PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS

Examination at the end of: III year **Instruction Hours: 110**

Theory: 100 marks (80 + 20 IA)

Practical &Viva 100 marks (60 - Practical + 20 - Viva + 20 - IA)

COURSE DESCRIPTION:

This course serves to integrate the knowledge gained by the students in clinical neurology with the skills gained in exercise therapy, electrotherapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to pathology in the nervous system.

COURSE OBJECTIVES:

The objectives of this course is that after 110 hours of lectures, demonstrations practicals and clinics the student will be able to identify disability due to neurological dysfunction, set treatment goals and apply their skills in exercise therapy, electrotherapy and massage in clinical situation to restore neurological function.

COURSE OUTLINE:

A. REVIEW OF NEUROANATOMY AND PHYSIOLOGY:

Review the structure and function of :- a) neuron b) synapse c) supporting tissue; Review the organization and function of : a) cerebral hemispheres b) cerebellum c) spinal cord d) peripheral nerves e) pyramidal system f) extra pyramidal system. Review the factors influencing alpha motor neuron activity. Review the neurological basis of muscle tone and movement and demonstrate the following: a) hypotonia b) hypertonia — spasticity and rigidity c) ataxia d) athetosis e) chorea.

B. PRINCIPLES OF ASSESSMENT:

Review a) skills in history taking b) assessment of higher functions, cortical sensations, cranial nerves, dorsal column sensation and pain and temperature sensations c) assessment of motor function : grading of muscle poer, assessment of range of movement, balance and coordination d) assessment of superficial and deep reflexes e) assessment of reflex maturation in terms of stimulus, position, negative / positive reactions and their significance f) assessment of gait — both normal and abnormal (spastic, ataxic and paralytic patterns). Emphasis should be placed on teaching accurate assessment techniques and various recording methods eg. colourcoding on body charts, graphs etc

C. PRINCIPLES OF TREATMENT:

Review the treatment principles as follows:-

a. Sensory re-education: hypersensitivity, hyposensitivity and anesthesia.

b. Treatment of altered tone: hypertonicity and hypotonicity

c. Motor re-education: strengthening exercises, coordination exercises, joint mobilization exercises, uses of equilibrium and labrynthine system, use of PNF patterns, controlled sensory stimulation to bias the spindle cell eg. vibration, tactile, ice etc., use of stretch to elicit movement (facilitation), light joint compression (inhibition), use of reflex activity to improve motor function, physiogenic sequence of motor behavior.

d. Treatment to improve functions: free exercises, gait training with and without aids, activities of daily living, mat exercises and exercises and recreation.

e. Review the use of ambulatory aids in neurological conditions: in spastic upper motor neuron lesions, in lower motor neuron lesions, in dorsal column dysfunction and cerebellar dysfunction.

f. Review the use of splints and braces in spastic upper motor neuron and flaccid lower motor neuron lesions in both upper and lower limb.

g. Review the management of chronic pain in neurological conditions with respect to the pain, treatment modalities available, selection criteria for each modality and possible complications.

h. Vestibular rehabilitation

i. General principles and selection of orthoses and assistive devices, training of patients with orthoses in various neurological conditions.

D. CEREBRAL PALSY:

Define cerebral palsy and describe the topographical classification — monoplegia, diplegia, paraplegia, hemiplegia & tetraplegia. Describe types of cerebral palsy; spastic, athetotic, mixed. Identify common associated problems: visual, hearing, speech and intelligence. Assess reflex activity at different levels: cortical, mid brain, brain stem, spinal. Assess developmental milestones from birth to five years. Assess functional ability: Prone to supine (rolling), crawling to sitting quadripod, crawling, kneeling kneel — stand, stand with support and walking. Examine for contractures as follows: hip: flexion, adduction, internal rotation; knee: flexion; ankle: plantar flexion, inversion / eversion; flexion contractures of elbow, wrist & fingers and spinal deformities.
Treatment — Describe and demonstrate the treatment of motor disabilities: passive movement, stretching of soft tissue to tightness, use of ice to reduce spasticity, positioning the child to prevent soft tissue contractures, to inhibit abnormal reflexes and to facilitate rotational movement. Describe and demonstrate techniques of carrying of different types of CP children, encouraging bimanual activities in different starting positions like prone, sitting and standing and activities across the

midline. Describe appropriate home programmes for positioning the child, handling them and assisting improvement of function, introduction to treatment techniques: Bobath, Rood.

E. PERIPHERAL NERVE LESIONS:

Identify types of peripheral nerve lesions. Assess the motor system: specific muscles, range of motion, active and passive ranges, muscle girth. Assess sensory system: touch, pain, temperature, parasthesia, nerve regeneration. Assess autonomic function: sweating, skin condition, soft tissue atrophy. Treatment: describe muscle re-education techniques: electrical stimulation (selection of current); active, assisted, resisted movements; passive education and pain relief by various modalities. Describe the common splints used in peripheral nerve lesions; static, dynamic and functional, muscle transfers: preparation for transfer assessment of muscle power, stretching of soft tissue tightness, Post-operative management: pressure bandaging & muscle re-education after transfer. Describe a home programme.

F. MUSCULAR DYSTROPHY:

Describe stages of the disease: ambulatory, wheel chair and bed stages. Describe significance of exercises - resistive, active and free. Identify and assess common contractures and deformities. Assess range of motion and muscle power. Assess functional ability.
Demonstrate treatment programme for strengthening weak muscles; active movements and hydrotherapy. Increase range of motion by suspension therapy, poder board, passive stretching. Positioning etc. demonstrate gait training with appropriate orthoses. Describe management of chest complications: breathing exercises, chest percussion, drainage of secretions, and assisted coughing.

G. Parkinsonism:

Review the natural history, course and prognosis. Identify and assess problems in posture, sitting, kneeling and standing balance, voluntary and automatic movements, rigidity, tremor and gait. Assess also hearing, speech, fingers, dexterity. Describe disability grading according to Yalu.
Demonstrate treatment: postural awareness and relaxation training, gait training, techniques; associated reactions, heel-toe gait. Overcoming obstacles, start and stop on command, turning and walking backwards, forwards and sidewards. Describe an appropriate home exercise programme.

H. SPINAL CORD LESIONS:

Describe types of spinal cord lesions. Describe signs of tract and root interruptions. Describe positioning of the patient in acute spinal cord injury. Describe assessment of the motor system: tone, power of specific muscles, range of motion and limb girth. Describe the assessment of sensory system and reflexes. Describe assessment of functional ability and balance reactions in appropriate cases. Describe assessment of respiratory function: muscles of respiration, coughing ability and vital capacity. Describe how the level of lesion is ascertained.

Treatment: Describe the stages of immobilization & stage when loading of the spine is allowed. Describe spinal orthosis. Demonstrate motor re-education programs and a program for respiratory care in high level paraplegics and quadriplegics. Demonstrate progressive ambulation, mat exercises, various strengthening programmes, methods of decreasing spasticity and improving sitting balance. Demonstrate various types of paraplegic gaits and re-education in functional activities; transfers and protective falling. Describe common ambulatory aids used in paraplegics and common splints used in tetraplegics. Describe the use of hydrotherapy in paraplegics. Describe the concept of team approach in rehabilitation of these patients.

I. C.V.A. (CEREBRO VASCULAR ACCIDENTS):

Define hemiplegia and identify the following: Sensory disturbance, alteration in tone, loss of selective movement, loss of balance reactions and communication problems.
Treatment: Describe the unilateral and bilateral approaches to treatment. Describe positioning in the supine position, on the affected and on the unaffected side. Demonstrate activities in the recumbent position : arm mobilization, trunk elongation, scapular movement, arm elevation, activities for a recovering arm : activities for the lower limb i.e., hip and knee flexion over the side of the bed, knee extension with dorsiflexion, hip control, isolated knee extension. Mat activities: demonstrate rolling on to affected and unaffected sides, sitting and kneeling. Describe the technique of making a patient sit passively and active assisted sitting. Demonstrate transfer techniques. Describe activities in siting : equal weight transference on both buttocks, shuffling on buttocks, weight transfer through arms balance, reactions of trunk — head. Demonstrate activities in the standing position : standing from plinth, from chair (assisted and independent), weight bearing on affected leg, knee control in standing, weight transfers forwards, backward and side wards, gait training and stair climbing. Describe tilt board activities in the lying and sitting positions. Describe additional methods of stimulation using verbal cues, ice, pressure & tapping. Describe management of shoulder pain and shoulder hand syndrome. Identify and describe a hemiplegic gait, identify synergy components and abnormal reflex activities. Demonstrate re-education of gait: motor re-learning techniques, functional approach and use of orthoses.

J. CEREBELLAR LESIONS:

Identify and assess abnormal tone, decomposition of movement, rapid alternate movements, pleurothotonus, proprioception, dysmetria, posture and gait.
Treatment: Demonstrate exercise for incoordination — Frenkels and weighted exercise. Demonstrate techniques for re-education of balance and equilibrium reactions by visual compensation. Describe

use of appropriate aids for ambulation depending on the severity of affectation — walker, elbow crutches, quadripod walking sticks etc.,

K. POLIOMYELITIS:

Define poliomyelitis and review the stages in the disease, acute recovery and residual paralysis. Describe treatment in the acute state: heat, chest care, positioning. Describe the assessment of a patient in the recovery stage: active and passive range of motion, soft tissue tightness, muscle power & spinal deformities. Demonstrate treatment in the recovery stage: muscle strengthening, progressive resistive exercise: active — assisted, active - resistive exercise. Describe the role of suspension and hydrotherapy. Describe the treatment of soft tissue tightness by passive stretching, auto stretching and positioning. Demonstrate treatment in the stage of residual paralysis, pre-operative assessment of contractures: hip flexion, TEL contracture, knee flexion and foot deformities. Describe also assessment of limb length discrepancy and spinal deformities. Review orthotic aids commonly used in the management of polio. Describe tendon transfer operations commonly performed. Describe functional retraining for self care, gait training and posture correction.

L. POLYNEUROPATHIES, MULTIPLE SCLEROSIS AND GUILLINA — BARRE SYNDROME.

Evaluation and management of the above condition, history, observation, palpation, motor & sensory examination, reflex testing, differential diagnosis, balance and co-ordination examination, gait analysis, functions analysis.
List of problems and complications, short and long term goals and management of systemic complications and physiotherapy intervention.

M. PT Management in Head injuries and motor neuron diseases.

References:-

1. Cash Text Book of Neurology for Physiotherapy
2. Key issues in Neurological physiotherapy — Ada / canning.
3. Physical Rehabilitation — Assessment and Treatment by Susan B.Os Sullivan Thomas J.Schemitz.
4. Neurological Examination in clinical practice — John Spillane, Bicker staffs
5. Neurological Physiotherapy — Susan Edwards.
6. Steps to follow: The comprehensive treatment of patients with Hemiplegia — Patricia M Davies.
7. Adult hemiplegia — Bobath.
8. Physiotherapy in Neuro conditions — Glady Samuel Raj.