination

Applied Basic Sciences

Paper-I

- | | |
|---|-----------|
| 1. Anatomy | (30 BCQs) |
| 2. Physiology | (20 BCQs) |
| 3. Pathology | (20 BCQs) |
| 4. Biochemistry | (10 BCQs) |
| 5. Pharmacology | (10 BCQs) |
| 6. Behavioral Sciences | (05 BCQs) |
| 7. Biostatistics & Research Methodology | (05 BCQs) |

Paper-II (General Surgery)

- | | |
|--|----------|
| 01. Systemic Response to injury and Metabolic Support | (4 BCQs) |
| 02. Fluid and Electrolyte Management of the Surgical Patient | (3 BCQs) |
| 03. Haemostasis, Surgical Bleeding and Transfusion) | (4 BCQs) |
| 04. Shock | (3 BCQs) |
| 05. Surgical infections | (4 BCQs) |
| 06. Trauma | (3 BCQs) |

07. Burns	(3 BCQs)
08. Wound healing	(3 BCQs)
09. Skin and Subcutaneous Tissue	(3 BCQs)
10. Disorders of the Head and Neck	(2 BCQs)
11. Chest Wall, Lung, Mediastinum and Pleura	(2 BCQs)
12. Arterial Disease	(2 BCQs)
13. Venous and Lymphatic Disease	(3 BCQs)
14. Soft Tissue Sarcomas	(3 BCQs)
15. Inguinal Hernia	(3 BCQs)
16. Pediatric Surgery	(2 BCQs)
17. Urology	(3 BCQs)
18. Orthopedics	(30 BCQs)
19. General Surgery	(20 BCQs)

CONTENT OUTLINE

Part I MS Orthopaedics Surgery

Basic sciences:

Student is expected to acquire comprehensive knowledge of Anatomy, Physiology, Pathology, Biochemistry and Pharmacology relevant to surgical practice and basic common principles of Orthopaedics Surgery.

1. Anatomy

- Detailed Anatomy of the organ systems of body, their blood supply, nerve supply, lymphatic drainage and important gross relations to other organs as appropriate for surgical operations
- Developmental Anatomy and associated common congenital abnormalities
- Features of Surface, Imaging and Applied Anatomy within each organ system
- Relate knowledge to assessment of clinical situation or progress of disease condition

CARDIOVASCULAR:

- Embryogenesis of heart and major vessels, and formation of the lymphatic system
- Common anatomical variations of heart chambers, valves and major vessels
- Surgical anatomy of heart and major arteries + veins in thorax, neck, abdomen and groins

RESPIRATORY:

- Embryogenesis of trachea and bronchial tree
- Lung development
- Development and defects of diaphragm
- Common anatomical variations of respiratory tree and lungs to include vascular anomalies
- Surgical anatomy of pleura, lung and trachea and bronchial tree

GASTROINTESTINAL TRACT AND ABDOMINAL WALL:

- Embryogenesis of the GIT to include formation of the solid organs, anorectum, and abdominal wall
- Common anatomical variations in the formation of the GIT and abdominal wall
- Surgical anatomy of the GIT and its relations to other systems

RENAL:

- Embryogenesis of the upper and lower renal tract to include male and female genital development
- Common anatomical variations of the renal tract and genitalia

- Surgical anatomy of the renal tract, and associated genital structures to include relationships to other systems

NEUROLOGICAL:

- Embryogenesis of the brain and spinal cord, and of the supporting structures (skull, vertebral column)
- Common anatomical variations of the brain and spinal cord
- Surgical anatomy of the brain, spinal cord and major somatic nerves (to include relationships to other systems)

MUSCULO SKELETAL:

- Embryogenesis of the skeleton and muscle development
- Common anatomical variations of skeleton
- Surgical anatomy of skeleton where relevant to other systems

ENDOCRINE:

Development, defects and surgical anatomy of endocrine organs

2. Physiology

- Cellular organization, structure function correlations and physiological alterations in the organ systems of body
- Relate knowledge to assessment of clinical situation or progress of disease condition

FLUID BALANCE:

- Basic requirements of fluid and electrolytes at different ages
- Mechanisms of homeostasis
- Influence of disease states

-renal

-cardiac

-gastrointestinal

-trauma

- Mechanisms of homeostasis
- Abnormalities encountered in disease

ACID-BASE BALANCE:

- Basic requirements of fluid and electrolytes at different ages

- Mechanisms of homeostasis
- Influence of disease states

OXYGEN TRANSPORT:

- Airway function in health and disease
- Alveolar function and gas exchange
- Effect of disease
 - R.D.S.
 - Infection
 - Barotrauma
 - Prematurity

Effect of foetal circulation

GASTROINTESTINAL TRACT:

- Motility of different regions of gut
- Secretion and absorption
- Function of sphincter regions
 - Gastroesophageal junction
 - Pylorus
 - Ileocaecal region
 - Anorectum
- Defaecation and continence

HEPATOBIILIARY FUNCTION AND PANCREATIC FUNCTION:

- Metabolic and synthetic hepatic function
- Bile production and transport
- Exocrine pancreatic function
- Effect of disease on normal function

RENAL TRACT:

- Renal mechanisms for maintenance of homeostasis
- Effect of disease
- Bladder function and continence

- Transitional renal physiology in neonate and young child

GROWTH AND METABOLISM:

- Nutritional requirements at different ages
- Endocrine factors influencing growth

-thyroid

-pituitary

-pancreatic

-adrenal

-gonadal

- Effect of disease states including
 - chronic disease
 - trauma
 - response to operation
- Influence and use of parenteral and enteral feeding

AUTONOMIC NERVOUS SYSTEM:

- Differing effects of sympathetic and parasympathetic innervation
- Effects on differing physiological processes

3. Biochemistry

- ☐ Membrane biochemistry and signal transduction
- ☐ Gene expression and the synthesis of proteins
- ☐ Bioenergetics; fuel oxidation and the generation of ATP
- ☐ Carbohydrate metabolism
- ☐ Lipid metabolism
- ☐ Nitrogen metabolism
- ☐ Enzymes and biologic catalysis
- ☐ Tissue metabolism

Biotechnology and concepts of molecular biology with special emphasis on use of recombinant DNA techniques in medicine and the molecular biology of cancer

4. Pharmacology

- The Evolution of Medical Drugs
- British Pharmacopeia
- Introduction to Pharmacology
- Receptors
- Mechanisms of Drug Action
- Pharmacokinetics
- Pharmacokinetic Process
 - Absorption
 - Distribution
 - Metabolism
 - Desired Plasma Concentration
 - Volume of Distribution
 - Elimination
 - Elimination rate constant and half life
 - Creatinine Clearance
- Drug Effect
 - Beneficial Responses
 - Harmful Responses
 - Allergic Responses
- Drug Dependence, Addiction, Abuse and Tolerance
- Drug Interactions
- Dialysis
- Drug use in pregnancy and in children

5.Pathology

Pathological alterations at cellular and structural level

- Inflammation
- Wound healing
- Cellular injury

- Vascular disorders
- Disorders of growth, differentiation and morphogenesis
- Tumours
- Surgical immunology
- Surgical haematology

Microbiology:

- Surgically important microorganisms
- Sources of infection
- Asepsis and antisepsis
- Sterilization
- Antibiotics
- High risk patient management

IMM (INTERMEDIATE MODULE) EXAMINATION

IMM ASSESSMENT PROTOCOLS

After completion of first two years training in M.S / Orthopaedics Surgery, trainees have to go through midway / IMM / summative assessment examination, which is scheduled two times in March and October of each year. At the end of two years of training, every resident of M.S must be assessed internally by the concerned supervisor and be submitted secretly to Director PGMC. The internal assessment described below has a marked quantification, and resident must have to secure 20 marks as an eligibility requirement to sit in IMM examination. While there should not be zero marks in any component of this assessment .

A) The Internal Assessment also known as formative evaluation leads the mentor to identify not only the core qualities of intellectual leadership but also deficiencies of interest and hardworking in trainee towards proper learning goals and intervention and simultaneously encourages and drives the trainee to master the required skills and knowledge within stipulated time.

This internal assessment comprises 25 marks with following distribution.

i.	Synopsis (Submitted or Approved)	➔	5 marks
ii.	Workshops	➔	5 marks
iii.	Logbook	➔	5 marks
iv.	Behaviors	➔	2 marks
v.	Regularity	➔	3 marks
vi.	Surgical Skills (Emergency)	➔	5 marks
=====			
Total Marks		➔	25 marks

B) The MTA Examination Consists of Two Components.

- | | | |
|-----|-------------------------|-----------|
| i. | Theoretical examination | 200 marks |
| ii. | Practical examination | 200 marks |

I-Theoretical Examination also known as theoretical assessment is held with BCQ's and comprises.

- Paper-I with 100 BCQs as described in following format of M.S.

- =====

=====

All candidates admitted in MS Orthopaedics Surgery course shall appear in Part-II examination at the end of structured training program (end of 5th calendar year after having completion and approval of research work / thesis and clearing of MTA examination).

A) There shall be three Theory papers (paper 1 BCQ100 marks) and (paper 2 SEQ marks 100 and LEQ Marks 100) Total marks 300.

AND

B) There shall also be Practical/ Clinical examination of 300 marks.

Part II MS Orthopaedics Surgery

Clinical Examination

Total Marks: 300

Table of specification

Topics included in paper 1

01. Fundamental Concepts in Orthopaedics Surgery	(02 BCQS)
02. Osteotomies	(02 BCQS)
03. Bone Fixation	(02 BCQS)
04. Bone Graft	(02 BCQS)
05. Limb reconstruction	(02 BCQS)
06. Arthotomy	(02 BCQS)
07. Arthodesis	(02 BCQS)
08. Arthroplasties	(02 BCQS)
09. Micro Surgery and Limb Re-implantation	(02 BCQS)
10. Amputation	(02 BCQS)
11. Prothesis	(02 BCQS)
12. Implant Material	(02 BCQS)
13. Deformity Correction	(02 BCQS)
14. Orthopaedics Diagnosis	(02 BCQs)
15. Infection (Bone/Surgical/Skin/Soft Tissue)	(02 BCQs)
16. Rheumatic Disorders	(02 BCQs)
17. Crystal Deposition Disorders	(02 BCQs)
18. Osteoarthritis	(02 BCQs)
19. Osteo Necrosis and Related Disorder	(02 BCQs)
20. Metabolic and Endocrine Disorders	(02 BCQs)
21. Genetic Disorders	(02 BCQs)

22. Muscoskeletal Tumors	(02 BCQs)
23. Neuromuscular Disorders	(02 BCQs)
24. Peripheral Nerve Injuries	(02 BCQs)
25. Orthopaedics Procedures	(02 BCQs)
26. Pectoral Griddle and Shoulder	(02 BCQs)
27. Elbow	(02 BCQs)
28. Wrist	(02 BCQs)
29. Hand	(02 BCQs)
30. Back & Neck	(02 BCQs)
31. Hip	(02 BCQs)
32. Knee	(02 BCQs)
33. Ankle & Foot	(02 BCQs)
34. Management of Major Injuries	(02 BCQs)
35. Systemic response to injuries and metabolic support	(02 BCQs)
36. Fluid and electrolyte management	(02 BCQs)
37. Haemostatis, surgical bleeding and transfusion	(02 BCQs)
38. Shock	(02 BCQs)
39. Principle of fractures & Treatment	(02 BCQs)
40. Injuries of Upper arm, shoulder and elbow	(02 BCQs)
41. Injuries of forearm wrist and hand	(02 BCQs)
42. Injuries to pelvis and spine	(02 BCQs)
43. Injuries to Femur, hip and knee	(02 BCQs)
44. Injuries to Leg, ankle and foot	(02 BCQs)
45. General surgery	(02 BCQs)
46. Urology	(02 BCQs)
47. Plastic Surgery	(02 BCQs)
48. Neuro Surgery	(02 BCQs)
49. Radiology	(02 BCQs)
50. Vascular Surgery and Disease	(02 BCQs)

Components of Part II Examination

Theory

Paper I

100 Marks

3 Hours	100 BCQs
Paper II	<u>100 Marks</u>
3 Hours	10 SEQs (No Choice)
Paper III	<u>100 Marks</u>
3 Hours	04 LEQs (No Choice)

Only those candidates who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.

A) TOACS	<u>100 Marks</u>
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10 interactive stations each carrying 10 marks of 7 minutes duration.

B) Long case	100 Marks
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C) 4 short cases	100 Marks
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Total	300 marks in
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Note A candidate should secure not less than 50% in each head viz theory papers and clinical examination (A B C) vis-a-vis 75 marks in each theory paper and 50 marks in TOACS , long case and short cases each.

Indeed the candidates are required to pass theory and practical/ clinical examination separately having secured not less than 60% marks cumulatively, to be declared SUCCESSFUL

**GENERAL INSTRUCTIONS (PLEASE READ THESE INSTRUCTIONS
CAREFULLY AND FOLLOW STRICTLY)**

- i. You will not be allowed entry in examination hall if you are late by more than 15 minutes.
- ii. You are not allowed to leave the Examination Hall within 1½ hour of the beginning of the examination.

- iii. You are not permitted to bring any printed material, hand written/photo copies and books. If brought, should be deposited in a designated place against a coupon, which will be provided by College staff.
 - iv. You are not permitted to bring any electronic communication device including cameras and Cellular phone. Such items if brought will not only be confiscated but you are liable for disciplinary action including exclusion from the examination.
 - v. All personal belongings such as hand bags, books etc. should be deposited in a designated piece against a coupon, which will be provided by College staff, LUMHS IS HOWEVER NOT RESPONSIBLE FOR ANY LOSS.
 - vi. Admit: Cards should be displayed around the neck during the examination.
 - vii. Consultations/communication in the hall, corridors or washrooms is strictly prohibited. Even looking in the direction of examination material of other candidates shall be construed as evidence of copying or and reported as irregular behavior.
 - viii. Smoking is strictly prohibited.
 - ix. You are required to maintain strict silence in the examination hall. Attention of the invigilator may be drawn by raising hand.
 - x. You are not allowed to leave the hall unescorted for washroom, which shall not be used until 1 ½ hours after the commencement of paper and 30 minutes before the completion of paper. Anybody using the facility during permissible time shall enter his/her Roll No. time in/out in a register kept for the purpose. STAY IN THE WASH ROOM BEYOND REASONABLE TIME WILL BE CONSTRUED AS USE OF UNFAIR MEANS.
 - xi. After the completion of paper, the candidate should hand over the ANSWER BOOKS to the concerned invigilator, who will give him/her an "EXIT PASS". This pass will be handed over at the exit gate. No re-entry is allowed.
 - xii. You are not allowed to ask any question about question papers.
- ANSWER BOOKS, STATIONERY, ETC.**
- i. CANDIDATES SHOULD NOTE THAT EACH ANSWER BOOK HAS PAGES WHICH ARE CONSIDERED ENOUGH FOR ANSWERING ONE QUESTION. NO EXTRA SHEETS ARE ALLOWED.
 - ii. Please do not write your roll number on places other than designated place to avoid being liable for disciplinary action.
 - iii. The candidates shall answer each question on a separate answer book, writing only on the ruled sides of the sheets.

- iv. The candidates must ensure, that the Roll No. & Question No. is written on each answer book.
- v. All answer books should be tagged together before handing them over to the invigilator.
- vi. Candidates shall bring their own pen for short answer questions.
- vii. It is the responsibility of the candidate to ensure that relevant question paper has been received by him/her. In case of any discrepancy, it is the responsibility of the candidate to inform the invigilator immediately and obtain to correct paper.

The candidates should note that any infringement of the Examination discipline will call for disciplinary action which may include debarring from the examination.

- viii. Please do not write any mark of identification on the answer sheet except for the roll number at the designated column.

DETAILED INSTRUCTIONS FOR CANDIDATES IN TOACS

1. Entry with admit card only.

The candidates must display their admit cards on their white coats throughout the examination.

2. Response sheet:

- Prior to entering the examination hall each candidate will be provided with a response sheet. Candidates must write their roll number on the response sheet before starting TOACS examination.
- The candidate will only carry his/her response sheet while rotating through the stations. No other papers will be allowed in the examination hall.

3. The candidate is not supposed to remove any document or material from any station.
4. Each station will carry equal weightage. Every station must be attempted.
5. A specified time will be allotted at each station which will be signaled by a bell.
6. Candidates are not allowed to bring mobile phones in the Examination Hall.

Conduct of Examination

1. The examination is in the form of a circuit. At the start the candidate would occupy the station allocated to him / her according to their roll numbers, and will move to the next station when the bell rings.
2. At these stations clear instructions would be written for performance of a task. The candidate is expected to read the instructions and act accordingly. On unobserved / static stations the

candidate will be presented with a clinical case, laboratory data, x-ray, ultrasound, CT scan, instrument, specimen etc. and will be asked to give written responses to questions asked.

In the observed / interactive stations the candidate will have to perform a procedure for example taking history, performing clinical examination, counseling, assembling an instrument etc. One examiner will be present at each such station who will either rate the performance of the candidate or ask questions testing the reasoning and problem-solving skills.

3. The performance of each candidate will be assessed by the examiners on a predetermined assessment form and the candidates will have to submit written responses to one-best /short answer questions in the response sheet.
4. Candidates will rotate through the stations in this way till they have completed the circuit. They will move only in one direction as displayed in the hall by arrow marks and will not be allowed to go back to the previous station.

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JAMSHORO

SAMPLE

BCQs

MS. Orthopaedics Surgery Part-II

SUBJECT: ORTHOPAEDICS

PAPER-I

- ALL QUESTIONS CARRY EQUAL TIME ALLOWED 03 HOURS MARKS
- TOTAL MARKS: 100

1. The most common direction for symptomatic herniation of cervical intervertebral disc is
 - A. Posteriorly
 - B. Posterolaterally
 - C. Anteriorly
 - D. Auterolaterally
 - E. Intraforaminally
2. The incidence of myelopathy in patients with spondylosis of the cervical spine is approximately
 - A. 5 %
 - B. 15%
 - C. 25%
 - D. 50%
 - E. 75%
3. The most frequent predictor of acute myelopathy in patients with spondylosis of the cervical spine is presence of
 - A. An unstable segment
 - B. A central soft disc herniation
 - C. A vascular malformation of the cord
 - D. A mid-cervical canal diameter of 17 to 20mm
 - E. A congenital vertebral anomaly

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JAMSHORO

SAMPLE

SEQs

MS. Orthopaedics Surgery Part-II

SUBJECT: ORTHOPAEDICS

PAPER-II

- ALL QUESTIONS CARRY EQUAL TIME ALLOWED 03 HOURS MARKS
- TOTAL MARKS: 100

1. A 15 years old boy present with pain and deformity of right ankle for the last two weeks. He is not able to put weight on right foot. He had such episodes 3-4 times in last two years. Clinically examination reveals pes plano-valgus deformity. Passive correction is very painful and cause 3-4 beats clonus in ankle.
 - A. What is your diagnosis and justify?
 - B. How would you treat him?
2. A 28 years female presents with low back pain radiating to right lower limb for three months duration. She complains of tightness of calf. No neurological deficits. X-ray lumbo-sacral spine reveals break in par-intraarticular is with displacement at L 4-5 level?
How will you manage this lady?

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JAMSHORO

SAMPLE

LEQs

MS. Orthopaedics Surgery Part-II

SUBJECT: ORTHOPAEDICS

PAPER-II

- ALL QUESTIONS CARRY EQUAL TIME ALLOWED 03 HOURS MARKS
- TOTAL MARKS: 100

1. A 28 years old male patient as sustained fracture of the mid shaft of the right humerus in a domestic fall.

On examination upper arm is swollen with wrist drop:

- a. How would you evaluate and treat this patient?
- b. Three month after non-operative treatment fracture has healed but he has still wrist drop. How would you evaluate and treat at this stage?
- c. What is difference between high radial nerve palsy and posterior interosseus nerve palsy?
- d. Nine months after injury EMG and nerve conduction studies show no recovery. What tendon transfers would be most helpful?

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MS ORTHOPAEDICS SURGERY Part-II

Four Short-Cases (100-Marks)

(Quantitative Comprehensive Clinical Assessment)

Seat No: _____

AREAS OF ASSESSMENT		MARKS	OBTAINED
Obtained information consent		20	
Used correct clinical methods			
Performed examination of the relevant system			
Gave correct findings		20	
Gave logical interpretations of findings		20	
Justifies diagnosis		20	
Differential Diagnosis			
Discussion		20	
Total		100	
Case-One	Case-Three		
Case- Two	Case-Four		
Examiner: 1	Examiner: 3		
Examiner:2	Examiner: 4		

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MS ORTHOPAEDICS SURGERY Part-II

One Long - Case (100-Marks)
(Quantitative Comprehensive Clinical Assessment)

Seat No: _____

History taking & Physical Examination	Total Marks	Obtained Marks
Combined clinical assessment by examiner 1&2	20	
-Introduce self to patient, listens patiently and attentively, is polite, obtains informed consent.		
- Asks necessary and relevant questions		
-Uses correct clinical methods is systemic and examines the patient as a whole.		
(including appropriate exposure and re-draping		
-Performs examination of relevant system in detail		
Presentation Skills	10	
Give Correct findings	10	
Give logical interpretation of findings	30	
Justifies diagnosis/DD	30	
Total	100	
Examiner – 1		
Examiner – 2		

RECOMMENDED BOOKS

ORTHOPAEDICS SURGERY:

Clinical:

- 1-An introduction to the symptoms and signs of surgical disease by Norman Browse
- 2-Macray's Clinical Examination & Treatment of Fracture
- 3-Handbook for Orthopaedics Examination

Theory:

- 4.R.J Last Anatomy
5. Apley's: System of Orthopaedics and Fractures by Louis Solomon
6. Campbell's Operative Orthopaedics Vol. 1, 2, & 4 by S.Terry Canale, James H Beaty.

OTHER REFERENCES FOR EXTRA READING:

7. AO Principles of Fracture Treatment by Richard E.
8. Essential Orthopaedics Principles and Practice by Manesh Kumar
9. Rockwood and green's Fractures in Adults & Children by Wolters Kluwer.
- 10.Bailey &Love Short Practice of Surgery by: H.Bailey & R.J.McNeil
11. Atlas of Anatomy by Anee M. Gilroy
12. Atlas of Orthopaedics Surgery, Latest Edition by Carter.
- 13.Mastery of Surgery by Nyhus and Baker.
- 14.Operative Orthopedics, Latest Edition by Campbell
- 15.Vascular Surgery, Latest Edition by Robert Rutherford (2 Volumes)
16. Plastic Surgery, Made Easy by by Prema Dhanraj.
17. Radiology & Imaging by David Sulton

LOG BOOK

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MS examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed the indications for the procedure, any

complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

Proposed Format of Log Book is as follows:

Candidate's Name: _____

Roll No. _____

The above mentioned procedures shall be entered in the log book as per format.

Procedures Performed

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure Performed	Supervisor's Signature
1					
2					
3					
4					

Emergencies Handled

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Diagnosis	Procedure /Management	Supervisor's Signature
1					
2					
3					
4					

Case Presented

Sr.#	Date	Name of Patient, Age, Sex & Admission No.	Case Presented	Supervisor's Signature
1				
2				
3				

4				
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Seminar/Journal Club Presentation

Sr.#	Date	Topic	Supervisor's signature
1			
2			
3			
4			

Evaluation Record

(Excellent, Good, Adequate, Inadequate, Poor)

At the end of the rotation, each faculty member will provide an evaluation of the clinical performance of the fellow.

Sr.#	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Supervisor's Signature
1				
2				
3				
4				



FINAL TRANSCRIPT OF M.S (ORTHOPAEDICS SURGERY)



Name of Student_____

Father's Name_____

Date of Birth_____

Enrollment No_____

Type of enrollment: (Full Time)_____

PMDC No:_____

Date of Admission into Degree program _____

Date of completion of Degree course _____

DURATION AND SCHEME OF COURSE (TRANSCRIPT).

EXIT



DURATION MS (Ortho) FIVE (5) YEARS			
Phase-I [Two(2) Years]		Phase-II [Three(3) Years]	
Introduction to Basic Concepts and Techniques in Orthopaedic Surgery and Traumatology		Adult Orthopaedics Objectives 1. Trauma 2. Hand 3. Neuromuscular 4. Joints 5. Tumor 6. Infection 7. Spine 8. Foot & Ankle 9. Amputation, Prosthetics & Orthotics 10. Sports Medicine 11. Pain 12. Workshops Paediatric Orthopaedics Objectives 1. Criteria for Acceptable Performance 2. General Affections of Bones 3. Infections of Bones & Joints 4. Affections of Joints 5. Affections of Nervous System 6. Affections of Muscle 7. Congenital Disorders of the Upper Limb 8. The Lower Limb 9. Traumatic Disorders 10. Miscellaneous Congenital Disorders	Elective Rotations not more than 6 months Into other unit or departments of Orthopaedics in other City The professors/HOD may arrange suitable rotations
Rotations <u>During first two years the candidate must spend at least one year in General Surgery and allied surgical specialties, depending upon their availability in the Hospital of training</u> 1. General Surgery 2. ICU 3. Plastic Surgery 4. Vascular Surgery 5. Neurosurgery 6. Radiology 7. Orthotics Prosthetics		Log Book, Assignments, Assessments	
Research Methodology and Biostatistics (Submission of Research Synopsis / Protocol before end of year -1)		Traumatology	
Principles of Surgery		Research (Thesis Submitted, six months before Final Examination)	
Applied Basic Science Education		→	

			8. Physiotherapy				FINAL EVALUAT-ION
							INTERM- EDIATE EVALUAT-ION

Year Wise Structured Training of Subject

1 st Year	% Attendance	Internal assessment
• History taking and case presentation • Principles of application of traction • Principles and technique of manipulation of fractures and application of Back slabs plaster casts • implant prescription • OT sterilization techniques • Debridement, soft tissue handling and suture techniques • Intra articular injections A thorough understanding of the following principles of medicine will be acquired during this year of training: • Infections of surgical importance • Fluid, electrolytes and acid-base balance • Physiologic monitoring of the surgical patient • Bleeding haemostasis and transfusion • Body response to • Trauma • Wound healing and special healing (bones, tendons) • Specific organ responses • Endocrine and metabolic responses • Burns • Shock • Sepsis • Principles of treatment ➤ Wound care ➤ Shock ➤ Burns ➤ Infection ➤ Trauma ➤ Nutrition		

• Oncology: ➤ Diagnosis and staging ➤ Principles of radiation therapy ➤ Immunotherapy & chemotherapy ➤ Transplantation and rejection • Completion of Synopsis • Workshops • <u>ORTHOPEDIC TECHNOLOGY</u>(Physiotherapy, Orthotics and Prosthetics) ➤ Principles of physiotherapy ➤ Principles of assessment of physical disability. ➤ Materials used in Orthotics and Prosthetics. ➤ Preparation of stump for prosthesis. ➤ Gait Training for paraplegics. ➤ Prescribing prosthetics and orthotics. ➤ Different types of walking aids ➤ Wheel chair		
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2 nd Year	% Attendance	Internal Assessment
Rotations ➤ General Surgery 6 Months (Major Rotation) • Tracheal Intubation • Needle and chest tube insertion • Peripheral venous cut down • Sub-clavical and internal jugular puncture • Needle pericardiocentesis • Application and removal of pneumatic anti-shock garments • Peritoneal lavage • Chest wall/ Thoracotomy		

• Non-operative management of major intra-abdominal injuries & potential complication and indication for emergency laparotomy ➤ ICU • To assess infarct, cardiac failure, arrhythmias & ECG interpretation. • Cardio pulmonary resuscitation (CPR) • Interpretation of blood gas analysis & its use in patient management • Common metabolic disorder • Electrolyte disorder & acid base imbalance. • Blood component therapy & Coagulopathy • Advance technique of monitoring ➤ Plastic Surgery • Principle of incision designing • Soft tissue handling • Method of skin closure • Skin graft • Skin flaps • Assessment of wound healing • Technical competence in split thickness skin grafting, local flaps & tendon repair • Introduction to or advancement of abilities in micro surgery ➤ Burn • Assessment and management of thermal burns including inhalation burns, Evaluation of the depth and extent of the burns, • Fluid and electrolyte management, • Antibiotics • Surgical principles. ➤ Neuro Surgery		
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Basic knowledge of the anatomy and physiology of the central and peripheral nervous system. ➤ Performance and interpretation of neurological examination. - Indications and limitations of non-invasive and invasive investigative techniques. ➤ Assessment and management of head injuries and appropriate differential diagnoses of altered level of consciousness. - Patho-anatomy, assessment and methods of investigation of injuries to the spinal cord, nerve roots. ➤ Management of injuries to the spinal cord, nerve roots and their prognosis. ➤ Assessment and management of spinal cord tumors, primary and secondary and tumor-like conditions. ➤ Assessment and management of degenerative disorders of the spinal cord and peripheral nervous system. ➤ Assessment and management of peripheral nerve injuries. • Radiology • Principles of general radiological interpretation. Principles of radiological investigation of trauma, indications and interpretation of specialized techniques (eg angiography, computerized tomography, arthrography). • Interpretation and pathophysiologic correlation of radiography of arthritic disorders, infection, tumors, metabolic and reactive disorders. Pediatric musculoskeletal radiology. • Techniques and interpretation of radiological investigation of spine injuries and disorders including myelography, computerized tomography and MRI if available. • Principles of isotope scanning (Nuclear Medicine) and ultrasonography. ➤ Vascular Surgery		
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• Assessment and management of vascular injuries of limbs • (two month for each department any of three minor rotation) ➤ Complete all Workshops.		
3 rd &4 th Year		
This year emphasis will be laid on the following areas: • Close treatment of dislocations of the shoulder, hip; elbow, small joints of hand and foot, fractures of tibia fibula, humerus, radius and ulna • External fixation of fractures of the upper and lower limbs • Skin grafting • Biopsy • Bone grafting • I/M nailing of long bones • Plating long bones • Surgery in PPRD and CP like tendon elongations/transfers etc. • Amputation		
5 th (Final) Year		
• Nerve repair • Tendon repair • Fixation of trochanteric and femoral neck fractures • Fixation of the lower end of femur, upper end of tibia, humerus, radius and ulna • Osteotomies • Arthrodesis • Emergency management of poly trauma • Paediatric Orthopaedics (CTEV, CDH, Contracture release etc.) • Tumour surgery including amputations • Hemiarthroplasty of the hip		

• Trainees will perform all types of regular surgeries as mentioned in the previous section and special emphasis will be laid on the following: • Hand surgery • Arthroscopy • Total joint replacements • Spine surgery • Bone tumors (limb salvage surgery) • Close nailing		
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Total Credit Hours

300 – 400

- **Workshops Attended**
- **No of Clinical Cases Presented in weekly meetings**
- **Log –Book/Surgeries Done Independently**

❖ Minor cases

Orientation of computer and internet	Yes	No
Research Methodology & medical writing	Yes	No
Communication Skills	Yes	No
Surgical Skills	Yes	No
Workshop- BLS,AVLS	Yes	No

❖ Major cases

- **Emergency Handles**
 - ❖ Minor cases
 - ❖ Major cases
- **Clinical Seminars & Conferences attended**
- **Research work**
- **Thesis Approval**

Total Credit Hours :

YES

Title

EXAMINATION:**A) MS part-I**

Paper-I (Basic Sciences)	Total Marks-100	Marks Obtained	Remarks
1. Anatomy (30 BCQs)			
2. Physiology (20 BCQs)			
3. Pathology (20 BCQs)			
4. Biochemistry (10 BCQs)			
5. Pharmacology (10 BCQs)			
6. Behavioral Sciences (05 BCQs)			
7. Biostatistics & Research Methodology (05 BCQs)			

Paper-II (Orthopaedics Surgery)	Total Marks-100	Marks Obtained	Remarks
1. Orthopaedics Diagnosis (03 BCQS)			
(3 BCQs)			
2. Infection (Bone/Surgical/Skin/Soft Tissue)(04 BCQS)			
(4BCQs)			
3. Rheumatic Disorders(02 BCQS)			

(2BCQs) 4.Crystal Deposition Disorders(02 BCQS) (2BCQs) 5. Osteoarthritis(02 BCQS) (2BCQs) 6.Osteo Necrosis and Related Disorder(3BCQs) 7.Metabolic and Endocrine Disorders(05 BCQS) (5BCQs) 8.Genetic Disorders (02 BCQS) (2BCQs) 9.Muscoskeletal(05 BCQS) (5BCQs) 10. Neuromuscular Disorders (02 BCQS)			
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(2BCQs) 11. Peripheral Nerve(03 BCQS)			
(3BCQs) 12.Orthopaedics Procedures (04 BCQS)			
(4BCQs) 13.Pectoral Griddle and Shoulder(02 BCQS)			
(2BCQs) 14.Elbow(03 BCQS)			
(3BCQs) 15.Wrist(03 BCQS)			

(3BCQs) 16.Hand (02 BCQS)			
(2BCQs) 17.Back & Neck(02 BCQS)			
(2BCQs) 18.Hip (03 BCQS)			
(3BCQs) 19.Knee (02 BCQS)			
(2BCQs) 20.Ankle & Foot(02 BCQS)			
(2BCQs)			

21.Management of Major Injuries(04 BCQS) (4BCQs) 22.Systemic response to injuries and metabolic support (2 BCQS) (2BCQs) 23.Fluid and electrolyte management (2BCQs) 24.Haemostatis, surgical bleeding and transfusion (2BCQs) 25.Shock (2BCQs) 26.Principle of fractures & Treatment(04 BCQS) (4BCQs) 27.Injuries of Upper arm, shoulder and elbow(03 BCQS) (3BCQs) 28.Injuries of forearm wrist and hand (03 BCQS) (3BCQs)			
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29.Injuries to pelvis and spine (03 BCQS) (3BCQs) 30.Injuries to Femur, hip and knee(03 BCQS) (3BCQs) 31.Injuries to Leg, ankle and foot(03 BCQS) (3BCQs) 32. General surgery(03 BCQS) (3BCQs) 33. Urology(02 BCQS) (2BCQs) 34. Plastic Surgery(02 BCQS)			
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(2BCQs) 35. Neuro Surgery(02 BCQS)			
(2BCQs) 36. Radiology(02 BCQS)			
(2BCQs) 37. Vascular Surgery and Disease(03 BCQS)			
(3BCQs)			
(02 BCQS)			

B) IMM ASSESSMENT:

I) Internal Assessment	Total Marks	Obtained Marks

Synopsis (Submitted or Approved	5 Marks	
Workshops	5 Marks	
Logbook	5 Marks	
Behaviors	2 Marks	
Regularity	3 Marks	
Surgical Skills (Emergency)	5 Marks	
Total Marks	25 Marks	

II) Theoretical Examination

Total Marks

**Obtained
Marks**

Paper-I BCQs

100

Paper-II BCQs

100

III) Practical

Total Marks

**Obtained
Marks**

TOACS

100

Total stations = 15

Static – 06

Observational - 04

Interactive – 05

C) Final MS Part – II

A) Theoretical

Paper – I BCQ	Total Marks100	Obtained Marks
Fundamental Concepts in Orthopaedics Surgery (04 BCQS)		
Osteotomies (02 BCQS)		
Bone Fixation (04 BCQS)		
Bone Graft (02 BCQS)		
Limb reconstruction (02 BCQS)		
Arthotomy (02 BCQS)		
Arthodesis (02 BCQS)		
Arthoplasties (02 BCQS)		
Micro Surgery and Limb Re-implantation(02 BCQS)		
Amputation (02 BCQS)		
Prothesis (02 BCQS)		
Complications (04 BCQS)		
Implant Material (02 BCQS)		
Deformity Correction (02 BCQS)		
General Orthopaedics (15 BCQS)		
Regional Orthopaedics (15 BCQS)		
Fracture and Joint Injuries (15 BCQS)		
General Surgery (02 BCQS)		
Anesthesia (02 BCQS)		
Neuro Surgery/Plastic Surgery(02 BCQS)		

Paper - II (SEQs)	Total Marks	Obtained Marks
	100	
Paper - II (LEQs)	100	

B) Practical

TOACS/OSCE (10)	Total Mark= 100	Marks Obtained=
SHORT CASES (04)	Total Mark= 100	Marks Obtained=
LONG CASE (01)	Total Mark= 100	Marks Obtained=

Total marks = 300

Marks Obtained =

FINAL REPORT: Passed in MS (Orthopaedics Surgery)

Performance Stages of MS Orthopaedic Surgery Trainees

1st Year Trainee – OBSERVER

Primary role is to observe, learn, and understand clinical workflows.

Develop professionalism, communication skills, and ethical practice.

Observe OPD, ward rounds, emergency, OT, and academic activities.

Perform history taking and examination under direct supervision.

Assist in basic procedures and maintain logbook.

Expected supervision: Direct supervision at all times.

2nd Year Trainee – ASSESSOR

Independently assess common orthopaedic cases before discussing with supervisor.

Interpret investigations and formulate differential diagnoses.

Assist as first assistant in common procedures.

Perform basic procedures under supervision.

Participate in case presentations, journal clubs, audits, and research.

Expected supervision: Direct to indirect supervision depending on complexity.

3rd & 4th Year Trainee – PERFORMER

Function as primary operator for common procedures under supervision.

Lead ward rounds and coordinate patient management.

Manage emergency and elective orthopaedic cases with increasing autonomy.

Teach junior trainees and medical students.

Demonstrate competence in decision-making, operative planning, and complication management.

Expected supervision: Indirect supervision for routine cases; direct supervision for complex cases.

5th Year Trainee – GUIDE

Lead the clinical team and supervise junior trainees.

Demonstrate consultant-level clinical reasoning under faculty oversight.

Perform advanced procedures and manage complex cases.

Mentor junior residents in clinical, operative, research, and professional development.

Lead morbidity & mortality meetings, audits, and quality improvement initiatives.

Prepare for independent consultant practice through leadership, teaching, and evidence-based decision making.

Expected supervision: Oversight with independent practice for appropriate cases.

Progression Framework

Specific Learning Outcomes

MS Orthopaedic Surgery (5-Year Program)

Cognitive Domain (Knowledge)

- Explain the anatomy, physiology, biomechanics, and pathology of the musculoskeletal system.
- Analyze orthopaedic trauma, congenital, inflammatory, infectious, metabolic, and neoplastic disorders.
- Differentiate orthopaedic conditions using clinical findings and investigations.
- Interpret radiographs, CT, MRI, ultrasound, bone scans, and laboratory investigations.
- Formulate differential diagnoses from history, examination, and investigations.
- Design evidence-based management plans for elective and emergency cases.
- Evaluate indications, contraindications, and complications of conservative and surgical treatments.
- Apply principles of fracture healing, fixation, bone grafting, and rehabilitation.
- Assess perioperative risks and implement patient safety measures.
- Critically appraise literature and integrate research evidence into practice.
- Explain biomechanics, implants, instrumentation, and surgical technology.
- Integrate multidisciplinary approaches into patient care.
- Evaluate ethical and legal issues in orthopaedic practice.
- Apply research methodology and scientific writing.

Psychomotor Domain (Skills)

- Obtain comprehensive orthopaedic history and perform musculoskeletal examination.
- Assess neurovascular status in trauma patients.
- Perform emergency trauma assessment using ATLS principles.
- Apply and remove splints, slabs, casts, and traction safely.
- Perform aspirations and intra-articular injections aseptically.
- Perform wound debridement, suturing, and open fracture management.
- Perform closed reduction of fractures and dislocations.
- Demonstrate proficiency in ORIF of common fractures.
- Apply external fixation devices appropriately.

Perform progressively complex orthopaedic procedures under supervision.

Perform fasciotomy, tendon repair, arthrotomy, arthroscopy, and selected reconstructions.

Manage perioperative care.

Interpret intraoperative imaging and use surgical instruments effectively.

Manage common complications including infection, non-union, malunion, and compartment syndrome.

Maintain accurate operative notes, records, and logbooks.

Affective Domain (Professionalism, Attitudes and Communication)

Demonstrate professionalism, honesty, integrity, and accountability.

Provide patient-centered care with empathy and respect.

Maintain confidentiality and obtain informed consent.

Communicate effectively with patients, families, and healthcare teams.

Respect cultural, religious, and social diversity.

Promote patient safety and quality improvement.

Accept feedback and engage in reflective practice.

Demonstrate leadership and teamwork.

Participate in teaching, journal clubs, seminars, and conferences.

Commit to lifelong learning and evidence-based practice.

Advocate ethical and efficient resource utilization.

Collaborate with multidisciplinary teams.

Maintain accurate documentation and continuity of care.

Uphold institutional and professional standards.

Integrated Program Learning Outcomes

Apply advanced orthopaedic knowledge to diagnose and manage musculoskeletal disorders.

Perform orthopaedic diagnostic and operative procedures safely and competently.

Demonstrate ethical practice, communication, leadership, research competency, and lifelong learning.

Chairman/Chairperson

Dean

Controller

Registrar

Vice Chancellor