Extrapyramidal tracts

Dr. zaineb Adil

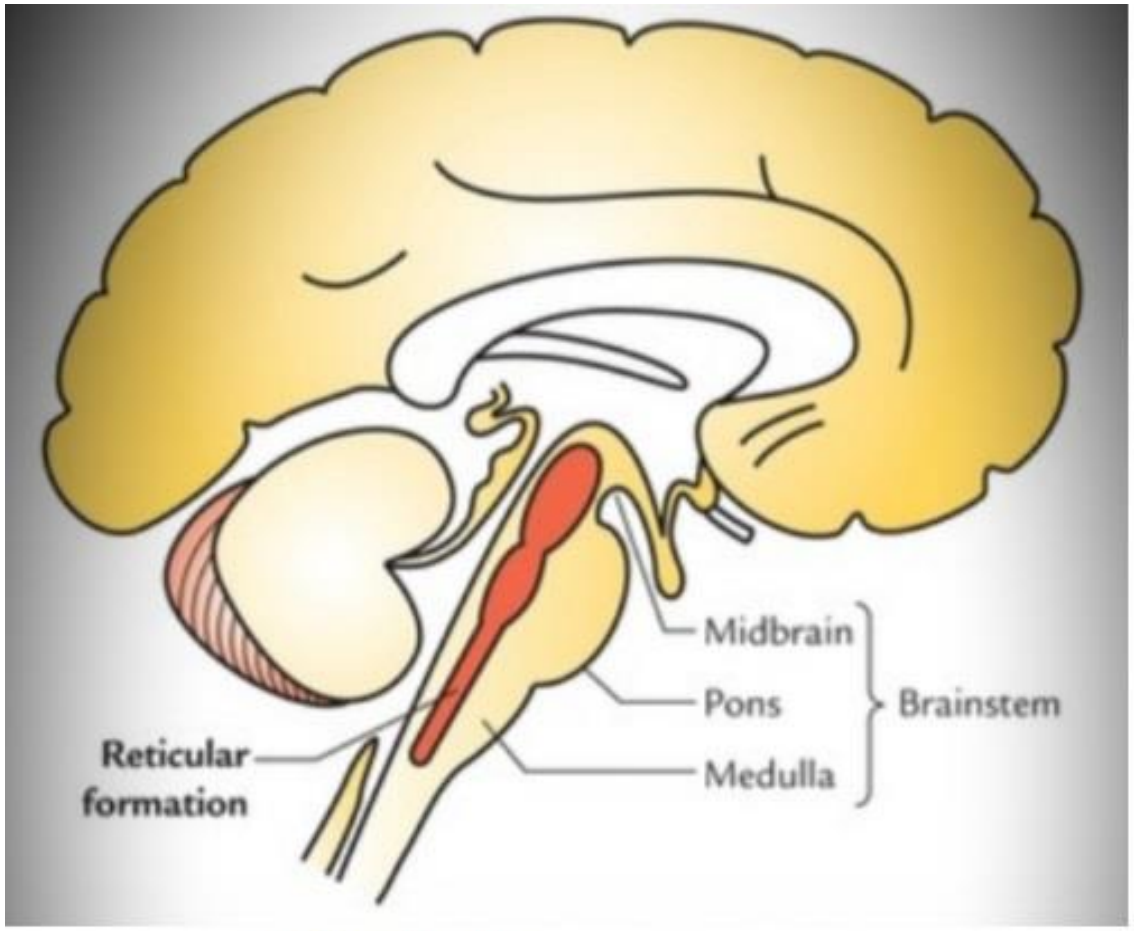
Physiology Department

College of Medicine\ University of Basrah

Objectives

1. Reticular formation.
2. Types of Reticular formation projections and their functions
3. Vestibulospinal tract nd its functions
4. Tectospinal tract

Reticular formation



It's a set of interconnected nuclei that are located throughout the brainstem

The neurons of the reticular formation make up a complex set of networks in the core of the brainstem that extend from the upper part of the midbrain to the lower part of the medulla oblongata

Reticulospinal tract

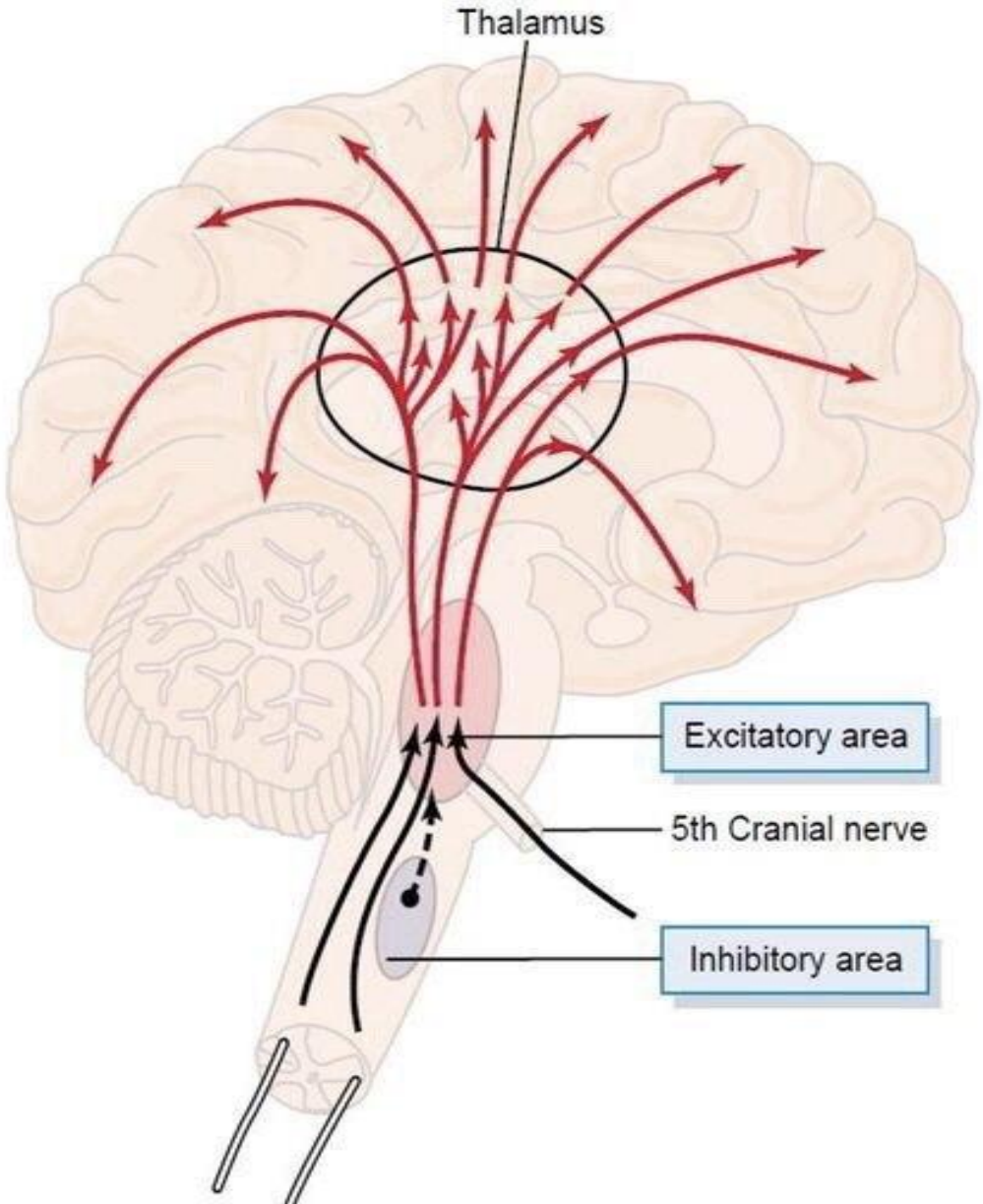
Fibers arising from reticular formation end on different segments of the spinal cord in the gamma motor neuron

Reticular formation consists of two parts:

1. Facilitatory area (larger & upper)
   Capable of spontaneous discharge → maintains normal muscle tone

2. Inhibitory area (smaller & caudal)
   Driven by fibers from inhibitory suppressor strips of cerebral cortex or fibers from basal ganglia

Tone: is muscles resistance to passive stretch at rest


Thalamus
Excitatory area
5th Cranial nerve
Inhibitory area

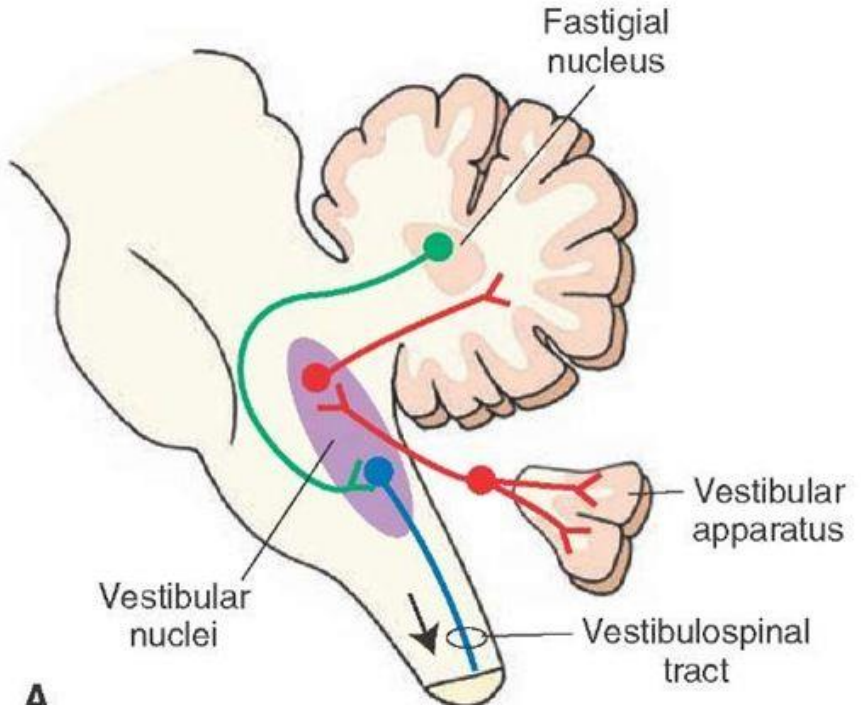
- Muscle tone is maintained by facilitatory and inhibitory reticular formation.

- Reticular formation is controlled by cerebral cortex and basal ganglia

- Damage to extrapyramidal fibers from cerebral cortex or basal ganglia → inhibitory influence to reticular formation is lost (facilitaory area can discharge spontaneously) → **hypertonia**

Vestibulospinal tract

Vestibular nucleus receives connections from inner ear, cerebellum, basal ganglia, cerebral cortex, reticular formation etc.

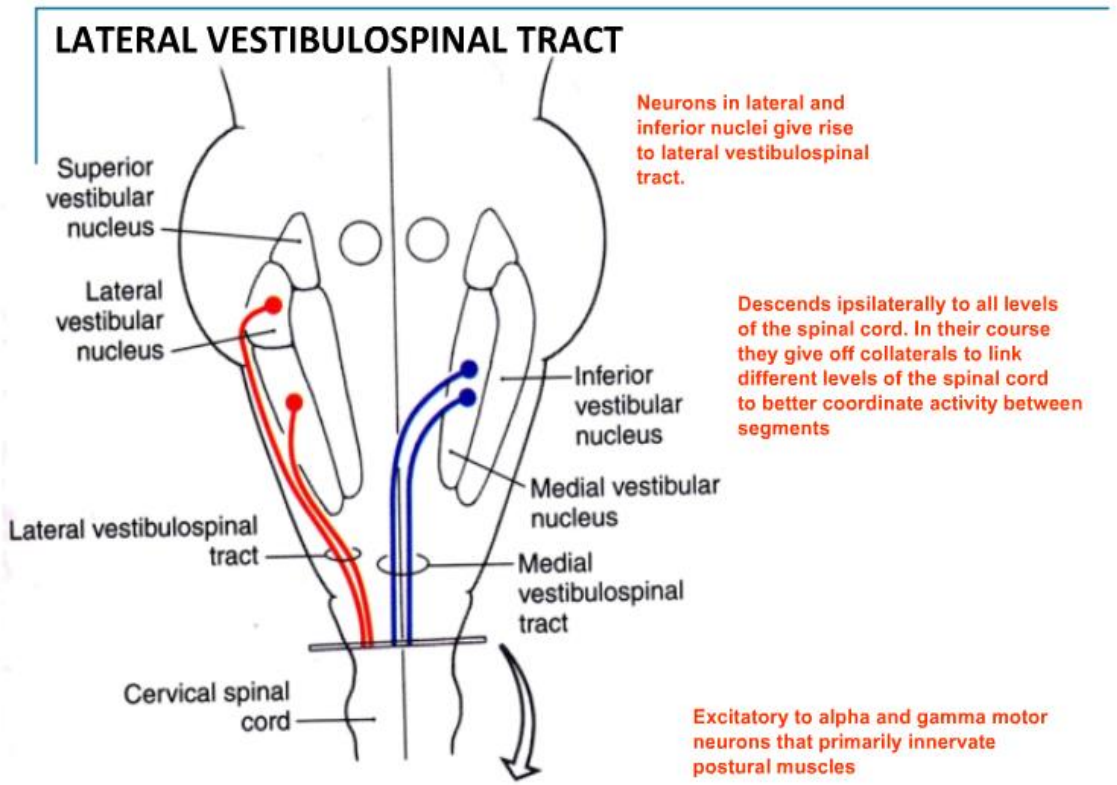


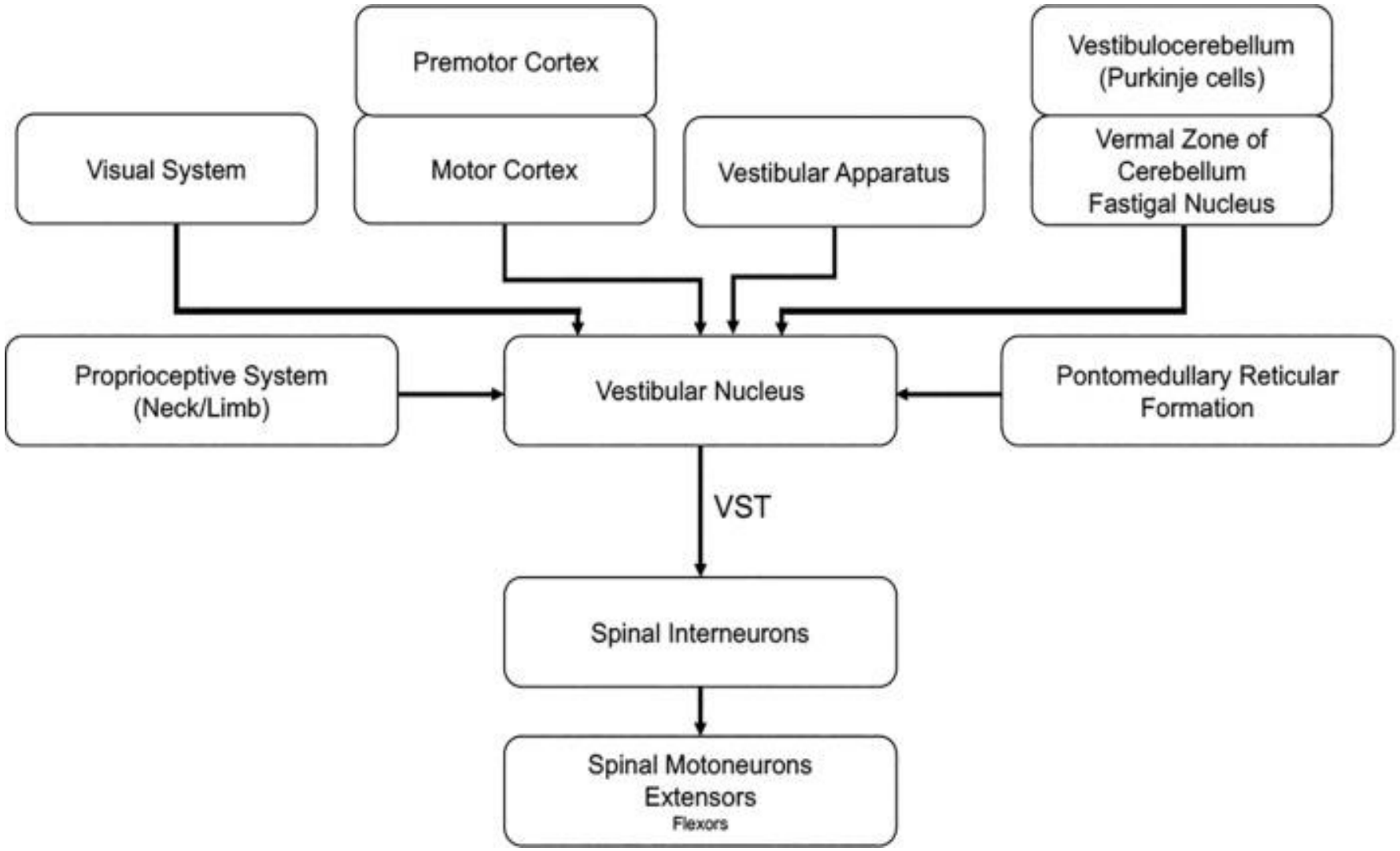
❁Lateral vestibulospinal tract

*From lateral and inferior vestibular nucleus

❁Medial vestibulospinal tract

*From medial vestibular nucleus




Premotor Cortex
Vestibulocerebellum
(Purkinje cells)
Visual System
Motor Cortex
Vestibular Apparatus
Vermal Zone of
Cerebellum
Fastigal Nucleus
Proprioceptive System
(Neck/Limb)
Vestibular Nucleus
Pontomedullary Reticular
Formation
VST
Spinal Interneurons
Spinal Motoneurons
Extensors
Flexors

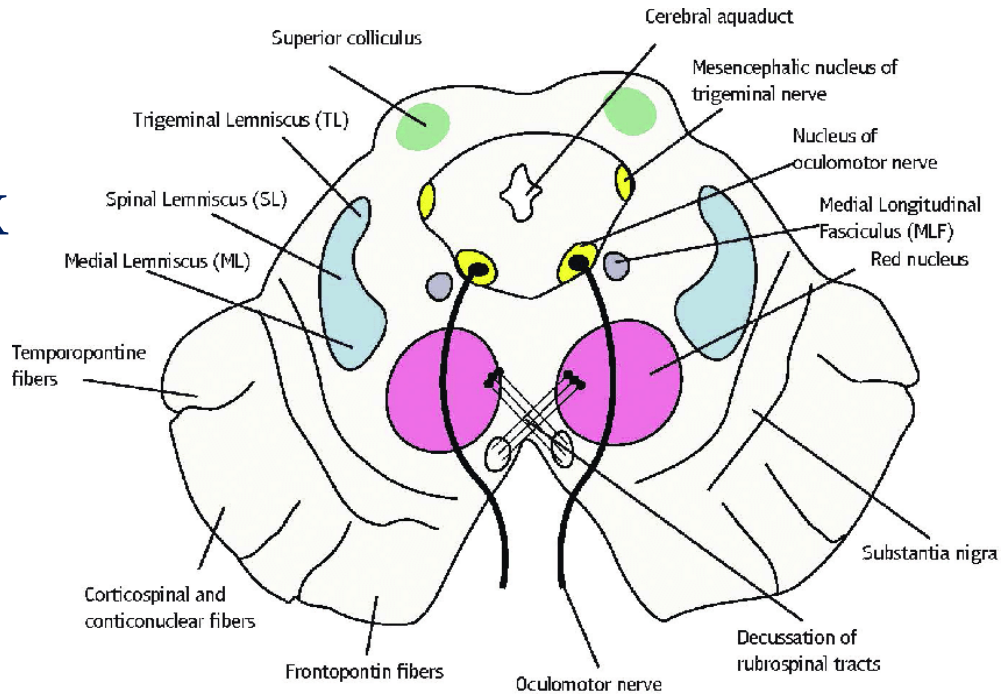
Functions of Vestibulospinal tract

The **vestibulospinal tract** is for

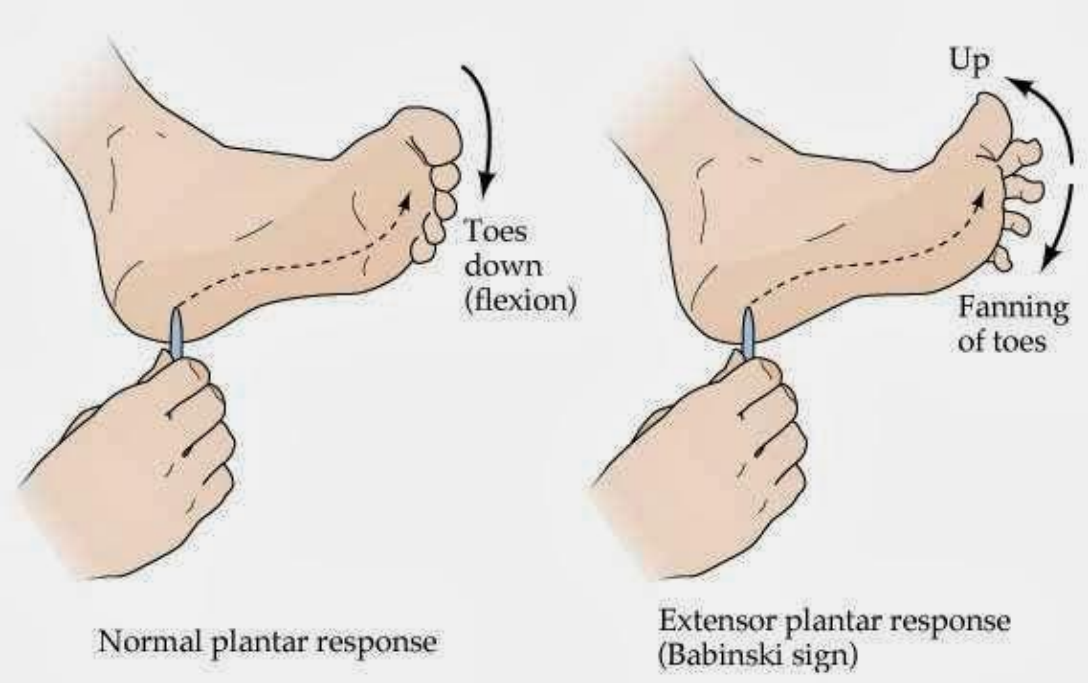
- maintenance of balance.
- regulation of the muscle tone related to posture.
- respond correctly by recording sensory information from hairs cells in the labyrinth of the inner ear.

Tectospinal tract

- Arises from neurons in the superior colliculus of midbrain
- Fibers cross and descends down to end in the upper segments of spinal cord neurons.
- It is concerned with spinovisual reflex (reflex neck movements in response to visual stimuli)

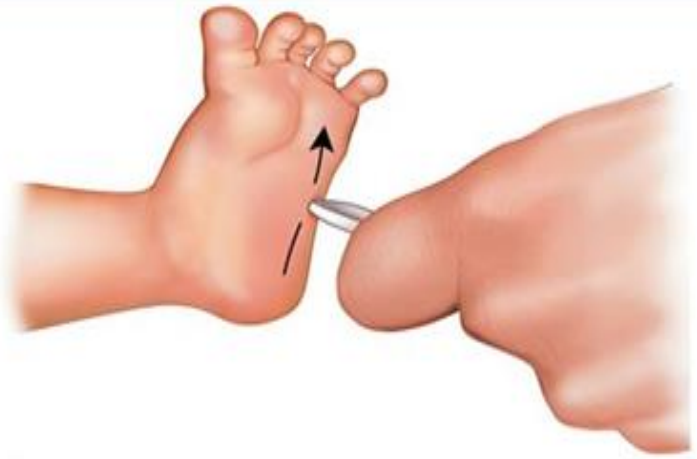


Upper motor neuron sign



- Lesion in corticospinal tract, the influence of extrapyramidal tracts on the toes become apparent (dorsiflexion of great toe and fanning out of the other toes)

  - Normally Babinski sign is positive in infants (pyramidal tract becomes fully developed and myelination is completed only after the child starts walking



Recap

1. Reticular formation :It's a set of interconnected nuclei that are located throughout the brainstem.

1. Ascending reticular formation
2. Descending pathway

(Facilitatory area :maintains normal muscle tone, Inhibitory area)

3. Vestibulospinal tract : maintenance of balance, posture, recording sensory information from hairs cells in the labyrinth of the inner ear
4. Tectospinal tract: reflex neck movements in response to visual stimuli

Thank You