



**ODISHA UNIVERSITY OF HEALTH SCIENCES,
BHUBANESWAR**



**PG Curriculum
M.Ch. NEUROSURGERY**

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Goal & Objectives of syllabus of M.Ch. Neurosurgery

Goal:

Goal of the course is to orient and train the students on different aspects of clinical diagnosis, different investigations and especially specific radiological investigations and management. This includes surgical procedure of different disorders of the central and peripheral nervous system and otherwise conservative management. They should be able to take independent decision regarding treatment of neurosurgical patients at secondary and tertiary level of medical care.

Objectives:

In order to achieve the goal of the course the following accomplished by the time the candidate completes three years course.

Three broad domains of the objectives are:

- 1 Cognitive domain (knowledge)
- 2 Psychomotor domain (skills)
3. Attitudinal domain (Human values, ethical practice etc.)

Cognitive domain (knowledge)

1. Describe aetiology, pathophysiology and principles of diagnosis and management of craniocerebral trauma, neurological conditions requiring surgical intervention including emergencies in adults and children.
2. Understanding the basic sciences relevant to neurology & neurosurgery
3. Identify important determinants namely - eg. Social, economic and environmental factors and take them into account for planning therapeutic measures.
4. Recognize conditions that may be outside the area of speciality / competence and refer them to proper specialist or ask for help.
5. Advise regarding the management (including interventional neurosurgery) of the case and to carry out the management effectively.
6. Update oneself by self-study and by attending courses, seminars, and workshop which are relevant to the field of neurosurgery
7. Carry out guided research with the aim of publishing his/ her work and presenting work at various scientific fora.

Psychomotor domain (Skills)

1. Take a proper clinical history, physical and neurological examination of the patient, perform essential diagnostic/interventional procedures and interpret the result to come to a reasonable diagnosis or differential diagnosis in the condition.
2. Provide basic lifesaving support service in emergency situations.

3. Undertake complete patient monitoring including the care of the patient.

Attitudinal domain

1. Adopt ethical principles in all aspects of his/her practice. Professional honesty and integrity to be fostered.
2. Develop communication skills in order to explain the various options available in management and to obtain a true informed consent from the patient.
3. Be humble and accept the limitations of his knowledge and skills and to ask for help from colleagues / seniors when needed.
4. Respect patient rights and privileges including patient's right to information and right to seek a second opinion.
5. Recognize and describe appropriately various manifestations of benign and malignant neoplasms of the brain and spinal cord.

Evaluation

Resident's progress through daily observation of work.

At the end of the rotation an assessment by a small group of faculty.

Maintaining a log book showing techniques learnt during the rotation-to be supervised.

Teaching and learning activities:

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/himself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

1. **Lectures:** lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a) Didactic Lecturers: Recommended for selected common topics for postgraduate students of all specialties. Few topics are suggested as examples:

- 1) Bio-statistics
- 2) Use of library
- 3) Research methods
- 4) Medical code of Conduct and Medical Ethics
- 5) National health and disease control programs
- 6) Communication skills etc.

7) Initial introductory lectures about the subject

These topics may preferably taken up in the first few weeks of the 1 year.

b) Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, e.g. Jaundice, Diabetes Mellitus, Thyroid disorders etc.

2. Faculty talk (Subject seminar): Every week on Monday morning between 9.00 AM to 10.00 AM, a topic is selected and discussed by faculty and Senior Residents and M.Ch. students are encourage to actively participate.

3. Radiology seminar: Every Tuesday between 9.00 AM to 10.00 AM all radiological investigations are discussed by M.Ch. students. The radiology department also participate during this time.

4. Clinical Case presentation: Every Wednesday between 9.00 AM to 10.00 AM a long case is presented by M.Ch. students. Should be attended by neurologist

5. Student symposium: Every Thursday between 9.00 AM to 10.00 AM a topic selected from neuro-anatomy, physiology, pharmacology, pathology and surgical procedures is discussed.

6. Journal Club : Held on every Friday between 9.00 AM to 10.00 AM. All the M.Ch. students are expected to attend and actively participate in discussion and enter in the logbook relevant details. Further, every candidate must make a presentation from the allotted journal (s) of selected articles at least four times a year and a total of 12 presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (See Check list in Chapter IV). A timetable with names of the students and the moderator should be announced at the Beginning of every year.

7. Death review: Every Saturday between 9.00 AM to 10.00 AM, a M.Ch. student presents and analyses the death of patients.

8. Subject seminar: Recommended to be held once a week. All the M.Ch. students are expected to attend and actively participate in discussion and enter in the logbook relevant details. Further, every candidate must present on selected topics at least four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (See Check list in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.

9. Inter Departmental Meeting: Being done particularly with departments of Neurology, Radiology and Pathology at least twice a month. These meetings should be attended by postgraduates students and relevant entries must be made in the Logbook.

10. Teaching skills: postgraduate students must teach undergraduate students (e.g. Medical Nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by faculty. Record of their participation should be kept in Logbook. Training of postgraduate students in Educational Technology is recommended.

11. Continuing Medical Education Programmes (CME): At least 2 state / national level CME programmes should be attended by each student in 3 years.

12. Conferences: attending conferences is optional. However, participation and presentation of scientific paper should be encouraged.

DISSERTATION

Thesis

1. Every candidate pursuing M.Ch. degree course is required to carry out work on a selected research project under the guidance of a recognized post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

2. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis and comparison of results and drawing conclusions.

3. Chief guide will be from the department of Neurosurgery while co-guides will be from either the department or other disciplines related to the dissertation topic.

4. Every candidate shall submit a thesis protocol to the Dean of the Institute in the prescribed proforma containing particulars of proposed dissertation work four months from the date of commencement of the course. The thesis protocol shall be sent through the proper channel.

Protocol in essence should consist of:

- a) Introduction and objectives of the research project.
- b) Brief review of literature
- c) Suggested material and methods
- d) Bibliography

5. Such thesis protocol will be reviewed and the dissertation topic will be registered by the Institute. No change in the dissertation topic or guide shall be made without prior approval of the Dean of the Institute.

6. Submission of thesis, dissertation.

Thesis will be submitted at the end of two and a half (2.5) years.

Thesis should consist of

- (a) Introduction
- (b) Review literature
- (c) Aims and objectives
- (d) Material and methods
- (e) Result
- (f) Discussion
- (g) Summary and conclusion

- (h) Tables
- (i) Annexure
- (j) Bibliography

7. Two copies of dissertation thus prepared shall be submitted to the Dean, six months before the final examination.

8. The dissertation shall be valued by two external examiners appointed by the institute. Approval of dissertation work is an essential precondition for a candidate to appear in the final M.Ch. examination.

Dissertation is graded as follows:

- Highly commendable
- Commendable
- Satisfactory
- rejected

9. Records: records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI

SCHEME OF EXAMINATION

- i. Theory 400 marks

There shall be four question papers, each of three hours duration. Each paper shall consist of 10 questions. Each question 10 marks. All questions are compulsory. Total marks for each paper will be 100. Questions on recent advances may be asked in fourth paper. Details of distribution of topics for each paper will be as follows:

Paper-I-Basic Sciences

Paper-II-Neurosurgery

Paper-III-Neurosurgical core subjects

Paper-IV- Recent advances

- ii. Clinical 200 marks
 - a) Long Case – One 100 Marks
 - b) Short Cases - Two 100 Marks (50 x 2)
- iii. Practical 100 Marks (50 marks operative skills)

All examiners will conduct viva-voce conjointly on candidates comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents, spotters of conventional & newer imaging techniques and instruments. In addition, candidates may be also be given case reports, charts etc., for interpretation. It includes discussion on dissertation also. A topic be given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes.

iv. Viva

100 marks

| Max. Marks for | Theory | Clinical | Practical | Viva | Grand Total |
|----------------|--------|----------|-----------|------|-------------|
| Neurosurgery | 400 | 200 | 100 | 100 | 800 |

Note: Minimum 50% marks in theory, 50% in practical and 50% in viva voce are required to declare a student pass in the subject.

M.Ch. NEUROSURGERY

(3 YEAR PROGRAMME)

INTRODUCTION

This curriculum reflects the body of knowledge which should be attained by an individual completing residency training in Neurological Surgery . it serves to create an organizational structure of academic, clinical, and technical criteria for the training of residents in Neurological Surgery. The goal is to improve patient care by assuring residents completing training have achieved the highest possible level of competency in Neurological Surgery.

The curriculum is constructed in such a manner that the educational experience is divided into two levels - Junior and Senior. The resident should display competency in each level before progressing to the next. Those individuals who do not stay on track will be promptly identified in an objective manner, thereby enabling more timely remedial attention or dismissal. The programs is structured to allow residents to act independently various tasks commensurate with their skills and the specific medical situation.

SYLLABUS

PART 1

1. NEUROANATOMY

Demonstrate knowledge of anatomy that is pertinent to the diagnosis of diseases of the nervous system and the practice of neurological surgery.

- a) Review the embryological development of the brain, cerebellum, brain stem glial elements, spinal cord, conus medullaris, cauda equine, sympathetic and parasympathetic systems and the peripheral nervous system.
- b) Discuss the embryologic development of the skull, craniovertebral junction and spine.
- c) Describe and differentiate the different types of neurons

2. NEUROPHYSIOLOGY

Demonstrate knowledge of physiology that is pertinent to the understanding of neurological disease.

3. NEUROPATHOLOGY

Demonstrate knowledge of neuropathology that is pertinent to the diagnosis of disease of the nervous system and practice of neurological surgery.

4. NEUROPHARMACOLOGY

Demonstrate knowledge of pharmacology that is pertinent to the treatment of neurological disorders and diseases which affect the nervous system.

5. FLUIDS, ELECTROLYTES AND NUTRITION

Demonstrate an understanding of normal and pathologic fluid and electrolyte homeostasis. Demonstrate an ability to maintain normal electrolyte balance. Demonstrate an understanding of the basics of nutritional management in neurosurgical patients

PART-11

1. NEUROLOGY

Demonstrate an understanding of the neurologic examination, diagnostic neurologic testing, neurologic diseases and their treatment.

2. NEURORADIOLOGY

Demonstrate an understanding of neuroradiological imaging and interventions as they specifically relate to neurosurgical patients.

3. GENERAL CRITICAL CARE

Demonstrate an ability to triage neurosurgical patients to and from a critical care setting. Demonstrate a knowledge of and the ability to manage neurosurgical patients in a the critical care setting.

4. INFECTION

Demonstrate an understanding of the factors related to the acquisition, diagnosis, and treatment of infections as they pertain to neurosurgical patients. Describe the typical presentation and treatment of common neurosurgical infections. Review the methods used to minimize infectious complications in neurosurgical patients.

Demonstrate an understanding of the techniques to minimize the risk of spread of viral infections, including hepatitis and human immunodeficiency virus (HIV).

5. CEREBROVASCULAR SURGERY

Demonstrate an understanding of the anatomy, physiology, pathophysiology and presentation of cerebrovascular diseases, including ischemic and hemorrhagic stroke, an other diseases and malformations of intracranial, extracranial, and spinal vasculature Demonstrate the ability to formulate and implement a diagnostic and treatment plan for cerebrovascular diseases, including medical and surgical management.

6. NEUROSURGICAL ONCOLOGY

Demonstrate an understanding of the anatomy, physiology, pathophysiology, and presentation of tumor-related diseases of the cranium. Demonstrate the ability to formulate and implement a diagnostic and treatment plan for tumor-related diseases of the cranium that are amenable to surgical intervention.

7. NEUROTRAUMA AND NEUROSURGICAL CRITICAL CARE

Demonstrate an understanding of the anatomy, physiology, pathophysiology, and presentation of traumatic injuries of the brain, spinal cord, and peripheral nervous system, including their supporting structures. Demonstrate the ability to formulate and implement appropriate diagnostic and treatment plans for traumatic injuries to the nervous system. including both surgical and non-surgical management.

8. SPINAL SURGERY

Demonstrate an understanding of the anatomy, physiology, pathophysiology, and presentation of disorders of the spine, its connecting ligaments, the spinal cord, the cauda equine, and the spinal roots. Demonstrate the ability to formulate and implement a diagnostic and treatment plan for diseases of the spine, its connecting ligaments, the spinal cord, the cauda equine, and the spinal roots that are amenable to surgical intervention.

9. PEDIATRIC NEUROSURGERY

Demonstrate an understanding of the anatomy, physiology, pathophysiology, and presentation of diseases in children which a neurosurgeon may be called upon to diagnose and treat. Demonstrate the ability to formulate and implement a diagnostic and treatment plan for these diseases.

10. STEREOTACTIC AND FUNCTIONAL NEUROSURGERY

Define neurosurgical stereotactic procedures and recognize their proper application. Describe the appropriate anatomy, physiology, and presentation of patients that are candidates for stereotactic procedures.

11. SURGERY OF THE PERIPHERAL NERVOUS SYSTEM

Demonstrate an understanding of the anatomy, physiology, pathophysiology and presentation of peripheral nerve disease. Demonstrate the ability to formulate and implement a diagnostic and treatment plan for disease of the peripheral nerves that are amenable to surgical intervention.

12. PAIN MANAGEMENT

Illustrate an understanding of the anatomical and physiological substrates of pain and pain disorders. Demonstrate an ability to formulate and execute diagnostic and therapeutic plans for management of pain and disorders giving rise to pain.

REFERENCE TEXTS AND PERIODICALS

Clinical Neurology / Neurosurgery

1. Paul W. Brazis, Joseph C. Masdeu, Jose Biller - Localization in clinical neurology.
2. William Wesley Campbell, Russell N. DeJong, Armin F. Haerer - DeJong's The Neurological Examination.

Neurosurgery

1. Mark S. Greenberg, Nicolas Arredondo - Handbook of Neurosurgery.
2. H. Richard Winn - Youman's Neurological Surgery.
3. Robert H. Wilkins, Setti S. Rengachary - Neurosurgery
4. Ravi Ramamurthi, PN Tandon - Text Book of Neurosurgery
5. H. Hunt Batjer, Christopher M. Loftus - Textbook of neurological surgery: principles and practices.
6. Marc Sindou - Practical handbook of Neurosurgery.

Operative Neurosurgery

1. Henry Schmidek, David Roberts - Schmidek and Sweet's Operative Neurosurgical Techniques.
2. Lalgam Sekhar, Richard Fessler-Atlas of Neurosurgical Techniques; Brain.
3. Richard Fessler Lalgam Sekhar - Atlas of Neurosurgical Techniques : Spine and Peripheral nerves.
4. Michael Apuzzo-Brain Surgery: Complication Avoidance and Management.
5. Andrw Kaye, Peter Black - Operative Neurosurgery

Neurology

1. Walter G. Bradley, Robert B. Daroff, Gerald Fenichel, Joseph Jankovic - Neurology in Clinical Practice.
2. Allan Ropper, Martin Samuels-Adams and Victor's Principles of Neurology.

Neuroradiology

1. Anne G. Osborn - Diagnostic Imaging: Brain
2. Jeffrey Ross – Diagnostic Imaging : Spine
3. Anne G. Osborn – Diagnostic Cerebral Angiography

Neuropathology

1. Louis, D.N., Ohgaki, H., Wiestler, O.D., Cavenee, W.K. – WHO classification of tumours of the central nervous system, 4th edition.
2. Seth Love, David N Louis, David W Ellison – Greenfield's Neuropathology.

Neuropharmacology

1. Laurence Brunton, Bruce Chabner – Goodman and Gilman's The pharmacological Basis of Therapeutics, Section II – Neuropharmacology (pgs 169-649)

Neuroanaesthesiology and neurocritical care

1. Cottrell, Young – Cottrell and Young's Neuroanesthesia.
2. Basil F. Matta, David Menon, John M. Turner – Textbook of Neuroanaesthesia and Critical Care.
3. Paul L. Marino and Kenneth M. Sutin – The ICU bpk

Neuroanatomy

1. Albert Rhoton – Rhoton’s Cranial Anatomy and Surgical Approaches.
2. Richard Snell – Clinical neuroanatomy

Neurophysiology

1. Kim E. Barrett, Susan M. Barman- Ganong’s Review of Medical Physiology (Section II, III pgs. 79-289).

Journals

1. Neurosurgery (Official journal of the congress of neurological surgeons).
2. Journal of neurosurgery (Official journal of the American association of neurological surgeons).
3. Acta Neurochirurgica (Official journal of the European association of neurological surgeons).
4. Neurology India (Official journal of the neurological society of India).
5. Child Nervous system
6. British Journal of Neurosurgery (Official Journal of the British Neurosurgical society).
7. Neurosurgery quarterly
8. Advances and technical standards in Neurosurgery

