NERVOUS SYSTEM BLOCK

26th Lecture

Upper & Lower Motor Neurons Lesions

PHYSIOLOGY TEAM – 430

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Upper & Lower Motor Neuron Lesion

- **Introduction:**

Sensory comes from granular cells not pyramidal

- UMNs start from pre-central gyrus (Pyramidal cells)
- 80% of pyramidal fibers will decussate in medulla oblongata
- UMNs originate from the cortex to contralateral Anterior Horn Cells
- Types of UMNs:
  - ✓ Cortico-bulber
  - ✓ Cortico-nuclear
  - ✓ Cortico-spinal
- Corticospinal is the longest neurons in our body → So it's more susceptible to damage

- LMNs originate from the Anterior Horn Cells to the ipsilateral muscles
- Examples of LMNs: All peripheral nerves (radial, unlar, femoral, tibial)

- Types of cells in the anterior horn:
  - ✓ Alpha
  - ✓ Gamma
  - ✓ Renshaw (Inhibitory regulation of motor efferent)

- **Lesions:**

Monoplegia: Lesion in one limb (Lesion in Corona Radiate → Monoplagia)
Hemiplegia: Lesion in two limbs in same side (Lesion in Internal Capsule → Hemiplesia)
Paraplegia: Lesion in both lower limbs (Paralysis of the lower half of the body)
Quadriplegia: Lesion of all limbs

- **How to differentiate between the different sites of hemiplegia:**

- Brain Stem hemiplesia → Cranial Nerves paralysis:

✓ **Midbrain** → 3rd + 4th will be paralyzed

✓ **Pons** → 6th, 7th, and 8th will be paralyzed (5th is rarely injured because it's a large nerve)

✓ **Medulla** → 9th, 10th, 11th, and 12th will be paralyzed

Note:

Lesion in the Brain Stem:

➔ Contralateral Hemiplesia

➔ Ipsilateral paralysis of the cranial nerves

- **Difference between UMN and LMN:**

	UMN Lesion	LMN Lesion
Extent of Paralysis	Widespread	Localized
Site of Paralysis	Contralateral	Ipsilateral
Tone of Muscles	Hypertonia (Spasticity or Clasp-Knife) Hyper-reflexia	Hypotonia (Flaccidity)
Tendon reflexes	Increased (Clonus often present)	Decreased or absent
Muscle wasting	Little wasting	Marked wasting
Skin appearance	Cyanosis and oedema may result from disuse	Skin often cold, blue and shiny ulceration may result

Note:

- **Babiniski's sign:** Fanning of toes when doing planter reflex (The big toe will respond before the others and will extend)
- Babiniski's sign indicates UMN Lesion, but there are few exceptions that will result in babinisiki's sign without UMN lesion, they are:

✓ Children newly born

✓ Deep Sleep

✓ Coma

- **Clasp-Knife (Pyramidal):** Means when you want to flex the arm there will be resistance in the beginning and then it will flex loosely
- **Rigidity (Extrapyramidal):** When extensors and Flexors contract at the same time e.g. Lead-Pipe Rigidity
- **Cog-wheel:** it happens in parkinsonism and it's a rigidity accompanied with tremors

- **Reflexes:**

- **Biceps Jerk:** A tap on the biceps tendon causes contraction of the biceps and flexion of the arm
- **Radial Jerk:** A sharp tap on the Styloid process of the radius causes at the elbow and partial supination of the forearm
- **Triceps Jerk:** Percussion of the triceps tendon causes contraction of the muscle with extension at the elbow
- **Knee Jerk:** The knees are supported and brisk tap made on each side to compare the response
- **Ankle jerk:** most difficult jerk a tap on the tendon calcaneus causes contraction of the gastrocnemius
  It is used for the hypothyroidism → there will be slow contraction and slow relaxation
- **Abdominal Jerk:** from the center of the umbilicus, the abdomen is divided into four quadrants, when you scratch each quadrant with a needle the umbilicus will move towards the needle

- **Centers of reflexes (Important !!):**

SEGMENTAL LEVELS OF SOME OF THE COMMONER REFLEXES*

Deep reflexes	Superficial reflexes
Ankle jerk S1, 2	Plantar reflex S1, 2
Knee jerk L3, 4	Abdominal reflexes T7–11
Biceps jerk C5, 6	Cremasteric reflex L1
Triceps jerk C7, 8	
Radial jerk C6	
Jaw jerk pons	

* Variations of these levels are given by different authors.