CURRICULUM

FOR

M.S (NEUROSURGERY)

POST GRADUATE MEDICAL INSTITUTE

QUETTA

CONTENTS

Section -1

INTRODUCTION

University of Balochistan was established in 1970. The University awarded its first medical undergraduate Bachelor of Medicine and Bachelor of Surgery in 1977. The University of Balochistan is oldest and the most prestigious seat of learning in Balochistan.

The University runs courses of Undergraduate Education, Postgraduate Diploma Courses, Postgraduate diploma Courses in Faculty of Medicine.

The Postgraduate Medical Institute possesses all the relevant learning facilities like qualified and well trained faculty, teaching hospitals, libraries, lecture halls, Clinicopathological conference halls, laboratories, audiovisual aids, internet access, etc.

In this document Statutes and Regulations regarding the Scheme of the Course, eligibility criteria for admission to the course, details of training program, Syllabus, Specific Objectives of the training program, Research Thesis /Dissertation and format of examination of the Postgraduate degree course of M.S. (Neurosurgery) of the Post Graduate Medical Institute Quetta is presented.

Section -2

ADMISSION CRITERIA

REGULATIONS REGARDING ADMISSION FOR MS NEUROSURGERY COURSE

The requirements for Admission in Post Graduate Degree Programme in MS Neurosurgery are laid down by PGMIQ are as under:

ELIGIBILITY CRITERIA FOR ADMISSION.

1. MBBS from the University of Balochistan or equivalent recognized by PM&DC.
2. One year House job after graduation with six months compulsory in surgery and allied.
3. Only those doctors are eligible who are in the active service of Government of Balochistan for a minimum period of two years.
4. Selection through entry test and selection committee approval.

Section -3

AIMS AND OBJECTIVES OF THE COURSE.

AIM

The aim of four years MS Programme in Neurosurgery is to train residents to acquire the competency of a specialist in the field so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

GENERAL OBJECTIVES

1. That the student accepts Neurosurgery in its full sense as a life long activity and that he/she is prepared to invest time and effort to acquire, maintain and further improve his/her own knowledge and skills.

2. A critical appreciation of techniques, procedures carried out in Neurosurgery an understanding of scientific methods, reliability and validity of observations and the testing of hypothesis.

3. The ability and willingness to adopt a problem solving approach to mange clinical situations included in the definition of Neurosurgery.

4. The ability to plan and interpret a management program with due regards to the patients Comfort and economic factors.

5. His/ her awareness of the role of specialists of Neurosurgery in health / rehabilitation / welfare teams and his/ her willingness to work cooperatively within such teams.

6. The awareness that he/ she have to create his/ her own professional impact as a capable Specialist/ Teacher/ Scholar of Neurosurgery in the world.

7. To pursue and develop the basic scientific pursuits and guideline for scientific discoveries to strengthen knowledge further about human body requirements.

Section -4

TRAINING PROGRAM

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. Clinico-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.

Section -5

DURATION AND SCHEME OF THE COURSE

A summary of Four (04) Years Course in MS Neurosurgery is presented as under:

4 YEARS COURSE

PHASE-I (1st Year)	PHASE-II (3 Years)
• **Basic Training in Specialty of admission (10 Weeks)**	• **Advanced Professional Education in Neurosurgery**
• **Biostatistics & Research Methodology** • **Submission of Synopsis** **(04 Weeks)**	**Compulsory/Optional Rotation 06 Weeks Rotation in allied Surgical disciplines.**
• **Basic Training in Neurosurgery** • **Basic Sciences Theory Classes** (Anatomy, Physiology, Biochemistry, Pharmacology & Pathology relevant to the specialty) • **Approval of Synopsis** (**34 Weeks)**	• **Log Book, Research / Thesis (assignments, assessments)** Submission and approval of research Thesis / dissertation at least 06 Months before Part-II examination. • **Eligibility to appear in final** Examination is subject to approval of research thesis and completion of Log Book.
INTERMEDIATE EVALUATION (PART-I EXAM) ❖ **Written** **Two Papers For Part-1** The Part-I Examination will be held at the end of 1st Calendar Year. • **Principles of Neurosurgery** (100 MCQ Single Best Type) • **Basic Science Education** (100 MCQ Single Best Type)	**FINAL EVALUATION (PART-II EXAM)** ❖ **Written** **Four Papers For Part-II** Part-II Examination will be held at the end of 4th Calendar Year • **Neurosurgery Paper-A** (100 MCQ Single Best Type) • **Neurosurgery Paper-B** (100 MCQ Single Best Type) • **Neurosurgery Paper-A** (10 Short Essay Questions) • **Neurosurgery Paper-B** (10 Short Essay Questions) ❖ **Oral & Practical / Clinical Examination** • **Long Case 01** • **Short Cases 04** • **TOCS 10 Stations**

Section-6

SYLLABUS FOR M.S NEUROSURGERY.

Principles of Surgery:

- History of surgery
- Preparing a patient for surgery
- Principles of operative surgery: asepsis, sterilization and antiseptics
- Surgical infections and antibiotics
- Basic principles of anaesthesia and pain management
- Acute life support and critical care:
- Pathophysiology and management of shock
- Fluids and electrolyte balance/ acid base metabolism
- Haemostasis, blood transfusion
- Trauma: assessment of polytrauma, triage, basic and advanced trauma
- Accident and emergency surgery
- Wound healing and wound management
- Nutrition and metabolism
- Principles of burn management
- Principles of surgical oncology
- Principles of laparoscopy and endoscopy
- Organ transplantation
- Informed consent and medico-legal issues
- Molecular biology and genetics
- Operative procedures for common surgical manifestations e.g. cysts, sinuses, fistula, abscess, nodules, basic plastic and reconstructive surgery
- Principles of basic diagnostic and interventional radiography
- Principles and interpretation of conventional and advanced radiographic procedures

Common Surgical Skills

- Incision of skin and subcutaneous tissue:
  - o Langer's lines
  - o Healing mechanism
  - o Choice of instrument
  - o Safe practice

- **Closure of skin and subcutaneous tissue:**

- o Options for closure
- o Suture and needle choice
- o Safe practice

- **Knot tying:**
  - o Choice of material
  - o Single handed
  - o Double handed
  - o Superficial
  - o Deep

- **Tissue retraction:**
  - o Choice of instruments
  - o Placement of wound retractors
  - o Tissue forceps

- **Use of drains:**
  - o Indications
  - o Types
  - o Insertion
  - o Fixation
  - o Management/removal

- **Incision of skin and subcutaneous tissue:**
  - o Ability to use scalpel, diathermy and scissors

- **Closure of skin and subcutaneous tissue:**
  - o Accurate and tension free apposition of wound edges

- **Haemostasis:**
  - o Control of bleeding vessel (superficial) o Diathermy
  - o Suture ligation
  - o Tie ligation
  - o Clip application
  - o Plan investigations
  - o Clinical decision making
  - o Case work up and evaluation; risk management

- **Pre-operative assessment and management:**
  - o Cardiorespiratory physiology

- o Diabetes mellitus
- o Renal failure
- o Pathophysiology of blood loss
- o Pathophysiology of sepsis
- o Risk factors for surgery
- o Principles of day surgery
- o Management of comorbidity

- **Intraoperative care:**
  - o Safety in theatre
  - o Sharps safety
  - o Diathermy, laser use
  - o Infection risks
  - o Radiation use and risks
  - o Tourniquets
  - o Principles of local, regional and general anaesthesia

- **Post-operative care:**
  - o Monitoring of postoperative patient
  - o Postoperative analgesia
  - o Fluid and electrolyte management
  - o Detection of impending organ failure
  - o Initial management of organ failure
  - o Complications specific to particular operation
  - o Critical care

- **Blood products:**
  - o Components of blood
  - o Alternatives to use of blood products
  - o Management of the complications of blood product transfusion including children

- **Antibiotics:**
  - o Common pathogens in surgical patients
  - o Antibiotic sensitivities
  - o Antibiotic side-effects
  - o Principles of prophylaxis and treatment

- **Safely assess the multiply injured patient:**
  - o History and examination
  - o Investigation
  - o Resuscitation and early management

o Referral to appropriate surgical subspecialties

- **Technical Skills**
  o Central venous line insertion
  o Chest drain insertion
  o Diagnostic peritoneal lavage
  o Bleeding diathesis & corrective measures, e.g. warming, packing
  o Clotting mechanism; Effect of surgery and trauma on coagulation
  o Tests for thrombophilia and other disorders of coagulation
  o Methods of investigation for suspected thromboembolic disease
  o Anticoagulation, heparin and warfarin
  o Role of V/Q scanning, CT angiography and thrombolysis
  o Place of pulmonary embolectomy
  o Awareness of symptoms and signs associated with pulmonary embolism and DVT
  o Role of duplex scanning, venography and d-dimer measurement
  o Initiate and monitor treatment

- **Diagnosis and Management of Common Surgical Conditions:**
  - abdominal pain
  - Vomiting
  - Trauma
  - Groin conditions
  - Hydrocoele
  - Penile inflammatory conditions o Undescended testis
  - Acute scrotum
  - Abdominal wall pathologies
  - Urological conditions
  - Head / neck swellings
  - Intussusception
  - Abscess

Clinical component

Neuro-Trauma:

- Medical management of acutely raised intracranial pressure
- Indications for operation intervention including the use of pressure monitoring
- Principles, diagnosis and confirmation of brain death
- Principles of intensive care of head injured patients
- Principles of spinal stabilization and radiological assessment in head injury patients
- Role of neurological rehabilitation
- Clinical assessment of the multiply-injured patient.
- Neurological assessment of the head-injured patient including:
    - Assessment and categorization of impaired consciousness
    - Recognition and interpretation of focal neurological deficits
- Prioritization of clinical risk
- Interpretation of CT scans and plain radiology
  Accurate documentation
- Indications for ICP monitoring
- Insertion of ICP monitor
- Insertion of frontal subdural and intraparenchymal ICP monitors using a standard frontal burr hole and/or twist drill craniostomy
- Calibration, zeroing and interpretation of ICP traces
- Potential complications of the procedure
- Burr hole evacuation of chronic subdural haematoma
- Management of anti-platelet and anti-coagulant medication
- Neurological assessment of patients with a CSDH
- Interpretation of CT scans
- Post-operative assessment and management
- Performance of single and multiple frontal and parietal burr hole
- Craniotomy for supratentorial traumatic haematoma, in particular:
- Planning and siting of craniotomies for evacuation of extradural and subdural haematomas
- Handling the "tight" brain
- Achieving haemostasis in the coagulopathic patient
- Achieving haemostasis from the skull base and venous sinuses
- Elevation of compound depressed skull fracture with dural repair
- Delayed cranioplasty of skull vault
- Management of soft tissue trauma
- Indications for primary and secondary closure of wounds
- Indications for antibiotic prophylaxis
- Assessment of tissue perfusion and viability
- Wound exploration under local and general anaesthesia Wound debridement
- Arrest of scalp haemorrhage
- Layered closure of the scalp without tension Suturing technique
- Wound drainage and head bandaging
- Use of external mobilization including cervical collars and spinal boards

- Application of halo traction
- Application of a halo-body jacket
- The role of posttraumatic neurological rehabilitation

General Management of Hydrocephalus:

- The assessment and operative management of adult patients with communicating and non communicating hydrocephalus
- The assessment of children with hydrocephalus; emergency external ventricular drainage in children with acute hydrocephalus
- The insertion and revision of ventriculo-peritoneal, ventriculo-atrial
- and lumbo-peritoneal shunts; endoscopic third ventriculostomy
- Image-guided placement of ventricular catheters
- Management of neonatal post-haemorrhagic hydrocephalus

General Management of Subarachnoid Haemorrhage:

- Principles of resuscitation and timing of interventions.
- Indications for CT scanning, diagnostic lumbar punctuure, CT angiography and digital subtraction angiography.
- Principles of management of post-haemorrhagic hydrocephalus
- Indications for endovascular and surgical intervention
- Interpretation of CT scans including assessment of intracranial blood load, haematomas and hydrocephalus
- Basic interpretation of cerebral angiography
- Diagnostic & therapeutic lumbar puncture
- To undertake an atraumatic lumbar puncture
- Interpretation of basic microscopy and biochemistry
- Principles of spectrophotometry
- Management of delayed secondary ischaemia
- Principles governing the augmentation of cerebral blood flow
- Assessment of a deteriorating patient
- Recognition and management of secondary insults
- Interpretation of CT scans
- Management of hypervolaemic hypertension
- Insertion of central venous catheter
- Insertion of lumbar drain
- Insertion of external ventricular drain
- Management of post-haemorrhagic hydrocephalus
- Indications for external ventricular drainage and lumbar subarachnoid drainage
- Assessment of the unconscious and deteriorating SAH patient
- Interpretation of CT scans
- The management of hydrocephalus complicating intracranial
- haemorrhage, head injury and intracranial space occupying lesions;
- Insertion and taping of CSF reservoirs; insertion and maintenance of lumbar and ventricular drains
- External ventricular drainage, ventriculoperitoneal shunting, lumbar CSF drainage and shunting, ventriculo-cisternostomy

- Insertion of ventricular drain/access device

Neuro-Oncology:

- Craniotomy for superficial, lobar supratentorial intrinsic tumour. In particular:
  - Safe patient positioning
  - Planning and siting of craniotomy with and without image-guidance - Intra-operative management of raised ICP
  - Appropriate exposure of the tumour, using operating microscope as necessary
  - Safe use of fixed retractors
  - Precise use of suction, electro-coagulation and ultrasonic aspiration - Intracranial haemostasis
- Advanced surgical techniques including awake craniotomy; stereotactic craniotomy, intraoperative neurophysiological monitoring
- Advanced image guidance with integration of functional data; Intraoperative imaging techniques
- Use of intraoperative chemotherapy wafers
- Third ventriculostomy
- The management of low grade intrinsic tumours using advanced techniques
- The surgical approaches to tumours of the ventricular system and pineal gland including the transfrontal transventricular excision of intraventricular tumours and cysts
- Transcallosal transventricular excision of lesions of the third ventricle and foramen of Munro
- Indications for biopsy of intracranial tumours Risks of biopsy
- Principles of image-guided surgery
- Principles of radiosurgery and stereotactic radiotherapy and the indications for their use as adjunctive and/or primary treatment modalities.
- Indications for neuroimaging
- Image-guided frameless and/or frame-based stereotactic biopsy including Setting up a computer workstation and importing and interrogating image data
  - Positioning the patient and applying a cranial fixator
  - Obtaining and confirming accurate patient registration
  - Positioning and performing a suitable burr hole
  - Passage of biopsy probe and biopsy
  - Preparation of smear histology (when available)
- Management of raised intracranial pressure
- Principles of operative management
- Detection and management of post-operative complications e.g. cerebral swelling, intracranial haematomas and intracranial sepsis; the management of post-operative seizures
- Basic interpretation of CT and MRI scans

- Interpretation of CT and MRI scans and selection of biopsy targets

Assessment and Peri-Operative Management of Patients with Space Occupying Intraspinal Lesions:

- Assessment and perioperative management of patients presenting with acute spinal disorders e.g. cauda equina and spinal root compression
- General and basic surgical management of patients with malignant spinal cord compression
- The surgical management of degenerative spinal disorders e.g. lumbar compressive radiculopathies by lumbar microdiscectomy and associated microsurgical decompressions
- The surgical management of compressive cervical myeloradiculopathies
- Including the multi-disciplinary management of patients with intracranial neoplasia
- Extradural spinal biopsy and decompression by laminectomy in selected patients without segmental instability
- Instrumented posterior spinal stabilization The management of spinal shock
- The ward management of patients with spinal instability
- The detection and initial management of postoperative complications including compressing haematomas, CSF fistula and spinal sepsis
- The operative management of supra-tentorial intrinsic tumours
- The operative management of convexity meningiomas e.g. use of
- duraplasty and cranioplasty

CNS Sepsis:

- General management of CNS infections e.g. ventriculitis, cerebral abscess, subdural empyema and spinal epidural abscess
- The operative management of cerebral abscess by burr hole aspiration

Paediatric Neurosurgery:

All trainees will undertake at least a six month placement in a paediatric neurosurgery service under the direct supervision of paediatric neurosurgeons with a full-time or major commitment to paediatric surgery. The service must provide a comprehensive range of paediatric neurosurgical care. On completion of general paediatric training trainees will be competent to assess and undertake the emergency neurosurgical management of the critically-ill child with raised intracranial pressure. On completion of a special interest fellowship in paediatric neurosurgery trainees will be competent in all aspects of the non-operative neurosurgical management of children presenting with disorders of the nervous system. They will have detailed knowledge of the statutory framework governing the care of children, paediatric neurointensive care, the principles of paediatric neuro-rehabilitation and of the management of non-accidental injury. They will be competent to undertake all aspects of the emergency

neurosurgical operative care of children and to undertake a range of elective procedures in the following fields with appropriate supervision:

Paediatric Neuro-oncology:

- Stereotactic and image guided biopsy of paediatric tumours
- Endoscopic biopsy of third ventricular tumours
- Resection of supratentorial and infratentorial intrinsic tumours
- Approaches to suprasellar, third ventricular and pineal tumours
- Management of spinal cord tumours

Paediatric Head Injury:

- Decompressive craniectomy
- Cranioplasty
- Management of growing fractures
- Craniofacial reconstruction including the management of simple craniosynostosis, syndromic craniosynostosis, post-traumatic deformity
- Management of CSF fistulae

Paediatric Hydrocephalus:

- Assessment of the ill child with hydrocephalus, impaired consciousness and sepsis
- Differential diagnosis of shunt malfunction
- Interpretation of CT scans in shunted children
- Taping and draining from an Ommaya reservoir
- Taping a shunt
- External ventricular drainage

Spinal Dysraphism:

- Management of neonatal spina bifida, meningoceles and encephaloceles Spinal cord tethering syndromes
- Management of congenital and acquired spinal deformity e.g. syndromic
- spinal deformity and post-operative spinal deformity

Functional Neurosurgery:

Trainees with a special interest in functional neurosurgery will develop additional expertise as follows:

Surgical Management of Pain:

- Implantation of spinal cord stimulators
- Insertion of intrathecal drug delivery systems
- Ablative surgical treatment for pain including DREZ lesioning, cordotomy and myelotomy
- Neuromodulatory techniques including peripheral nerve, motor cortex and deep brain stimulation.
- Neurovascular compression syndromes: including microvascular decompression of the trigeminal nerve; microvascular decompression of the facial nerve; percutaneous trigeminal rhizotomy

Surgical Management of Spasticity:

- Medical and surgical treatments for spasticity

- Implantation of intrathecal drug delivery systems
- Other surgical treatments for spasticity including phenol blocks, neurectomies and rhizotomy.

Surgical Management of Epilepsy:

- Multidisciplinary assessment and preparation of patients for epilepsy surgery
- Stereotactic placement of depth electrodes and placement of subdural Electrode grids
- Temporal lobectomy
- Selective amygdalohippocampectomy
- Callosotomy
- Insertion of vagal nerve stimulators
- Hemispherectomy
- Multiple subpial transections

Surgical Management of Movement Disorders:

- Multidisciplinary assessment and management of patients with movement disorders e.g. Parkinson's disease and dystonia
- Selection, targeting and placement of deep brain stimulation electrodes
- Management of neuro-stimulators; radiofrequency lesioning

Neurovascular Surgery:

Special interest training will take place in units with extensive experience in the multi-disciplinary management of all common intracranial vascular disorders. Trainees with a special interest in neurovascular surgery will develop additional expertise in:

Intracranial Aneurysms:

- Surgical and endovascular strategies for the management of ruptured and un-ruptured intracranial aneurysms
- Surgical treatment of ruptured aneurysms of the anterior circulation
- Principles of microvascular reconstruction and bypass for complex aneurysms
- Intracranial Vascular Malformations:
- Surgical, endovascular and radiosurgical strategies for the management of arteriovenous malformations
- Surgical treatment of superficial cortical arteriovenous malformations Other Vascular Disorders:
- Surgical and endovascular treatment of dural arteriovenous fistulae Image-guided resection of cavernomas
- Management of primary intracerebral haematomas
- The management of venous occlusive disorders

- Medical, surgical and endovascular management of extracranial arterial occlusive disease

Skull-Base Surgery

Skull-Base and Craniofacial Surgical Access:

- Standard variations of fronto-basal, fronto-orbital, transzygomatic infratemporal, transtemporal, far-lateral,transphenoidal and transmaxillary approaches

Cranial Base Meningiomas:

- Resection of anterior fossa (olfactory groove and suprasellar) meningiomas; tentorial and petrous temporal meningiomas; petroclival meningiomas

Pituitary and Sellar Tumours:

- Microsurgical and endoscopic transphenoidal resection of pituitary tumours
- Pterional, subfrontal, interhemispheric and transventricular approaches to suprasellar tumours

Acoustic Neuromas:

- Retrosigmoid, translabyrinthine and middle fossa resection of acoustic neuromas

Other skull-base tumours:

- Management of other cranial nerve schwannomas, glomus tumours and malignant primary and secondary tumours of the skull-base
- Management of cranio-facial trauma:
- Management of fronto-orbital disruption Repair of CSF Fistulae:
- Management of postoperative CSF fistulae
- Indications for endoscopic repair of basal CSF fistula
- Techniques for open repair and skull-base reconstruction

Spinal Surgery:

Spinal trauma:

- Reduction and internal stabilization of atlanto-axial, sub-axial and thoraco-lumbar fractures and dislocations

Metastatic Disease of the Spine:

- Posterior decompression and stabilization using pedicle screw, hook and sub-laminar wire constructs
- Corporectomy and instrumented reconstruction of the anterior column Primary tumours of the spine
- Techniques for local ablation of benign lesions and en bloc resections of malignant tumours
- Transpedicular and open vertebral and disc biopsy in vertebral osteomyelitis and discitis

Intradural Tumours:

- The radical resection of intradural, extra-medullary tumours; biopsy and optimal resection of intramedullary tumours

Syringomyelia and Hind Brain Anomalies:

- Foramen magnum decompression, syringostomy, syringopleural shunting, detethering and duroplasty

Advanced Surgery of the Ageing and Degenerative Spine:

- Management of osteoporotic collapse, vertebroplasty, kyphoplasty Stabilization of the osteoporotic spine
- Operative management degenerative spondylolisthesis and scoliosis
- The assessment, counseling and pre-operative preparation of patients with lumbar radiculopathies
- Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms
- Primary lumbar microdiscectomy
- Primary posterior decompression (laminotomy, hemilaminectomy etc): including
  - Identification of spinal level by pre and intra-operative fluoroscopy - Achieving safe access to the spinal canal by micro-surgical fenestration
  - Achieving full decompression of the spinal canal, lateral recess and foramen by appropriate bone and soft tissue resection
  - Protection and safe retraction of neural tissues
- The assessment, counseling and pre-operative preparation of patients with cervical myeloradiculopathies
- Interpretation of plain radiographs, CT scan, MRI scans and CT myelograms
- Single level anterior cervical discectomy with and without fusion
- Standard anterolateral approach to the cervical spine
- Use of fluoroscopy or plain radiographs to confirm spinal level
- Radical and subtotal excision of the cervical disc, PLL, central and uncovertebral osteophytes
- Protection and full decompression of the spinal cord and spinal nerve roots
- Interbody fusion using autologous bone with or without interbody cages

The Rheumatoid and Ankylosed Spine:

- Management of atlanto-axial subluxation
- Cranial settling and odontoid migration
- Sub-axial degeneration; cervico-dorsal kyphosis Spinal Deformity:
- Multidisciplinary management of patients with spinal dysraphism, diastematomyelia etc

NEUROLOGY

- Encephalography,

- Principles of sensory evoked potentials,
- Indication for using intraoperative SEP
- Principle of motor evoked patients / MEP
- Use of intraoperative EMG
- Use of EMG studies in detail
- Nerve conduction studies & its applications.
- Define delirium & dementia list differential diagnosis for
- Stroke primary causes, clinical presentation, radiological management of,
- TIA cerebral infarction.
- Cerebral hemorrhage.
- Sub arachnid hemorrhage
- Various infections.
  Cerebral vasculitis, etiology clinical presentation diagnostic management differentiate between basal occlusive telangiectasia.
- Tumor ionizing radiation & its effects on brain.
- Pseudo cerebri, diagnosis & management.
- Diagnosis & management of normal pressure hydrocephalus.
- General topic of Chromosomal abnormalities & ts effect
- Electro Encephalography, microencephaly & megalencephly.
- Major storage disease & its effect on brain.
- Major acquired neuropathies.
- Poliomyelitis.
- Pathophysiology & Neurosurgical manifestations (motor multiple scalars pathophysiology & clinical manifestations).
- Migraines headache syndrome.
- Common epileptic disorders.
- Neurological aspects of pregnancy.
- Muscular dystrophies.
- Poliomyelitis.
- Etiology & pathogenesis.
- Myasthenia gravis, Etiology & pathogenesis.
- Pathophysiology clinical presentation, diagnosis and treatment of Parkinson's disease and other related movement disorders.

Fluids Electrolytes & Nutrition

- Normal distribution of intracellular & extracellular fluid.
- Potential implications of diuresis & fluid restriction on water & electrolyte balance.
- Review the criteria for nutritional assessment.
- Describe & contrast the indications, contra indication, complications & benefits of enteral & parenteral nutrition.
- Common changes of metabolism & nutritional requirements of

trauma patient & their evaluation.

- Manage fluid & electrolyte requirements of neonatal, pediatric & adult Neurosurgical patients.
- Ability to place central venous catheters.
- Ability to place enteral feeding tubes.
- Prescribe appreciate parental of enteral nutrition.
-

General Critical Care

- General medical issues pertinent to the management of Neurosurgical patients in a critical care unit.
- Indications & pharmacokinetics for medications commonly used in the management of critically ill Neurosurgical patients.
- Clinical presentation, evolution & treatment of infections which commonly occur in critical care neurosurgical patient, commonly used pulmonary values functions of ventilators, indications & usage.
- Sign of acute myocardial ichemia & the emergent treatment of this condition.
- Impact of renal insufficiency as it pertains to the management of
- neurosurgical patients.
- Diagnosis & management of acute renal insufficiency.
- Endocrine disorders & management.
- Diabetics mellitus.
- Diabetic insipidus.
- Medical & legal definitions of brain death.
- Moral & ethical issues pertaining to critically ill neurosurgical patients.
- Physiology of hydrogen ion production & excretion. .
- Acute & chronic buffering systems.
- Metabolic acidosis & alkalosis.
- Obtain ACLS & ATLS certification.
- Demonstrate the ability to perform an initial evdlution & management of
- Critically ill neurosurgical patients.
- Perform orotracheal intubation, nasogastric intubation.
- Bladder intubation.
- Serve on a trauma team.

Infections.

Demonstrate an understanding of the factors, related to acquisition, diagnosis & treatment of infection as they pertain to neurosurgical patients.
Describe the typical presentation & treatment of common neurosurgical infections.
Review the methods to minimize infectious complications in neurosurgical patients.
Demonstrate on understanding of the techniques to minimize the risk of spread of viral infections including Hepatitis & HIV.

BLOCK ROTATIONAL OBJECTIVES

PGY Level: I , II	**How Topic or Skill is Taught ?** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**
Objectives for Rotation: **Knowledge (topics to be covered)**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Basic assessment of the neurosurgery patients	1,2,3,4	D,T,C,E	
2. Introductory level knowledge base regarding pathophysiology of intracranial vascular lesions, spine conditions, tumor grading and treatment, spinal tumors, and CNS infections	1,2,3,4	D,T,C	
3. Introductory knowledge base regarding pathophysiology of the ICU patient with special knowledge of post-surgical issues and vasospasm.	1,2,4,5	D,T,C,E	
4. To gain familiarity with the assessment of complex neurosurgical disease as well as develop a knowledge base regarding interpretation of neurosurgical, radiography/angiography	1,2,3,4,5	D,C	
5. Participate in family conferences.	1,2,4	D,E	

Skills (that should be learned or performed) **Outpatient Clinic / Emergency Room/Consults**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor.	1,2,3,4	D,E	
2. Have a working knowledge of the necessary pre-operative work-up and post-operative management of the complex neurosurgical patient.	1,2,3,4	D,E	
3. Perform a focused neurosurgical evaluation in context with the patient's complaint.	1,2,3	D	
4. Insert an intracranial pressure monitor and an external ventricular drain.	1,2,3,4	D	
5. Decide appropriately which patients need invasive hemodynamic monitoring.	1,2,3,5	D	
6. Read CT scans and MRI.			
7. Be able to intubate patients in both emergent and elective situations.	1,2,4 1,2,4,5	D,E,T,O D	
8. Demonstrate an ability to prescribe appropriate parenteral and enteral feeding.	1,2,4	D	
9. Recognize and treat the complications of parenteral and enteral feeding.	1,2,4	D	
10. Demonstrate an ability to manage the fluid and electrolyte requirements, including acid- base issues of pediatric and adult neurosurgical patients.	1,2,4	D	
11. Demonstrate an ability to perform an initial evaluation and management of critically ill neurosurgical patients.	1,2,3,4	D,E	
12. Accurately document H&P and consultations according to the AMA-CPT E&M documentation guidelines.	1,2,3	D	

Operating Room 1. Position, prep and drape a trauma craniotomy and spine patient. 2. Apply Mayfield pins and head holder. 3. Place burr holes. 4. Insert subdural drains. 5. Identify parts of the brain and name blood vessels while observing complex vascular surgery. 6. Open and close a tumor case. 7. Basic understanding of transsphenoidal approach. 8. Assist in tumor surgery. 9. Assist with resuscitation and surgical / endovascular planning of critically ill vascular patient.	 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5	 D,C D,C D,C D,E D,E D D,E D,E D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.

BLOCK ROTATIONAL OBJECTIVES

PGY Level: II, III, IV,	**How Topic or Skill is Taught?** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**

Objectives for Rotation: **Knowledge (topics to be covered)** 1. To gain a more advanced understanding of pathophysiology of intracranial hemorrhage and tumor including: • Aneursysm • AVM • Gliomas • Benign tumors • Physiology of vasospasm • Angiography interpretation • The ability to function independently in all phases of management of patients with vascular lesions and tumors	 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5	 D,T D D D D D D D	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
Skills (that should be learned or performed) Outpatient Clinic / Emergency Room /Consults			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor. 2. Have a working knowledge of the necessary pre-operative work-up and 3. post-operative management of the complex neurosurgical patient. 4. Discuss the differential diagnosis of all neurosurgical problems and develop a rational and cost effective therapeutic plan for the patient	1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4,5	D,E D,E D,E D	

regardless of race, sex or disability.			
Operating Room 1. Performance of approach of aneurysm 2. Performance of stereotactic biopsy. 3. Performance of craniotomy for tumor resection 4. Performance of intradural procedures for neoplastic and infectious lesions 5. Supervision of junior resident and trauma team in caring for critically ill neurosurgical patients. 6. To develop a skill level to allow participation of a first assistant in neurosurgical procedures. 7. Performance of approach of aneurysm 8. Performance of stereotactic biopsy. 9. Performance of craniotomy for tumor resection 10. Performance of intradural procedures for neoplastic and infectious lesions 11. Supervision of junior resident and trauma team in caring for critically ill neurosurgical patients. 12. To develop a skill level to allow participation of a first assistant in neurosurgical procedures.	 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5	 D,E D,E D,E D,E D,E D,E D,E D,E D,E D,E D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.

BLOCK ROTATIONAL OBJECTIVES

PGY Level: II,III, IV,	**How Topic or Skill is Taught** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**
Objectives for Rotation: **Knowledge (topics to be covered)**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
2. To gain a more advanced understanding of pathophysiology of intracranial hemorrhage and tumor including:	1,2,3,4,5	D,T	
• Embolic Stroke	1,2,3,4,5	D	
• Thrombotic Stroke			
• Lacunar Stroke			
• Hemorrhagic Stroke			
• CT angiogram interpretation			
• CT Perfusion interpretation	1,2,3,4,5	D	
• Angiography interpretation	1,2,3,4,5	D	
• The ability to function independently in all phases of management of patients with vascular lesions and tumors	1,2,3,4,5		

Skills (that should be learned or performed) Outpatient Clinic / Emergency Room /Consults			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
5. Perform a complete neurosurgical history and physical exam and interpret basic CT scans, as well as CTA and CTP. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor.	1,2,3,4	D,E	
6. Have a working knowledge of the differential diagnoses for ischemic stroke	1,2,3,4	D,E	
7. Have a working knowledge of criteria for administration of tPA and use of IA tPA and Merci retriever.	1,2,3,4	D,E	
8. Discuss the differential diagnosis of all cerebrovascular problems and develop a rational and cost effective therapeutic plan for the patient regardless of race, sex or disability.	1,2,3,4,5	D	
Operating Room			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
13. Performance of approach IPH	1,2,5	D,E	
14. Carotid Endarterectomy	1,2,5	D,E	
15. EC/IC Bypass	1,2,5	D,E	
16. Endovascular Rescue techniques	1,2,5	D,E	
17. Craniotomy for evacuation of IPH.	1,2,5	D,E	
18. Craniectomy for cerebral edema			
19. Supervision of junior resident and neurology and Hospitalist teams in caring for critically ill stroke patients.	1,2,5	D,E	
20. To develop a skill level to allow participation of a first assistant in neurosurgical procedures.	1,2,5	D,E	

BLOCK ROTATIONAL OBJECTIVES

PGY Level: PGY I-II	**Topic or Skill is Taught** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**
Objectives for Rotation: **Knowledge (topics to be covered)**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Basic assessment of the neurosurgery patients	1,2,3,4	D,T,C,E	
2. Introductory level knowledge base regarding pathophysiology of common neurosurgical conditions such as degenerative spine conditions, non-surgical management of neck and back pain, spinal tumors, and CNS infections.	1,2,3,4,5	D,T,C	
3. Introductory knowledge base regarding pathophysiology chronic pain.	1,2,3,4,5	D,T,C	
4. To gain familiarity with the assessment of the spine patient as well as develop a knowledge base regarding interpretation of neurosurgical radiography.	1,2,3,4,5	D,E	

Skills (that should be learned or performed) **Outpatient Clinic / Emergency Room/Consults**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor.	1,2,3,4	D,C	
2. Have a working knowledge of the necessary pre-operative work-up and post-operative management of the neurosurgical patient.	1,2,3,4	D,E	
3. Perform a focused neurosurgical evaluation in context with the patient's complaint.	1,2,3,4	D,D	
4. Decide who needs urgent spine decompression versus elective.	1,2,3,4	D	
5. Understand which degenerative conditions require complex instrumentation.	1,2,3,4	D	
6. Read CT scans, MRI and basic spine films.	1,2,3,4,5	D	
7. Accurately document H&P and consultations according to the AMA-CPT E&M documentation guidelines	1,2,3,4	CD	
Operating Room			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Position, prep and drape a patient for neck and back surgery-simple and complex.	1,2,5	D	
2. Apply Mayfield pins and head holder.	1,2,5	D	
3. Place burr holes.	1,2,5	D	
4. Insert subdural drains.	1,2,5	D	
5. Identify parts of the vertebral column, spinal cord, and nerve roots at the time of surgery.	1,2,5	D	
6. Open and close both simple and complex spine surgery cases.	1,2,5	D	
7. Assist in spine decompression.	1,2,5	D	
8. Basic understanding of neuromonitoring principles.	1,2,5	D	

BLOCK ROTATIONAL OBJECTIVES

PGY Level: PGY I-III	**Topic or Skill is Taught** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**
Objectives for Rotation: **Knowledge (topics to be covered)**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Basic assessment of the neurosurgery patients	1,2,3	D,T,C,E	
2. Introductory level knowledge base regarding pathophysiology of common neurosurgical conditions such as closed head injury, traumatic and degenerative spine conditions, non-surgical management of neck and back pain, spinal tumors, and CNS infections.	1,2,3,4	D,T,C	
3. Introductory knowledge base regarding pathophysiology of the ICU patient including surgical nutrition, fluids and electrolytes, ventilator management, intracranial pressure and basic pharmacology.	1,2,3,4	D,T,C	
4. To gain familiarity with the assessment of neurosurgical emergencies as well as develop a knowledge base regarding interpretation of neurosurgical radiography.	1,2,3,4,5	D,T,C	
5. Participate in family conferences / ethics committee meetings.	1,2,3,4,5	D,E	

Skills (that should be learned or performed) **Outpatient Clinic / Emergency Room/Consults**			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor.	1,2,3,4	D,C	
2. Have a working knowledge of the necessary pre-operative work-up and post-operative management of the complex neurosurgical patient.	1,2,3,4	D,E	
3. Perform a focused neurosurgical evaluation in context with the patient's complaint.	1,2,3,4	D,D	
4. Insert an intracranial pressure monitor and an external ventricular drain.	1,2,4,5	D,E	
5. Decide appropriately which patients need emergent craniotomy and other procedures	1,2,3,4	D,E	
6. Read CT scans and basic spine films	1,2,3,4,5	D,E	
7. Be able to intubate patients in both emergent and elective situations	1,2,4,5	D,E	
8. Demonstrate an ability to prescribe appropriate parenteral and enteral feeding	1,2,3,4	D,E	
9. Recognize and treat the complications of parenteral and enteral feeding	1,2,3,4	D,E	
10. Demonstrate an ability to manage the fluid and electrolyte requirements, including acid-base issues of pediatric & neurosurgical patients	1,2,3,4	D,E	
11. Obtain ACLS & ATLS certification			

Operating Room			All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
1. Position, prep and drape a trauma craniotomy and spine patient	1,2,5	D	
2. Apply Mayfield pins and head holder.	1,2,5	D	
3. Place burr holes.	1,2,5	D	
4. Insert subdural drains.	1,2,5	D	
5. Identify parts of the vertebral column, spinal cord, and nerve roots at the time of surgery	1,2,5	D	
6. Open and close a head trauma case and cervical / thoracolumbar case.	1,2,5	D	
7. Assist in spine decompression.	1,2,5	D	
8. Assist with poly trauma patient resuscitation and other trauma team activities.	1,2,5	D	

BLOCK ROTATIONAL OBJECTIVES

PGY Level: PGY II,III, IV	**How Topic or Skill is Taught** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**

Objectives for Rotation: **Knowledge (topics to be covered)** To gain a more advanced understanding of pathophysiology of neurosurgical trauma including: • Head trauma • Spine trauma • Non-surgical management of neck / back pain • Physiology of bone growth and fusion • Complex spinal radiography • Complex spinal radiography • The ability to function independently in all phases of management of patients with spinal disorders and head traumas	 1,2,3,4,5 1,2,3,4,5 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4	 D,T D D D D D D	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
Skills (that should be learned or performed) Outpatient Clinic / Emergency Room /Consults 1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor. 2. Have a working knowledge of the necessary pre-operative workup and post-operative management of the neurosurgical patient. Discuss the differential diagnosis of all neurosurgical problems and develop a rational and cost-effective therapeutic plan for the patient regardless of race, sex or disablilty.	 1,2,3,4 1,2,3,4	 D,E D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.

Operating Room 1. Performance of decompressive craniotomy for head trauma 2. Performance of complex spinal procedures including cervical and thoracolumbar anterior/posterior instrumentation. 3. erformance of intradural procedures for neoplastic and infectious lesions. 4. Performance of cranioplasty with consideration of cost effectiveness 5. Supervision of junior resident and trauma team in caring for critically ill.	 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5	 D,E D,E D,E D,E D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.

BLOCK ROTATIONAL OBJECTIVES

PGY Level: II, III, IV	**How Topic or Skill is Taught** **Examples:** **1. Didactic** **2. Case conference** **3. Continuity clinic** **4. Work rounds** **5. Procedure Room/OR**	**Assessment Method (s)** **(D) Direct Observation** **(T) Standardized test (w/o)** **(C) Clinical Records Review** **(E) Eval by other providers & staff** **(S) Patient Survey** **(M) Mini Clinical Exam** **(P) Portfolio Review** **(O) Other**	**What constitutes Acceptable Performance Rating** **Examples:** **1. Specific score on in-training exam** **2. Completing steps in proper sequence** **3. Specified Likert scale rating** **4. Listing specific possibilities in a differential diagnosis**

Objectives for Rotation: **Knowledge (topics to be covered)** 1. To gain an understanding of the pathophysiologic disease in the pediatric population. 2. Perform a complete H&P and assessment on newborns, infants an children 3. To understand the specific disease entities including: • Embryology of the CNS • Myelomeningocele • Hydrocephalus • Differences between pediatric and adult brain tumors • Presentations of shunt infections • Spasticity and movement disorders • Pathophysiology of cranial synostosis • Types of seizures in children • Children with multi systems trauma • SCIWORA • NAT 4. To gain a better understanding and interpretation of radiologic and pathologic diagnostic tests in a pediatric population. 5. Attend pediatric radiology conference and epilepsy conference	 1,2,3,4,5 1,2,3,4 1,2,3,4,5 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 1,2,3,4 2	 D,T,C D,T,C D,T,C D,T,C D,O D,C D,C D,C D D D D D D	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
Skills (that should be learned or performed) **Outpatient Clinic / Emergency Room /Consults** 1. Perform a complete neurosurgical history and physical exam and interpret basic CT scans. Based on this information, the resident should be	 1,2,3,4	 D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.

able to order appropriate diagnostic procedures in a cost-effective and non-discriminatory manor. 2. Have a working knowledge of the necessary pre-operative workup and post-operative management of the pediatric neurosurgical patient. 3. Discuss the differential diagnosis of common pediatric neurosurgical problems and develop a rational and cost-effective therapeutic plan for the patient regardless of race, sex or disablilty. 4. Meet with families to discuss patient issues and family concerns	 1,2,3,4 1,2,3,4 1,2,3,4	 D,E D,E D,E	
Operating Room – Junior Resident 1. Performance of basic pediatric neurosurgery including insertion of shunts, craniotomy, laminectomy (normal anatomy). 2. Perform a shunt tap 3. Craniotomy for elevation of depressed skull fracture 4. Demonstrate an ability to open and close cranial and spinal wounds	 1,2,5 1,2,3,4,5 1,2,5 1,2,5	 D,E D,E D,E D,E	All performance rating standards for all procedures/rotations/skills are clearly defined in the residency manual.
Middle Level 1. Assist with repair of an intracranial encephalocele 2. Perform an exposure for spinal exploration in a patient with abnormal anatomy or re-operation 3. Assist an ETV 4. Perform placement of baclofen pumps 5. Insert a vagal nerve stimulator	 1,2,5 1,2,5 1,2,5 1,2,5 1,2,5	 D,E D,E D,E D,E D,E	

SPINAL SURGERY	PGY-1	PGY-2	PGY-3	PGY-4
Cervical				
- Laminectomy	1-2	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Anterior disectomy	1-2	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Posterior disectomy	1-2	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Interbody fusion	1-2	1	1	1
- Vertebrectomy	1-2	1	1	1
- Posterior fusion	1	1	1	1
- Plating	1	1	1	1
- Transoral Decompression	1	1	1	1
Thoracic				
- Laminectomy	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Disectomy	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Costotransversectomy	1	1	1	1
- Vertebrectomy	1	1	1	1
- Fusion	1	1	1	1
- Rodding	1	1	1	1
Lumbosacral				
- Laminectomy	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Disectomy	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
- Vertebrectomy	1	1	1	1
- PLIF	1	1	1	1
- Posterior Fusion	1	1	1	1
Extramedullary tumor surgery	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Intramedullary tumor surgery				
- Tumor	1-2*	1-2*	1-2*	1-2*
- AVM	1-2*	1-2*	1-2*	1-2*
- Syrinx	1-2*	1-2*	1-2*	1-2*
Percutaneous discectomy / chemonucleolusis	1	1	1	1
Cordotomy	1	1	1	1
Rhizotomy	1	1	1	1

STEREOTACTIC /FUNCTIONAL SURGERY	PGY-1	PGY-2	PGY-3	PGY-4
Biopsy	1-2*	1-2*	1-2*,3+	1-2*,3+
Radiofrenquency lesions (spinal)	1	1	1	1
Radiofrequency lesions (Intracranial)	1	1	1	1
Tissue transplantation	1	1	1	1
Interstitial brachytherapy	1	1	1	1
Stimulator placement	1	1	1-2*	1-2*
Placement of continuous infusion pumps	1	1	1-2*	1-2*

PERIPHERAL NERVE SURGERY	PGY-1	PGY-2	PGY-3	PGY-4
Release procedures for entrapment syndromes	1-2*	1-2*	1-2*	1-2*
Repair, grafting or exploration of peripheral nerves	1-2*	1-2*	1-2*, 3+	1-2*, 3+
Brachial plexus surgery	1	1	1	1
Sympathectomy	1	1	1	1

NEUROVASCULAR SURGERY	PGY-1	PGY-2	PGY-3	PGY-4
Carotid ligation	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Carotid endarterectomy	1	1	1	1
Extracranial-to-intracranial bypass	1	1	1	1

PEDIATRIC NEUROSURGERY	PGY-1	PGY-2	PGY-3	PGY-4
Premature infants (<40 week gestation)	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Neonates / infants (< 2 years)	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Children (2-12 years)	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Adolescents (12-18 years)	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+

NEUROINTENSIVE CARE	PGY-1	PGY-2	PGY-3	PGY-4
A-LINE PLACEMENT	3	3	3	3
Ventriculostomy placement	3	3	3	3
Extradural & subarachnoid monitor placement	3	3	3	3
Swan-Ganz catheter placement	3	3	3	3
Central line placement	3	3	3	3
Chest-tube placement	3	3	3	3
Thoracentesis	3	3	3	3
Paracentesis	3	3	3	3
Tracheostomy	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Cut-downs	3	3	3	3
Insertion of Endotracheal tube	3	3	3	3
Ventilator management	3	3	3	3

NEURORADIOLOGIC PROCEDURES	PGY-1	PGY-2	PGY-3	PGY-4
Myelograms	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Cerebal angiograms	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Ventriculograms (air or positive contrast)	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Discograms	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Transarterial occlusion of aneurysms & / or feeding vessels	1	1	1	1

MISCELLANEOUS	PGY-1	PGY-2	PGY-3	PGY-4
Trauma Neurosurgery	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Seizure Surgery	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Stereotactic Radiosurgery	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Intraoperative neurophysiologic monitoring	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Excision of scalp lesions	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Halo / tongs placement	3	3	3	3
Skin grafting	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Harvesting of bone, fascia, muscle, omentum, skin and pericranium	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+
Laser Surgery	1-2*, 3+	1-2*, 3+	1-2*, 3+	1-2*, 3+

Section -7

SPECIFIC OBJECTIVES.

The objective of M.S postgraduate programme is as follows:-

- Block-1. First one year of training.
- Block-2. Four years of training.

Block-1.

A postgraduate student of M.S Neurosurgery programme at the end of the one year training is able to:-

- After attending research methodology works synopsis develop the skill to
  - Write synopsis
  - Write Research work
- The goals are to develop knowledge of surgical diseases and complications, develop surgical judgment, learn basic pre- and post-operative care, and develop elementary skills in surgical technique.
- Perform and document comprehensive surgery history and physical examination [H&P] abilities
- Understand and interpret indications for laboratory studies and imaging
- Develop skills necessary to establish and implement an effective patient management plan
- Perform service examination
- Demonstrate a solid foundation of knowledge
- Develop accuracy in clinical evaluation skills
- Provide compassionate ward and outpatient care as determined by patients, families, colleagues and ancillary health
- Develop and nurture sound and appropriate interpersonal and communication skills

Block-2.

A postgraduate student of M.S Neurosurgery programme at the end of 04 years training is able to:-

- Teach medical students the fundamentals of the surgical H&P
- Accurately interpret complex laboratory and imaging tests and other

fundamental skills

- Develop complex patient diagnostic and managerial skills
- Perform selected surgical procedures under direct supervision.

  Assist in major surgical procedures and perform those portions of the operation that are appropriate to the resident's level of training under direct supervision
- Demonstrates competency regarding performance of inpatient and surgical procedures
- Demonstrate clear and concise patient care plans
- Demonstrate the ability to implement the aforementioned patient care plans.
- Acquire trauma and commensurate critical care skills
- Demonstrate the ability to evaluate medical literature in journal clubs and on rounds
- Demonstrate an ongoing and improving ability to learn from errors
- Develop critical care and trauma care and technical skills
- Perform a clinical or basic research project that is appropriate
- Develop fundamental research skills
- Begin to direct ward and clinic patient care
- Instruct residents and medical students regarding their performance of selected non-complex surgical procedures appropriate to their level of training
- Demonstrate competency regarding performance of inpatient and surgical procedures
- Demonstrate clear and concise patient care plans
- Demonstrate the ability to implement the aforementioned patient care plans
- Provide high level non-operative care
- Manage and administrate the complexities of a large clinical and academic service
- Demonstrate ability to perform all major surgical procedures.
- Demonstrate the highest level of patient care skills, problem solving

skills and technical skills

- Have a working knowledge of the necessary pre-operative work-up and post-operative management of the complex surgical patient.
- Perform a focused surgical evaluation in context with the patient's complaint.
- Demonstrate an ability to prescribe appropriate parenteral and enteral feeding.
- Recognize and treat the complications of parenteral and enteral feeding.
- Demonstrate an ability to manage the fluid and electrolyte requirements, including acid- base issues of pediatric and adult surgical patients.
- Demonstrate an ability to perform an initial evaluation and management of critically ill surgical patients.

Section -8

RESEARCH THESIS / DISSERTATION

(a) CHARACTERISTICS OF THE RESEARCH TOPIC.

The Research Topic in clinical subjects should address 20% to the Related Applied Basic Sciences and in Basic Sciences should address 20% to the Related Applied Clinical Sciences. The research topic must consist of a reasonable sample size and sufficient no. Of variables to give training to the candidate to conduct research to acquire data, analyze data and reach results, discuss results and draw conclusions and thus test the hypothesis.

During course on Research Methodology and Biostatistics held during Phase-I of the Course, the Candidate is expected to develop synopsis of Research.

(b) GUIDELINES FOR PREPARATION OF SYNOPSIS

The applicants should organize the synopsis to address the following points:-

a) Title:

b) Introduction	:	Should clearly manifest why the present work is undertaken.
c) Literature review	:	Place the project in academic context by referring to the major work by others on the topic.
d) Objectives	:	Define clearly the aims of the research proposal.
e) Significance	:	Explain the significance of the proposal for the field and the country.
f) Plan	:	Give year wise tentative plan of the work.
g) Methodology	:	Explain the approach and methods he will follow.
h) Bibliography	:	Upto dated references.

(c) SUBMISSION / EVALUATION OF SYNOPSIS.

Synopsis of research project will be submitted during the year-1 of the course. The synopsis will be submitted through the supervisor to the Dean / Director PGMI, Quetta. The synopsis will be evaluated by the following committee.

1. Dean / Director or his representative. Chairman
2. Supervisor of the student Member/ Secretary
3. One Prof. appointed by the Dean / Director Member
4. Co-opted member whenever required

After the approval, by the Committee the synopsis will be submitted to the Board of Higher Studies in the University of Balochistan for further approval by the Vice Chancellor University of Balochistan.

(d) GUIDELINES FOR THESIS / DISSERTATION FORMAT

The thesis must be bound in accordance with the following specification:

a) Four hard copies and one soft copy (CD) of thesis / dissertation to be submitted.

b) A4 paper size to be used, except for drawings and maps on which no restriction in placed.
A margin 1.5 inches to be left on left hand side. Thesis copy should be properly hard bounded.

c) The front should bear the title, name of the candidate and the insignia of the University.

(e) SUBMISSION OF THESIS / DISSERTATION.

1) The Thesis / Dissertation must be bound in accordance with specifications.
2) Four (4) copies of the Thesis must be submitted at least 6- months before the commencement of the written and oral Examination.

3) The minimum duration between approval of synopsis of research and submission of thesis should be 2 years, the maximum duration will be 5 years.
4) The Thesis will be submitted along with Bank Challan Form of amount as fixed by University of Balochistan paid in the account of University of Balochistan.
5) Application for Thesis Evaluation recommended by the Supervisor.

Section -9

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

S #	Date	Name of Patient, Age, Sex & Admission No	Diagnosis	Procedure Performed	Supervisor's Signature

EMERGENCIES HANDLED

S #	Date	Name of Patient, Age, Sex & Admission No	Diagnosis	Procedure / Management	Supervisor's Signature

CASE PRESENTED

S #	Date	Name of Patient, Age, Sex & Admission No	Case Presented	Supervisor's Signature

SEMINAR / JOURNAL CLUB PRESENTATION

S #	Date	Topic	Supervisor's Signature

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.

S #	Date	Method of Evaluation (Oral, Practical, Theory)	Rating	Signature

- Log Book will be signed by the supervisor / Co- Supervisor regularly.
- Log Book completion is must before the candidate examination forms are signed.
- Log Book should be used in Practical / Clinical Examination at viva voice table or at TOCS cabin.

Section -10

EVALUATION / EXAMINATION

INTERMEDIATE EVALUATION PART-I EXAMINATION.

1. Eligibility to appear in Part – I Examination

(a) Application by the candidate recommended by the Supervisor.

(b) Certificate by the Supervisor , counter signed by Dean PGMI that candidate has regularly attended at least 75% of the basic sciences classes, Lectures, Seminars, Practical, demonstrations of Phase–I education.

(c) Bank Challan Form of Payment of examination fee as fixed by the university of Balochistan.

2. REGULATIONS.

a) All candidates admitted in MS Neurosurgery course will appear in Part – I examination at the end of 1st Calendar Year.

b) The candidate who fails to pass the examination in 3 consecutive attempts availed or un-availed, shall be dropped from the course.

c) The candidates who will not pass this examination within two years after their admission, their name will be removed from the course.

d) The Part-I Examination will Consist of Paper-I on Basic Sciences Education (relevant to the specialty) and Paper-II on Principles of Neurosurgery.

e) For Part-1 Examination the Paper-I and Paper-II will be set from the MCQ bank. The question for MCQ bank will be provided by all the subject specialist involved in teaching the curriculum of the course

f) Paper Weight age; each paper will carry 100 Marks. Time allowed for each Paper will three hours.

g) The Pass Marks will be 60 % in each paper.

h) Papers will have 100 MCQ Single Best in each paper.

3. CONTENTS OF THEORY PAPER PART-I EXAMINATION.

SUBJECT	COMPONENTS	NO OF QUESTIONS	MARKS
Basic Science Education Paper-I	MCQ's Single Best Type	100	100
Principles of Neurosurgery Paper-II	MCQ's Single Best Type	100	100

FINAL EVALUATION: (PART-2 EXAMINATION)

(a) ELIGIBILITY TO APPEAR IN PART-2 EXAMINATION.

1. The candidate has completed the prescribed period of training of the course.
2. The candidate has passed the Intermediate Evaluation.(Part-1 Examination).
3. The thesis / dissertation must be dully approved by University of Balochistan.
4. Certificate by the Supervisor that the Log Book of candidate is complete in all aspects and is signed by the Co-Supervisor and the Supervisor. The original Log Book will be presented by the candidate during Practical / Oral examination.
5. A certificate by the Supervisor /Counter signed by Dean PGMI, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;
6. The application form for Part-II examination with recommendation of the Supervisor.
7. The Bank Challan Form for the payment of the Examination Fee of amount as fixed by University of Balochistan.

(b) <u>COMPONENTS OF THE PART-2 EXAMINATION.</u>

1- Theory (300 Marks)
2. Clinical / Practical (300 Marks)

Total = (600 Marks)

(i) CONTENTS OF THEORY PAPERS.

SUBJECT	CONTENTS	NO OF QUESTIONS	WEIGHTAGE	MARKS
Neurosurgery	MCQ Paper-A Single Best Type	100	0.75/Per	75
Neurosurgery	MCQ Paper-B Single Best Type	100	0.75 /Per	75
Neurosurgery	Short Essay Paper-A	10	0.75/Per	75
Neurosurgery	Short Essay Paper-B	10	0.75 /Per	75

Total 300 Marks

- **Candidate must secure 60% in each paper to pass theory examination**.

(ii) CLINICAL / PRACTICAL EXAMINATION FOR M.S NEUROSURGERY

SUBJECT	COMPONENTS	ASSESSMENT TECHNIQUES	MARKS
Neurosurgery	Long Cases	1	100
	Short Cases	4	100
	TOCS	Specimens, Instruments, Investigation for interpretation including X-ray, MRI, ICT, Nuclear scans, Table Viva on Log book, Table Viva on Thesis / Dissertation, Slides etc.	100 (10 Stations 10 Marks Each station).

- **Candidate must obtain 60% in total clinical component and 50% in each component to pass clinical examination.**

(d) NUMBER OF EXAMINERS.

The Final Evaluation (Part-2 Examination) will be conducted by a board of four examiners of Neurosurgery. All examiners have equal functions except the chairman who will be responsible to conduct the examination process and send result to the controller university.

(e) RESULT.

The candidates who will Pass their Theory and Clinical / Practical examination separately will be declared pass The Candidates who will Pass in Theory but fail in Clinical / Practical examination will re-appear only in Clinical / Practical examination again for another two times. After total of three attempts in Clinical / Practical examination the candidate will have to appear in all the parts of Theory and Clinical / Practical Part-II examination.

- To pass as ordinary, the candidate must obtain 60% marks in each of 2 components.
- To pass with distinction, the candidate must obtain overall marks should be 80% or above.

Section -11

SUPERVISION OF POST GRADUATE STUDENT (TRAINEE MEDICAL OFFICER)

Purpose:

To ensure that Trainee Medical Officers / residents are provided adequate and appropriate levels of supervision during the course of the educational training experience and to ensure that patient care continues to be delivered in a safe manner.

Policy and Procedure:

The Supervisor is responsible for all care delivered by trainees. Trainees shall always be appropriately supervised and the supervision of trainees is ultimately the responsibility of the supervisor, who is accountable to the PGMIQ. PGMIQ shall have a mechanism in place that communicates to the trainees the identity of the Supervisor and back-up coverage by another faculty member in the event that the Supervisor is not immediately available.
All program faculty members supervising Trainee Medical Officers / residents must have a faculty or clinical faculty appointment in the Bolan Medical College Department of surgery or be specifically approved as supervisor by the PGMIQ. Faculty schedules will be structured to provide Trainee Medical Officers / residents with continuous supervision and consultation.

Trainee Medical Officers / Residents must be supervised by faculty members in a manner promoting progressively increasing responsibility for each Trainee Medical Officer / resident according to their level of education, ability and experience be provided information addressing the method(s) to access a in a timely and efficient manner at all times while on duty.

The program provides additional information addressing the type and level of supervision for each post-graduate year in the program that is consistent with the PGMI Quetta program requirements and, specifically, for supervision of Trainee Medical Officers / Residents engaged in performing invasive procedures.

1. To provide patients with quality care and Trainee Medical officers/Resident trainee with a meaningful learning experience, a supervising attending physician shall be clearly identified for each patient admitted to, or consulted by, the surgical service. It is the responsibility of the Trainee Medical Officers / Residents trainee to notify an attending physician that a consultation or admission has been initiated on his/her service, based on the call schedule and back-up mechanisms established in the department.
2. The supervising attending physician is ultimately responsible for all recommendations rendered and care delivered by Trainee Medical Officers / Residents trainee, paramedical personnel and other trainees on the surgical service.
3. Supervision shall be readily available to all Trainee Medical Officers / Residents on duty. Each program or service in the department shall maintain a clear call list of attending physicians; with appropriate back up in the event the supervising physician is not immediately available (this typically represents another attending faculty on call that same day). A comprehensive call list of Trainee Medical Officers / Residents and attending physicians is disseminated to all switchboard operators, patient affair coordinators, clinical care areas and all covering Trainee Medical Officers / Residents on a monthly basis.
4. Supervision shall be conducted to ensure that patients receive quality care and Trainee Medical Officers / Residents assume progressively increased responsibility in accordance with their ability and experience, based on curriculum objectives for the respective level of training.
5. Levels of supervision include an attending physician demonstrating a procedure, assisting with the procedure, present physically in the area where intervention is performed, attending available by telephone, senior Trainee Medical Officer / Resident or other supervisor present physically or available by telephone. The attending physician in charge of a respective procedure shall determine the level of supervision for a particular resident and the specific invasive procedure.

6. The responsible attending physician may delegate supervision of more junior residents to a more senior resident as appropriate. These determinations shall be consistent with the individual resident knowledge base and skills, the complexity of the case and procedure, and the residents prior evaluations regarding levels of performance per the residency program core curriculum objectives for each level of training.
7. The Trainee Medical Officers / Residents must request help when the need for assistance is perceived, and responsible attending physicians must respond personally when such help is requested. When a patient's attending physician is not available, a previously designated physician or the attending on call shall assume all coverage responsibilities for the patients.
8. The Senior Trainee Medical Officer / Resident shall relay to the Department Chair or the Supervisor any incident where another Resident did not notify a responsible faculty member, a responsible faculty member was not responsive, or any other breach of supervision as outlined in this policy.

Section -12

GRIEVANCES

The entire faculty is dedicated to Trainee Medical Officer / Resident education and to providing the best possible environment in which to learn. If there are any problems that arise; personal problems, communication issues with team members, complaints about working conditions, the perception or allegation of harassment or abuse etc, the faculty encourages the residents to ask for help. The residents are welcome to contact the Registrar and Dean / Director of PGMIQ.

GRIEVANCE POLICY AND PROCEDURE

Grievances are limited to allegations of wrongful suspension during the training year. The decision to suspend, recommendation to dismiss or termination is an academic responsibility of the Supervisor If a Trainee Medical Officer / Resident believes he/she has been wrongfully suspended or recommended for dismissal or termination, the grievance process described below can be invoked. The process is intended to protect the rights of the Trainee Medical Officer / Resident and the training program and to ensure fair treatment for both parties.

In all cases of suspension, termination, or non-renewal of contract, it is expected that the appropriate probationary and remedial periods will have been performed.

All "written notification" associated with the formal grievance process shall be by certified mail.

Grievance Procedure

1. Notification of intent to appeal: After receiving the written notification of suspension dismissal or termination, the Trainee Medical Officer / Resident will have 10 calendar days to file, in writing, a formal appeal to the dean PGMIQ. The Trainee Medical Officer / Resident may be represented by an attorney in an advisory capacity, but the attorney may not function as a spokesperson for the Trainee Medical Officer / Resident during this grievance

process.

2. Assembly of Disciplinary committee: Upon receipt of an appeal, the Dean will refer to disciplinary committee to review the Trainee Medical Officer / Resident case. The committee shall seek advice from PGMI Council who shall be present for the hearing to advise the committee. The disciplinary committee may also seek advice from outside experts in the field of Trainee Medical Officer / Resident specialty if deemed necessary.

The disciplinary committee will include the deputy dean for clinical affairs (or designee), two regular faculty member from a different training program. The deputy dean for clinical affairs will chair the disciplinary committee. The Resident may object to a member of the disciplinary committee for cause. The Dean has sole discretion to replace a member if deemed warranted.

3. Hearing: The disciplinary committee will assess the merits of the case and hear evidence and arguments by the Trainee Medical Officer / Resident and the supervisor, or department chair, or division head.

The supervisor, department chair, or division head is obligated to present to the disciplinary committee the reasons for and substantiating evidence of the resident suspended / dismissed or termination. The Trainee Medical Officer / Resident may question witnesses who testify on behalf of the program director, department chair, or division head. The Trainee Medical Officer / Resident may present documents, letters of support and call the testimony of witnesses. These witnesses may be questioned by the supervisor, department chair, or division head.

The disciplinary committee shall tape / record the hearing proceedings, but not its deliberations. Either party may, at its own expense, have a verbatim transcript made of the proceedings. Both parties may request a copy of the tape / recording made by the committee.

4. Final Determination: The disciplinary committee will make its determination within 30 days from the close of the hearing. The disciplinary committee will notify the supervisor PGMI, division head, or program director; and the dean in writing of its decision. The decision of the committee to

uphold the termination or to reinstate the resident is final. Should the Trainee Medical Officer / Resident be reinstated, the disciplinary committee may impose an additional period of probation and/or remediation as a condition of continuation.

Notification Required:

1. Reporting required for Resident dismissed, suspended, or required Notice will be according to the PGMI Policy, any Trainee Medical Officer / Resident "who has not progressed satisfactorily in the program or who has been dismissed from the program for inadequate performance or ethical reasons". The phrase, "not progressed satisfactorily in the program," means those residents who have been dismissed, suspended or required to repeat a year of the program.

2. Probation: Probation is a remedial mechanism utilized by the PGMI in a variety of circumstances. It is designed to improve the academic performance of a Trainee Medical Officer / Resident. In most instances, Trainee Medical Officers / Residents by supervisor placed on probation continue to progress satisfactorily in a program. Regular reporting of Trainee Medical Officers / Residents placed on probation to the PGMIQ is required.

3. Referral to Health Department Government of Balochistan.

If a Trainee Medical Officer / Resident is government employee and is on deputation for his postgraduate studies to PGMIQ. The PGMIQ Directorate will report the final recommendation of disciplinary committee to his parent department e.g. Health Department Government of Balochistan.

Section -13

TRAINING SITE

ATTACHED TEACHING HOSPITALS.

(i) Bolan Medical Complex Hospital Quetta

(ii) Sandeman Provincial Hospital Quetta.

BED STRENGTH.

SPH, QUETTA.

UNIT	MALE	FEMALE	TOTAL
Neurosurgery Unit-II	16	10	26
Neurosurgery HDU	09		09
Surgical ICU	05		05

Total 40

BMCH, QUETTA.

UNIT	MALE	FEMALE	TOTAL
Neurosurgery Unit-I	30	10	40
Surgical ICU	10		10

Total 50

Grand Total:- 90

Section -14

RECOMMENDED BOOKS & JOURNALS

2. Youman's Neurological Surgery Vols. 1-4
3. Neurosurgery by Wilkins and Rengachary
4. Operative Techniques in Neurosurgery by Schmidek and Sweet Vols.1-2
5. Brain Surgery
6. Journal of Neurosurgery (AANS)
7. Neurosurgery (CNS)
8. Journal of Neurology, Neurosurgery and Psychiatry
9. British Journal of Neurosurgery

Section-15

FACULTY MEMBERS

PROFESSORS.

Prof: Hameed ullah Buzdar..	MBBS, FCPS.
Prof. Naqibullah Achakzai	MBBS, FCPS
Prof. Shabbir Ahmed Lehri	MBBS, FCPS

ASSOCIATE PROFESSOR.

Dr. Raz Muhammad Bazai	MBBS, FCPS
Dr. Sh: Ibrahim Khalil	MBBS, MS,

ASSISTANT PROFESSOR.

Dr. Ghulam Mustafa	MBBS, MS;

SENIOR REGISTRAR

Dr. Abid Hussain	MBBS, MS.
Dr. Salim Khan	MBBS, FCPS