

**NATIONAL MEDICAL COMMISSION**  
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**GUIDELINES FOR COMPETENCY  
BASED  
POSTGRADUATE TRAINING  
PROGRAMME FOR M.Ch. IN  
PEDIATRIC SURGERY**

# **GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR M.Ch. IN PEDIATRIC SURGERY**

## **1. PREAMBLE**

The aims and objectives of M.Ch. training should be to train candidates with knowledge in surgical sciences and an aptitude to care for neonates and children with specific knowledge, skills and attitudes in the specialty of Pediatric Surgery. The training should help him/her to function as a safe Pediatric surgeon, an independent clinical consultant, a medical teacher and conduct research studies.

## **2. SUBJECT SPECIFIC OBJECTIVES**

The aim of course is to produce Pediatric surgeons who are capable of setting a standard and demonstrate commensurate expertise in the field. The training should aim to facilitate the candidate's acquisition of a judicious mix of the three domains of learning that will be practiced ethically-

- Cognitive (knowledge),
- Psychomotor (practice) and
- Affective (communication).

### **2.1 Cognitive domain (Knowledge)**

- Understand the basic sciences (embryology, anatomy, physiology, biochemistry, pharmaco-therapeutics etc.) and principle of pediatric medical care as applicable to pediatric surgical practice.
- Be conversant with the embryology, etiology, pathophysiology, diagnosis and management of common neonatal and pediatric surgical problems - elective or emergency.
- **Group approach:** Recognize the role of multidisciplinary and interdisciplinary approach in the management of various pediatric surgical disorders so as to obtain relevant specialist consultation, where appropriate.
- **Research Methodology:** Basic knowledge of research methodology and bio-statistics; familiarity and participation in clinical and experimental research studies; involvement in scientific presentation and publication.

- Recognize the importance of family, society and socio-cultural environment in the treatment of the sick child.

## **2.2 Psychomotor domain(Practical)**

- Evaluate a patient thoroughly (history, clinical examination), order relevant investigations and interpret them to reach a diagnosis and plan of management.
- Plan and carry out simple investigations/ procedures (bedside, laboratory, radiology suite) independently.
- Provide Basic and Advanced Life Support services in emergencies e.g. NALS, PALS.
- Acquire familiarity with and provide critical care of surgical neonates and infants - airway support, ventilation, central vascular access etc.
- Prepare a patient for an elective/emergency surgery and provide specific post-operative care.
- Provide counseling to the patient and primary caretakers for the smooth dispensation of medical care.
- Acquire skills in routine ward procedures (e.g. bladder catheterization, wound dressings, peripheral vascular access, child restraint etc.).
- Acquire proficiency in prescribed minor and major operative procedures, and provide these, initially with assistance and later independently.
- Monitor the post-operative patient in the routine post-op ward / high dependency unit / and in the intensive care setting.
- Provide specific and relevant advice to the patient and family at discharge time for proper domiciliary care, hospital reporting in emergency and routine follow up.

## **2.3 Affective domain(Communication )**

- Develop and practice effective communication skills.
- Professionally interact and obtain relevant specialist/ancillary services' consultation where appropriate.
- While teaching others in a clinical care unit, ensure team work and establish a pediatric surgical unit.
- Establish effective communication with the caregivers of the patient including counseling and terminal care.

- **Medical Ethics and Human values:** The student will inculcate ethical principles in all aspects of pediatric surgical practice/research (professional honesty and integrity, humility, moderation, informed consent, counseling, awareness of patients' rights and privileges, etc.).

### 3. SUBJECT SPECIFIC COMPETENCIES

#### 3.1 COGNITIVE (KNOWLEDGE) DOMAIN

##### 3.1.1 Competencies to be acquired in the cognitive domain (knowledge)

###### a. History and Physical

- Establish rapport with child and parent/guardian who has complete knowledge of the child and obtain comprehensive history,
- Perform a complete physical examination of relevant systems based on history,
- Should have knowledge of systemic examination in a child,
- Summarize history and physical examination results to arrive at a provisional diagnosis with other differential diagnosis in order of possibility and communicate the same to the team members.

###### b. Evaluation and Management

- List out and order appropriate investigations towards arriving at a final diagnosis or narrowing the list of differential diagnosis. Prioritize emergency and routine investigations,
- Should know to interpret the results of the investigations ordered, including acceptable normal variations and confirm a working diagnosis,
- Plan management based on the final diagnosis arrived at,
- Communicate effectively the diagnosis, plan of management and possible outcomes to the parents/ caretakers,
- Communicate clearly the investigation results, plan of management to the team justifying the same,
- Should be able to recognise abnormal results and reports and prioritise those requiring immediate response,
- Train and mentor junior team members.

###### c. Documentation

- Should be able to systematically document case history, examination findings, summarize management plan based on investigations and clinical examination,
- Uses the electronic record when available to keep the team informed of progress,

- Flow chart of management with orders which are clear and understandable by juniors,
- Should be able to write appropriate cross departmental referrals,
- Should be able to write lucid discharge summaries chronicling the admission, evaluation, management and post-operative course in the hospital with clear instructions regarding medications on discharge and follow up.

d. Communication

- Communicates the diagnosis, plan of management clearly to parents/guardians,
- Communicates orally and by documentation to junior healthcare workers the treatment plan,
- Communicates appropriately while handing over to maintain uninterrupted care of patient,
- Obtain informed consent for surgery and procedures after explaining alternatives to the parents,

e. Team work.

- Should work as an active member of the professional team
- Should accept responsibilities and carry them out effectively
- Should ask for help from team members when needed and should be willing to help when asked for
- Should be actively involved in patient care and follow up

f. Others.

- Have empathy for patients and parents/guardians,
- Incorporates all the four pillars of medical ethics and practise them diligently,
- Recognizes medico-legal issues, patient confidentiality and other regulations pertaining to medical practice,
- Conceptualises and carries out research incorporating the principles of Good Clinical practices,
- Teach relevant aspects of Pediatric surgery to resident doctors, junior colleagues, nursing, and para-medical staff,
- Understand factors for hospital infection and take appropriate universal precautions to prevent hospital infection,
- Should be well versed in the administrative functioning of the department and the ward including the staffing requirements, procurement and maintenance of electro-medical equipment,

### **3.1.2 Competencies to be acquired in basic sciences applicable to Pediatric Surgery:**

- a) Genetic basis of disease
- b) Molecular biology applicable to congenital anomalies
- c) Fetus as a patient
  - Antenatal diagnostic tools
  - Antenatal prognosticators
  - Fetal interventions
- d) Normal and anomalous embryogenesis of all systems:
  - Gastrointestinal tract
  - Hepatobiliary and pancreas
  - Respiratory system including diaphragm and related Cardiovascular system
  - Genito-urinary tract, including descent of testes, sexual differentiation.
  - Lymphatic system
  - Face and neck including lip, palate, branchial and thyroglossal apparatus
  - Abdominal wall, umbilicus and inguinal canal
  - Central nervous system and spine
- e) Surgical anatomy of all above mentioned systems
- f) Physiology and biochemistry
  - Physiology of fetus and newborn including transition from former to latter
  - Gastrointestinal physiology including deglutition, esophageal motility, antireflux mechanism, intestinal motility & defecation and neuroenteric regulation
  - Altered biochemistry in intestinal obstruction
  - Hepatic function including bilirubin metabolism.
  - Physiology of micturition and neurogenic regulation of same
  - Biochemical changes in obstructive uropathy and renal failure.
  - Cardiovascular physiology including fetal & neonatal cardiac function
  - Pulmonary physiology and basis of mechanical ventilation
  - Fluid and electrolyte balance.
  - Hemolytic disorders
  - Nutritional requirements in health and disease including parenteral nutrition.
  - Sexual differentiation including biochemical aspects in anomalous conditions.
  - Physiological changes during pre-operative and post-operative period and changes during different types of anesthesia and laparoscopic surgery

g) Microbiological principles governing:

- Pathophysiology of sepsis in neonates, infants and children, and inflammatory response,
- Maintenance of asepsis, sterility in newborn nursery, ward and operation theatre,
- Sterilization of surgical instruments including endoscopes & ventilators,
- Common surgical infections, including osteomyelitis and septic arthritis,
- Surgical tuberculosis including atypical mycobacterial infection,
- AIDS/HIV in Pediatric Surgery,
- Parasitic surgical conditions,
- Elements of immunology including its importance in organ transplantation & immunosuppression,
- Immunization and vaccination.

### **3.1.3 Competencies to be acquired in general patient care applicable to Pediatric Surgery**

- Basic and Advanced life support in Neonates and Pediatrics
- Basics of mechanical ventilation, different types of ventilatory support
- Different types of venous access, arterial access - monitoring
- Principles and types of physiological monitoring
- Transport and restraint of the sick child

### **3.1.4. Trauma**

#### **A. General principles of trauma**

Upon completion of this, the trainee should be able to describe & discuss:

- Epidemiology of Pediatric trauma
- Different types of trauma, presentation
- Acute care of trauma patients including immediate assessment, triaging, evaluation tools to be used, scoring systems and prognostications

#### **B. Systemic trauma**

Upon completion of this, the trainee should be able to describe & discuss the different types of trauma pertaining to, their management, indications for surgery, outcomes of :

- Head injury
- Thoracic injuries including airway, chest wall and mediastinum
- Abdominal injuries including blunt and penetrating, solid and hollow viscera, retroperitoneum

- Genitourinary trauma including kidney, ureter, bladder, urethra and genital organs
- Musculoskeletal and spine trauma
- Burns
- Child abuse
- Soft tissue and envenomation

### **3.1. 5 Pediatric Oncology**

#### **A. General principles**

Upon completion of this, the trainee should be able to describe & discuss:

- Genetic basis of tumours
- Tumour markers
- Principles and application of chemotherapy including toxicities of routinely used chemotherapeutic drugs
- Principles and application of radiotherapy including toxicities of routinely used radiotherapy
- Immuno-therapy
- Gene therapy and newer modalities of treatment
- Various evaluation modalities in Oncology

#### **B. Systemic oncology**

Upon completion of this, the trainee should be able to describe & discuss in detail the presentations, staging, prognostication, various treatment systems applicable to specific tumours:

- Wilms' tumour
- Neuroblastoma
- Liver tumours
- Rhabdomyosarcomas
- Germcell - tumours

Upon completion of this, the trainee should be able to describe & discuss an outline of the presentation and management of the following tumours:

- Common lymphomas and leukemias
- Common bone tumours
- Central nervous system tumours



### **3.1.6 Evaluation methods in Pediatric Surgery**

#### **A. Radiology**

Upon completion of this, the trainee should be able to describe & discuss the principles of, applications, pitfalls, modifications in specific situations, how to carryout various investigations and interpret:

1. X rays
2. Ultrasonography including Doppler
3. CT scan
4. Voiding Cystourethrography
5. Contrast upper and lower GI series
6. Intravenous pyelography
7. MRI
8. PET - CT scan

#### **B. Nuclear Medicine**

Upon completion of this, the trainee should be able to describe & discuss the principles of, applications, pitfalls, modifications in specific situations, how to carryout various investigations and interpret:

1. Renal Dynamic Diuretic Radionuclide scintigraphy with various isotopes like EC, MAG3, DTPA
2. Static Cortical renogram - DMSA
3. Direct Radionuclide Cystography (DRCG)
4. Hepatobiliary scintigraphy
5. MIBG scan
6. Lymphatic scintigraphy
7. Thyroid scintigraphy
8. Gastro-esophageal reflux scintigraphy
9. RBC blood pool scan
10. Technitium Meckel's scan
11. PET scan
12. Liver-Spleen scan
13. Bone scan

#### **C. Urodynamics**

Upon completion of this, the trainee should be able to describe & discuss the principles of, applications, pitfalls, modifications in specific situations, how to carryout various investigations and interpret:

1. Uroflowmetry

2. Cystometrogram
3. Video urodynamics

#### **D. Others**

Upon completion of this, the trainee should be able to describe & discuss the principles of, applications, pitfalls, modifications in specific situations, how to carryout various investigations and interpret:

1. 24 hour pH monitoring
2. Esophageal and anorectal manometry
3. Intracranial pressure monitoring
4. Basics of pathological biopsies, examination including frozen section immunohistochemistry

### **3.1.7 Transplantation**

Upon completion of this, the trainee should be able to describe & discuss:

1. Principles of transplantation including immunology and selection of recipients
2. Organ procurement and preservation
3. Outcomes including complications of transplantation
4. Immuno-suppression and its toxicities
5. Indications, preparation of recipient, techniques and post transplantation management and outcomes of the following:
  - a. Kidney transplantation and liver transplantation in detail
  - b. An outline of pancreatic transplantation, intestinal transplantation, bone marrow transplantation, heart & heart-lung transplantation

### **3.1.8 Regional and Special Pediatric Surgery**

At the end of the training, the student should be able to describe, discuss, analyse and present pathogenesis, clinical presentations, differential diagnosis, diagnostic approach, roles of specific diagnostic tools, interpretation of the test results, management options (both non-operative and surgical), indications for surgery, preparation for surgery, peri- and post-operative management, surgical steps, complications and their management, outcomes (short and long - term) of the various congenital and acquired pathologies in each system as below (elaborated in detailed in the syllabus sections):

- A: Head and Neck:  
B: Thorax:

- C: Abdomen:
- D: Genitourinary Tract
- E. Special Pediatric Surgery

### 3.1.9 Recent Advances

Upon completion of this, the trainee should be able to describe & discuss the advanced technology, its applications in diagnosis and treatment, complication and research options related to the fields outlined above. In addition, he must be conversant with:

- Minimal Access surgery of all areas including laparoscopy, thoracoscopy, ventriculoscopy, STEALTH and endoscopic surgeries, gastrointestinal endoscopy including ERCP (endoscopic retrograde cholangio-pancreatography), Bronchoscopy and Endourology.
- Robotics in Pediatric Surgery
- Use of newer energy sources in surgery including LASER, harmonic scalpel etc.
- Use of various types of staplers: Intestinal, Vascular, Endo GI etc.

### 3.2 AFFECTIVE DOMAIN (ATTITUDES AND VALUES)

The post graduate student should imbibe the following:

- **Group /Team approach:** function as a part of a team, co-operate with colleagues, and interact with the patient to provide the optimal medical care.
- **Ethical practice:** Abide by ethical principles in medical practice, maintain proper etiquette in dealings with patients, caretakers and other health personnel including due attention to the patient's right to information, consent and second opinion. Maintain professional integrity while dealing with patients, colleagues, seniors, pharmaceutical companies and equipment manufacturers.
- **Skills:** Preparation of oral presentation, medical documents, professional opinion in interaction with patients, caretakers, peers and paramedical staff – both for clinical care and medical teaching. Effective communication with the patient/caretakers regarding the nature and extent of disease, treatment options available and realistic outcome following optimal management is essential.

- During the course of three years the post graduate student is expected to attend instructive courses that facilitate proficiency relevant to this domain, eg., communication skills, biomedical ethics, patient counseling etc.

### **3.3 PSYCHOMOTOR DOMAIN (SKILLS)**

The trainee pursuing MCh. in Pediatric Surgery course must acquire the following evaluations and skills - procedural and non-procedural skills - in the management of surgical diseases of children -

#### **3.3.1. Clinical examination, outpatient and inpatient evaluation**

Upon completion of the course, the post graduate student should be able to perform the following:

- Assess the child patient with surgical problems by:
  - Eliciting pertinent history.
  - Performing correct physical examination.
  - Making a working diagnosis.
  - Determining the type of care that is appropriate – outpatient/ inpatient /daycare.
  - Initiate and institute life-saving emergency care, including CPR.
  - Requesting appropriate investigations and interpretation of their result.
  - Identify pre-operative and post-operative complications promptly and deal with them safely.
  - Document and maintain a record of patients systematically.
  - Seek professional help from other colleagues where needed.
  - Treat patients and their relatives with respect and empathy.
  - Able to counsel caretakers and the family of patient and obtain requisite consent for care.

#### **3.3.2 Radiological procedures**

Upon completion of the course, the post graduate student should be able to perform the following:

- Apply knowledge of imaging modality (USG,CT,MR) to investigate surgical diseases of childhood,
- Interpret the radiological images to correctly identify normal structures, abnormalities and pathology,

- Familiarity with conduct and interpretation of intra-operative imaging – radiography and ultrasonography,
- The postgraduate student should be able to perform certain investigative and therapeutic procedures in the radiology suite with due precautions -
  - Esophageal swallow
  - Upper GI contrast study
  - Contrast enema
  - Therapeutic contrast enemas in meconium ileus
  - Reduction of select idiopathic intussusception with radiological (air/contrast enema) or ultrasonography (hydrostatic)
  - Voiding cystourethrogram
  - Retrograde urethrogram
  - Antegrade studies through drainage tubes
  - Percutaneous drainage, biopsy

### **3.3.3 Physiological studies:**

The post graduate student should be able to perform a uroflowmetry and cytometry with standard precautions and interpret the results real time.

### **3.3.4 Operative procedures:**

This includes elective, semi-emergency and emergency procedures.

- Minor surgery
- Major surgery
- Endoscopic procedures
- Minimally invasive surgery

The actual numbers performed may vary according to the patient load of the training unit and related departments.

**At the end of his training period, the candidate must be able to PERFORM THE FOLLOWING PROCEDURES INDEPENDENTLY**

#### **General:**

- Peripheral and central venous access, chemoport and Hickman catheter placement
- Arterial line placement
- Wound debridement and suturing
- Incision and drainage of abscess
- Excision of superficial lesions of skin / subcutaneous planes

- Limb amputation
- Percutaneous/open tumor, viscera (e.g. liver ) and lymph node biopsy
- Skin grafting
- Fasciotomy
- Contracture release
- Muscle biopsy
- Nerve biopsy
- Umbilical vein cannulation
- Peritoneal dialysis catheter insertion
- Restraint of the sick child

### **Head and Neck:**

- Repair of cleft lip
- Repair of cleft palate
- Salivary duct / orifice dilatation
- Ranula - marsupialization
- Release of ankyloglossia
- Sistrunk's procedure
- Excision of branchial remnants
- Excision of superficial head and neck masses
- Sternomastoid muscle release
- Diagnostic laryngoscopy
- Esophagostomy
- Cricothyroidotomy
- Injection sclerotherapy of accessible vascular lesions
- Tracheostomy

### **Thorax:**

- Mastectomy
- Bronchoscopy - diagnostic, lavage
- Esophagoscopy - diagnostic
- Diagnostic thoracoscopy
- ICTD insertion
- Repair of eventration diaphragm
- Decortication
- Primary repair of TEF
- Diversion for TEF – esophagostomy, gastrostomy

### **Abdomen:**

- Exploratory laparotomy for acute abdomen
- Laparoscopy - diagnostic, therapeutic minor
- Gastrostomy,
- Fundoplication
- Pyloromyotomy
- Ladd's procedure
- Repair of cong. diaphragmatic hernia -Bochdalek, Morgagni

- Repair of eventration diaphragm
- Per op cholangiogram
- Cholecystectomy, cholecystostomy
- Cystogastrostomy, cystojejunostomy
- Surgery for Vitello-intestinal duct remnants
- Feeding tube jejunostomy
- Ileostomy, colostomy
- Surgery for meconium ileus
- Mesenteric cyst excision
- Appendectomy
- Appendicular abscess – drainage
- Bowel resection, anastomosis
- Secondary suturing (burst abdomen)
- Surgery for inguinal hernias and hydrocele, Umbilical hernia, Femoral hernia
- Rectal biopsy
- Anoplasty for low anorectal malformation
- Splenectomy

#### **Genitourinary**

- Cystoscopy - Diagnostic, stent removal
- Nephrostomy
- Suprapubic cystostomy
- Vesicostomy
- Urolithiasis- pyelolithotomy, cystolithotomy
- Meatotomy/meatoplasty
- Distal hypospadias repair
- Urethral fistula repair
- Urethral calibration / dilatation
- Circumcision, preputioplasty and dorsal slit, reduction of paraphimosis
- Orchidopexy- open
- Fowler Stephen Stage 1 (open, laparoscopic ) orchidopexy
- Exploration for torsion testes, orchidectomy

#### **Neurosurgery**

- Ventriculoperitoneal shunts.
- External ventricular drainage
- Repair of spina bifida

**At the end of his training period, the post graduate student must be able to PERFORM THE FOLLOWING PROCEDURES UNDER SENIOR SUPERVISION:**

#### **General**

- Vascular anastomosis
- HD catheter insertion

#### **Trauma:**

- Laparotomy for trauma

- Thoracotomy for trauma

#### **Head and Neck:**

- Salivary gland excision
- Excision of lymphatic malformations/ neck masses
- Thyroidectomy
- Repair of H-type TEF

#### **Thorax:**

- Bronchoscopy - foreign body extraction
- Esophagoscopy - foreign body extraction , dilatation
- Repair of Pectus Excavatum
- Repair of Pectum Carinatum
- Thoroscopic procedures, VATS for empyema
- Mediastinal mass excisions
- Pulmonary resection
- Esophageal replacement.

#### **Abdomen:**

- Abdominal wall defects - Silo construction
- Surgery for varicocele
- Orchidopexy- lap assisted
- Duodeno-duodenostomy
- Neonatal small bowel atresia – resection, anastomosis
- Laparoscopy - therapeutic, major
- Pull through for Hirschsprung disease
- Excision of duplication cyst
- Operations for necrotizing enterocolitis
- Anorectal myectomy
- Surgery for high anorectal malformation: PSARP, ASARP, AP Pull through etc.
- Colonic resections
- Kasai's portoenterostomy
- Operations for choledochal cyst
- Liver abscess drainage
- Operation for liver hydatid
- Hepatic resection
- Operation for portal hypertension
- Operation for pancreatic pseudocysts
- Pancreatic resection
- Pancreatico-enteric anastomosis
- Adrenalectomy

#### **Genitourinary**

- Nephrectomy Nephroureterectomy
- Partial nephrectomy
- Cystoscopy, fulguration of PUV
- Pyeloplasty
- Ureterocele incision



- Ureterostomy
- Ureteric reimplantation
- Urolithiasis - nephrolithotomy, ureterolithotomy
- Exstrophy repair (turn in)
- Bladder augmentation
- Mitrofanoff procedure
- Bladder neck repair
- Ureterosigmoidostomy
- Epispadias repair
- Colonic conduit
- Urethroplasty for Hypospadias
- Operation for intersex disorder
- Correction of penoscrotal transposition

### **Oncosurgery**

- Pediatric solid tumour surgery for Wilms' tumour, Neuroblastoma, Hepatoblastoma, Sacrococcygeal teratoma, Germ cell tumours, Thoracic tumours, Head & Neck tumours, Genitourinary tumours, Soft tissue tumours, Common bone tumours, Lymphomas

### **Neurosurgery**

- Repair of encephalocele
- Repair of occult spinal dysraphism

In addition to the above procedures, the student must be familiar with, prepared a patient for and should have witnessed procedures like:

- UGI endoscopy and variceal sclerotherapy / banding,
- Colonoscopy,
- Extracorporeal shock wave lithotripsy, Percutaneous nephrolithotomy.

## **4. SYLLABUS**

### **Course contents:**

#### **A. Cognitive domain**

The following is a broad outline of the syllabus:

#### **1. Basic sciences as applied to Pediatric Surgery**

- Medical genetics and gene therapy.
- Antenatal diagnosis and fetal intervention
- Developmental and transitional physiology of the respiratory, cardiovascular and renal systems

- Neonatal physiology and assessment of the surgical neonate.
- Neonatal sepsis
- Nutrition – enteral, parenteral
- Vascular access
- Principles of imaging (radiodiagnosis, nuclear) in Pediatric practice
- Pharmacology and use of common drugs , antibiotics and policy
- Pediatric analgesia and anaesthesia , critical care , mechanical ventilation
- General principles of Endoscopy and Minimal Access Surgery – fetoscopy, genitourinary endoscopy, tracheo-bronchoscopy, laparoscopy, thoracoscopy, robotic surgery
- Biomedical ethics and legal issues in Pediatric surgical practice.
- The organisation of a Pediatric Surgical unit
- HIV/AIDS in children
- National health policy-programs pertinent to Pediatric practice
- Telemedicine and telesurgery - principles , practice and limitations

## **2. Trauma**

- Birth trauma
- Pediatric trauma – general principles.
- Thoracic, abdominal, genitourinary, central nervous system trauma
- Soft tissue and envenomation injuries
- Musculoskeletal and vascular trauma
- Burns
- Child abuse.

## **3. Pediatric Oncology**

- General principles of oncology, radiotherapy and chemotherapy
- Wilms' tumor
- Neuroblastoma
- Liver tumours

- Rhabdomyosarcoma
- Germ cell tumours
- Other tumor of childhood (outline)-Leukemias, Lymphomas, Bone tumours, CNS tumours,
- Retinoblastoma

#### **4. Transplantation**

- General principles
- Kidney and liver transplantation
- Outline of other solid organ and bone marrow transplantation

#### **5. Head and Neck Disorders**

- Craniofacial anomalies
- Cleft lip and palate
- Disorders of the upper airway and oral cavity.
- Salivary glands
- Disorders of lymph nodes.
- Thyroid and parathyroid gland
- Cysts and sinuses of the neck
- Torticollis

#### **6. Thoracic Disorders**

- Congenital chest wall deformities.
- Disorders of the breast.
- Diaphragmatic hernia and eventration
- Mediastinal mass lesions.
- Endoscopy of the upper aerodigestive tract.
- Congenital tracheal and Bronchopulmonary/ foregut malformations
- Infective pleuro-pulmonary condition.
- Congenital oesophageal anomalies

- Oesophageal motility disorders ,achalasia cardia , gastro-esophageal reflux
- Oesophageal rupture, injury, stricture, perforation.
- Oesophageal replacement.

## **7. Abdominal Disorders**

- Umbilical disorders and abdominal wall defects.
- Inguinal hernias and hydroceles
- Testicular maldescent, torsion
- Hypertrophic pyloric stenosis.
- Duodenal atresia, annular pancreas.
- Jejunoileal atresia and stenosis
- Meconium ileus
- Meckel's diverticulum
- Intussusception.
- Disorder of midgut rotation.
- Short bowel syndrome
- Gastrointestinal endoscopy and laparoscopy.
- Gastrointestinal bleeding
- Gastrointestinal duplications.
- Mesenteric and omental cysts
- Ascites
- Polypoid disease of the GIT
- Necrotising enterocolitis.
- Intestinal stomas
- Primary peritonitis.
- Inflammatory bowel disease in children.
- Colonic atresia and functional obstruction.
- Appendicitis
- Hirschsprung disease, neuromuscular disorders of intestines
- Anorectal malformations.
- Congenital short colon /pouch colon

- Colonic and rectal tumours
- Neonatal/Infantile obstructive cholangiopathy
- Congenital biliary dilatation.
- Infective and inflammatory hepatobiliary disorders
- Benign liver tumours
- Portal hypertension
- Disorders of the pancreas
- Splenectomy and post-splenectomy sepsis.
- Adrenal gland.

## **8. Genitourinary and related disorders**

- Renal agenesis, dysplasia, cystic disease, ectopia
- Pelvic ureteral junction obstruction
- Vesicoureteric reflux
- Infective and inflammatory renal disorder.
- Pediatric urolithiasis
- Congenital ureteric anomalies.
- Prune belly syndrome
- Urinary diversion and undiversion, bladder augmentation
- Disorders of bladder function.
- Structural bladder disorders
- Exstrophy – epispadias complex
- Hypospadias.
- Anomalies of the external genitalia
- Disorders of Sex Differentiation
- Abnormalities of the female genital tract.

## **9. Miscellaneous Pediatric Surgical Disorders**

- Spina bifida
- Hydrocephalus
- Congenital heart disease

- Congenital orthopaedic deformities
- Amputation, bone and joint infections
- Conjoined twins
- Hemangiomas & vascular malformations.

## 5. TEACHING AND LEARNING METHODS

Teaching programs will need to be held on all working days (at least one hour per day)

Activities
Journal Club
Didactic lectures
Seminars/ Webinars
Hospital (Grand Rounds/Clinical meeting/Audit meet)
Clinical Case Presentation/ presentation to multidisciplinary tumour boards

### 5.1 TEACHING AND LEARNING METHODS

**General principles** - Acquisition of practical competencies being the cornerstone of post graduate medical education, PG training should be skills oriented. Learning in PG program should be essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort. The post graduate student should be given the responsibility of managing and caring for patients in a gradual manner under supervision.

**Formal teaching sessions:** This should include regular bedside case presentations and demonstrations, didactic lectures, seminars/Webinars, journal clubs, clinical meetings, and combined conferences with allied departments, Audit meet, clinical case presentation etc. as per sample schedule given below:

**Didactic Lectures by faculty:** In addition, lectures covering recent advances in all aspects of pediatric surgical conditions would be taken by faculty. All post graduate students will be required to attend these lectures.

Short term courses on the following basic and clinical aspects must be included:

- Research methodology and bio-statistics
- Laboratory medicine techniques/courses relevant to Pediatric Surgery
- Use of computers/ data science management in medicine,
- Bioethics, ethical issues involved in pediatric surgery
- Hospital waste management,
- Health economics.

**5.1.** The M.Ch. Pediatric Surgery training program will include two main arms:

**5.1.1.** Formal training and learning

**5.1.2.** Experiential learning

**5.1.1.** Formal training and learning will include the topics listed in the syllabus: The **modalities for formal training** will be as follows:

- 1. Seminars/Webinars:** To be held once a week and presented by the trainee under supervision of teaching faculty.
- 2. Journal Review:** To be held once a week under supervision of teaching faculty. It should include discussion on recent articles, which relate to various topics in Pediatric Surgery and allied disciplines.
- 3. Clinical Case presentation:** Representative clinical cases shall be presented and discussed in detail in presence of faculty.
- 4. Operative procedures:** This session, recommended once a month, aims at discussing common operative procedures and practical details.
- 5. Treatment Planning:** The trainee must discuss the planning of a given patient who is being worked up for surgery. The idea of this academic exercise is to familiarize the trainee with the objectives of planning in a given patient through group discussion/ multidisciplinary tumour boards based on evidence-based medicine.
- 6. Pediatric Radiology/Nuclear Medicine conferences** should be held once a week in which the radiological and nuclear medicine investigations of various cases are discussed in consultation with the faculty of Radiology and Nuclear Medicine.

7. **Clinical grand rounds:** A clinical grand round, involving presentation of unusual and difficult cases, is to be done by a post graduate student, once a week, in the presence of all the clinical staff belonging to the department of Pediatric surgery. The exercise is to develop the clinical acumen of the trainee.
8. **Clinico-pathological conference:** Special emphasis is made on the surgical pathology, histology review and autopsy discussions.
9. **Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar, is to be arranged as per need.
10. **Teaching and training responsibilities (Pedagogy skills):** A final year M.Ch. trainee should be entrusted with the responsibilities of teaching post graduate students of General Surgery and allied disciplines.
11. **Training in research methodology:** The purpose of the exercise is to impart proficiency in research methodology to the trainee. This would be a mandatory component of training. All M.Ch. trainees must complete research projects as per requirement of concerned Universities, under the supervision of a principal supervisor and appropriate number of co-supervisors which would enable the trainee to attain proficiency in collecting clinical / experimental data and analyze them in a scientific way using appropriate statistical methods.
12. **Attendance and presentation at academic meets:** The student must attend accredited scientific meetings (CME, symposia, and conferences) once or twice a year. He should present at least one poster or read one paper at a national/state conference in Pediatric Surgery or sub-speciality (Pediatric Urology, Pediatric Surgical Oncology etc.) during the second and third year of the training period.
13. **Research Publication (Research skills):** A student has to present one paper which is published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination. The research has to be done under the direct supervision of the supervisor or his associate(s). Through this exercise, the trainee would learn how to collect and analyze data, make observations in a scientific manner, and use appropriate statistical methodology. The trainee would learn the



art of putting the outcome of observations and results in an appropriate format of a scientific paper that is relevant to a particular journal.

- 14. Use of Skills lab stations:** The skills lab must facilitate training and acquisition of both common (e.g. endotracheal intubation, ICT drainage, Central line insertion) skills in real life situations and uncommon skills (laparoscopic suturing, cricothyroidotomy etc.) that the student may not encounter often.
- 15. Mortality and morbidity (Audit) meetings:** Departmental and interdepartmental / institutional

### 5.1.2. Experiential learning

Apart from routine postings in ward, OPD, operation theatre and speciality clinics, the M,Ch (Pediatric Surgery) trainee will be posted in the following allied specialities. The total duration of these postings shall not exceed three months. There is no specified compulsory posting in Emergency Medicine/Casualty; however, the student will attend the emergency cases pertaining to/referred to their department at the Emergency/ Casualty in the course of the routine clinical duties.

- 1. Pediatric Intensive Care Unit: Duration- 2-4 weeks.** This is intended to familiarize the student to the principles of pediatric medical intensive care and its applications to pediatric surgical care.
- 2. Neonatology Intensive Care Unit: Duration- 2-4 weeks.** During this posting, the candidate will receive training on care of the sick neonates, particularly premature and small for date.
- 3. Optional External Posting:** Other postings may be scheduled as deemed necessary for the fulfilment of curricular demands, e.g. Pediatric Oncology, etc. in the third year, in the same or in another tertiary teaching Centre/Institute. The posting in another institute may be for a special training that is currently not available at the home institute. It may be for 4-8 weeks with the prior approval of the Head of the Institution. Prescribed institutional regulations will be adhered to for such an external posting.
- 4. Administrative experience:** The final year post graduate student should be entrusted with administrative responsibilities including preparation of academic

programme, patient management, functioning of the ward and outpatient department. These may include:

- Admission of patients,
- Preparing the operation theatre lists,
- Improving the functioning in the ward through the supervisor,
- Preparing list of topics for teaching of junior trainees posted in the department,
- Organizing the posting of trainees in various work stations of the department as per the demand of the situation.

## **5. Log Book**

The trainees must maintain a log book of the work carried out by them and the training program undergone during the period of training including details of the surgical operations assisted or done independently. The log book should be checked and assessed periodically by the faculty members imparting the training.

**During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of skills laboratories in medical colleges is mandatory.**

## **6. ASSESSMENT**

**A. FORMATIVE ASSESSMENT** during the training includes:

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| • Personal attributes             | Ongoing after each clinical posting  |
| • Clinical skills and performance | -do-                                 |
| • Academic activities             | -do-                                 |
| • Theory assessment               | End of 1-, 2- and at 2years 9 months |
| • Practical assessment            | -do-                                 |

Clinical skills and performance, academic performance and personal attributes shall be graded on a scale of 1 to 5 (5 being the highest). The academic presentations shall be graded at the time of presentation by the faculty in-charge. Evaluation on clinical skills and personal

attributes etc. shall be done by the unit/department in-charge at the end of every semester. The student to be assessed periodically as per categories listed in post graduate student appraisal form (Annexure I).

**B. SUMMATIVE ASSESSMENT** at the end of the training will be as follows:

The **M.Ch. examination** shall be in two parts:

1. **Theory:** There shall be four theory papers as follows:

Paper I: Basic Sciences in Pediatric Surgery, Trauma, Transplantation

Paper II: Regional Pediatric Surgery (Head and Neck, Thorax),  
Pediatric Oncosurgery

Paper III: Regional Pediatric Surgery (Abdomen, Genitourinary)

Paper IV: Recent advances in Pediatric surgery

The theory examination shall be held in advance before the clinical and practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/practical/oral examination. The post graduate students for M.Ch in Pediatric surgery will be examined also in surgical procedures.

2. **Practical:** The practical examination should consist of the following and should be spread over two days, if the number of candidates appearing is more than one:

- a. Four cases from various sections of Pediatric surgery/subspecialities:  
History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
- b. Ward rounds comprising of discussion of practical problems in the management of pediatric patients undergoing surgery.
- c. Viva-voce examination
  - Instruments and operative procedures
  - Radiology and imaging
  - Surgical Pathology

- Thesis and logbook evaluation

3. Theory and Practical examination will be conducted as per University guidelines.

**Other recommendations:** Systematic and periodic formative assessment should be done every 6 months and feedback should be given to trainee.

**Recommended Reading:**

**Books (latest edition)**

1. Coran AG, Adzick NS, Krummel TM, Laberge JM, Shamberger RC, Caldamone AA. Pediatric Surgery, 7Ed: Elsevier - Health Sciences Division; 2012.
2. Holcomb GW, Murphy JP, Peter SD. Holcomb and Ashcraft's Pediatric Surgery, 7Ed: Elsevier; 2019.
3. Hutson JM, Brien MO, Woodward AA, Beasley SW. Jones Clinical Pediatric Surgery: Diagnosis and Management, 6Ed: Wiley-Blackwell; 2008.
4. Docimo SG, Canning D, Khoury A, Salle JLP. The Kelalis-King-Belman Textbook of Clinical Pediatric Urology, 6Ed: CRC Press; 2018.
5. Pizzo PA, Poplack DG, Adamson PC, Blaney SM, Helman L. Principles and Practice of Pediatric Oncology, 7Ed: Wolters Kluwer; 2016.
6. Davenport M, Spitz L, Coran A. Operative Pediatric Surgery, 7 Ed: CRC Press; 2013.
7. Holcomb GW, Rothenberg SS. Atlas of Pediatric Laparoscopy and Thoracoscopy, 2 Ed: Elsevier; 2021.
8. Eichenwald EC, Hansen AR, Stark AR, Martin C. Cloherty and Stark's Manual of Neonatal Care, 8Ed: Wolters Kluwer; 2017.
9. Kliegman RM, Stanton BMD, Geme JS, Schor NF. Nelson Textbook of Pediatrics: Elsevier Health Sciences, 21 Ed; 2019.
10. Farquharson M, Hollingshead J, Moran B. Farquharson's textbook of Operative General Surgery, 10 ed: CRC Press; 2015.
11. Gray SW, Skandalakis JE. Embryology for surgeons: the embryological basis for the treatment of congenital defects, 2 ed: Lipincott Williams and Wilkins; 1994.
12. Glover T, Mitchell K. An Introduction to Biostatistics, 3 ed: Waveland Press; 2015.

13. David L. Katz, Joann G. Elmore, Wild D, Sean C Lucan. Jekel's Epidemiology, Biostatistics, Preventive Medicine, and Public Health: Elsevier Health Sciences; 2013.
14. Coley BD. Caffey's Pediatric Diagnostic Imaging, 13 ed: Elsevier; 2018.
15. Husain AN, Dehner LP. Stocker and Dehner's Pediatric Pathology, 5 ed: LWW; 2021.
16. Holschneider AM, Hutson JM. Anorectal Malformations in Children: Embryology, Diagnostics, Surgical Treatment and Follow up: Springer, 2006.
17. Puri P. Newborn Surgery, 4 ed: CRC Press;2019.
18. Hadidi A, David MA. Hypospadias Surgery: An Illustrated Guide: Springer;2013.
19. Barry P, Morris K. Pediatric Intensive Care (Oxford Specialist Handbooks in Pediatrics), 1 ed: Oxford University Press; 2017.
20. Papandria DJ, Besner GE, Moss RL, Diefenbach KA. Operative Dictations in Pediatric Surgery, 1 ed: Springer; 2019.

## **Journals**

### **3-5 international and two national journals (all indexed).**

#### **Essential**

- Journal of Indian Association of Pediatric Surgeons
- Journal of Pediatric Surgery
- Pediatric Surgery International
- European Journal of Pediatric Surgery
- Journal of Pediatric Urology
- Seminars in Pediatric Surgery
- British Journal of Urology International Indian Pediatrics
- Indian Journal of Pediatrics

#### **Optional**

- The Journal of Pediatrics
- Pediatrics
- Pediatrics Clinics of North America
- Any other relevant journal pertaining to pediatric surgery

**Postgraduate Students Appraisal Form**  
**Clinical discipline**

**Name of the Department/Unit :**

**Name of the PG Student :**

**Period of Training : FROM.....TO.....**

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach activities / CMEs				
6.	Thesis / Research work				
7.	Log Book maintenance				

**Publications**

Yes/ No

Remarks\* \_\_\_\_\_

\*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

**SIGNATURE OF ASSESSEE**

**SIGNATURE OF CONSULTANT**

**SIGNATURE OF HOD**