

Guidelines
For
Competency Based Training Programme
DrNB - Neurosurgery
2021



NATIONAL BOARD OF EXAMINATIONS IN MEDICAL SCIENCES

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TABLE OF CONTENT

S.NO	CONTENT	PAGE NO.
I.	Aim	3-6
II.	Teaching and Training Activities	7-8
III.	Syllabus	9-10
IV.	Log Book	11
V.	Recommended Books & Journals	12-13



I. AIM

The aim of teaching postgraduate students in neurosurgery is to prepare them to have adequate knowledge in the subject, covering both theoretical and practical knowledge, in accordance with the institutional goals.

The end product should have acquired knowledge, skills, aptitude and attitudes to be able to function as an independent clinician/consultant and a teacher acquainted with research methodology.

1. PROGRAMME GOAL

The goal of DNB course is to produce a competent Neurosurgeon who:

- i. Recognizes the health needs of patients and carries out professional obligations in keeping with principles of National Health Policy and professional ethics
- ii. Has acquired the competencies pertaining to neurosurgery that are required to be practiced in the community and at all levels of health care system
- iii. Has acquired skills in effectively communicating with the patients, family and the community.
- iv. Is aware of the contemporary advances and developments in medical sciences.
- v. Acquires a spirit of scientific enquiry and is oriented to principles of research methodology.
- vi. Has acquired skills in educating medical and paramedical professionals

2. PROGRAMME OBJECTIVES

Curriculum objective has been to impart essential clinical knowledge so that he/she becomes capable of working up and treating a neurosurgical problem in a logical way inculcating preventive and socioeconomic aspects also in care

The objectives of postgraduate degree training programme - in terms of knowledge and skills – are to enable a candidate to

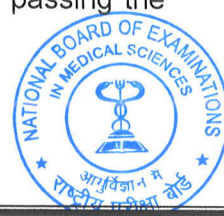
- i. Recognize the key importance of medical problems in the context of the health priority of the country
- ii. Practice the specialty of Neuro surgery in keeping with the principles of professional ethics



- iii. Identify social, economic, environmental, biological and emotional determinants of Neuro Surgery and know the therapeutic, rehabilitative, preventive and promotion measures to provide holistic care to all patients
- iv. Take detailed history, perform full physical examination and make a clinical diagnosis; Perform and interpret relevant investigations (Imaging and Laboratory); Perform and interpret important diagnostic procedures;
- v. Diagnose illnesses in patients based on the analysis of history, physical examination and investigative work up.
- vi. Plan and deliver comprehensive treatment for illness to his patients using principles of rational drug therapy; Plan and advise measures for the prevention of diseases.
- vii. Plan rehabilitation of patients suffering from chronic illness, and those with special needs; manage emergencies efficiently.
- viii. Demonstrate skills in documentation of case details, and of morbidity and mortality data relevant to the assigned situation
- ix. Demonstrate empathy and humane approach towards patients and their families and respect their sensibilities.
- x. Demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities.
- xi. Develop skills as a self-directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze relevant published literature in order to practice evidence-based medicine;
- xii. Demonstrate competence in basic concepts of research methodology and epidemiology; Facilitate learning of medical/nursing students, practicing surgeons, paramedical health workers and other providers as a teacher-trainer
- xiii. Play the assigned role in the implementation of national health programs, effectively and responsibly.
- xiv. Organize and supervise the desired managerial and leadership skills;
- xv. Function as a productive member of a team engaged in health care, research and education.

a. Knowledge:

- At the end of the course, upon successful completion of training and passing the examination the student is expected to



- Acquire comprehensive knowledge of the basics of neurosurgery including all allied specialities related to neurosurgery like Neuroanatomy, Neuropathology, Neuro infections, Neuro immunology, Preventive Neurology, Neuro epidemiology, Pediatric Neurology etc.
- Acquire knowledge in interpretation of common neuroimaging investigations such as CT scanning, PET scanning, MRI scanning, MR and Digital subtraction angiography, MR spectroscopy and Single Photon Emission Computerized Tomography etc.
- Possess a complete knowledge of all the commonly used Neurosurgery procedure diagnostic tests like Electroencephalography, Evoked Potentials, etc.
- Possess knowledge of the recent advances in the subject of Neurosurgery and all its allied specialities and working knowledge of the sophisticated and routine equipments.
- Possess basic knowledge in Neurochemistry, Neurogenetic and molecular biology related to neurosurgery
- Possess knowledge of principles of research work in the field of Neurology and Neurosurgery in both the clinical and experimental field with the ability to analyse data.
- Acquire knowledge in the interpretation of special investigations such as Video EEG, autonomic function tests, Transcranial Doppler tests, Magnetic Encephalogram etc.
- Mandatorily enroll and undergo training in at least one Cadaveric workshop every year
- Acquire the basics of knowledge and skills in Online Consultations
- Be aware in basics of Medicolegal aspects of practicing Neurosurgery in India
- Periodic Basic sciences exam in the first year with the question papers and answer sheets being evaluated centrally

b. Skills:

- Diagnose and manage majority of conditions in the specialty of Neurosurgery on the basis of clinical assessment, and appropriate investigations.
- Possess complete clinical Diagnostic Skills for the recognition of common Nervous system diseases.



- Acquire skills in the interpretation of special investigations such as DSA, Video EEG monitoring, EEG – Telemetry, autonomic function tests, Transcranial Doppler tests, CT scanning, PET scanning, MRI scanning, MR and Digital subtraction angiography, MR spectroscopy and Single Photon Emission Computerized Tomography etc.
- Acquire skills in invasive procedures such as lumbar puncture, intrathecal drug administration, CSF manometry; assisting in digital subtraction angiography and intraarterial thrombolysis; and Nerve and muscle biopsy and their interpretation of relevant histopathology etc.
- Acquire exposure in sophisticated neuromodulation procedures such as planning of deep brain stimulation, vagal nerve stimulation etc.
- Able to apply sound clinical judgment and rational cost effective investigations for the diagnosis and management of Neurosurgery Cases in the OPD, WARdS, Emergency Room and Intensive Care Unit.
- Be able to teach undergraduate MBBS and Post Graduate Students in the subject of Neurosurgery.
- Be able to perform Clinical and Investigative studies and to present in Seminars, meetings and conference etc.
- Have the ability to organize specific teaching and training programmes for paramedical staff, associated professionals and patient education programmes.
- Should be able to develop good communication skills and give consultations to all other departments of the hospital.
- Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
- Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectation.
- Develop skills as self-directed learner recognizes continuing educational needs: select and use appropriate learning resources.



II. TEACHING AND TRAINING ACTIVITIES

1. Training curriculum for 3 yrs. course

1 st Year	Basic Neurosciences (Neuroanatomy, Neurophysiology, Neurochemistry, Neuropathology, Neuropharmacology, Clinical Neurology), by way of didactic lectures, symposia, etc. Patient care, history taking and neurological examination, case-sheet writing, preparing discharge summaries, supervised emergency calls, Academic activity. Basic Sciences online theory exam at the end of one year
2 nd Year	Overall in-charge of ward work, OPD, Emergency calls, Neurology posting for one month at the end of the second year and 2 weeks posting in neuro interventional lab.
3 rd Year	Academic activity, Emergency calls, assisting and managing operation theatres, Posting in other Neurosurgical centre(s) for 1 month in the beginning of final year. Desirable: Training in skill lab, Cadaveric workshops

2. Minimum operative surgical exposure required for the trainees:

i. Mandatory:

- 200-250 cases exposure at least for the whole training program. Minimum 30 independent surgeries for 3-year course; performed independently/ under supervision in the OT.
- At least 2 OTs a week including trauma
- About 1/3 cranial and 1/3 spinal cases
- Spectrum of surgeries should include Neuro-trauma, Neuro-oncology, Stroke and cerebrovascular surgery, Pediatric Neurosurgery, Spinal surgery and peripheral nerve surgery,
- If any of the sub specialities is not available, the trainee may be posted to other centres where such sub specialty is available for 4 weeks and 8 weeks respectively for 3 years and 6 years course.
- Consent taking and procedure Specific Consent



- g. Desirable:
- h. Exposure to sub-specialties including
- i. Cerebrovascular surgery including endovascular procedures
- j. Functional Neurosurgery and Epilepsy surgery
- k. Neuro-endoscopy
- l. Peripheral nerve surgery
- m. Minimal invasive spinal & cranial surgery.
- n. Stereotactic surgery

3. Practical Surgical training curriculum: 3 years

1 st Year	Lumbar puncture, external ventricular drainage, tracheostomy, endotracheal intubation, emergency scalp suturing, Simple neuro-trauma including chronic subdural hematoma, extradural hematoma, learning elective case exposures, VP shunt (under supervision).
2 nd Year	Neurotrauma: contusion and intracerebral hematoma, Elective craniotomy and spinal exposures
3 rd Year	Elective exposures, supervised surgery, Sub-speciality exposure depending on interest, independent elective surgical procedures (as outlined below)

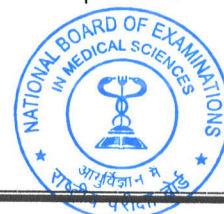
4. Independent surgery (supervised):

Neuro-trauma: Chronic SDH, EDH, depressed fractures, ICH, contusions, (Experience with conventional craniotomy required). Elective cases: VP shunt, Gliomas (at least 2 anatomical regions), Surface meningiomas, Chiari malformation, Midline suboccipital exposure and surgery, Lumbar disc and cervical disc surgery.

Simple spinal instrumentation, laminectomy, extradural intradural spinal exposure.

Attendance (paper/ poster presentation) in Neurosurgical conferences/workshops:

- i. Minimum 1 for 3 year and Publication of papers (in peer reviewed journals): Minimum 1(In case an Institution is unable to fulfill the bare requirements, e.g. absence of a particular sub-specialty, the trainees should be allowed to go and train for a stipulated period at any other Institute, where that particular surgery is practiced.)



III. SYLLABUS

1. Basics in Neuroanatomy, Neurophysiology, Neuropathology, Electrophysiology, Neuro pharmacology, Neuro biochemistry, Neuro immunology with reference to neurosurgery
2. Neuroradiology:
3. Normal skull & spine, changes in skull and spine due to SOL, special views. Contrast studies – DSA, Isotopic scanning & diagnostic procedures – C.T. Scan, M.R.I & P.E.T Scan etc.
4. Neurology:
5. Methods of clinical examination, General diagnostic principles, Localization with specific reference to function of brain & spinal cord.
6. Neurosurgery:
 - i. Basic principles
 - ii. Vascular Neurosurgery
 - iii. Neuro- oncology
 - iv. Surgery for congenital malformation like Hydrocephalus, craniovertebral anomalies, syringomyelia, spinal dysraphism management etc.
 - v. Traumatic brain and spinal & peripheral nerve Injuries
 - vi. Spinal instrumentation
 - vii. Different approaches for disc surgeries
 - viii. Management of brain secondaries
 - ix. Infection of CSF
 - x. Pediatric neurosurgery
 - xi. Minimal Invasive (stereotactic neurosurgery) and neuroendoscopy.
 - xii. Functional neurosurgery
7. Other areas in which knowledge is to be acquired:
 - i. Biostatistics, Research Methodology and Clinical Epidemiology
 - ii. Ethics
 - iii. Medico legal aspects relevant to the discipline



- iv. Health Policy issues as may be applicable to the discipline
- v. Nuances of Online Consultation
- vi. Medicolegal Aspects of Neurosurgical Practice

8. Training on sub-specialty of neurosciences

- i. Neuro-Anesthesiology: The candidate must learn the resuscitation management of coma, life supporting system & monitoring of patients. The neurosurgery training should also know the interaction of anesthetic drugs with systemic disease condition. The major thrust would be on continuing training for the Neurosurgery trainees in the operation theatre as a result of the informal discussions which would be taking place during the training period.
- ii. Neuroradiology: Combined Neuroradiology rounds or meetings twice or thrice a week.
- iii. Neuropathology It is suggested that there should be a 4 week capsuled training for Neurosurgery trainees or regular once a week Neuropathology conference in 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.



IV. LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s)) The candidate will maintain the record of all academic activities undertaken by him/her in log book.

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.



V. RECOMMENDED BOOKS & JOURNALS

BOOKS

1. Brain Surgery: Complication avoidance and management - Michael, L.J. Apuzzo. 2 vol, Elsevier,
2. Neurological Examination Part A - De Jong's, Lippincott,
3. Principals of Neurology – Adams, MGH,
4. Localization in Clinical Neurology – Brazis., Lippincott,
5. Neurological Surgery – Youmans., Elsevier,
6. Operative Neurosurgery techniques - Schmidek/Sweet. Elsevier,
7. Micro neurosurgery - Yasargil. 4 Volume, Thieme, New youk,
8. Principal of Neurosurgery Rengachary, Elsevier,
9. Neuropathology - Greenfield, Holdder, Apuzzo
10. Brain Surgery: Complication avoidance and management
11. De Jong's Neurological Examination Part A
12. Brazis Localization in Clinical Neurology
13. Youmans Neurological Surgery
14. Wilkins/Rengachary Neurosurgery
15. Ramamurthi Text Book of Neurology & Neurosurgery
16. Greenfield's Neuropathology

JOURNALS

1. J Neurotrauma
2. J Neurosurgery
3. J Neurosurgery Spine
4. Acta Neurochirurgica



5. Surgical Neurology
6. Paediatric Neurosurgery
7. Neurosurgical Clinics of North America
8. Neurosurgical Focus
9. Journal of Neurosurgery: Paediatrics
10. Spine
11. Neurosurgery
12. Surgical Neurology
13. Neurology India

