COURSE NAME : CLINICAL NEUROLOGY

COURSE CODE : 746285

TITLE : NEUROPHYSIOLOGY – PART I

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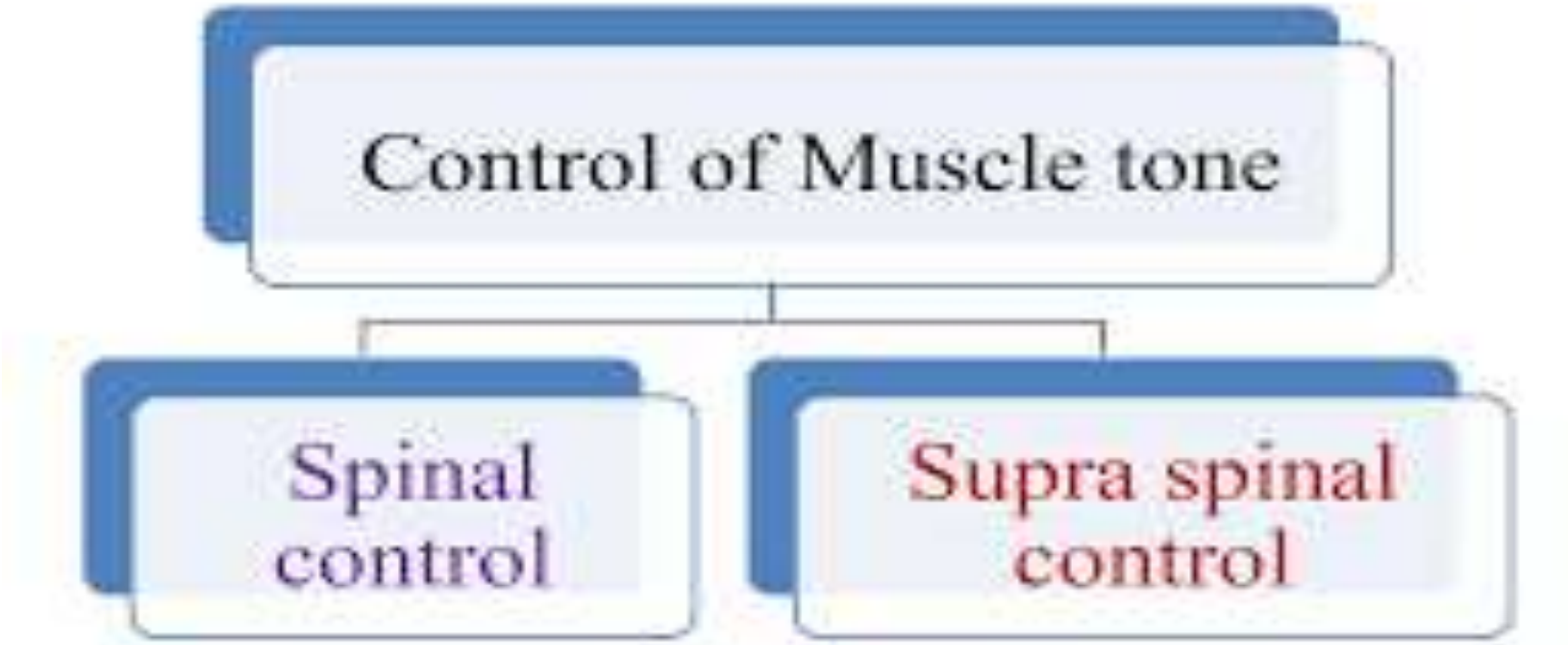
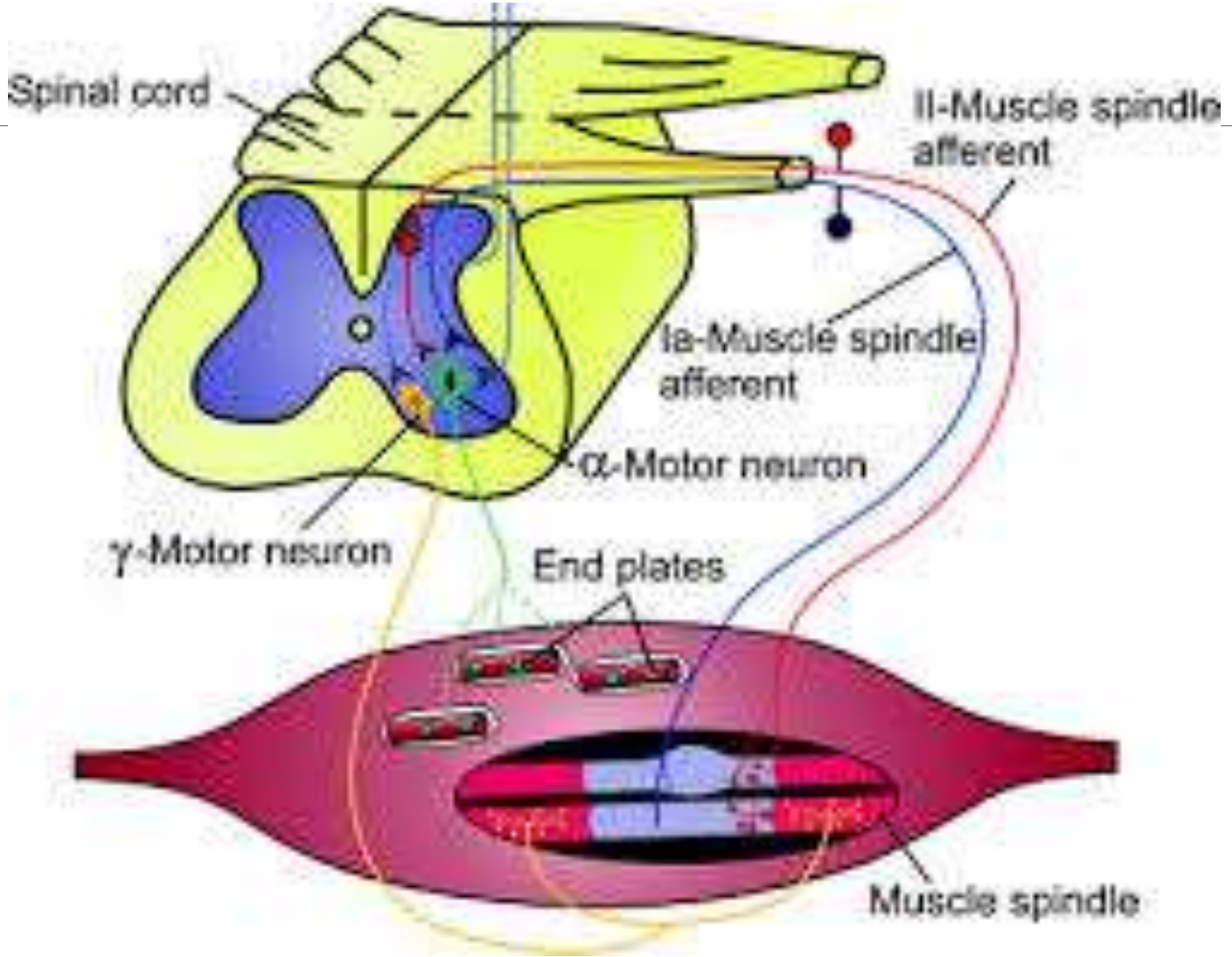
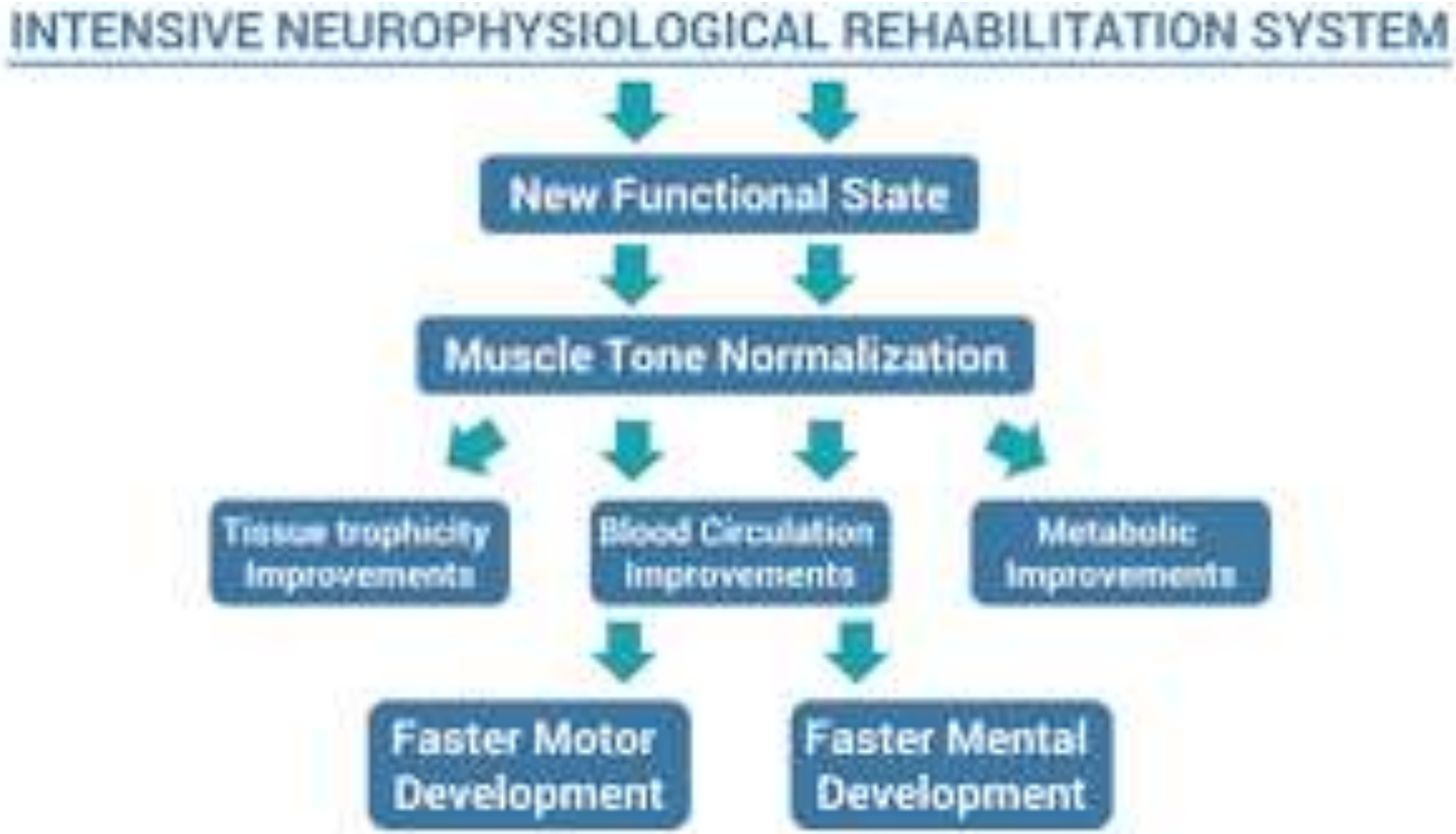
DESIGNATION : ASSOCIATE PROFESSOR

Neurophysiology of Muscle Tone

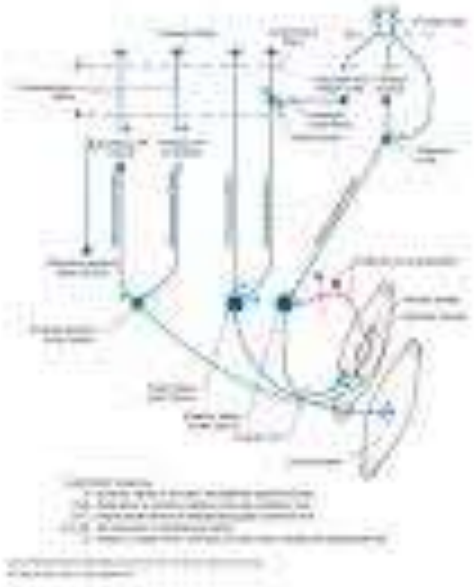



Spinal cord
II-Muscle spindle afferent
Ia-Muscle spindle afferent
α-Motor neuron
γ-Motor neuron
End plates
Muscle spindle


INTENSIVE NEUROPHYSIOLOGICAL REHABILITATION SYSTEM
New Functional State
Muscle Tone Normalization
Tissue trophicity Improvements
Blood Circulation Improvements
Metabolic Improvements
Faster Motor Development
Faster Mental Development

Decerebration

- A complete transection of the brain stem between the superior and inferior colliculi permits the brain stem pathways to function independent of their input from higher brain structures. This is called a **midcollicular decerebration. (A)**



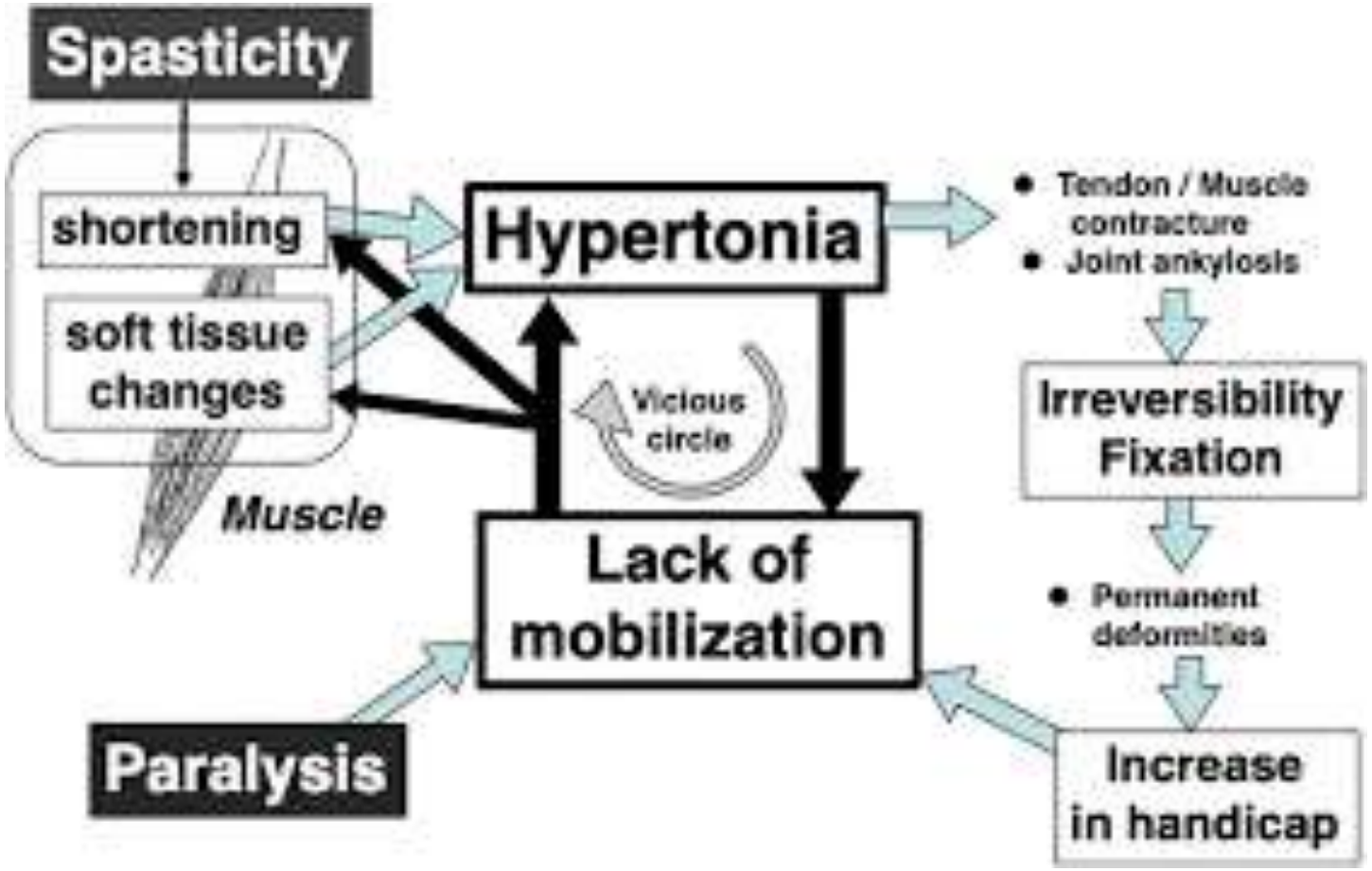
Dystonia

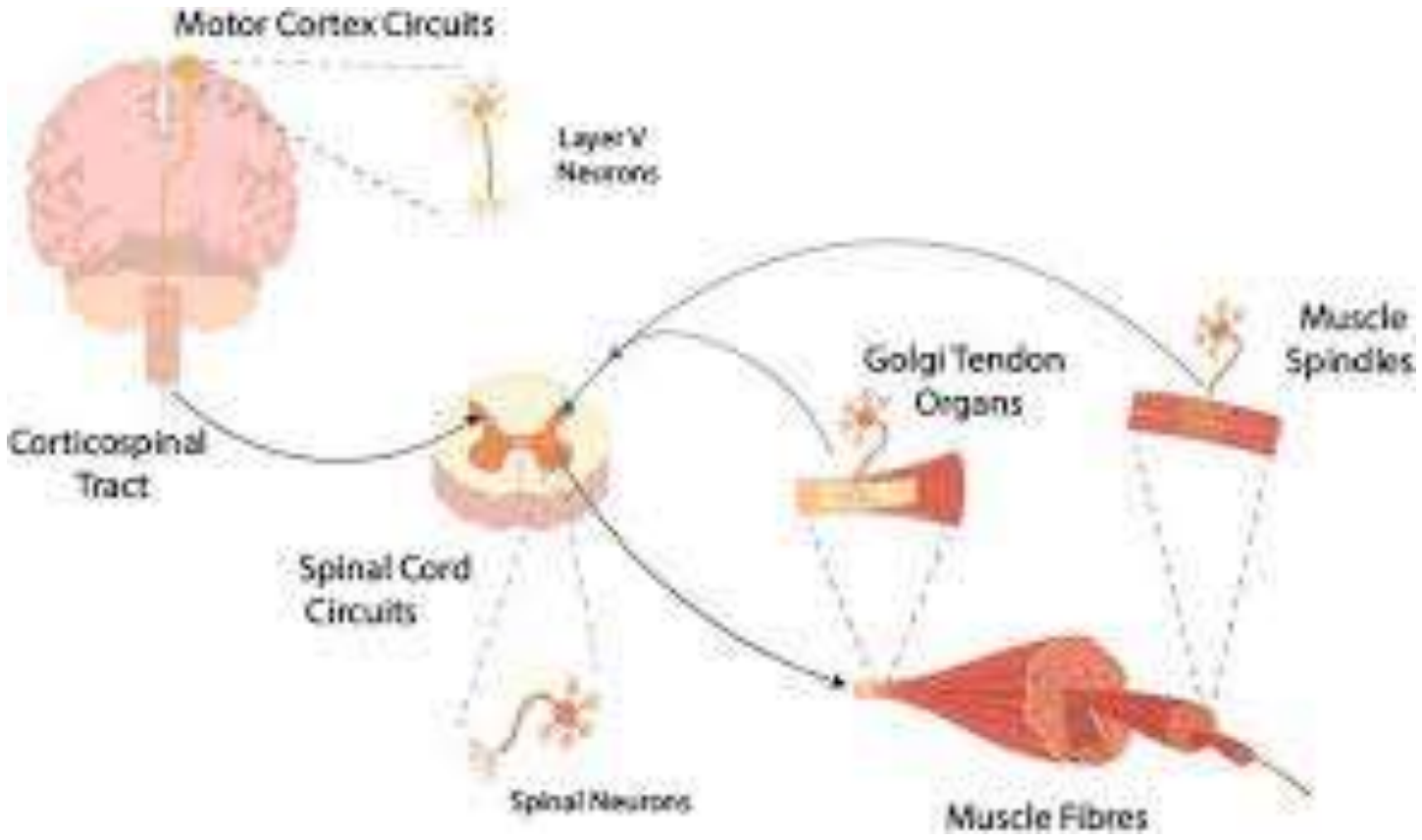
- Characterized by abnormal muscle spasm producing distorted motor control and undesired postures.
- A principle finding is the loss of cortical inhibition.
- Failure of "surround inhibition". Brain activates a specific movement and simultaneously inhibits unwanted movements.

Hypotonia

- Hypotonia may affect a muscle's resistance to passive movement and/or its extensibility.
- Aetiological types of hypotonia :

  1. Nerve trunk and root lesion
  2. A lesion of anterior horn
  3. Cerebellar lesions
  4. Cerebral lesions


Spasticity
shortening
soft tissue changes
Muscle
Hypertonia
Vicious circle
Lack of mobilization
Paralysis
Tendon / Muscle contracture
Joint ankylosis
Irreversibility Fixation
Permanent deformities
Increase in handicap


Motor Cortex Circuits
Layer V
Neurons
Corticospinal
Tract
Golgi Tendon
Organs
Muscle
Spindles
Spinal Cord
Circuits
Spinal Neurons
Muscle Fibres

INCLASS ASSESSMENT

1. **Muscle tone is best defined as:**
   A. The maximal force produced during voluntary contraction
   B. The resistance of muscle to passive stretch at rest
   C. The amount of muscle hypertrophy present
   D. The speed of muscle contraction during activity

2. **Which of the following peripheral receptors is most important in the regulation of muscle tone under resting conditions?**
   A. Golgi tendon organs
   B. Pacinian corpuscles
   C. Muscle spindles
   D. Meissner's corpuscles

3. **Spasticity is best described as:**
   A. A uniform, velocity-independent increase in tone affecting agonist and antagonist muscles equally
   B. A motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes
   C. A fluctuating increase and decrease in tone associated only with voluntary movement
   D. A reduction in resistance to passive movement with absent reflexes

INCLASS ASSESSMENT

4. **Rigidity, typically seen in extrapyramidal (basal ganglia) lesions such as Parkinson's disease, is characterized by:**
   A. Velocity-dependent increase in resistance to passive movement
   B. Cogwheel or lead-pipe resistance that is relatively independent of movement speed
   C. Complete absence of resistance with exaggerated tendon jerks
   D. Selective hypotonia of proximal muscle groups only

5. **Hypotonia is MOST likely to be seen in a lesion involving which of the following structures?**
   A. Basal ganglia
   B. Cerebellum
   C. Medial reticulospinal tract
   D. Lateral vestibulospinal tract

INCLASS ASSESSMENT

ANSWERS

1. B. The resistance of muscle to passive stretch at rest.
2. C. Muscle spindles.
3. B. A motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes.
4. B. Cogwheel or lead-pipe resistance that is relatively independent of movement speed.
5. B. Cerebellum.

THANK YOU!!!!

References Books:

- Hankey Greame - Clinical Neurology
- Bickerstaff - Clinical Neurological Examination
- Dejongs - Neurological Examination
- Demyers - The Neurologic Examination
- Snell - Clinical Neuroanatomy - 7th Ed
- Satish Khadilker - Neuromuscular Disorders
- Vishram Singh - Texbook of Clinical Neuro Anatomy 2nd edition
- Kenneth W. Lindsay - Neurology and Neurosurgery Illustrated