

MOTOR SYSTEM

Draw and label muscle Spindle Reflex and Enumerate its functions?

Muscle Spindle Reflex:



Functions: (i) Regulate length of muscle & prevent length to go beyond the limits & inform CNS.

(ii) Involved in muscle tone mechanism

(iii) Role in voluntary motor activity

(iv) Damping ability to prevent oscillation / jerkiness of body movement.

(v) Stabilized body position during tense motor activity.

Compare stretch Reflex with innverse stretch Reflex involving Withdrawl Reflex.

	Stretch Reflex	innverse stretch Reflex
Name	Muscle spindle	Golgi Tendon Reflex
Type	Monosynaptic	Disynaptic
Receptor	Muscle Spindle Receptor	Golgi Tendon Receptor
Afferent	Type IA, IIB	Type IB
Efferent	Gamma E, Delta	inhibitory neurons
Functions	Previous page	<ul style="list-style-type: none"> i) control muscle Tension ii) Transmission of impulse

With Drawl Reflex

Synonyms : Flexor Reflex

Type : Polysynaptic

Receptor : Nociceptor

Afferent : Fibers From Nociceptor
(centre from spinal cord)

Efferent : Motor Fibers

Functions : Protective Function.

Draw Pathway OF Pyramidal Tract & Function

origin:

30% Fibers From P^o motor cortex

30% Fibers From Premotor & Supplementary cortex

40% Fibers From Somatosensory area

↓
They converge on Corona Radiata

↓
Pass to Posterior limb of Internal capsule and pudenci of MidBrain

↓
longitudinal fascicles of Pons

↓
Form pyramid of Medulla oblongata

↓
lateral corticospinal tract

↓
Anterior corticospinal tract

Functions:

(i) Control fine and skilled movement

e.g = writing & painting

(ii) voluntary movement at distal end of the limbs.

Write Difference b/w upper & lower motor neuron lesion.

Upper motor neuron lesion	Lower motor neuron lesion
(i) At level of Brain	(i) At level of Spinal cord
(ii) loss of group of muscle	(ii) loss of individual muscle
(iii) Spastic paralysis	(iii) Flaccid paralysis
(iv) NO Atrophy	(iv) Atrophy of muscle
(v) Few Reflex are lost	(v) All Reflexes are lost
(vi) Babinski sign ⊕	(vi) Babinski sign ⊖
(vii) large area of body involve	(vii) Small area of body involve

Write down Divisions of Cerebellum & Abnormalities of Cerebellum?

Functional Division:

- (i) vermis : Control voluntary movement of Axial Skeleton = neck, shoulders & lips
- (ii) Intermediate : Appendicular portion of Limbs = e.g. Hands, Finger, Feet
- (iii) lateral zone : Plannings of Sequential activities.

Physiological Divisions:

(i) vestibulocerebellum / Archeocerebellum:

- (i) Flocculonodular lobe
- (ii) vestibuli nuclei
- (iii) Maintains body equilibrium movement.

(ii) Spinocerebellum / Neocerebellum:

- (i) vermis - intermediate zone
- (ii) Spinal nuclei
- (iii) Coordination of movement of distal portion of limbs.

(iii) Cerebrocerebellum / Paleocerebellum:

- (i) lateral zone
- (ii) cerebral nuclei
- (iii) Planning of motor activity

ABNORMALITIES:

Dysmetria : → inability to control range of movement
→ Patient unable to do finger nose test

Ataxia : → uncoordination movement
→ Ipsilateral lesion

Disarthria : → Failure of progression in talking
→ Slowness in talking

Disidiokinesia: Inability to perform Rapid alternating movement e.g Pronation & supination.

intentional Tremors: Incoordination to perform voluntary movement (lower limb muscle)

Nystagmus: Tremor in Eyeball movement.

Hypotonia: Decrease tone of muscle.

Write Down atleast 3 Pathological conditions in which CSF is inc. also level & indications?

Pathological conditions:

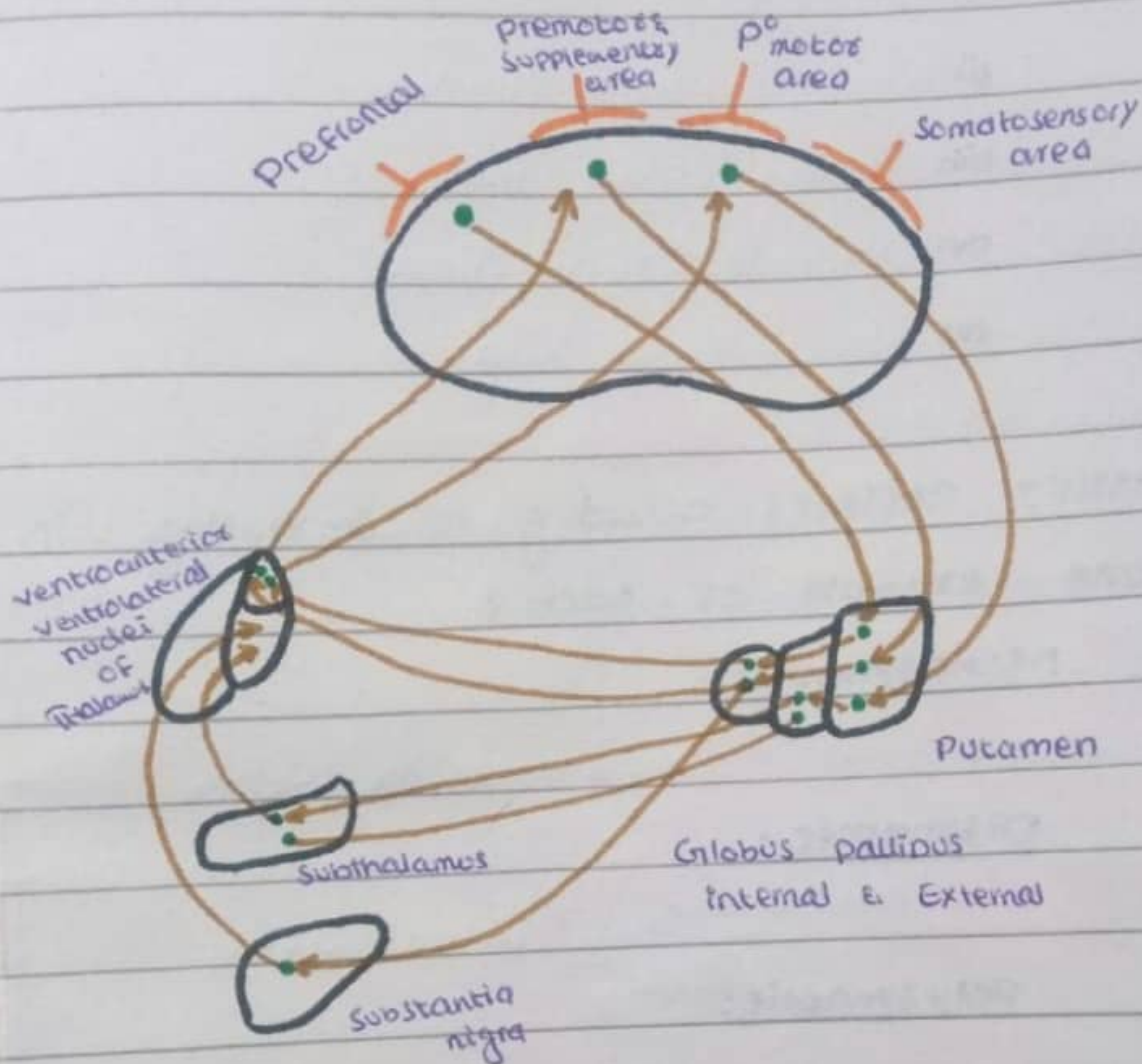
- (i) Meningitis
- (ii) Hydrocephalous
- (iii) Brain Tumors
- (iv) infection

Level: L3 - L4

Indications:
Anesthesia
Diagnostic Purpose

To introduced drugs such as
Guillein Barre Syndrome.

Draw a Putamen Circuit & its Diseases?



Diseases:

Athetosis: lesion in Globus Pallidus.

Slow writing, involuntary movement of body

Hemiballismus: Lesion in ~~Substantia nigra~~ ^{Subthalamus}

jerky & involuntary movement of proximal part of limb

Chorea: Lesions in Putamen.

Flickering movement of hand & face & other body part

Parkinson: Lesion in Substantia nigra.

Enlist Extrapyramidal Tracts ?

- (i) Rubro - spinal Tract
- (ii) Reticulo - spinal Tract
- (iii) Tecto - spinal Tract
- (iv) vestibulo - spinal Tract
- (v) olivo - spinal Tract

Classify Reflexes according to Synapsing with one example of each ?

Monosynaptic:

Muscle Spindle Reflex

Disynaptic:

Golgi Tendon Reflex

Poly synaptic:

- Flexor Reflex
- Withdrawal Reflex

Motor Areas of Cerebral Cortex ?

P^o motor area : (4)

Pre motor area : (6)

Frontal eye lid : (8)

Broca area : (44, 45)

Pre Frontal area : (9, 10, 11, 12)

Classify motor Cortex and their Functions?

Divided into 3 subareas

- (i) Primary motor cortex
- (ii) Premotor cortex
- (iii) Supplementary motor cortex

(i) Primary motor cortex (Area 4)

Lies in First convolution of Frontal lobe anterior to Central Sulcus.

Function: one half of entire P^u cortex

Concerned with the controlling

- Muscle of hand
- Muscle of speech

(ii) Pre-motor cortex (Area 6)

Lies Anterior to P^u motor cortex. It extends inferiorly into Sylvian Fissure & superiorly into longitudinal fissure

(i) Area for hand skills

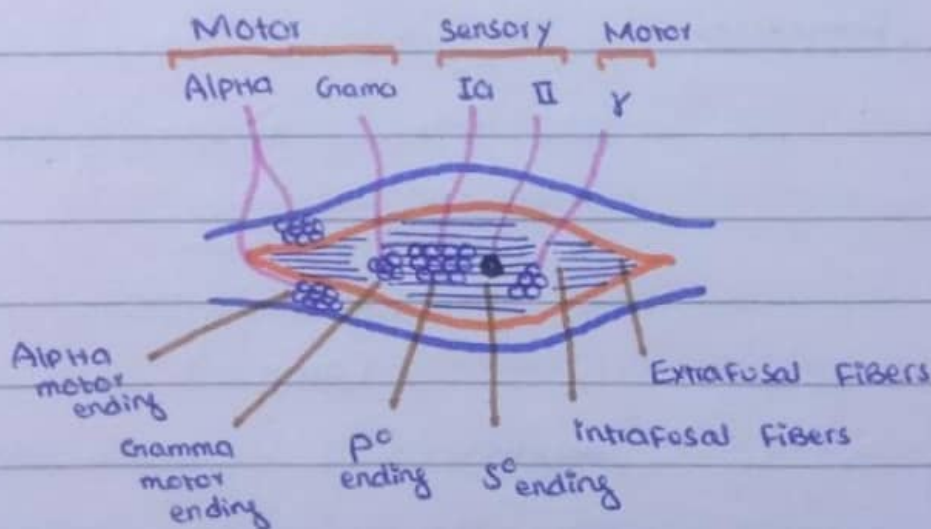
(ii) Nerve signal generated are cause more complex pattern of movements.

Supplementary Motor area:

Lies mainly in longitudinal fissure but extend a few cm onto Superior Frontal cortex.

Function: Grasping movement of Hands
Fixation movement
Positional movement of Head & eyes

Draw muscle spindle innervation & function?



(i) p^o Spindle afferent: (Ia)

Dynamic changes in muscle length

(ii) s^o Spindle afferent:

Response p^o to static changes in muscle ^{Length}

Contraction of Extrafusal fiber cause changes of Intrafusal fibers with cessation of discharge

Scenario

A 60 year old person who had Diabetes mellitus & Hypertension from last 20 years come in emergency department. He Paralyzed one half of body & unable to any type of voluntary motor activity. He can walk but with little limb. on Examination Deep reflex exaggerated superficial reflex are lost & Babinski sign ⊕

Diagnose

Upper Hemiplegia

What are Basic causes:

- (i) Congenital ~~tumor~~ Trauma
- (ii) Stroke & embolism of Artery Supply internal capsule
- (iii) Tumors / Thrombosis

Features:

- (i) Upper motor neuron lesion
- (ii) Difficulty in swallowing
- (iii) Difficulty in walking
- (iv) Balance problem / loss
- (v) vision loss
- (vi) Postural loss

② A 50 year old man come to dr. & told that he had feelings of stiffness in leg & feet. Difficultly starting movement & have involuntary

movement of hand at rest. His gait also
Short Stepped?

Diagnose:

Parkinson Disease → deficiency of Basal ganglia

Pathophysiology:

- (i) Dopamine receptor Dysfunctioning
- (ii) L-Deprenyl neuronal Degeneration of the Substantia Nigra of Dopamine
- (iii) Dopamine deficiency.

Treatment:

L-DOPA

L-Deprenyl

③ A 50 year old man is evaluated for difficulty in walking & coordination. An acute change in gait unclear speech is also noticed. Examination reveals Tremor with movement & loss of head coordination. Romberg Test is (+ve)

Which part of Brain is affected

Cerebellum

Which part affected control planning movement

Paleocerebellum

Which part control coordination of limb & Gait

Neo-cerebellum

How this part of Brain Control Timing & Rapidly occurring movement.

Paleocerebellum: maintains posture & performance of voluntary movement
Planning

Neocerebellum:

Coordinated of Limb & Gait

Archicerebellum:

maintain Equilibrium

A 30 year married women was looking for the flowers. She noticed a red rose and tries to pluck it. which doing so one of thorns attached to flower stem pricking her finger. She withdraw her right hand & at same time extend her left arm.

WHICH reflex mechanism involved in movement of

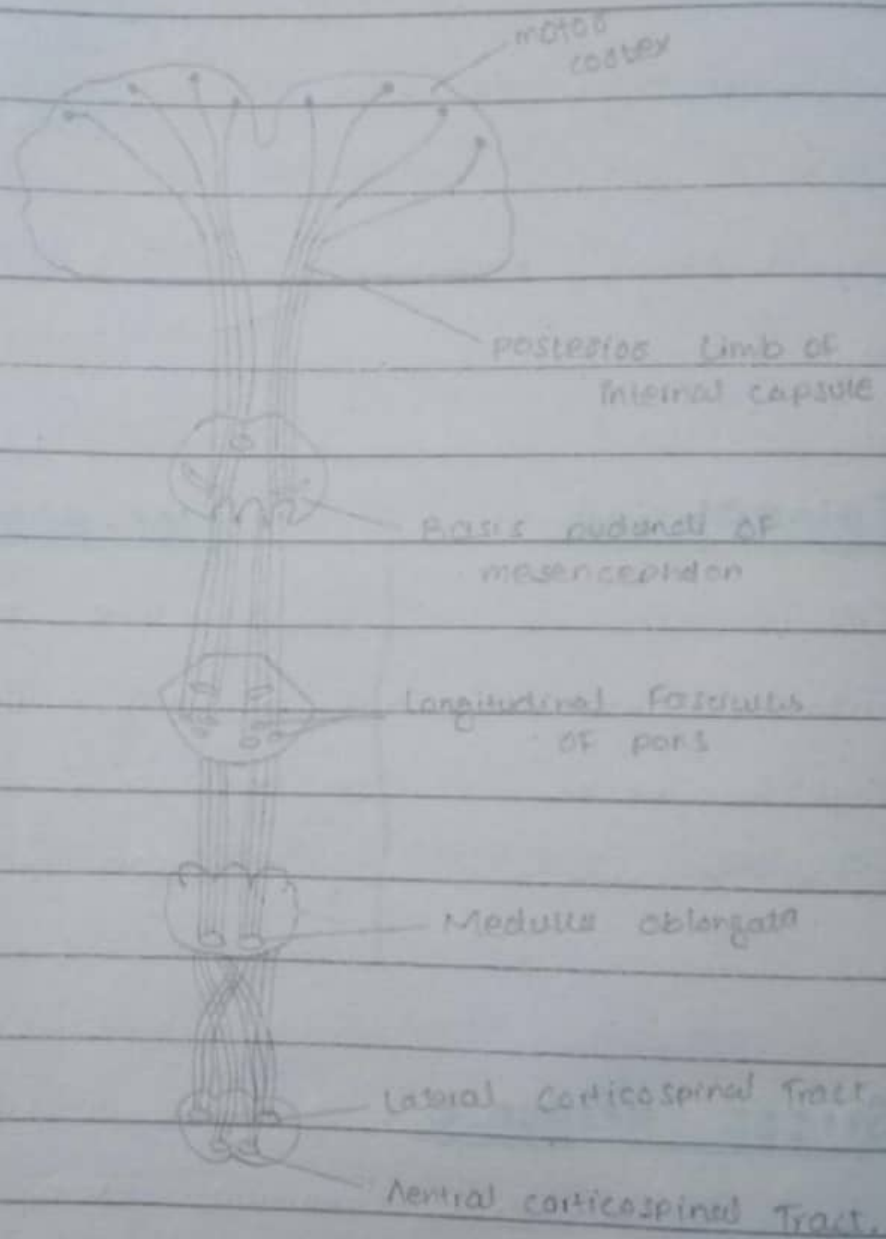
Right hand:

withdrawal reflex

Left hand:

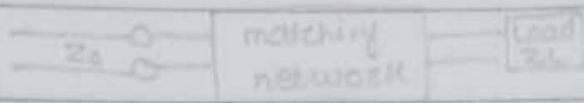
Extensor reflex

Draw Pyramidal Tract:



What is impedance matching:

The matching network is ideally lossless and is placed b/w a load and Transmission Line, to avoid unnecessary loss of power.



importance:

- ① Maximum Power delivered & Minimum Power loss
- ② It reduce amplitude & PHASE errors