



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A++' Accredited by NAAC

Sector-01, Kamothe, Navi Mumbai -410 209

Tel 022-27432471, 022-27432994, Fax 022 -27431094

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Curriculum for Fellowship in Clinical Neurophysiology

**(Nerve Conduction study (NCS), Electromyography
(EMG) and Evoked Potentials (EP))**

(with effect from 2023-24 Batches)

Approved as per AC - 46/2023, Dated 28/04/2023

Amended History

1. Approved as per AC-46/2023 [Resolution No. 5.6], Dated 28/04/2023.

Fellowship in Clinical Neurophysiology
[Nerve Conduction Study, Electromyography and Evoked Potentials]

Objective of fellowship:

To develop the expertise to practice as an independent Clinical Neurophysiologist with the necessary skills to perform and interpret all basic and advanced Nerve Conduction Studies, Needle Electromyography and Evoked Potentials.

To develop the potential to conduct researches and communicate the results to his/her fraternity

Duration of fellowship: 1 year (12 months)

Commencement: June 2023

Intake capacity in each batch: 2 per batch.

Eligibility criteria for admission: MD physiology or MD/ MS in relevant fields.

Admission/ Selection criteria:

based on number of candidates, selection will be based on their CVs and personal interview or as decided by MGMIHS.

Course fees: 1.5 lakhs

Stipend: equivalent to post of Tutor or Senior Resident.

Faculty Mentors –

- Dr. Aarthika Sreenivasan (Clinical Neurophysiologist, MBBS, MD)
- Dr. Rita M. Khadkikar (Professor & HOD Physiology)
- Dr. Virti Shah (Neurologist, MBBS, MD, DNB Neurology)
- Dr. Rahul Jankar (Neurologist, MBBS, MD, DM Neurology)

Course Content: Annexure I

Complete curriculum of course: Annexure II

Teaching scheme:

On the job training, mostly being a practical fellowship with 2 theory sessions per month.

Scheme of examination:

- Both knowledge and technical skills to be assessed every 3 months
- Oral presentation of various topics by trainee
- Theory written exam and practical viva at the end of course with external examiners to assess competency of trainee and quality of training.

Infrastructure available:

1. Functional neurolaboratory - space and required electrical setup
2. Standard NCS and EMG machine with appropriate software and hardware support.
3. Recording electrodes, needle electrode, EMG needles as procured by the hospital.
4. Charges for NCS/EMG/RNS procedure as fixed by the hospital.
5. Support staff for handling appointments and patient movement.

Textbooks and reference books :

1. EMG Simplified
2. Peripheral Nerve diseases
3. Electromyography and Neuromuscular disorders: clinical-electrophysiologic correlation
4. Aminoffs Electrodiagnosis in Clinical Neurology
5. Manual of nerve conduction studies
6. Essentials of electrodiagnostic medicine

Annexure I : Course Content:

- Basic and advanced nerve conduction study, needle electromyography and evoked potentials - procedure and interpretation.
- Daily logbook maintenance with details of procedure assisted/ conducted
- Attending adult and paediatric neurology clinics/ case presentations - in depth understanding of neurological clinical examination.
- Patient follow up and attending relevant ward rounds to understand management of patient and operative procedures which impact the NCS/EMG findings.
- Exposure to allied branches to understand relevant aspects of nerve/muscle diseases - for example, MRI findings in spine disorders, USG findings in carpal tunnel syndrome, histopathology of nerve/ muscle biopsy, etc.
- Exposure to special procedures at parent/ other centres : single fibre EMG/ intraoperative neuromonitoring, Autonomic function tests, etc.
- Attending at least 1 national/ international conference of neurophysiology plus 1 scientific paper presentation/ publication.

Annexure II : Complete curriculum of course

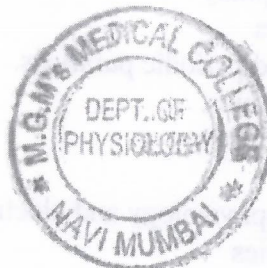
- Overview of NCS and EMG
 - Basic and applied neurophysiology - Physiology of nerve conduction, neuromuscular transmission and excitation contraction coupling mechanism in the muscle
 - Basic and applied anatomy- spinal cord, plexus, peripheral nerves and muscles.
- Electronics and Instrumentation in Neurophysiology lab.
- Fundamentals of Nerve Conduction Studies
 - Basics principle of Nerve conduction studies of upper and lower limbs and face.
 - Basics of F waves, H reflex and Blink reflex.
 - Basics principle of Repetitive Nerve Stimulation tests.
 - Basics of Evaluation of ANS
 - Normal values, effect of age, temperature, height on the various parameters assessed in nerve conduction study (Sensory and motor potentials, late responses, RNS)
- Fundamentals of Electromyography
 - Basics of EMG - insertional, spontaneous and volitional.
 - Motor unit potential analysis
 - Recruitment and interference pattern of EMG
- Fundamentals of Evoked potentials
 - Visual evoked potential (VEP) - basics and applied aspects
 - Somatosensory Evoked Potential (SSEP) - basics and applied aspects
 - Brainstem auditory evoked response (BAER) - basics and applied aspects
 - VEP, SSEP, BAER in paediatric population
- Technical Consideration in NCS EMG and EPs
 - Artefacts and technical factors
 - Anomalous innervations
- Clinical Electrophysiological Correlation
 - Clinical presentation, pathophysiology and electrodiagnosis of Peripheral neuropathies - hereditary and acquired
 - Clinical presentation, pathophysiology and electrodiagnosis of Muscle diseases
 - Clinical presentation, pathophysiology and electrodiagnosis of neuromuscular junction disorders.
 - Radiculopathies and Myelopathy
 - Anterior Horn Cell disorders
 - Muscle Channelopathies and periodic paralysis.
 - Critical illness neuromyopathies.
 - Anomalous innervations in limbs.
 - Basics of nerve repair.
 - Clinical presentation, pathophysiology and electrodiagnosis of traumatic neuropathies and plexopathies
 - Paediatric neuromuscular diseases.

Practical Skills:

- Detailed history taking and Clinical examination of patient to formulate the electrodiagnostic study.
- Basic Nerve Conduction Study (Sensory and Motor action potentials) - techniques of elicitation, parameters assessed and interpretation
- Late responses (F wave and H reflex)- techniques of elicitation, parameters assessed and interpretation
- Facial nerve study - techniques of elicitation, parameters assessed and interpretation
- Blink reflex - techniques of elicitation, parameters assessed and interpretation
- Advanced Nerve conduction studies - techniques of elicitation, parameters assessed and interpretation
 - i. Slow and Rapid rate Repetitive Nerve Stimulation test
 - ii. Provocative tests for channelopathies
 - iii. Sympathetic skin response test
 - iv. Short Segment Studies
- Needle EMG -
 - a) Assessment for spontaneous and voluntary activity.
 - b) Identification of neurogenic and myopathic potentials.
 - c) Tremor analysis / Surface EMG in movement disorders.
 - d) EMG guided Botox injections in cases of dystonia/ spasticity.
- Somatosensory evoked potential - from upper and lower limbs
- Visual Evoked Potential - Pattern reversal and Flash VEP
- Brainstem Auditory Evoked Response.
- Care for the patient throughout the procedure.
- Adaptations necessary while conducting procedure in particular patient groups or difficult operating situations.
- Interpretation of the findings of the electrodiagnostic study to formulate the final report.
- Liaises with referring/ treating colleagues for better patient care.

Aarthika
Dr. Aarthika Sreenivasan
Asst. Professor
Dept of Physiology
MGM Medical College
Kamothe, Navimumbai

Dr. Aarthika Sreenivasan
MBBS, MD (Physiology)
Asst. Prof-Physiology
MGM Medical College & Hospital,
Reg. No. MMC 06/02/0557



Rita Khadkikar
5.7.23

Dr. Rita Khadkikar
Professor and HOD
Dept of Physiology
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Kamothe, Navimumbai

Professor & Head
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