Guidelines for M.Ch. Neurosurgery Training

Aims & Objectives of Training:

1. The end products should have acquired knowledge so as to be able to functions as an independent consultant.
2. Should have learned performed skills of common neurosurgical operations.
3. Should be well acquainted with the research methodology & the relevant current literature.
4. Should be able to investigate, diagnose & treat common neurosurgical conditions.

Training methods:

1. Clinical teaching in the OPD and in the Operation theatre
2. Clinical teaching round in Neurosurgery ward
3. Bedside presentations
4. Lectures/seminars//journal cluds
5. Mortality /morbidity meetings
7. Assisting & Performing neurosurgical operations
8. Treatment-planning & Decision-making sessions
9. Preparation of manuscript for publication
10. Paper presentations at conferences
11. Training in an experimental microsurgical laboratory where candidates learn dissection / suturing of fine arteries / nerves under microscope & Skull-base dissections
12. Visit to other neurosurgical institutions for about 4 weeks to be able to observe difference in approaches to various neurosurgical problems

**Course Contents:**

1. Knowledge of history of neurosurgery  
2. Clinical Neurosurgery & Clinical Neurology  
3. Basic medical science relevant to the practical of Neurosurgery  
4. Performance of common neurosurgical operations in supra_&infra-tentorial Compartments, in the spinal canal and on the peripheral nerves; initially under supervision later independently.  
5. Ability to use the operating microscope is mandatory.  
6. Training in an experimental microsurgical laboratory where candidates learns dissection / suturing of fine arteries / nerves under microscope & Skull-base dissections

**Examination**

Paper setting  
PracticalS  
Thesis  

One internal Examiner  
Three external Examiners
**Neurosurgery Examination**

Paper I – Basic Science  
Paper II – Neurosurgery  
Paper III – Neurosurgery Special Branches  
Paper IV – Neurosurgery Recent Advances  
Requirements of Thesis / Dissertation  
Pattern of examination

**JOURNAL**

1. JOURNAL OF NEUROSURGERY  
2. NEUROSURGERY – WFMS  
3. CLINICAL VOL NORTH AMERICA  
4. SPINE

**NEUROSURGERY**

<table>
<thead>
<tr>
<th>SR. NO.</th>
<th>NAME OF THE BOOKS</th>
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| 1.      | YOUMANS VOL. I – VI  
KEMPEES- OP NEUROSURGERY- I  
KEMPEES- OP NEUROSURGERY- II  
RENGACHARY PRINCIPLES OF NEUROSURGERY  
KUMAR- PRADIATRICS NEUROSURGERY  
LINDSAY- NEUROLOGY  
NEUROSURGERY ILLUSTRATED |
| 2.      | NEURO ANATOMY  
WARNER- ATLAS NUROANOTOMY 1ST EDITION |
3. **NEUROPATHOLOGY**
   GREEN FIELD- NEUROPATHOLOGY
   VOL-1 NELSON- NEUROPATHOLOGY

4. **NEUROLOGY**
   ADAMS- PRINCIPLE OF NEUROLOGY
   RUSELL- BAILLEY & LOVE – SHORT PRACTICE

5. **NEURORADIOLOGY**
   GROSSMAN - NEURORADIOLOGY
   OSBORNS – DIAGNOSTIC IMAGINE BRAIN 2004 BEAVER ATLAS OF SPINAL OPERATIONS

6. **NEURO EXAMINATION**
   DEMYER- TECH OF NEURO EXAMINATION FULLER – NEUROLOGICAL EXAMINATION 2004 EDITION DEJONG – NEUROLOGICAL EXAMINATION

7. **NEUROANGIOGRAPHY BRAIN & SPINE**
   P. LASJAUNIEA, BARENSTEIN, KARLTER BRUGGE

8. **HIV / AIDS, CARNIAL NERVES SPEECH**

9. **SPINE**
   REGAN – ATLAS OF MIN ACCESS SPINE SURGERY
7. Familiarity with Neuro-radiology, Neuro-pathology, Neuro-anesthesiology, Neuro-ophthalmology, Neuro-otology, Neuro-biochemistry, Neuro-anatomy, Neuro-physiology & Neuro-immunology. There should be didactic lecture & inter-departmental meetings once a week regularly. **Weightage** to these sub-specialties (all taken together) should be around **five percent** of the theory & practical examination.

8. Knowledge of percent advance in neurosurgery.

9. Stereotaxy, Functional neurosurgery, Gamma X-Knife etc.

**Essential Pre-requesting for appearing for M.Ch. (Neurosurgery) examination:**

1. Logbook of work done (surgical procedures assisted/performed & academic activities)
2. Publications- a paper on review of available clinical material from the dept.
3. Dissertation / Thesis
4. Attendance, as per rules of the institute

**Evaluation Pattern for M.Ch. (Neurosurgery):**

1. **Internal Assessment- 20% weightage**
   To be done by all the teachers concerned in the training of the candidate independently and entered into logbook on a standard marking system. The course director will average out and put the final evaluation.

2. **Theory Examination- 30% weightage**
   (Equally distributed for each paper)
   Three Papers- a. Basic Neurosciences (applied)
   b. Clinical Neurology & Clinical Neurosurgery
   c. Advance & Operative Neurosurgery
The Theory Examination will be held at the end of 36 months of training.
Minimum pass marks- 50% in each paper

3. **Practical Examination- 50% weightage**
   Distributed as follows:
   a. Clinical (1 Long case & 2 Short case) – 20%
   b. Actual Operative demonstration – 20%
   c. Radiology, Pathology & General Viva- 10%
   Minimum pass marks- 50%

**MCH NEUROSURGERY----PROGRAME**

   B Tutorial/journalMin3)
   C Log book
   (OT work OPD work theory work), conference-CMEs & sysposia attended

2. **PRESENTATION STUDIES FROM THE mch STUDENT**
   A. Clinical case presentation
   B. Neuroradiology presentation
   C. Speech on topics designation by the guide
   D. CPC

3. Rotation program of the MCh student as decided by the guide for 9 months in the following order, The completion certification from the HOD’s along with a separate letter mentioning assessment of the student is required at the end of the rotation (Ref. book –A to G)
   A. Plain radiology- Skull& Spine- 15 days
   B. CT MRI 6 weeek
   C. NEUROLOGY at AFMC &ruby hall guide 3 months
D. Neuropathology & Neuroanatomy 15 days
E. Neuroanaethaesia 15 days
F. Neuro angiography- brain/spine 3 months
G. OT work 1 year

4. Thesis ---topic--- comparative, prospective or some new ideas
5. Examination
   Internal examination of the student & assessment at the end of 1 year (September 2008)
A. Theory: four days & four papers -3hrs..each
B. Practical
   1st day
   Clinical case presentation 1 long case & 3 short cases followed by operation – case
   Operation – pre op evaluation, differential and post op management.
   2nd day Operation
   3rd day VIVA----2 hours

Syllabus for Mch NEUROSURGERY
   History of Neurosurgery and Micro-Neurosurgery
   Microanatomy Neurophysiology

CLINICAL AND DIAGNOSTIC EVALUATION OF THE NERVOUS SYSTEM

   Approach to the patient with a neurological illness Clinical evaluation
   Coma
   Seizures- diagnosis and management
   Dementia
   NPH
   Nystagmus and relation ocular movements
Neuro-ophthalmology
Neuro-otology
Neuro-urology
Neuro-imaging-CT, MRI, PRT, SPECT, DSA, USG etc
Neuro—psychology
Ancillary Diagnostic test—CSF, Brain biopsy etc
Electro diagnostic in neurology and neurosurgery—EMG, EEG, Evoked potential, NCV etc
Ultrasound in neurosurgery
Intra clinical pressure monitoring

FUNDAMENTAL OF OPERATIVE NEUROSURGERY
Pre-operative evaluation
Preparation for neurosurgical procedures
Micro-surgical anatomy
Positioning
Antibiotics
Principles of cranial and spinal surgery
Cerebral oedema and control of raised ICP
Blood brain barrier
Instrumentation in neurosurgical procedures
Intra operative monitoring
Neuro anesthesia and intensive care
Blood coagulation and blood transfusion
Thrombo-embolic complications—prevention and treatment
Ultrasonic aspirators CUSA
LASERS CO2, ETC
Interventional Neuroradiology
NEURO ONCOLOGY
General considerations
Cell Kinetics & biochemistry
Genetics
Phakomatoses
Etiological factors
Immunology
Tissue culture and monoclonal antibodies
Tumor markers
Adjuvant therapies-RT, CT, other agent, hormones etc
Immunotherapy
Heavy particle irradiation, Brachytherapy
Hyperthermia
Recent advances in neuro- oncology

INTRINSIC TUMORS
Gliomas
Primitive neuroectodermal tumors
Pineal tumor and 3rd ventricular tumors
  Germ cell tumors
  Medulloblastoma
Ependymomas
CNS Lymphomas
Haemangioblastomas
Metastatic brain tumors
Cerebellar tumors-Astrocytoma etc
Brain stem tumors
Intracranial sarcomas
Intracranial lipomas
Etc
EXTRISIC TUMORS
Meningiomas
Hemangiopericytomas
Meningeal sarcomas
CP angle tumors and Acoustic Schwannomas
Sellar and parasellar tumors, functional non –functional
Craniopharyngiomas
Epidermoid, dermoid& neurenteric cysts
Etc

VENTRICULAR TUMORS
Chorid plexus tumors
Meningiomas
Ependymomas
Cysts
Etc

SKULL AND SKULL BASE TUMORS
General considerations
Chondroma and chondrosarcoma
Glomus jungulare tumors
Neoplasm of para nasal sinuses
Esthesioneuroblastomas
Tringeminal schwannoma and other schwannomas
Juvenile angiofibromas
Etc

ORBITAL TUMORS

SKULL TUMORS

SCALP TUMORS
MISCELLANEOUS TUMORS

LESION MIMISKING BRAIN TUMORS

Pseudotumor cerebri
Multiple sclerosis

SPINAL TUMORS
Intradural tumors
Epidural tumors
Tumors of the bone
Masses of sacrum
Etc

NEUROVASCULAR SYSTEM

General consideration
Investigations of neurovascular system
Neurovascular anatomy
Pathophysiology of brain ischaemia
Medical management of stroke and cerebral ischaemia
Cerebral protection
Vasospasm
Occlusive Cerebrovascular disease
Cerebral venous sinus thrombosis
Spontaneous Intra cerebral hemorrhage
Vascular trauma
Surgery for anterior and posterior circulation
Coagulopathies and hypertension
CEREBRAL ANEURYSMS
General consideration, surgical anatomy, diagnosis & evaluation
Surgical approaches to cerebral aneurysm
Endovascular treatment of an aneurysm
Multi modality management of complex intracranial aneurysms
Revascularization procedures

ARTERIO-VENOUS MALFORMATION
General consideration, surgical anatomy, diagnosis & evaluation
Surgical approaches to cerebral AVM
Endovascular treatment of AVM’S
Multi modality management of complex intracranial AVM’S
Cavernous malformations
Spinal AVM’S
Pregnancy and treatment of vascular disease

NEURO TRAUMA
Modes of trauma
Cellular basis of injury
Pathophysiology
Evaluation
Glasgow coma scale
Grades of Traumatic Brain Injury
Imaging Management
Paediatric Head Injury
Outcome and predications
Minor Head injury
Growing skull fracture
Scalp injuries
CSF Fistula
Traumatic intracranial haematomas
Coagulopathies
Sequalae of head injury
Cranial defect and Cranioplasty
Vascular injuries of the head
Penetrating injuries of the head
Etc

SPINAL TRAUMA

High cervical, mid cervical and low cervical injuries
Whiplash injuries
Traction and immobilization
Management of cervical injuries
Thoracic and lumbosacral injuries
Instrumentation in spinal injuries
Penetrating wounds of the spine
Syringomyelia

PERIPHERAL NERVOUS SYSTEM

General principles and clinical evaluation
Anatomy and physiology
General principles & management of peripheral nerve injuries
Peripheral nerves and their injuries
Neurovascular compression syndrome
Plexopathy
Nerve and muscle biopsy
Sympathectomy
INFECTIONS OF CENTRAL NERVOUS SYSTEM
Bacterial infections
Meningitis
Brain and spinal abscess
Viral Infections
HIV and CNS
Parasitic diseases
Fungal Infections
Granulomatous lesions
Thromboembolism of venous sinuses and cortical veins

DEVELOPMENTAL ANOMALIE AND PAEDIATRIC NEUROSURGERY
General consideration
Genetics
Neurological evaluation of infants and children
Spinal dysraphism
Encephalocoels
Craniostenosis and craniofacial anomalies
Dandy-Walker syndrome
Arnold Chiari Malformations
Arachnoid cysts
Hydrocephalus
Sacral agenesis
Sacrococcygeal teratoma
Congenital defects of skull and scalp
Craniophagus twins
CV junction anomalies
Anten diagnosis and treatment of congenital abnormalities
Neonatal intracranial haemorrhage
Stroke in children, subdural haematoma and effusions in children
DISEASE OF SPINE
General consideration and biomechanics of spine
Osteoporosis
Degenerative diseases of spine
Cervical disc disease and spondylosis
Rheumatoid Arthritis of cervical spine
Tuberculosis of the spine
OPLL
Lumbar spondylosis and spinal stenosis
Thoracic and lumbar disc disease
Intervertebral disc disease
Chemonucleolysis
Disc space infections
Lateral recess syndrome
Redundant nerve root syndrome of cauda equine
Lumbar spondylolisthesis
Failed back syndrome
Post laminectomy kyphosis
Scoliosis
Spinal bracing
Principle of spinal fixation Instrumentation

PAIN
Anatomy and physiology of pain
Clinical evaluation & psychological assessment
Pain syndrome – craniofacial, trigeminal, glossopharyngeal, postherpetic, postspinal injuries, neuralgia phantom limb pain etc
Management of chronic and intractable pain
Multisciplinary pain clinics
Peripheral nerve stimulation
TENS
Percutaneous spinal epidural stimulation

DBS
Ablative procedures—Rhizotomy, DREZ, Myelotomy, tractotomy, chordotomy etc
Stereotactic procedures and hypophysectomy

Seminar topics for neurosurgery
1. Development of the CNS
2. Surface Anatomy of the cerebral Hemisphere with functional Significance
3. CSF pathways and cisternal anatomy
4. Anatomy and functions of cerebellum
5. The basal Ganglia and the Thalamus anatomy and functions
6. The spinal Cord
7. Blood supply of the CNS Arterial- Venous
8. Higher mental functions
9. The Oculomotor systems
10. optic pathways
11. auditory pathway
12. Trigeminal facial nerves & other cranial nerves
13. lower cranial nerves
14. Brain stem syndromes
15. Traumatic Brain injury- Current Concepts
16. Classification of tumors of the CNS
17. Management of Gliomas
18. Pineal Tumors
19. posterior fossa tumors
20. Sub Arachnoid Haemorrhage
21. Aneurysms and AVM’S management
22. Movement disorder-Surgical management
23. Neural tube disorders
24. Hydrocephalus and its management
25. Antiepileptics
26. Surgery for epilepsy
27. History of neurosurgery
28. Neuro Anaesthesia- concepts
29. Neuro protection