

M.D. PHYSICAL MEDICINE & REHABILITATION

SYLLABUS

The following syllabus for MD in Physical Medicine & Rehabilitation has been conceived, organized and integrated in order to guide the sincere student towards a comprehensive understanding of the science which he has chosen as his subject of study, envisaging a future which is bound to require holistic, complete, wholesome and quality health care for every individual inhabiting the globe, which the philosophy of Rehabilitation Medicine is most equipped to supply. After the successful completion of this period of study, it is hoped that the student of Rehabilitation Medicine becomes not only an ideal physician to the disabled but also a more complete and compassionate individual and an asset to the world community.

I. Basic Sciences as applied to Physical Medicine & Rehabilitation

1. Anatomy (40 hours of lectures and demonstrations)

- a. Musculo-skeletal system – Osteology and Myology, Functional Anatomy, Kinesiology and Anthropology
- b. Neuroanatomy - Brain, Spinal Cord, Peripheral Nerves, Autonomic Nervous System.
- c. Cardiovascular system
- d. Respiratory system
- e. Histology of bones, cartilage, muscles, nerves and skin

2. Physiology (30 hours of lectures and demonstrations)

- a. Muscle – Ultra structure and chemical composition, contraction, fatigue, changes in denervated muscle
- b. Nerve – properties of peripheral nerve, membrane potential and depolarization, nerve impulse, nerve conduction, neuromuscular transmission, motor unit, muscle spindle, electro- diagnosis
- c. Central nervous system – sensations and volition, co-ordination of movement and regulation of posture, special senses, language and speech
- d. Autonomic nervous system
- e. Cardiovascular system
- f. Respiratory system – including assessment of pulmonary function
- g. Endocrine system -
- h. Renal functions, control of micturition
- i. Temperature regulation
- j. Physiology of exercise

3. Biochemistry (10 hours of lectures and demonstrations)

- a. General metabolism and nutrition
- b. Acid base balance
- c. Calcium and Phosphorus metabolism

4. **Biophysics as applied to Physical Medicine** (30 hours of lectures and demonstrations)

- a. Biomechanics of human movement
- b. Properties of physical agents used in Physical Medicine – heat, cold, light, electromagnetic spectrum, electricity and ultrasound

5. **Pathology** (35 hours of lectures and demonstrations)

- a. Degenerations, circulatory disturbances, inflammation and repair
- b. Infections of bones and joints, Rheumatoid arthritis and allied disorders (in detail)
- c. Neuropathology- trauma to central nervous system, degenerations of CNS, infections, cerebrovascular accidents
- d. Cardiovascular diseases with emphasis on congenital heart diseases, valvular heart diseases, hypertension and peripheral vascular disorders
- e. Respiratory diseases with emphasis on infections, restrictive and obstructive disorders
- f. Diseases of the kidney and urinary tract
- g. Major endocrine disorders like Hypothyroidism, and Obesity
- h. Nutritional deficiencies
- i. Diseases of muscles
- j. Genetic disorders
- k. Pathology of aging

6. **Pharmacology** (20 hours of lectures and demonstrations)

- a. Drugs acting on the adrenergic system
- b. Drugs acting on the peripheral nervous system (somatic) including skeletal muscle relaxants
- c. Local anaesthetics
- d. Autocoids and related drugs
- e. Drugs for COPD and Asthma
- f. Oxygen Therapy
- g. Hormones
- h. Drugs affecting calcium balance
- i. Sedatives, hypnotics
- j. Anticonvulsants
- k. Antispasticity agents
- l. Anxiolytics
- m. Nonopioid Analgesics and Nonsteroidal Antiinflammatory Drugs
- n. Opioids
- o. Hypolipidaemic agents and Plasma Expanders
- p. Steroids
- q. Antihypertensive agents
- r. Drugs acting on the neurogenic bladder
- s. Drugs acting on the bowel
- t. Anti rheumatic agents
- u. Antibiotics
- v. Antidepressants
- w. Immunosuppressants

- x. Anti-cancer agents
- y. Drugs in diabetes

II. Clinical Physical Medicine & Rehabilitation (175 hours)

1. History and scope of the specialty, definitions and terminology
2. Diagnostic application of physical agents
3. Treatment modalities used in Physical Medicine- general properties and detailed clinical use of each
 - a. Heat – general physiological properties and mode of action as a treatment agent, indications and contraindications, forms of heat therapy – superficial and deep heating including treatment techniques. Emphasis will be given to Infrared, Hydro collator, Paraffin Wax bath, convection heating devices, shortwave diathermy, microwave diathermy and ultrasonic therapy
 - b. Cold as a therapeutic agent
 - c. Ultraviolet radiation – physiological properties of U.V.R., mode of application in clinical use with indications, contraindications and side effects
 - d. Therapeutic electricity – Low voltage currents, low and high frequency currents
 - e. Hydrotherapy
 - f. Prescription of physical modalities and their applications in medical, surgical and gynaecological disorders
4. Clinical use of massage, manipulation, stretching and traction
5. General principles of therapeutic exercises (for muscle strength, endurance, power, motor re-education, co-ordination and joint mobility), maintenance of physical fitness through optimum exercise
6. Prescription of exercise therapy and other supportive measures
7. Analysis of gait – kinetics and kinematics, normal and pathological gaits, gait analysis and gait lab
8. Energy costs of functional activities in health and disease, experimental and clinical use of ergometry in Physical Medicine
9. Principles of occupational therapy, training in activities of daily living for rehabilitation, self-help devices, instrumental activities of daily living, environmental control units, setting up an occupational therapy section
10. Rehabilitation aids including walking aids, wheelchairs, tricycles, modified vehicles
11. Electro diagnosis - electromyography and application of electrophysiological testing of muscles and nerves for diagnostic and prognostic purposes including SSEP and Repetitive stimulation
12. Outcome assessment tools, use of questionnaires, disability evaluation, certification
13. Sports Medicinea.
 - a. Physical fitness training for sports personnel
 - b. Rehabilitation of the injured athlete
 - c. Sports for the disabled

- d. Nutrition in sports
- e. Use and abuse of drugs in sports
- f. Rational and safe use of medications in sports
- g. Fluid and electrolyte changes in exercise
- h. Safety, management and prevention of sporting trauma, principles of safety equipment
- i. Knowledge of contact and non-contact sports
- j. Sudden death in sports
- k. Chronic and overuse injuries
- l. Medical and psychological problems of athletes
- m. The growing athlete
- n. The female athlete
- o. Performance below par
- p. Ethics of sports medicine and rehabilitation
- q. Managing medical issues at stadiums
- r. Non-competitive and competitive sports

14. Rehabilitation management of cases with various systemic disorders

- a. Neuromuscular disability – with particular emphasis on strokes, post-polio paralysis, cerebral palsy, spinal cord injuries, muscular dystrophies, spinal muscular atrophy, disorders of the neuromuscular junction
- b. Orthopaedic disability- arthritis and joint deformities, postural problems and amputations
- c. Cardiovascular disability
- d. Pulmonary disability
- e. Urological problems
- f. Cancer
- g. Problems of the vestibular system
- h. Obesity
- i. Diabetes and Dyslipidaemia

15. Prosthetics and Orthotics

- a. General definitions – evolution of the field with emphasis on the Indian scene
- b. Indications for amputations – classical amputations- influence of prosthetic technology on amputation techniques – ideal stump – stump complications and their management
- c. Recent advances in amputation surgery and prosthetic science – myoelectric control for prostheses, computer aided design and manufacture
- d. Clinical examination of the amputees, and prescription of prosthesis
- e. Types of lower extremity prostheses – biomechanical considerations – knee and foot mechanics, alignment and fit, check-out
- f. Immediate post-operative fitting of prostheses
- g. Type of upper extremity prostheses - functional considerations, cosmetic considerations
- h. Bracing – Indications and preliminary considerations on pre-orthotic preparation and post-orthotic training
- i. Types of common braces and corrective shoes – prescription criteria and checkout procedures in fitting – lower extremity, upper extremity and spinal orthoses
- j. Common materials used in prosthetics and orthotic manufacture
- k. Equipment necessary for prosthetic and orthotic fabrication, organization of prosthetic & orthotic workshop
- i. Minimum requirements for setting up of an Artificial Limb fitting Centre

16. Psychosocial and psychiatric problems in rehabilitation and their management
17. Epidemiology of disability
18. Principles of rehabilitation nursing
19. Principles of management of communication impairments
20. Special principles in the rehabilitation management of children's problems
21. Management of the geriatric patient and rehabilitation
22. Rehabilitation management of the injured "industry" worker
23. Orientation on the socio-economic and vocational aspects of rehabilitation
 - a. Principles of vocational guidance, training and placement
 - b. Social integration of the disabled
 - c. Elimination of architectural barriers for the handicapped in relation to housing, transportation and employment
 - d. Mobilizing community resources for rehabilitation
 - e. Role of voluntary agencies
24. Principles of the "Team approach" towards rehabilitation, members of the team and the role of each.
25. Organization and administration of Rehabilitation facilities in
 - a. Teaching hospitals
 - b. Large general hospitals
 - c. Specialized treatment centers
 - d. Rural rehabilitation services
26. Issues of sexuality in Rehabilitation, rehabilitation of sexual problems
27. Community Based Rehabilitation
28. Interventional Pain Management
 - a. Anatomy and Physiology of Pain pathways
 - b. Pharmacotherapy of pain
 - c. Intra-articular injection techniques
 - d. Complex Regional Pain Syndromes
 - e. Phantom pain
 - f. Facial Pain
 - g. Fibromyalgia and myofascial pain syndromes
 - h. Interventions for musculoskeletal pain
 - 1) Stellate ganglion block
 - 2) Trigger point injections
 - 3) Gasserian ganglion block and block of branches of the trigeminal nerve
 - 4) Sphenopalatine ganglion block
 - 5) Cervical epidural block
 - 6) Cervical transforaminal epidural block
 - 7) Cervical discogram and Ozone discectomy/ ozone nucleolysis
 - 8) Cervical facet joint block
 - 9) Occipital nerve block

- i. Management of cancer pain- overview
- j. Pharmacotherapy of cancer pain
- k. Interventions for cancer pain

- 1) Coeliac plexus block
- 2) Lumbar sympathetic block
- 3) Superior hypogastric block
- 4) Splanchnic nerve block
- 5) Peripheral nerve block

- l. Rehabilitation of the patient with cancer related disability
- m. Management of colostomy, tracheostomy, laryngectomy and mastectomy
- n. Evaluation and interventional management of spinal pain
- o. Pain after spinal cord injury- evaluation and management
- p. Caudal epidural block and epidurogra

- 29. Epidemiology of Disability
- 30. Medical emergencies in rehabilitation
- 31. Computers in rehabilitation
- 32. Research methodology in rehabilitation medicine
- 33. Multiple disabilities
- 34. Sociology and health, social epidemiology, health seeking behaviour, social planning and development, socialization, environment and health, social groups, family, community, social psychology, QOL, groups and leadership, social problems in contemporary society, medical and social work as relevant to Rehabilitation Medicine

II. Allied Disciplines:

A. **Medicine including Neurology and Rheumatology** (80 hours)

- a. General metabolic and endocrine disorders including diabetes and dyslipidaemia
- b. Common infectious diseases prevalent in India
- c. Disorders of nutrition
- d. Degenerative diseases and special problems in the elderly
- e. Common cardiovascular diseases
- f. Common respiratory diseases
- g. Rheumatoid and allied diseases including classification, etiology, pathogenesis, clinical manifestations, diagnosis, differential diagnosis and management
- h. Genetics
- i. Neurological disorders
 - 1. Congenital disorders of the nervous system
 - 2. Hereditary – familial, degenerative, demyelinating, neoplastic disorders
 - 3. Progressive disorders
 - 4. Language disorders
 - 5. Epilepsy
 - 6. Stroke
 - 7. Spinal Cord Injury- Paraplegia and tetraplegia
 - 8. Autonomic disturbances
 - 9. Disorders of peripheral nerves

10. Assessment of intelligence – Mental retardation

11. Traumatic Brain Injury

12. Extrapramidal disorders

13. Multiple sclerosis

14. Infectious and toxic encephalitis

j. Disorders of frontal lobe function, dementias- primary and secondary

k. Apraxia, Agnosia and Aphasia

l. Human Immunodeficiency Virus and AIDS

B. Surgery including Orthopaedic Surgery (60 hours)

a. Shock and its management

b. Management of burns

c. Wound infections and their management

d. Pressure sores - aetiology, management and prevention

e. Principles of emergency resuscitation

f. Common orthopaedic injuries and principles of management, plaster techniques, complications of fractures, post-surgical patient, joint replacements, spinal stabilization

g. Orthopaedic problems in children and their management

h. Diseases of bones and joints (congenital, infective, inflammatory, metabolic, degenerative and neoplastic)

i. Orthopaedic problems resulting from neuromuscular diseases – pathogenesis, clinical picture, diagnosis and principles of management including surgical techniques

j. Scoliosis and other spinal deformities

k. Amputation surgery

l. Hand rehabilitation

m. Hip and knee contractures, foot disorders

B. Community Medicine (20 hours)

a. Identification of community needs for health services, including rehabilitation services, utilization of the epidemiological approach and statistical methodology

b. Principles of comprehensive health care, integrating rehabilitation practices with general health services (candidates are expected to acquire clinical practice through rural and urban health units)

c. Preventive rehabilitation approach in medical care at the grass root and intermediate community levels

d. Immunization practices

e. Health education practices

C. Pediatrics (20 hours)

a. Normal growth and development.

i. Prenatal

ii. Neonatal to adolescence (gross motor, fine motor, reflex maturation, cognitive, social and personality)

- b. Developmental delay and mental subnormality
- c. Behavioural disorders and their relationship to organic diseases
- d. Planning education programs for disabled children
- e. Common congenital and hereditary disorders of children
- f. Common childhood diseases (including poliomyelitis, cerebral palsy, meningitis, rheumatic fever and neoplasms)
- g. Childhood disability
- h. Autism and Attention Deficit Hyperactivity Disorder

D. Psychiatry and Clinical Psychology (20 hours)

- a. Mental status, intelligence and personality assessment
- b. Behavioural disturbances due to organic brain damage
- c. Overt psychopathologic reactions – neurotic, psychotic or sociopathic states
(Latter including addiction, alcoholism and sexual disturbances)
- d. Emotional disturbances – anxiety, depression, aggressiveness, apathy
- e. Psychological responses to illness and disability
- f. Introduction to counseling, counseling in individuals and organizations, assessing various types of counseling provisions, conflicts between values of organization and counseling, the roles and responsibilities of counselors, common methods of counseling and their applications in relation to Rehabilitation Medicine

E. Cardiology (10 hours)

- a. Common disorders of the cardiovascular system with particular emphasis on the congenital, rheumatic, hypertensive and ischemic diseases
- b. Assessment and classification of functional status of the heart and work capacity
–Application of data for rehabilitation – recent advances
- c. Rehabilitation of patients with cardiac illnesses – post-myocardial infarction, CABG, cardiac transplantation, cardiomyopathy and valvular heart disease, protocols in exercise testing (Bruce, Naughton and others)

F. Chest diseases (10 hours)

- a. Allergic, infective, neoplastic, obstructive and restrictive disorders of the respiratory system
- b. Respiratory assistance therapy, oxygen therapy, chest physiotherapy

G. Radiology and Cancer (15 hours)

- a. Interpretation of radiological findings on common diseases
- b. Common diagnostic radiological procedures
- c. Contrast studies and their significance
- d. Principles of nuclear medicine
- e. Principles of radiotherapy
- f. Principles of anti-cancer chemotherapy
- g. Palliative care

H. **Neurosurgery** (10 hours)

- a. Management of trauma to the central nervous system
- b. Congenital, infective, degenerative and neoplastic diseases of the brain or spinal cord including aetiology, pathogenesis, diagnosis and management
- c. Peripheral nerve injuries

I. **Plastic Surgery** (7 hours)

- a. Methods and techniques of skin grafting
- b. Principles of reconstructive surgery for correction of deformities
- c. Surgical treatment of decubitus ulcers
- d. Principles of hand surgery, tendon transfers in upper and lower limbs

J. **Urology** (6 hours)

- a. Evaluation and management of the neurogenic bladder
- b. Upper and lower urinary tract infections – aetiology, diagnosis and treatment

K. **E.N.T** (10 hours)

Common E.N.T disorders, including speech and hearing impairments and their management

L. **Obstetrics and Gynecology** (6 hours)

- a. Pelvic infections
- b. Urogenital prolapse
- c. Role of exercise therapy in Obstetrics and Gynaecology practice
- d. Women's issues in rehabilitation

M. **Ophthalmology** (10 hours)

Common ophthalmological disorders, causes of blindness, prevention and management, and disability evaluation

N. **Law in relation to disability including PWD Act, 1995 and RCI Act 1992, The National Trust Act, 1999** (10 hours)

O. **Recent advances** (20 hours)

1. Exercise management for persons with chronic disease and disability-
ACSM

Clinical work and practical training

28 months should be spent in Physical Medicine and Rehabilitation.

8 months should be spent in allied disciplines.

The Thesis

Every MD candidate should submit a thesis done under a guide recognized by the University before the theory examinations. The candidate will have to choose a thesis topic as per the University rules and work on it. He has to make a written presentation of the thesis and submit it to the University through the Guide and the Head of the Department of PMR, in accordance with the rules of the University in force from time to time.

Practice task

Doing practice tasks is included as a method of ensuring student-centred learning. It also enables the candidate to improve his proficiency in problem identification, solving and managing issues on a time frame. A candidate has to perform a minimum of one practice task during the MD programme. A member of the teaching faculty who will be responsible for guiding and monitoring each task will supervise the practice tasks. A practice task is a course work and must be satisfactorily completed for the candidate to appear for the final examination. Presentation of a record of cases including follow-up may also be treated as a practice task. The candidate pursuing the MD programme has to submit a time-table for doing the practice task during the course. The duration of the practice task will be 120 to 150 hours. Though information collected and gained from the practice task may be used in the thesis work by the candidate, the practice task is independent of the thesis. The report of the task should be submitted at least six months before the final examination.

The candidate is evaluated to see if he/she is able to fulfil (assessment by written and internal evaluation) the broad aims of the course work such as:

1. Problem identification, prioritizing and evolving a strategy to manage the problem without strain on available resources,
2. Undertaking enquiry into the problem area based on specific methodology and
3. Formally documenting the stages of the study, including description of the problem, the process of investigation, the findings and their implications.

The practice task will carry 10 marks. It will form part of the internal assessment in clinical examination.

Text Books recommended:

- Text book of Rehabilitation Medicine by Howard, A.Rusk
- Physical Medicine and Rehabilitation- Braddom R L
- Muscle Testing and Function - Kendall F.P
- Hutchison's Clinical Methods- Swash M
- Sports Injury Assessment and Rehabilitation- Reid, David.C
- Therapeutic Exercises - Basmajian
- Kelly's Text book of Rheumatology- Ruddy, Harris and Sledge
- Medical Ethics –Schwartz
- Spinal Cord Medicine –Denise J C, Delisa J
- Physiological Basis of Rehabilitation Medicine- Downey and Darling
- The Physiology of the Joints, Vol. I, II, III- Kapandji.I.A
- Exercise and the Heart- Froelicher and Myers
- Turek's Orthopaedics: Principles and Applications- Weinstein S L, Buckwalter J

- Apley's System of Orthopaedics and Fractures- Apley A, Solomon L
- The Internet and Health Communication- Rice and Katz
- Amputations and Prosthesis- May
- Radiology and Imaging for Medical Students- Sutton
- Geriatric Medicine- Schrier
- Computers in Medicine- Javitt
- Practice Manual of PMR- Tan
- EMG Secrets- Tan
- Ultrasound Scanning, Principles, Protocol- Tempkin
- How to write health science papers, thesiss- Thomas et al
- Textbook of Rehabilitation Medicine- Delisa
- Principles of Hospital Administration- Sakharker
- Ergonomics at Work- Osborne
- Management in Rehabilitation- Schuch and Sekarak
- Clinical Biomechanics- Valmassy
- Psychology- Westen
- Clinical Neuophysiology- Mishra U K, Kalita J
- Handbook for Research Methods in Health Sciences- Sullivan M
- A Manual on Clinical Surgery - Somen Das.
- Pain Management in Rehabilitation- Monga & Grabois
- Disability Evaluation- Demeter, Anderson & Smith
- Basic and Clinical Pharmacology - Katzung B.G
- Harrison's Principles of Internal Medicine- Fauci A.S, Braunwald E
- Treatment and rehabilitation of fractures-Hoppenfeld & Murthy
- Introducing Palliative Care- Robert Twycross
- Nelson Textbook of Paediatrics- Nelson W.E, Behrman R.E
- Exercise management for persons with chronic disease and disability- ACSM

Journals Recommended

1. Indian Journal of PMR
2. Archives of Rehabilitation Medicine
3. Scandinavian Journal of Rehabilitation Medicine
4. Spinal Cord
5. Prosthetics Orthotics International
6. Indian Journal of Orthopaedics
7. Stroke
8. Arthritis and Rheumatism
9. Indian Pediatrics
10. Neurology India
11. Indian Journal of Disability and Rehabilitation
12. Sports Training, Medicine & Rehabilitation
13. Journal of Rehabilitation Research and Development
14. National Medical Journal of India
15. American Journal of Physical Medicine and Rehabilitation
