

CURRICULUM
DM NEUROLOGY
2009-10



JAWAHARLAL INSTITUTE OF POSTGRADUATE MEDICAL EDUCATION &
RESEARCH (JIPMER),

PUDUCHERRY-605 006

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CURRICULUM - D.M. NEUROLOGY

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1. COURSE OBJECTIVES

The Higher Specialty Post-Doctoral Course D.M Neurology is all set to be started at JIPMER, Pondicherry.

The Course has been planned as per Cabinet committee's decision to start DM/MCH courses in the existing higher specialties in JIPMER, consequent to the upgradation of infrastructure of the department to suit the commencement of DM course through the creation of the superspecialty block and shifting of our department to this newly created facility in April 2009. The Cabinet committee has granted approval of starting of this courses in this institute of national importance declared through an act of Parliament vide Gazette notification dated 19th of May, 2008 and the chief purpose of creation of the superspecialty block has been to start higher specialty courses including Neurology in which the country needs more specialists of the best caliber and training who are capable of delivering excellent standards in clinical care in Neurology .

The Course Duration is for 3 Years as per the norms of the Medical Council of India Recommendations on Post Graduate Medical Education Adopted by the Medical Council of India in January 1992 Revised up to April 1993, and opening of Higher Course of study regulation 1993 as amended by Gazette notification part III-section 4 dated 24th June 1997, amended again and called as The Post graduate Medical Education Regulations and published in Part III, Section 4 of Gazette Of India Dated the 7th October, 2000.

GENERAL CONDITIONS TO BE OBSERVED AS PER MCI AND PARLIAMENT NOTIFICATION ON A CENTRE OF EXCELLENCE GUIDELINES

1. Post Graduate Medical Education in the case of Super-specialties shall be of three years duration after MD as prescribed.
2. Post Graduate Curriculum shall be competency based.
3. Learning in post graduate programme shall be essentially autonomous and self directed.

4. A combination of both formative and summative assessment is vital for the successful completion of the PG programme.
5. A modular approach to the core curriculum is essential for achieving a systematic exposure to the various sub-specialties concerned with the discipline of Neurology.
6. The training of PG students shall involve learning experience derived from and targeted to the needs of the community. It shall, therefore, be necessary to expose the students to community base activities.

1.1: TRAINING OBJECTIVES

GENERAL OBJECTIVES OF POST-GRADUATE TRAINING EXPECTED FROM STUDENTS AT THE END OF POST GRADUATE TRAINING AS RECOMMENDED BY THE MCI

At the end of the Postgraduate training in the discipline concerned the student shall be able to

1. Recognise the importance of Neurology in the context of the health needs of the community and national priorities in the health sector.
2. Practice Neurology ethically as per the Hippocratic oath and in step with the principles of primary health care, International GCP guidelines (Good Clinical Practice) .
3. Demonstrate sufficient understanding of the basic sciences relevant to Neurology.
4. Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
5. Diagnose and manage majority of conditions in the specialty of Neurology on the basis of clinical assessment, and appropriately selected and conducted investigations.
6. Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty of Neurology.
7. Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
8. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectation.
9. Play the assigned role in the implementation of National Health Programmes, effectively and responsibly.
10. Organise and supervise the Neurological Health Care services demonstrating adequate managerial skills in the clinic/hospital in the field situation.
11. Develop skills as a self-directed learner, recognise continuing educational needs: select and use appropriate learning resources.
12. Demonstrate competence in basic concepts of research methodology and epidemiology and be able to critically analyse relevant published research literature.
13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
14. Function as an effective leader of a health team engaged in health care, research or training.

COMPONENTS OF THE POST GRADUATE CURRICULUM

The major components of our Post-Graduate Curriculum are according to the guidelines issued by the MCI

1. Theoretical Knowledge
2. Practical and Clinical skills
3. Attitudes including Communication skills
4. Knowledge about research methodology.

TRAINING OBJECTIVES IN THE HIGHER SPECIALTY OF NEUROLOGY

KNOWLEDGE:

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

- 1.1.1: Acquire comprehensive knowledge of the basics of Neurology including all allied specialities related to Neurology like Neuroanatomy, Neurophysiology, Neurochemistry, Neuropharmacology, Neuroimaging, Neuropathology, Neuroinfections, Neuroimmunology, Preventive Neurology, Neuroepidemiology, Paediatric Neurology and Neurosurgery.

SKILLS

- 1.1.2: Possess complete Clinical Diagnostic Skills for the recognition of common Nervous system diseases.
- 1.1.3: Possess a complete knowledge of all the commonly used Neurophysiological diagnostic Tests like Electroencephalography, Electroneurography, Electromyography, Cerebral evoked potentials.
- 1.1.4: Acquire skills in the performance and interpretation of special investigations such as Polysomnography, Video EEG monitoring, EEG-Telemetry, autonomic function tests, Transcranial Doppler tests
- 1.1.5: Acquire skills in interpretation of common neuroimaging investigations such as CT scanning, MRI scanning, MR and Digital subtraction angiography, Myelography, MR spectroscopy and Single Photon Emission Computerised Tomography.
- 1.1.6. 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;
- 1.1.7. Acquire exposure in sophisticated neuromodulation procedures such as planning of deep brain stimulation, vagal nerve stimulation;.

1.1.8. Able to apply sound clinical judgement and rational cost effective investigations for the diagnosis and management of Neurology Cases in the OPD, Wards, Emergency Room and Intensive Care unit.

1.1.9: Possess some understanding of the recent advances in the subject of Neurology and all its allied specialities and working knowledge of the sophisticated and routine equipments, consumables used in Neurology especially with respect to Neurochemistry, Neurogenetic and molecular diagnostic techniques

1.2.0: Possess knowledge of principles of research work in the field of Neurology in both the Clinical and experimental field with the ability to usefully analyse data.

1.2.1: Be able to teach undergraduate students MBBS and Post Graduate Students MD Med or Pediatrics or Psychiatry as well as investigative Neurology.

1.2.2: Be able to perform Clinical and Investigative studies and to present in Seminars, meetings and conferences etc.

1.2.3: Have the ability to organise specific teaching and training programmes for para medical 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.

ATTITUDE AND VALUES

Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal **skills and behaviour in accordance with the societal norms and expectation.**

1.2: NATIONAL OBJECTIVES

1.2.1: Should be able to work in any hospital in India with minimum of facilities and should be able to diagnose and treat Neurological disease swiftly and efficiently both on an elective and emergency basis.

1.2.2: Should be able to start a Neurology Unit with effective functioning with minimum inputs.

1.2.3: Should be able to work effectively in National Programmes for the Prevention or Eradication of Neurological Diseases as laid down under the goals of national mental health programme and ICMR programmes .

2. COURSE CONTENT

A) AIM: To produce specialists with necessary skills, judgement and sense of dedication to tackle all major and minor cardiac problems. The candidates will be trained in all aspects of Neurology starting from Basic Sciences to Recent Advances.

B) THEORY: The study will cover the entire scope of Neurology.

2.1: BASIC SCIENCES RELATED TO NEUROLOGY

2.1.1: NEUROANATOMY

The Neuroanatomy with special emphasis on development of Neuraxis (brain, spinal cord and neurons and glia), autonomic nervous system and their maturation process in the post natal, childhood and adolescent states; the location and significance of stem cells, CSF pathways, Blood supply and sinovenous drainage of brain and spinal cord, the meninges, skull and vertebral column, the cranial nerves, spinal roots, plexuses, and their relation to neighbouring structures; anatomy of peripheral nerves, neuromuscular junction and muscles; histology of cerebrum, cerebellum, pituitary gland, brain stem and spinal cord, nerves and neuromuscular junction and muscle. Functional anatomy of lobes of cerebrum and white matter tracts of brain and spinal cord, craniovertebral junction, conus and epiconus and cauda equina, brachial and lumbosacral plexuses, cavernous and other venous sinuses; New developments in understanding of ultrastructural anatomy of neurons, axonal transport, neural networks and synapses and nerve cell function at molecular level.

2.1.2: NEUROPHYSIOLOGY

Neurophysiology will cover all the physiological changes in the nervous system during its normal function with special reference to nerve impulse transmission along myelinated fibres, neuromuscular junction and synaptic transmission, muscle contraction; visual, auditory and somatosensory and cognitive evoked potentials; regulation of secretions by glands, neural control of viscera such as heart, respiration, GI tract, bladder and sexual function; sleep-wake cycles; maintenance of consciousness, special senses, control of pituitary functions, control of autonomic functions, cerebellar functions, extrapyramidal functions, reflexes, upper and lower motor neuron concepts and sensory system.

2.1.3. MOLECULAR BIOLOGY

Brain is the one structure where maximum genes are expressed in the human body. Principles of molecular biology including Gene Structure, Expression and regulation; Recombinant DNA Technology; PCR Techniques, Molecular basis for neuronal and glial function, Molecular and cellular biology of the membranes and ion-channels, mitochondrial genome, role of RNA in normal neuronal growth and functional expression, receptors of neurotransmitters, molecular and cellular biology of muscles and neuromuscular junction, etc, The Human Genome and its future implications for Neurology including developmental and neurogenetic disorders, bioethical implications and genetic counselling, Nerve growth and other trophic factors and neuroprotectors, Neural Tissue modification by genetic approaches including Gene Transfer, stem cell therapy etc, Molecular Development of neural tissue in peripheral nerve repair are exciting areas where students need to have basic exposure..

2.1.4 NEUROCHEMISTRY

All aspects of normal and abnormal patterns of neurochemistry including neurotransmitters associated with different anatomical and functional areas of brain and spinal cord, especially with respect to dopaminergic, serotonergic, adrenergic and cholinergic systems, opioids, excitatory and inhibitory aminoacids; their role in pathogenesis of parkinsonism, depression, migraine, dementia,

epilepsy; neuromuscular junction and muscle contractions; carbohydrate, aminoacid and lipid metabolism and the neural expression of disorders of their metabolism, electrolytes and their effect on encephalopathies and muscle membrane function, storage disorders, porphyrias;

2.1.5 NEUROPHARMACOLOGY

Application of neuropharmacology is the mainstay of all medical therapy of epilepsy, parkinsonism, movement disorders, neuropsychiatric syndromes, spasticity, pain syndromes, disorders of sleep and dysautonomic syndromes. Their drug interactions with commonly used other drugs, usage during disorders of renal, hepatic function and in the demented, their adverse reactions etc. are part of basic curriculum for DM course in Neurology.

2.1.6 NEUROPATHOLOGY

All pathological changes in various neurological diseases with special reference vascular, immune mediated, de/dysmyelinating, metabolic and nutritional, genetic and developmental, infectious and iatrogenic and neoplastic aetiologies to clinical correlation included. Special emphasis on pathological changes in nerve and muscle in neuropathies and myopathies. Ultrastructural pathologies such as apoptosis, ubiquitinopathies, mitochondrioses, channelopathies, peroxisomal disorders, inclusion bodies, prion diseases, disorders mediated by antibodies against various cell and nuclear components, paraneoplastic disorders etc.

2.1.7 NEUROMICROBIOLOGY

The various microbiological aspects of infectious neurologic diseases including encephalitis, meningitis, brain abscess, granulomas, myelitis, cold abscess, cerebral malaria, parasitic cysts of nervous system, rhinocerebral mycoses, leprous neuritis, neuroleptospirosis, Primary and secondary Neuro HIV infections, congenital TORCH infections of brain, slow virus infections such as JCD and SSPE, neurological complications of viral infections such as Polio, EBV, Chickenpox, Rabies, Herpez, Japanese encephalitis and other epidemic viral infections.

2.1.8 NEUROTOXICOLOGY

Organophosphorus poisoning, hydrocarbon poisoning, lead, arsenic, botulinumtoxin and tetanus toxicity, snake, scorpion, spider, wasp and bee stings are important tropical neurotoxic syndromes whose prompt diagnosis and effective therapy are crucial in life saving.

2.1.9. NEUROGENETICS AND PROTEOMICS: Autosomal dominant and recessive and X-linked inheritance patterns, disorders of chromosomal anomalies, Gene mutations, trinucleotide repeats, dysregulation of gene expressions, enzyme deficiency syndromes, storage disorders, disorders of polygenic inheritance, and proteomics in health and disease.

2.1.10. NEUROEPIDEMIOLOGY: Basic methodologies in community and hospital based neuroepidemiological studies such as systematic data collection, analysis, derivation of logical conclusions, concepts of case-control and cohort studies, correlations, regressions and survival analysis; basic principles of clinical trials.

THERE WILL BE ONE THEORY PAPER OF 100 MARKS ENTIRELY DEVOTED TO BASIC SCIENCES AS RELATED TO NUROLOGY.

2.2 CLINICAL NEUROLOGY INCLUDING PEDIATRIC NEUROLOGY and NEUROPSYCHIATRY.

2.2.1 GENERAL EVALUATION OF THE PATIENT

The science and art of history taking, Physical Examination including elements of accurate history taking, symptoms associated with neurological disease, The physical examination of adults, children, infants and neonates, syndromes associated with congenital and acquired neurological disease, cutaneous markers, examination of unconscious patients, examination of higher mental functions, cranial nerves, the ocular fundus, examination of tone, power of muscles, proper elicitation of superficial and deep reflexes including the alternate techniques and neonatal and released reflexes, neurodevelopmental assessment of children, sensory system, peripheral nerves, signs of Meningeal irritation, skull and spine examination including measurement of head circumference, shortness of neck and carotid pulsations .and vertebral bruits.

2.2.2 COMA

Pathophysiology and diagnosis of COMA, Diagnosis and management of coma, delirium and acute confusional states, reversible and irreversible causes, persistent vegetative states and brain death, neurophysiological evaluation and confirmation of these states and mechanical ventilation and other supportive measures of comatose patient and prevention of complications of prolonged coma. The significance of timely brain death in organ donation and ICU resource utilization.

2.2.3 SEIZURES AND EPILEPSY and SYNCOPES

Diagnosis of seizures, epilepsy and epileptic syndromes, Recognition, clinical assesment and management of seizures especially their electrodiagnosis, videomonitoring with emphasize og phenomenology and their correlation with EEG and structural and functional brain imaging such as CT and MRI and fMRI and SPECT scan, Special situations such as epilepsy in pregnant and nursing mothers, driving, risky occupations, its social stigmas dfferentiation from pseudoseizures, use of conventional and newer antiepileptic drugs, their drug interactions and adverse effects etc., modern lines of management of intractable epilepsies, such as ketogenic diet, vagal nerve stimulation, epilepsy surgery and about presurgical evaluation of patients. Management of status epilepticus and refractory status epilepticus; Differentiation of seizures from syncopes, drop attacks, cataplexy, startles etc..

2.2.4 HEADACHES AND OTHER CRANIAL NEURALGIAS

Acquisition of skills in analysis of headaches of various causes such as those from raised intracranial pressures, migraines, cranial neuralgias, vascular malformations, Meningeal irritation, psychogenic etc. and their proper pharmacologic management.

2.2.5 CEREBROVASCULAR DISEASES

Vascular anatomy of brain and spinal cord, various causes and types of cerebrovascular syndromes, ischemic and haemorrhagic types, arterial and venous types, anterior and posterior circulation strokes, OCSF and TOAST classifications, investigations of strokes including neuroimaging using dopplers, CT and MR imaging and angiography, acute stroke therapy including thrombolytic therapy, interventional therapy of cerebrovascular diseases, principles of management of subarachnoid haemorrhage etc. Special situations like strokes in the young, Strategies for primary and secondary prevention of stroke

2.2.6 DEMENTIAS

Concept of minimal cognitive impairment, Reversible and irreversible dementias, causes such as Alzheimer's and other neurodegenerative diseases and vascular and nutritional and infectious dementias, their impact on individual, family and in society, Genetic and familial syndromes. Pharmacotherapy of dementias, Potential roles of cognitive rehabilitation and special care of the disabled.

2.2.7 PARKINSONISM AND MOVEMENT DISORDERS

Disorders of extrapyramidal system such as parkinsonism, chorea, dystonias, athetosis, tics, their diagnosis and management, pharmacotherapy of parkinsonism and its complications, management of complications of parkinsonism therapy, including principles of deep brain stimulation and lesional surgeries. Use of EMG guided botulinum toxin therapy, management of spasticity using intrathecal baclofen and TENS.

2.2.8 ATAXIC SYNDROMES: such as parainfectious demyelinations, cerebellar tumours, hereditary ataxias, vestibular disorders; Diagnosis and management of brainstem disorders, axial and extra-axial differentiation.

2.2.9 CRANIAL NEUROPATHIES:

Disorders of smell, vision, visual pathways, pupillary pathways and reflexes, internuclear and supranuclear ophthalmoplegia; other oculomotor disorders, trigeminal nerve testing, Bell's palsy, differentiation from UMN facial lesions, brainstem reflexes, Investigations of vertigo and dizziness, differentiation between central and peripheral vertigo, Differential diagnosis of nystagmus, investigations of deafness, bulbar and pseudobulbar syndromes,

2.2.10 CNS INFECTIONS: Diagnosis and management of viral encephalitis, meningitis-bacterial, tuberculous, fungal, parasitic infections such as cysticercosis, cerebral malaria, SSPE, Neuro HIV primary and secondary infections with exposure to gram stain and cultures, bac tec, QBC, ELISA and PCR technologies

2.2.11 NEUROIMMUNOLOGIC DISEASES

Diagnosis and management of CNS conditions such as Multiple sclerosis, PNS conditions such as GBS, CIDP, Myasthenia gravis, polymyositis

2.2.12 NEUROGENETIC DISORDERS

Various chromosomal diseases, single gene mutations such as enzyme deficiencies, autosomal dominant and recessive conditions and X-linked disorders, trinucleotide repeats, disorders of DNA repair. Genetics of Huntington's disease, familial dementias, other storage disorders, hereditary ataxias, hereditary spastic paraplegias, HMSN, muscular dystrophies, mitochondrial inheritance disorders,

2.2.13 DEVELOPMENTAL DISORDERS OF NERVOUS SYSTEM

Neuronal migration disorders, craniovertebral junction diseases, spinal dysraphisms, phacomatoses and other neurocutaneous syndromes- their recognition and management.

2.2.14 MYELOPATHIES

Clinical diagnosis of distinction between compressive and non-compressive myelopathies, spinal syndromes such as anterior cord, subacute combined degeneration, central cord syndrome, Brown-sequard syndrome, tabetic syndrome, Elseberg phenomenon. Diagnosis of spinal cord and root compression syndromes, CV junction lesions, syringomyelia, conus-cauda lesions, spinal AVMs, tropical and hereditary spastic [paraplegias, Fluorosis.

2.2.15 PERIPHERAL NEUROPATHIES

Immune mediated, hereditary, toxic, nutritional and infectious type peripheral neuropathies; their clinical and electrophysiological diagnosis

2.2.16 MYOPATHIES AND NEUROMUSCULAR JUNCTION DISORDERS

Clinical evaluation of patients with known or suspected muscle diseases aided by EMG, muscle pathology, histochemistry, immunopathology and genetic studies. Dystrophies, polymyositis, channelopathies, congenital and mitochondrial myopathies.. Neuromuscular junction disorders such as myasthenia, botulism, Eaton-lambert syndrome and snake and organophosphorus poisoning, their electrophysiological diagnosis and management . Myotonia, stiff person syndrome. .

2.2.17 PAEDIATRIC NEUROLOGY:

Normal development of motor and mental milestones in a child, Cerebral palsy, Attention deficit disorder, Autism, developmental dyslexias, Intrauterine TORCH infections, Storage disorders, Inborn errors of metabolism affecting nervous system, developmental malformations, Child hood seizures and epilepsies, neurodegenerative diseases.

2.2.18 COGNITIVE NEUROLOGY AND NEUROPSYCHIATRY:

Detailed techniques of higher mental functions evaluation, basics of primary and secondary neuropsychiatric conditions such as anxiety, depression, schizophrenia, acute psychosis, acute confusional reactions (delirium), organic brain syndrome, primary and secondary dementias, differentiation from pseudodementia

2.2.19 TROPICAL NEUROLOGY

Conditions which are specifically found in the tropics like neuro cysticercosis, cerebral malaria, tropical spastic paraplegia, Snake/scorpion/ Chandipura encephalitis, Madras Motor Neuron disease etc. will be dealt with in special detail in the curriculum

THERE WILL BE ONE THEORY PAPER OF 100 MARKS ENTIRELY DEVOTED TO CLINICAL NEUROLOGY INCLUDING PEDIATRIC NEUROLOGY.

THE CLINICAL EXAMINATION WOULD BE ENTIRELY DEVOTED TO CLINICAL NEUROLOGY INCLUDING PEDIATRICS ON THE ABOVE SYLLABUS AND WOULD INCLUDE ONE LONG CASE OF 100 MARKS AND TWO SHORT CASES OF 50 MARKS EACH, TOTTALLING TO 200 MARKS

2.3 DIAGNOSTIC AND INTERVENTIONAL NEUROLOGY INCLUDING NEUROLOGICAL INSTRUMENTATION

2.3.1 DIAGNOSTIC NEUROLOGY

Performing and interpreting Digital Electroneurogram, Electromyogram, Evoked potentials, Electroencephalography, Interpretation of skull and spine X rays, computerized tomography of brain and spine, Magnetic resonance images of brain including correct identification of various sequences, angiograms, MR spectroscopy, basics of functional MRI, Interpretation of digital subtraction imaging, SPECT scans of brain, subdural EEG recording, transphenoidal electrode EEG Techniques for temporal lobe seizures, video EEG interpretation of phenomenology and EEG-phenomenology correlations, EEG tapemetry, Transcranial Doppler diagnosis and monitoring of acute ischemic stroke, subarachnoid haemorrhage, detection of right-to-left shunts etc; Colour duplex scanning in Carotid and vertebral extracranial segment screening.

2.3.2 INTERVENTIONAL NEUROLOGY AND NEUROINSTRUMENTATIONS

To acquire skills in Procedures like

a) intrathecal administration of antispasticity drugs, beta interferons in demyelination, opiates in intractable pain etc.,

b) EMG guided Botox therapy for dystonias,

c) subcutaneous administration of antimigraine and antiparkinsonian drugs

d) Intrarterial thrombolysis in extended windows of thrombolysis in ischemic strokes,

e) Transcranial Ultrasound clot-bust intervention in a registry in acute stroke care unit

e) Planing in deep brain stimulation therapy in uncontrolled dyskinesias and on-off phenomena in long standing parkinsonism

f) Planning in vagal nerve stimulation in intractable epilepsy

<p>THERE WILL BE ONE THEORY PAPER OF 100 MARKS ENTIRELY DEVOTED TO DIAGNOSTIC AND INTERVENTIONAL NEUROLOGY INCLUDING NEUROLOGICAL INSTRUMENTATION.</p>

2.4 RECENT ADVANCES IN NEUROLOGY: ADVANCES IN NEUROIMAGING TECHNIQUES, BIONICS IN NEURAL PROSTHESIS AND REHABILITATION, NEUROPROTEOMICS AND NEUROGENETICS, STEM CELL AND GENE Y, GENE THERAPY

2.4.1: ADVANCES IN NEUROIMAGING TECHNIQUES: Integration of CT, MR, SPECT images with each other and with EEG, EVOKED potentials based brain maps in structural and functional localization in neurological phenomena and diseases, Fluorescent ye tagged study of neurons in diseases in animal models in vivo and in tissue cultures in-vitro.

2.4.2: BIONICS IN NEURAL PROSTHESIS AND REHABILITATION: Advanced techniques in neurorehabilitation such as TENS, principles of man-machine interphase devices in cord, nerve and plexus injuries, cochlear implants, artificial vision.

2.4.3: NEUROPROTEOMICS AND NEUROGENETICS: Brain functions are regulated by proteomics and genomics linked to various proteins and genes relevant to the brain, body's maximum number of proteins and genes being expressed in brain as neurotransmitters or channel proteins and predisposing brain to a number of disorders of abnormal functioning of these proteins.

2.4.4: STEM CELL AND GENE THERAPY: Principles of ongoing experiments on stem cell therapy for nervous system disorders such as foetal brain tissue transplants in parkinsonism; intrathecal marrow transplants in MND,MS, Spinal trauma; myoblasts infusion therapy in dystrophies

2.4.5: NEUROEPIDEMIOLOGICAL STUDIES AND CLINICAL TRIALS: The students of the DM course will be trained in conducting sound neuroepidemiological studies on regionally and nationally important neurological conditions as well as on diseases of scientific and research interest to the department. They will also be trained in principles of clinical trials with exposure to

LEARNING RESOURCE MATERIALS

3. RECOMMENDED TEXT BOOKS AND JOURNALS

The following is only a partial recommended list of the prevailing text books and journals at the time of the compilation of the syllabus. As and when New Text Books or Journals become available, the candidates would be appraised accordingly.

3.1 : TEXT BOOKS

1. DeJong's The Neurological Examination, Sixth Edition. Stephanie Lessig, MD edited by William Campbell, 671 pp., illus., Philadelphia, Lippincott Williams & Wilkins, 2005
2. Localization in Clinical Neurology
By Brazis, Paul W, Masdeu, Joseph C. , Biller, Jose ; 5th edition 2006.Lippincot and Williams
3. Principles of Neuroscience: Kandal and Schwartz 4th edition
- 4..Applied neuroanatomy: Carpenter.
5. Clinical neurophysiology: Aminoff.
- 6.Evoked potentials. Chiappa.
- 7.Neuropharmacology: Seigal.
8. The Mental Status Exam. in Neurology. Strub abd Black.
- 9.Examination of a comatose patient: Plum and Posner
- 10.Handbook of Neurology; Vinken and Bruyn.
11. Tropical Neurology. JS Chopra
- 12.Tropical Neurology: NH Wadia
13. Neurology in Clinical Practice. 2 volumes; 4th edition, 2003 by Bradley, Gerald M. Fenichel, Robert B. Daroff, Joseph Jankovic
- 14.. Diseases of the Nervous System: Clinical Neuroscience and Therapeutic Principles (diseases of the nervous system (Asbury). 2002
15. Adams & Victor's Principles of Neurology, 9th Edition Allan H. Ropper, Martin A. Samuels
16. Clinical Neurology, 6th Edition. Michael J. Aminoff, David A. Greenberg, Roger P. Simon
- 17.. Epilepsy: A Comprehensive Textbook 3 Volumes; Editors 2nd edition. Jerome Engel Jr., MD, PhD, Timothy A. Pedley MD
- 18..Epilepsy and Epileptic syndrome. Hansluder.
- 19.. Clinical guide to epileptic syndromes and treatment. Panayiotopod
20. Niedermeyer. 5th Ed. 2005. Electroencephalography.

21. Parkinson's disease and movement disorders. By Joseph Jankovic, Eduardo Tolosa. 3rd edition
- 22.. Dystonia 2. Stanley Fahn, C. David Marsden, Donald Brian Calne
Editors Stanley Fahn, C. David Marsden, Donald Brian Calne; Publisher Raven Press, 1988
23. Clinical Pediatric Neurology, 6th Edition - A Signs and Symptoms Approach: Expert Consult -
By Gerald Fenichel
24. Pediatric Neurology. Swaiman & Wright
25. Caplan's Stroke: A Clinical Approach; 5th edition by Louis Caplan
26. Stroke: A practical management: by Charles Warlow, Jan Van Gijn, Joanna M. Wardlaw,
Martin S. Dennis. 2008, 2nd edition
27. Sleep Disorders Medicine: Basic Science, Technical Considerations, and Clinical Aspects
Edited by Sudhansu Chokroverty. 504 pp. Boston, Butterworth-Heinemann, 1994. Edition 2, 2002.
28. Continuum in Neurology. (American Academy of Neurology)

3.2 JOURNALS

1. Annals of Indian Academy of Neurology
2. Neurology India
3. Neurology
4. Annals of Neurology.
5. Journal of the Neurological Sciences.
6. Journal of Neurology, Neurosurgery and Psychiatry.
7. Brain
8. Stroke
9. Neurology Clinics of North America
10. 10. Current opinion in Neurology
11. The Lancet
12. Journal of the Association of Physicians of India.
13. Journal of the Indian Medical Association.
14. Bulletin of the ICMR
15. Bulletin of the WHO
16. Journal of the American Medical Association.
17. Medical Clinics of North America.

The Student should also be familiarised with Internet browsing for Journals, Special Articles, Review Articles and other recent recommendations of International Societies like the World Federation of Neurology, American academy of Neurology and World Stroke Association

4. MODE OF SELECTION

4.1 SELECTION OF POST GRADUATE STUDENTS MCI GUIDELINES

1. Students for DM Neurology shall be selected strictly on the basis of their academic merit.
2. For determining the academic merit, the Institution may adopt course :- (i) On the basis of merit as determined by a competitive test conducted by a competent authority on a national level.

4.2 ELIGIBILITY

1. Candidates should have passed M.D Degree in General Medicine or in Pediatric Medicine from any University recognised as equivalent thereto by the Medical Council of India.
2. Candidates should have passed DNB in General Medicine or DNB in Pediatric Medicine with Thesis.
3. Candidates appearing for M.D General Medicine/DNB General Medicine or MD Pediatric Medicine/DNB Pediatric Medicine examination and expecting results before admission may also submit their application subject to the condition that they pass their qualifying examination before admission.

4.3 PROCEDURE FOR SELECTION

1. There will be an Entrance Examination conducted by the Institute on a National Level at JIPMER, Pondicherry in the month of December/January . The advertisement for the same would be published in all the leading national newspapers and employment news in the month of October/November.
2. The written examination would consist of 100 MCQs (40 in General Medicine & Pediatrics and 60 in Neurology). The duration of the examination will be 1¹/₂ hours.
3. The correct answer should be blackened with black ball point pen.
4. Each answer with correct response will carry (1) mark and no negative marking for wrong answer and unanswered.
5. After the written examination there will be a personal interview for the merit listed candidates at the rate of 5 candidates for one seat.
6. The personal interview will carry 20 marks and will have X rays, CT scans
7. The final merit list will be drawn on the basis of marks obtained both in written examination and in personal interview.
8. A detailed prospectus would be published and sent along with the application form giving all details of the mode of eligibility of admission, submission of application, Procedure for selection, Date of Joining, Registration with University, Contract and Emoluments, Leave during residency, Accommodation, Duties and Responsibilities, Hours of work, Leave, Certificates, Fees etc.
9. The course would commence ordinarily on 1st January.

SAMPLE OF THE MULTIPLE CHOICE QUESTION PAPER FOR DM ENTRANCE

1. All of the following are true about absence seizures except
 - A. Onset is between 5 and 15 years usually
 - B. Frequency of attacks is almost always less than 5 per day
 - C. 3hz Spike and wave discharges are seen on EEG
 - D. Seizures are precipitated by hyperventilation
2. All of the following is true about syncope except:
 - A. Due to reduced cerebral perfusion

Key: (b)

- B. Prolactin levels rise during and after syncope
 - C. Watershed infarcts may result in predisposed individuals
 - D. Vasovagal syncope is the commonest cause of syncope in young **Key: (b)**
3. Reversible Posterior Leukoencephalopathy is seen in all except
- A. Eclampsia
 - B. Cyclophosphamide therapy
 - C. AIDS
 - D. Adrenoleukodystrophy **Key: (d)**

TEACHING LEARNING EXPERIENCE

5. TRAINING

5.1 PERIOD OF TRAINING MCI GUIDELINES

The period of training for obtaining the degree of D.M in Neurology shall be three completed years (including the examination period) after obtaining M.D degree, or equivalent recognised qualification in the required subject.

5.2 TRAINING PROGRAMME MCI GUIDELINES

1. The training given with due care to the post graduate students in the recognised institutions for the award of D.M Neurology , shall determine the expertise of the specialist and /or medical teachers produced as a result of the educational programme during the period of stay in the institution.
2. All the candidates joining the D.M Neurology training programme shall work as full time residents during the period of training , attending not less than 80%(Eighty percent) of the training during the calendar year, and given full time responsibility, assignments and participation in all facets of the educational process.
3. D.M Neurology students shall maintain a record (log book) of the work carried out by them and the training programme undergone including details of the Non-Invasive, Invasive Neuro Diagnostic and Interventional Work assisted or done independently by the D.M Candidates.
4. During training for the D.M Neurology there shall be proper training in basic medical sciences related to neurology. Emphasis to be laid on preventive and social aspects and emergency care services.
5. The D.M Neurology student shall be required to participate in the teaching and training programme of undergraduate and post graduate students in the departments of medicine, pediatrics etc.
6. Training in Medical Audit, management, health economics, health information system, basics of statistics, exposure to human behaviour studies, knowledge of pharmacoconomics and introduction to non linear mathematics shall be imparted.

7. In Service training with the students being given graded responsibility in the management and treatment of patients entrusted to their care: participation in Seminars, Journal Clubs, Group Discussions, Clinical Meetings, Grand Rounds and Clinico-Pathological Conferences, Advanced Diagnostic, Therapeutic and Laboratory techniques in Neurology.

5. 3 TEACHING LEARNING SCHEDULE

5.3.1 CLINICAL POSTINGS

YEAR	NO OF MONTHS	FROM TO	POSTING
FIRST YEAR	3	JAN-MAR	WARD/OPD
FIRST YEAR	3	APRIL-JUNE	ICU
FIRST YEAR	1	JULY	RADIODIAGNOSIS
FIRST YEAR	1	AUG	NEUROCHEMISTRY AND GENETICS LABS
FIRST YEAR	1	SEPT	IMMUNOLOGY AND MICROBIOLOGY
FIRST YEAR	3	OCTOBER-DEC	NEUROPHYSIOLOGY LAB
SECOND YR	1	JAN-MAR	ICU
SECOND YR	2	APRIL-JUNE	NON-INVASIVE LAB INCL VEEG, PSG
SECOND YR	1	JULY	NEUROPTHAL, NEURO-OTOLOGY,NEUROPATHOLOGY
SECOND YR	2	AUG	AUTONOMIC FUNCTION (Physiology)AND SLEEP LAB (Pharmacology)
SECOND YR	3	OCTOBER-DEC	WARD/OPD
THIRD YR	1	JAN	PED NEUROLOGY
THIRD YR	1	FEB	PSYCHIATRY
THIRD YR	1	MARCH	NEUROSURGERY
THIRD YR	1	APRIL	CEREBROVASCULAR LABS
THIRD YR	2	MAY-JUNE	RESEARCH WRITING
THIRD YR	2	JUL-AUG	ICU
THIRD YR	2	SEPT-NOV	WARD/OPD
THIRD YR	1	DEC	EXAMINATIONS

5.3.1.1: WARD / OPD

These would be the first posting of the D.M Candidate. The candidate would first familiarize himself/herself with the general working of the hospital, the Wards, admission norms, sending of investigations, geography of the hospital, location of the various services, consent forms, blood availability, discharge protocol, medical records section etc. In addition the candidate would examine all the cardiac cases in the wards and give consultation to all other departments of the hospital with the help of the consultant.

If there are undergraduate MBBS or Post Graduate MD students from Medicine, Pediatrics or other specialties posted then he would impart relevant clinical examination and diagnostic skills to them.

The candidate would also be working in the OPD and assessing the suitability of the patients for admission, making an OPD diagnosis, planning the relevant investigations etc. In addition the candidate would manage the special clinics like Post Intervention Clinic and the Special Clinics of the Department.

The DM candidate would be put on regular 24 hour duties and would take the call from the Casualty and other department of the hospital. He/she would relieve the ICU person for Lunch etc.

A typical Ward / OPD posting would be

Work schedule, Year 2009: Department of Neurology

1. Monday and Wednesday: 8.30 am: Residents/consultant ward rounds
9.00 am: OPD starts
11.00- 11.15 Cofee break
11.15-1.0 PM: OPD
1.00to 2.00 pm: Lunch Break
From 2.00: OPD continues till this is over
Cross-references
4.00: Consultant ward service rounds with residents
2. Tuesday and Thursdays: 11 am: Service ward Rounds
2 PM consultant Dopplers and EMGs and special Neurophysiological studies.
Residents: Discharge summary preparations and assist consultants
(Except first week Tuesday)

3. Thursday: 11 am: Service ward Rounds
 2 PM:consultant Dopplers and EMGs and special Neurophysiological studies.
 3PM:Residents: Discharge summary preparations and assist consultants
 2nd and 4th week Thursday 3PM: Neuroradiology
- 3.Fridays: 8.30 am: Academic seminar
 11 am: Teaching ward rounds
 2 pm: Seminar and case presentations
- 4.Saturdays:11am: Ward Notes meet with SRs and Research and academic works at Meeting Room
5. Sundays: Service rounds

5.3.2: INTENSIVE CARE UNIT

This posting is essential for the candidate to learn all the aspects of Neuro Intensive Care like Thrombolytic Therapy in Acute stroke, Hemodynamic Monitoring in Acute stroke especially massive infarcts and subarachnoid haemorrhages, comatose patients, Ventilator therapy in neuroparalytic diseases such as GBS, Myasthenic crisis, ADEM, Organophosphorus and other CNS poisoning, management of acute CNS infections such as encephalitis and meningitis; status epilepticus, delirium, coma and confusional states, periodic paralysis. The candidate should familiarize himself/herself with all the monitoring gadgets in the ICU like Monitors, ventilators, blood gas analyzer, infusion pumps, alpha beds, TEDS, continuous Transcranial Doppler, EEG and CSF manometry monitoring of comatose patients, confirmation of brain death etc.

The candidate would be on duty in the Intensive Care Unit from 9 A.M to 9 P.M and 24 hours by rotation. He / she would also attend the teaching programmes of the department when free from patient care. He/she would be relieved for lunch by the ward resident. The candidate would also be taking calls from the casualty and giving consultations to all department of the hospital.

5.3.3: NEUROPHYSIOLOGY LABORATORY POSTING

The candidate would be posted in the Non-Invasive Laboratory wherein he/she would receive training and independently perform Computerised EEG, ENMG, EP Recording and reporting, Transcranial and Colour Duplex neurosonographic Examination and reporting, autonomic function testing, neuro-otology, language and speech therapy exposure, neurophthalmology

5.3.4: NEUROPHYSIOLOGY INVASIVE LAB POSTING: The candidates will be trained in Transcutaneous electrical nerve stimulation, Planning of deep brain stimulation and vagal nerve stimulation therapy

The candidate would also be attending the OPD. During this period the candidate would also be attending all teaching programs of the department and would be doing emergency duties also in the ICU / taking casualty calls and giving consultations to all departments of the hospital.

5.3.5: PERIPHERAL CLINICAL POSTINGS: The candidate will be receiving a total of 3 months peripheral posting of which one will be in Paediatric Neurology, one in Psychiatry and one in Neurosurgery.

During this periods, the candidate would also be attending the OPDs of the corresponding departments only.. During this period the candidate would also be attending all teaching programs of the corresponding department. He would also however be doing emergency duties also in the ICU / taking casualty calls and giving consultations to all departments of the hospital.

5.3.6: PERIPHERAL LAB POSTINGS:

The candidates will undergo a total of 5 months of peripheral laboratory postings one month each in

- a) Neurochemistry and Neuropharmacology including genomics lab
- b) Immunology and virology/microbiology and Neuropathology
- c) Physiology and pharmacology
- d) Neuro-otology and Neuro-ophthalmology

The candidate should also learn all the consumables and the hardware used in diagnostic and interventional laboratories. He / she should be familiar with interpretation and diagnosing all the laboratory data.

The candidate must learn all the ethical, legal considerations of the invasive work and learn to use them with wisdom and discretion.

5.4 ACADEMIC PROGRAMME

5.4.1 Departmental Academic Programmes

1. **Journal Clubs:** Critical analysis of original research articles in Indian and International Journals, Journals from the Internet, recommendations of various committees like the American Academy of Neurology, American College of Neurology etc regarding indications of various procedures.
2. **Short Reviews:** Short review of the literature on a simple specified topic based upon the various theory papers in the examination like Basic Sciences applied to Neurology, Clinical Neurology including Pediatrics, Diagnostic Neurology, Intervention and Neuro Instrumentation and recent advances in Neurology, Preventive Neurology, Neuroepidemiology and Neurosurgery.
3. **Long Reviews:** Complete updated review of literature with critical analysis of major topics in Neurology e.g. Risk factors of stroke, dementia etc. These should be presented with slides and should be bound in the form of a book. Minimum number of Long reviews to be done is three during the entire course.
4. **Bed-Side Clinics:** Both short cases and long cases to be taken by the candidate and presented to the consultants in the same pattern as examination.
5. **Video EEG conference:** Complete work up of each case with ECG, X-Ray, Colour Doppler, TEE and Cardiac Cath and Angio presented to the consultants and reviewed. All diagnostic and interventional cases done in one week reviewed.
6. **DBS, TENS and Vagal stimulation planning conferences**

5.4.2 INTER DEPARTMENTAL PROGRAMMES

1. Neuroradiology Conference: A fortnightly inter departmental programmes between the departments of Neurology and Radiodiagnosis Departments.
2. Neuropsychiatry conference: Monthly meetings between the departments of Psychiatry and Neurology.
3. Neuropathology conference: Monthly meetings between Neurology, Neurosurgery and pathology departments
4. Modular Teaching: Participation in Undergraduate Modular Teaching in the subjects of Neurology.
5. Bed-side Clinics for Undergraduates in the Neurology OPD.
6. Bed-side Clinics for Post Graduates i.e. M.D (Med), MD (Psychiatry) students.

CENTRAL ACADEMIC PROGRAMMES

1. Clinico-Pathological Exercise.
2. PG Seminar
3. Monthly meeting of the JIPMER Scientific Society.
4. Monthly Medical Review Meeting

6.1.1: **Log Book:** 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 JIPMER Scientific Society, Conferences, PG Seminars, CPCs etc. (9) List of ENG, EMG, EEG, EP, TCD, Carotid duplex etc performed and analysed. (10) List of TENS, DBS and Vagal nerve stimulations observed. (11) List of nerve and muscle biopsies performed and interpreted (11) Samples of ECG ENG, EMG, EEG, EP, TCD, Carotid duplex etc performed to be pasted in the Log Book. (12) Abstracts and lists of papers published or sent for publication. (13) Any other research projects undertaken. (14) Any other interesting detail.

This Log Book would be scrutinised and certified by the Head of Department and other Consultants and presented to the external examiners at the time of the final examination.

6.1.2: **Long Reviews:** The long reviews presented during the period of the course should be compiled and bound in the form of a book incorporating any diagrams, flow charts, algorithms etc and a complete list of up to date references and this along with the CD containing slides of these reviews should be submitted for scrutiny before the examination.

This Long Review book would also be scrutinised and certified by the Head of the Department and other Consultant and presented to the External Examiners at the time of the final examination.

6.1.3: **Publications:** Xerox copies or reprints of full paper/ abstracts published or sent for publication in National / International Journals should be submitted to the department before the examination..

EXTERNAL EVALUATION

6.2.1: **Organisation of the Examination:** The Examination shall be organised on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence at the end of the training and obtaining a minimum of 50% marks in theory as well as practical separately shall be mandatory for passing the whole examination. This examination shall be at the end of 3rd Academic Year (Six Academic terms). The academic terms shall mean six months training period

6.2.3: **Number of Candidates:** The maximum number of candidates to be examined in Clinical/practical and oral on any day shall not exceed two.

6.2.4: **Number of Examinations:** The University shall conduct not more than two examinations in a year, with an interval of not less than 4 and not less than 6 months between the two examinations.

6.2.5: **Theory:** There will be Four Theory Papers. One paper out of these shall be on Basic Medical Sciences and another paper on Recent Advances. The Theory examinations will be held sufficiently earlier than the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the start of the Clinical/Practical and Oral examinations.

MODEL QUESTION PAPER

D.M NEUROLOGY

PAPER-I

Basic Medical Sciences as related to Neurology

Time: 3Hours

All questions carry equal marks

Max Marks: 100

Write Briefly on

1. Cerebral Circulation.
2. EEG rythms in health .
3. Cerebrospinal fluid pathways and dynamics
4. Pathology of acute cerebral infarction
5. Neurophysiology of sleep.
6. Innervation and neurophysiology of bladder
7. Innervation and neurophysiology of GI tract
8. Define muscle tone. Explain neurophysiology of muscle contraction and muscle tone
9. Draw a neuron and synapse. Explain axonal transport, salutatory conduction and synaptic transomission.
10. Explain the role of neurotransmitters in normal neurophysiological mechanisms.

D.M NEUROLOGY

PAPER-II

Clinical Neurology including Pediatric Neurology

Time: 3 Hours All questions Carry Equal Marks Max Marks: 100

Write Briefly on:

1. Management of status epilepticus.
2. Periodic paralysis.
3. Diagnosis and management of narcolepsy.
4. Episodic ataxias.
5. Stiffman syndrome.
6. Management of myasthenic crisis.
7. Brain death
8. Idiopathic intracranial hypertension.
9. CNS manifestations in AIDS
10. Treatable causes of peripheral neuropathy.

D.M NEUROLOGY

PAPER III

Diagnostic and Therapeutic Neurology including NeuroInstrumentation

Time: 3 Hours All Questions Carry Equal marks Max Marks: 100

Write Briefly on:

1. Explain the phenomena Silent period and collision in Nerve conduction studies
2. Transcranial Doppler study.
3. Compare and contrast Digital EEG with paper EEG.
4. Diagnosis of demyelination in Neurology.
5. Polysomnography.
6. Second generation antiepileptic drugs .
7. Indications and contraindications of thrombolytic therapy in stroke.
8. Debate on L-Dopa versus dopamine agonists in early parkinsonism.
9. Debate on Wada test vs. fMRI in evaluation of cerebral dominance in presurgical evaluation.
10. Mitochondrioses in Neurology.

D.M NEUROLOGY

PAPER IV

Recent advances in Neurology, Neuroepidemiology, Preventive Neurology and related Neuro Surgery

Time: 3 Hours All Questions carry equal marks Max Marks: 100

Write Briefly On:

1. Principles of governing conduction of Phase III clinical trials.
2. Epidemiology of Stroke in India.
3. Trinucleotide repeats.
4. Fragile X syndrome.
5. Bionics in Neurorehabilitation.
6. Deep Brain stimulation.
7. Transcranial magnetic stimulator.
8. Channelopathies in Neurology.
9. Ubiquitinopathies in Neurology.
10. Discuss carotid stent vs. carotid endarterectomy in secondary prevention of stroke.

6.2.6: Clinical/Practical and Oral: Clinical examination would consist of 3 Cases, 1 Long Case and 2 Short Cases.

Long Case: The candidate would have one hour to take a detailed history, and do a complete clinical examination. If there is any language problem he / she would be provided with an interpreter for the same. On the basis of the history and examination, the candidate is expected to come to a reasonable provisional diagnosis. He / she would then present the case to the examiners and after the provisional diagnosis is assessed, the candidate would be given the ENMG/EEG and the CT/MR images and other investigation reports. Case discussed further based on this. He / she would then be questioned on the management strategies and related matters.

Total Marks for the long case is 150.

Partial List of Long cases kept for the examination

1. Rheumatic Multivalvular Disease.
2. Coronary Artery Disease with complications like Ventricular aneurysm, ischemic cardiomyopathy, papillary muscle dysfunction with MR etc.
3. Congenital Cyanotic Heart Disease.
4. Congenital Acyanotic Heart Disease with additional features like ASD with MS, ASD with MR, Endocardial Cushion Defects etc.
5. Aortoarteritis with hemiplegia, renal bruits etc.
6. Hypertrophic Obstructive Cardiomyopathy.
7. Any type of heart disease with infective endocarditis.
8. Post surgical patient with complications like Post CABG with angina, heart failure and valve dysfunction or Post Prosthetic Valve Patient with new valvular lesions etc.
9. Restrictive type of heart disease like Constrictive Pericarditis, Endomyocardial Fibrosis.
10. Coarctation of Aorta with associated abnormalities etc.

Short Cases 2: The candidate would have to present 2 short cases. In each, he/she has to take a short history, do a complete clinical examination and come to a reasonable provisional diagnosis. The time allotted is 30 minutes for each short case. The pattern of the examination is the same as that for the long case except for the fact that the discussion is faster. It is generally the case that the candidate would get different categories of cases for each of the cases he/she is given for the examination. For example, a candidate is usually given one Congenital, One Rheumatic and One Coronary/Myocardial etc as long or short case. However, there is no rigid compartment that a particular case should be given as long or short case and this usually is decided by the External Examiners.

Total Marks for the Short Cases; Each 75 Total: 150

Partial List of Short Cases

1. Lower Cranial nerve palsies.
2. Aphasias.
3. Movement disorders.
4. Mononeuritis multiplex.
5. Plexopathies.
6. Oculomotor palsies.
7. Myasthenia gravis.
8. Epileptic syndrome
9. Neurocutaneous syndrome.
10. Neurological optic fundus.

Oral/Viva-Voce Examination: (100 marks)The candidate may be shown ENMGs, EEGs, EP Tracings, X ray, CT and MR Pictures, Angiograms, Videos of seizures and movement disorders. This examination shall be comprehensive to test the candidates’ overall knowledge of the subject.

SAMPLE MARKS SHEET

Theory : Paper I. 100 Marks

Paper II. 100 Marks

Paper III 100 Marks

Paper IV 100 Marks

Total Theory : 400 Marks	Pass 200/400 (50%)
1. Clinics : Long Case : 150 Marks Short Case: 75 Marks	
Short Case: 75 Marks	
Total Clinics : 300 Marks	
3. Viva-Voce : 100 Marks	
Total of Clinics and Viva-Voce: 400 Marks	Pass 200/400(50%)

At the end of the examination the minutes of the meeting shall be prepared and after all the external and internal examiners sign the minutes this is despatched to the academic section in a sealed cover.

CONCLUSION

1. The current syllabus, selection, evaluation are based on the current MCI guidelines for post graduate medical education 2000.
2. This would be subject to revision based on the change in MCI Guidelines, New Syllabus and topics in Neurology, New Professors and Heads of Departments being inducted as External Examiners etc.