

**CURRICULUM FOR COMPETENCY BASED
POSTGRADUATE TRAINING PROGRAMME
FOR
M.Ch. in TRAUMA SURGERY and CRITICAL CARE
(3-years course)**

1. GOAL

- The goal of this course is to produce trauma surgeons who are capable of demonstrating commensurate expertise in this field. The training programme will focus on to develop knowledge, skills, an aptitude and attitudes to be function as an independent trauma surgeon in a teaching/non-teaching hospital with confidence and competence to diagnose and manage trauma victims
- The candidate would also have acquainted with research methodology and acquire the ability to transfer knowledge and thus fulfil the function of a teacher.
- To know about ethical and legal aspects of trauma and critical patients

2. PROGRAM OUTCOMES

Upon completion of the M.Ch trauma Surgery program, the trainee shall be able to acquire certain subject specific competencies in the cognitive, psychomotor and affective domain.

1. Cognitive Domain	
Sr. No.	Competencies
1.1	Acquire comprehensive knowledge of the basics of trauma surgery including all allied specialties related to trauma surgery like Basic Anatomy, Physiology, Biochemistry, Pharmacology, pathology
1.2	To understand pathophysiology of Trauma and its implementation to the patients in terms of treatment
1.3	To learn principles of Emergent Trauma Care and to develop an organized approach to the assessment, resuscitation, stabilization and provision of definitive care for the trauma victim

1.4	To learn about the principles and practice of Advanced Trauma Life Support, Basic life support, Advanced cardiac life support, paediatric cardiac life support, Neonatal Life support and Advanced burn life support.
1.5	To learn a systems approach to trauma management that includes state-wide trauma systems and categorization of institutions and emergency department
1.6	To learn the principles of pre-hospital trauma care including the role of BLS and ALS ambulance services and air transport services
1.7	To learn about organization of an emergency room
1.8	To learn special considerations in the evaluation and management of the pregnant trauma victim.
1.9	To learn special considerations in the evaluation and management of the paediatric trauma victim
1.10	To learn special considerations in the evaluation and management of the geriatric trauma victim
1.11	To learn the principles of disaster management including Chemical, Biological, Radiological, Nuclear and Use of explosive (CBRNE)
1.12	To learn to recognize and treat immediate life and limb threatening injuries in the ED
1.13	Able to identify life threatening chest trauma – Tension Pneumothorax, Massive haemothorax.
1.14	To learn surgical methods of immediate chest decompression– Needle decompression, tube thoracostomy, finger thoracostomy and to its importance.
1.15	Able to Manage Open chest trauma – as three sided dressing in remote area and immediate chest drain placement in hospital setup.

1.16	Candidate should able to identify indications of thoracotomy – immediate inform to seniors (call for help) and activate trauma team
1.17	To learn the principles of management of patients with hemodynamic instability, multiple system organ failure, and complex coexisting medical problems: as applicable to trauma surgery practice.
1.18	Candidate should know lethal triad and its importance in management of trauma patients.
1.19	Candidate should aware of permissive hypotension, dilutional coagulopathy, hypothermia in trauma, trauma induced coagulopathy
1.20	To know massive transfusion protocol and its activation
1.21	Possess knowledge of the commonly used radio-imaging techniques like Plain X-ray, FAST / Ultrasound, CT, MRI various contrast radiographies and nuclear imaging techniques
1.22	To learn about research methodology and biostatistics and to participate in clinical and experimental research studies
1.23	Working knowledge of the sophisticated and routine equipment, consumables used in trauma surgery
1.24	Possess knowledge about recent advances in the subject of trauma surgery and all its allied specialties.
2. Psychomotor domain	
2.1	Diagnose and management of majority of the conditions in the speciality of trauma surgery on the basis of clinical assessment and appropriate investigations.
2.2	Demonstrate ability to establish priorities in the initial management of victims of life-threatening trauma.
2.3	Able to apply sound clinical judgment and rationale cost effective investigations for the diagnosis and management of trauma victims
2.4	Acquire skills in routine ward procedures (e.g. bladder catheterization, wound dressings, peripheral vascular access, central line insertion, intercostal drain etc.).

2.5	Acquire skills in the performance and interpretation of FAST and specific investigations such as contrast enhanced CT scan, CT or MR angiography, intraoperative x-rays
2.6	Demonstrate ability to perform the following procedures: oral and nasogastric intubation, venesection , insertion of large bore peripheral and central venous lines,, tube thoracostomy, local wound exploration, diagnostic peritoneal lavage, vessel ligation, repair of simple and complex lacerations, splinting of extremity fractures, and reduction and immobilization of joint dislocations, cricothyroidotomy, resuscitative thoracotomy, pericardiotomy, cardiography, aortic cross-clamping, and extensor tendon repair.
2.7	Demonstrate ability to coordinate consultants involved in the care of multiple trauma patients
2.8.	Prepare a patient for an elective/emergency surgery and provide specific post-operative care.
2.9	Demonstrate ability to arrange appropriate consultation of trauma patients in the ED.
2..20	Monitor the post-operative patient in the routine post-op ward /high dependency unit/ and in the intensive care setting.
2.21	Acquire proficiency in prescribed minor and major operative procedures, and provide these, initially with assistance and later independently.
2.22	Demonstrate ability to use and interpret imaging modalities in the evaluation of trauma patients.
2.23	Demonstrate ability to arrange appropriate disposition of trauma patients from the ED
2.24	Able to perform Damage Control surgery for major abdominal and thoracic injuries in clinically unstable patients.

2.25	Demonstrate skills in Advanced Trauma Life Support, Basic life support, advanced cardiac life support, paediatric cardiac life support, Neonatal Life support and advanced burn life support.
3. Affective Domain	
3.1	Develop and practice effective communication skills including consent taking
3.2	Professionally interact and obtain relevant specialist/ancillary services' consultation where appropriate.
3.3	Develop an ability to work in team
3.4	Inculcate ethical principles in all aspects of trauma surgical practice/research like professional honesty and integrity, humility, moderation, informed consent, counselling, awareness of patients' rights and privileges, etc.
3.5	Teach the Postgraduate Students: Surgery, Orthopaedic and Emergency Medicine
3.6	Organize specific teaching and training programmes for paramedical staff, associated professionals and patient education programmes.
3.7	Perform Clinical and Investigative studies and to present in Seminars, meetings and conferences etc.

3. ELIGIBILITY

M.S. General Surgery /traumatology from INI/NMC recognized Institute/ D.N.B General Surgery from recognised institute shall be the minimum qualification.

4. SELECTION OF CANDIDATES

The selection shall be through the INI Super speciality entrance test conducted by the competent authority.

5. DURATION OF TRAINING: 3 years.

6. SYLLABUS

Course contents:

6.1 Topics

6.1.1 Trauma overview

- Kinematics
- Epidemiology
- Injury Prevention
- Trauma Systems, Triage, and Transport
- Injury Severity Scoring, Modeling, and Outcomes Research
- Coding and Billing
- Critical Appraisal of Trauma Research
- Acute Care Surgery
- Genomics and Acute Care Surgery
- Pre-hospital Care
- Rural Trauma

6.1.2 Generalized approaches to the traumatized patient

- Disaster and Multiple/Mass Casualties
- Initial Assessment
- Management of the Airway
- Management of Shock
- Trauma-Induced Coagulopathy
- Resuscitative Thoracotomy
- Surgeon-Performed Ultrasound in Acute Care Surgery
- Diagnostic and Interventional Radiology
- Principles of Anesthesia and Pain Management in Trauma Patients
- Infections
- Brain
- Eye

- Face

6.1.3 Management of specific injuries

- Neck and Larynx
- Spinal Cord and Spine
- Trauma Thoracotomy: Principles and Techniques
- Chest Wall and Lung
- Trachea, Bronchi, and Oesophagus
- Heart and Thoracic Vessels
- Trauma Laparotomy: Principles and Techniques
- Diaphragm
- Liver and Biliary Tract
- Spleen
- Stomach and Small Bowel
- Duodenum and Pancreas
- Colon and Rectum
- Abdominal Vessels
- Pelvis
- Genitourinary Tract
- Trauma in Pregnancy
- Trauma Damage Control
- Upper Extremity
- Lower Extremity
- Peripheral Vessels
- Alcohol and Drugs
- Social Violence
- Paediatric Trauma
- Geriatric Trauma

6.1.4 Specific challenges in trauma

- Wounds, Bites, and Stings
- Burns and Radiation
- Temperature-Related Syndromes
- Modern Combat Casualty Care
- Organ Donation from Trauma Patients
- Rehabilitation
- Trauma, Medicine, and the Law

6.1.5 Management of complications after trauma

- Principles of Critical Care
- Cardiovascular Failure
- Respiratory Failure
- Gastrointestinal Failure
- Renal Failure
- Nutritional Support and Electrolyte Management
- Post injury Inflammation and Organ Dysfunction
- Trauma and Global Health

6.1.6 Recent Advances

- Minimal Access surgery of all areas including laparoscopy, thoracoscopy, endoscopic surgeries, gastrointestinal endoscopy and Bronchoscopy and
- Robotics in trauma Surgery
- Use of newer energy sources in surgery including LASER, harmonic scalpel CUSA etc.
- Use of various types of staplers: Intestinal, Vascular, Endo GI etc

6.2 Skills

6.2.1. Clinical examination and evaluation

Assess the Trauma patient by

- Eliciting pertinent history.
- Performing primary and secondary survey.
- Making a working diagnosis.
- Determining the type of care that is appropriate – outpatient/ Inpatient /day-care.
- 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.

6.2.2. Diagnostic modalities in Trauma Surgery

6.2.2.1. Radiological procedures

- Apply knowledge of imaging modality (X-ray USG, CT, MR) to investigate trauma patient
- Interpret the radiological images to correctly identify normal structures, abnormalities and pathology
- Familiarity with conduct and interpretation of intra-operative imaging like radiography and ultrasonography
- To perform certain investigative and therapeutic procedures in the radiology suite with due precautions:
 1. Oesophageal swallow
 2. Upper GI contrast study
 3. Voiding cystourethrogram
 4. Retrograde urethrogram
 5. Antegrade studies through drainage tubes
 6. Percutaneous drainage,

6.2.2.2.

CT Angiography in vascular injury

6.2.2.3. Others

1. 24 hour pH monitoring
2. Oesophageal and anorectal manometry

3. Intracranial pressure monitoring
4. Intraabdominal pressure monitoring

6.2.3. Surgical skills:

Quantum of Surgical Work

The operative work experience would be acquired through graded surgical responsibility including, history writing, investigation preoperative and postoperative management, initially assisting in operative work and later an independent operative work responsibility under supervision. All entries related to surgical work must be done in log book. The following number of surgical cases should be assisted /operated by each candidate during the training program:

- 1 Abdominal trauma cases/procedures: 50 to100
- 2 Extremity and vascular trauma surgical cases/procedures: 50 to100
3. Thoracic Trauma surgical cases/procedures: 50-100.
4. Damage control surgery 30-50
4. Urological trauma cases/procedures: 25-50
6. Cardiac trauma cases/procedures: 10-15
7. Plastic surgery cases/procedures: 25-30
8. Neurosurgical and spinal trauma cases/procedures: 25-30
9. Endoscopic procedures: 25-30
10. Laparoscopic procedures: 20-30

NOTE: The number of cases mentioned are merely guide lines and are desirable but not mandatory

6.3. Attitudes and Values

- 6.3.1. Communication skills, patient counselling and consent taking: Effective communication with the patient/caretakers regarding the nature and extent of injury, treatment options available and realistic outcome following optimal management is essential.
- 6.3.2. 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.
- 6.3.3. 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.

- 6.3.4. Maintain professional integrity while dealing with patients, colleagues, seniors, pharmaceutical companies and equipment manufacturers.
- 6.3.5. Preparation of oral presentation, medical documents, professional opinion in interaction with patients, caretakers, peers and paramedical staff – both for clinical care and medical teaching.

7. TEACHING- LEARNING METHODS:

Sr. No	Teaching/Learning Activity	Frequency
1.	Clinical Case presentation	Once a week
2.	Clinical grand rounds	Once a week
3.	Operative procedure planning and discussion	Once a week
4.	Journal Review	Once fortnight
5.	Seminars/Webinars	Once a month
6.	Radiology/Nuclear Medicine meet	Once a month
7.	Mortality and Morbidity meets	Once every 3 months
8.	Dissertation review	Once every 6 months
9.	Didactic Lectures by faculty	Once a week

8. DISSERTATION

Every student registered as post graduate shall carry out 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 dissertation. Work for writing the dissertation 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 advanced in medical science and the manner of identifying and consulting available literature. Dissertation will be done in accordance with institutional protocol.

Process to be completed within six months of admission to M.Ch. trauma surgery program:

Activity	July admission	January admission
Selection of topic in consultation with PG Guide	September /October	March /April
Approval by Department PG Committee		
Institute Scientific Committee approval	November / December	May / June
Institute Ethics Committee approval		
Final approval letter by Academics Section	31st December	30th June

9. LOG BOOK

The trainees will 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 will be checked and assessed periodically by the faculty members imparting the training.

10. ROTATIONAL POSTING

Apart from routine postings in ward, emergency ward, OPD, operation theatre and Speciality clinics, the M.Ch. (Trauma Surgery) trainee will be posted in the following Allied specialities

S.N.	Department	Duration (In Months) In Second year
1	Orthopaedics	03
2	Neurosurgery	03
3	Oral and Maxillofacial	01
4	Burns & Plastic	02
5	Critical Care unit SICU	02
6	Cardio-Thoracic and Vascular Surgery	01
Total duration (Months)		12

11. ASSESSMENT

11.1 Essential Pre-Requisite To Appear For Summative Assessment

1. 50% marks in research Methodology workshop
2. Minimum 80% attendance in each year of training.
3. Minimum of four satisfactory six monthly progress reports
4. Approval of Dissertation
5. Minimum one scientific paper/poster presentation at International / National / State trauma Surgery Conference
6. Minimum one research paper – published / accepted for publication / sent for publication in a peer-reviewed indexed scientific Journal.

11.2 Formative assessment:

Theory:

Time	Marks	Total
At end of first year (Paper I)	100	600
At end of second year (Paper II)	100	
Preliminary (4 Papers of 100 marks each)	400	

- Pattern for Paper I and Paper II: Marks: 100 Duration: 3 hours 10 questions of 10 marks each
- The Prelim Examination will be conducted in accordance with the pattern of the final examination for theory.

Practical:

Time	Marks	Total
At end of first year (Practical I)	100	700
At end of second year (Practical II)	100	
Preliminary	500	

- Pattern for Practical I and Practical II
 1. Long Case 50 marks
 2. Operative Procedure discussion :30 marks
 3. Radiology, 20 marks
- Pattern for Practical Examination (Preliminary)
 1. Long Case 100 marks
 2. Two Short cases 50 marks each
 3. Surgical demonstration 100 marks
 4. Ward round 100 marks
 5. Viva-voce 100 marks comprising of
 1. Radiology and Interventional imaging
 2. Instruments, tubes, catheters and Operative procedures
 3. Research Methodology

11.3 Six monthly progress report:

The progress of the PG student will be monitored with the help of a structured six monthly report. The report will contain details pertaining to attendance, teaching-learning activities, clinical duties, teaching assignments, practical work, marks obtained at intermediate examinations, papers / posters presented, research publications and progress of dissertation work. The performance of the student will be graded by the PG Guide and the Head of the Department.

Summative Assessment:

1. Theory: There shall be three theory papers as follows:

Paper I	Basic Sciences in trauma Surgery, Trauma,
Paper II	Trauma surgery (Thoracic and Abdominal Trauma)
Paper III	Trauma surgery (Head, Facial and Extremity Trauma)
Paper IV	Recent advances in trauma surgery

2. Practical: The practical examination should consist of the following

1.	Three cases from various sections of trauma surgery	History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
2	Ward rounds (4 cases)	Discussion of practical problems in the management of trauma patients undergoing surgery, communication skills and consent
3	Demonstration of Operative Procedure	Evaluation of surgical skill
4	Viva-voce examination	I. Instruments, tubes, catheters and Operative procedures II. Radiology and intervention radiology III. Research Methodology and logbook evaluation

12. Evaluation

SN	Assessment type	Marks allotted	Remark	Total Marks
1	Theory Papers (Four Papers)	100 marks each	Minimum pass marks 50% in each paper	400
2	Practical Examinations	500	Include clinical cases, operative demonstration, ward round and viva-voce	500

10. The Washington Manual of Critical Care
11. Grabb and Smith's Plastic Surgery
12. Orthopedic Traumatology: An Evidence-Based Approach

B. Journals

International

1. Journal of Trauma and Acute care surgery
2. Injury
3. Trauma
4. Trauma Case Report
5. European journal of Trauma And Emergency surgery
6. Acute care surgery
7. Journal of Trauma And Orthopaedic in rural practice
8. Journal of Traumatic brain injury
9. Wound

National

1. Indian journal of surgery
2. Indian journal of critical care
3. Journal of emergency trauma and shock
