CURRICULUM

PhD NEUROSURGERY

Datta Meghe Institute of Medical sciences

(DEEMED to be University)

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Curriculum Outline and Syllabus for PhD Neurosurgery

A) AIM OFTRAINING

The candidate at the completion of training would be expected to have acquired knowledge, skills, aptitude and attitudes to be able to function as an independent clinician / consultant and a serve as future teachers, trainers, researchers and leaders in the field of Neurosurgery

Objectives:

The end product:

1. Should be well acquainted with the current literature on relevant aspects ofthe basic, investigative, clinical and operativeneurosciences.
2. Should have acquired performance skills and ability to interpret relevantclinical investigations
3. Should be able to diagnose, plan investigations and treat common conditions in the specialty by relevant current therapeuticmethods
4. Should be acquainted with allied and general clinical disciplines to ensure appropriate and timelyreferral
5. Should be capable of imparting basic neurosurgicaltraining
6. Should be able to identify, frame and carry out research proposals in the relevant speciality

B) TRAINING SYSTEM

Full time, based on the residency pattern.

C) ELIGIBILITY

Essential:

1) Candidates who have passed MCh Neurosurgery approved by Medical Councilof India(MCI).
2) Candidates who have passed Diplomate of National Board (DNB) in NeuroSurgery.
3) Candidates who have appeared for MS/DNB Neuro Surgery exam andexpecting results may also submit their application subject to the condition that they pass their qualifying examination beforeadmission.

Mode of selection

1) The selection of candidates for the PhD Neurosurgery course will be basedon their knowledge - assessed through a Theory Test consisting ofmultiple choice questions covering neurosurgery and rest of general surgery of the level of M.S. General Surgery.

2) The written test consists of 100 MCQs (40 in General Surgery and 60in Neurosurgery. The duration of the examination will be $1^{1/2}$hours.
3) After the written examination there will be a personal interview for the merit listed candidates at the rate of 5 candidates for oneseat.

4) The personal interview will carry 20marks.

5) The final merit list will be drawn on the basis of marks obtained both in written examination and in personal interview.

The eligibility criteria and selection of candidates will be in accordance with University guidelines.

Overview

Total period of PhD Neurosurgery is 36- 60 months. Three months will be spent in learning Clinical Neurology. Externship to one of the premier institute of India for one month

D) TRAININGMETHODS

1. Clinical teaching in the outpatient clinics, emergencyroomand operation theatres. Clinical teaching rounds in ward and bedsidepresentations
2. Special teaching sessionslike

- Neuro radiology discussion (once a week),
- Tumour board (once a week)
- Neuro- endocrine clinics (once a month),
- Interdepartmental case discussions with Neurology (once a week), Neuropathology discussion (once a month)
- Seminars (once a month)
- Journal Club (once a month)
- Morbidity and Mortality meet (once a month)
- Treatment planning session (once a week)

3. Assisting and performing neurosurgicaloperations
4. Paper presentations atconferences
5. Preparation of manuscript forpublication
6. Training in an experimental microsurgical laboratory(desirable)
7. Classes forundergraduates and junior residents undergoing training inNeurosurgery

E) COURSE CONTENT

1. Clinical Neurosurgery including history taking, physical examination,diagnosis, selection and planning of relevant investigations, appropriate treatment and rehabilitation of patients with neurosurgical disorders including those presenting asemergencies
2. Essentials of Clinical Neurology especially with reference to disorders common in India and those likely to present to theNeurosurgeons
3. Basic medical sciences relevant to the practice of Neurosurgery including anatomy, physiology, biochemistry, pharmacology andepidemiology
4. Surgical Neuropathology and the essentials of the Pathology of Neurological disorders likely to present to theNeurosurgeon
5. Principles, technique and interpretation of Neuro radiological procedures likeCT and MRI scans, angiography and interventionalprocedures
6. Principlesand interpretation of common Neuro-physiological, Neuro-ophthalmological, Neuro-otological and Neuro-endocrinological tests especially with reference to Neurosurgicaldisorders

7. Performance of common neurosurgical operations in the supra and infratentorial compartments, in the spine and peripheral nerves, initially under supervision and later on independently. Ability to use microscope ismandatory.
8. Familiarity with various types of anaesthesia used in neurosurgery, their indications and contra indications, the use of ventilators and techniques of monitoring andresuscitation
9. Pharmacology and various drugs used in neurosurgery
10. Knowledge of recent advances in the field of neurosurgicalsurgery
11. Preparation of papers for presentation at scientific conferences and for publication
12. It is desirable to have microsurgical laboratory training where candidateslearn dissection/suturing of fine arteries/nerves under microscope and skull base dissections
13. Development of proper attitudes towards patients, their relatives, subordinates, colleagues andseniors
14. Candidate should have knowledge about computers and their application in clinicalpractice.

F) SUB-SPECIALTYTRAINING:

Neuro-Anaesthesiology:

There should be didactic lectures, covering anaesthetic techniques in Neurosurgical procedures, critical care management of an unconscious patient, resuscitation, ventilators and other life support systems. Neurosurgery trainees would also be expected to know the basics of anesthetic drugs and their interaction with systemic diseases and neurosurgical disease. Neurosurgery trainees would continue their training in the operation theatre by discussions with the Anaesthesiologists during the trainingperiod.

Neuroradiology:

Combined weekly Neuroradiology rounds or meetings. Candidates will rotate with Radiology for two weeks in the second year of training.

Medical Neurology and Neurophysiology:

Candidates should have 2 months (1 month in the second year and 1 month in the fourth year of the course) training in Neurology to familiarize themselves with common

neurological disorders. During this period candidate should also familiarize themselves with the technique and interpretation of EEG / EMG / NCV and evoked potentials.

Neuropathology:

There should be a 4 week rotation in Neuropathology during the third year, during which they should be familiarized with the techniques of grossing, staining procedures, brain cutting, autopsy methods and tissue processing including frozen sections and should be able to identify histological features of the common neurosurgical disorders. In addition, participation in regular clinicopathological conferences through the training period is essential.

Neuro-chemistry, Neuro-immunology:

There should be an encapsulated course of didactic lectures to familiarize the trainees with the elements and techniques of neuro-chemistry and neuro-immunology.

G) CLINICALROTATIONS

1. Neurology – total 2 months, one month in the first year of the course and another month in the second year of the course. Candidates are expected to familiarize themselves with common neurological disorders. During this period candidate should also familiarize themselves with the technique and interpretation of EEG / EMG / NCV and evokedpotentials.

2. Neuro-radiology – 2 weeks in the first year oftraining

3. Neuropathology – 4 weeks in the second year oftraining

H) TRAINING IN OTHERINSTITUTIONS

Candidate in the third year should visit other neurosurgical centers recognized by MCI for at least 4 weeks to be able to observe their practices and understand the difference in approaches to various neurosurgical problems.

It is desirable to have training in certain special areas at another center, when facilities like microsurgical lab training and interventional Neuro-radiology are not available within the parent department or institute.

I) LOGBOOK

The candidate is expected to maintain a Log Book of all his/her activities with respect to
(1) Bio-data (2) Complete List of Postings with periods and dates (3) Interesting cases seen and worked up during the period of posting (4) List of Short

Reviews presented (5) List of Long Reviews presented (6) List of Journals reviewed

(7) List of Cases presented and discussed in Bed-side clinics (8) List and abstracts of presentations in Conferences, PG Seminars, CPCs etc.
(9) Abstracts and lists of papers published or sent for publication. (10) Any other research projects undertaken. (11) Any other interesting detail.

This Log Book would be periodically scrutinized and certified by the Head of Department, other consultants and presented to the external examiners at the time of the final examination.

J) RESEARCH -Thesis

The candidates will be required to submit one thesis during the course of PhD programme. Progress on dissertations will be reviewed every semester and feedback given to the candidates.

The candidate will make at least 3 formal presentations to the Department, viz
(i) Protocol, (ii) Mid-course progress and (iii) Final report.

Thesis will be submitted at least six months before the completion of the course.

K) ESSENTIAL PRE-REQUISITE FOR APPEARING FOR THEPhD (Neurosurgery) FINALEXAMINATION:

1. **Logbook** of work done (surgical procedures performed / assisted, case presentation and other academic activities), rotations, internal assessmentreport.

2. **Publications** / paper based on review of available clinical material from the department.

3. One laboratory oriented project / prospective research related to Neurosurgery / thesis completed in all respects for publication preferably published. The thesis / dissertation should be in accordance with Universityguidelines.

4. Attendance as per rules of the institute – minimum 80% in each year of thecourse

J) EVALUATION OF PhD(Neurosurgery):

Thesis / dissertation will have to be submitted for evaluation by the completion of 2yrs and 6 months of the course

Timing of examinations

a) **Part 1** – at the end of 18 months oftraining
Two papers on basic neurosciences including anatomy, physiology, pharmacology, pathology, biochemistry, clinical neurology, neuroradiology , 100 marks each
pass marks will be 50% overall

Candidates will necessarily have to pass the above mentioned examination to be eligible to take the final examination

b) **Part 2 -** at the end of 3 years oftraining
Four papers – Basic Neurosciences (applied), Clinical Neurology and Neurosurgery (2 papers), advances and operative Neurosurgery, 100 marks each, total 400 marks
pass marks will be 50% overall

Candidates will necessarily have to pass in the theory examinations to be eligible to take the final practical examination and viva voce

Practical examinations

Distributed as follows

1. Practical clinical examination comprising of long and shortcases total 200marks

2. Radiology,pathology,operativeproceduresandgeneralviva total 200marks

Minimum pass marks will be 50%

Sample Paper I- Basic Neurosciences

Marks 100 (10 x 10)

Write short notes on

1. Microsurgical anatomy of the 3rd cranial nerve
2. Regulation of muscle tone and its abnormalities
3. Pharmacology and use of diphenylhydantoin
4. Microsurgical anatomy of the fourth ventricle
5. Pathology of pineal tumours
6. Blood brain barrier in health and disease
7. Embryology and pathology of split cord malformations
8. Internuclear ophthalplegia
9. Vascular supply of the spinal cord
10. Sciatic nerve

Sample Paper II – Applied Neurosciences

Marks 100

1. Discuss the pathology, clinical features, diagnosis and management of a patient with Cushing's disease. (20 Marks)

Write notes on Marks 80 (10 x 8)

a. Management of raised intracranial pressure
b. Lipomeningocoele
c. Arrested hydrocephalus
d. Complications of surgery for vestibular schwannoma
e. Carotid – cavernous fistula
f. Hangman's fracture
g. Management of trigeminal neuralgia
h. Brain abscess

Sample Paper III – Neuroradiology and Operative Neurosurgery

Discuss the pathology, clinical features, diagnosis and management of intracranialgerm celltumours Marks20

Writenoteson Marks 80 (8 x 10)

1. Surgical approaches to lesions in the anterior thirdventricle
2. Pituitaryapoplexy
3. Neuro –navigation
4. Management of lumbarspondylolisthesis
5. Endovascular management of intracranialaneurysms
6. Magnetic resonance spectroscopy and itsapplications
7. Bone grafts and bone graftsubstitutes
8. Erbs palsy

Sample Paper IV – Recent advances in Neurosurgery

Marks 100 (10 x 10)

Write notes on

1. Minimally invasive spinalsurgery
2. Controversies in the management of extra cranial carotid arterystenosis
3. Advances in chemotherapy for malignantgliomas
4. Management of brainmetastasis
5. Electrophysiological monitoring during surgery for cerebellopontine anglelesions
6. Role of diffusion tensor imaging inneurosurgery
7. Idiopathic intracranialhypertension
8. Role of endoscopy in the management ofhydrocephalus
9. Management of intractablepain
10. Thoracic discherniation