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Med 435

Dorsal column (Gracile & Cuneate fasciculi) Carry impulses concerned with: 1-proprioception (movement and joint position) 2-discriminative touch 3-half of the crude touch

*from ipsilateralside of

the body

Fasciculus Gracile:

Receives at sacral, lumbar and lower thoracic levels. Fasciculus
Cuneatus:
Receives at
upper thoracic
and cervical
levels.

Pathway

- 1.Fibers ascend without interruption.
- 2. 2nd order neurons in nucleus gracilis and nucleus cuneatus.
- 3.The axons of the 2nd order neurons decussate in the medulla as internal arcuate fibers.
- 4. ascend through the brain stem as Medial Lemniscus.
- terminates in the ventral posterior nucleus of the thalamus (3rd order neurons.
- which project to the somatosensory cortex.
 (thalamocortical fibers)

Ascending Tracts Pathways

Spinothalamic Tracts

(Anterior & Lateral)

- •The spinothalamic tracts contain axons of second-order neurones, thier cell bodies lie in the contralateral dorsal horn.
- Located lateral and ventral to the ventral horn.
- In brain stem, the two tracts constitute the <u>Spinal</u> <u>Lemniscus</u>.
- Information is sent to the primary sensory cortex on the opposite side of the body

Spinocerebellar Tracts

(Anterior & Posterior)

- The Spinocerebellar system consists of a sequence of only two neurons
- Neurone 1 :Large cells of dorsal root ganglia.
 - Neurone 2 : cells of the nucleus dorsalis; Clark's nucleus (column) .
- Located near the <u>dorsolateral and</u> ventrolateral surfaces of the cord
- Contain axons of the second order neurons
 - Carry information derived from:
 1-muscle spindles
 2-Golgi tendon
 - 3-tactile receptors
- -to the cerebellum for the control of posture and coordination of movements

Spinothalamic Tract	Lateral	Anterior
Function	Carries pain & Temperature to thalamus and sensory area of the cerebral cortex.	Carries 1/2 crude touch (non discriminative) & pressure to thalamus and sensory cortex.
1 st Neuron	Small cells in the dorsal root ganglia.	Medium sized cells in the dorsal root ganglia.
2 nd Neuron	Cells of substantia gelatinosa of Rolandi in the posterior horn.	-Cells of main sensory nucleus or (nucleus proprius)Fibers arising from Substantia Gelatinosa & Nucleus Proprius decussate in the Anterior White Commissure
3 rd Neuron	Cells of (Ventral Posterior) nucleus of the thalamus.	Cells of (Ventral Posterior) nucleus of the thalamus.

SPINOCEREBELLAR TRACT	POSTERIOR PRESENT ONLY ABOVE LEVEL L3	Anterior
CELL BODIES OF 2 ND NEURON	lie in Clark's column	lie in base of the dorsal horn of the lumbosacral segments
AXONS OF 2ND NEURON	terminate ipsilaterally (uncrossed) in the cerebellar cortex by entering through the inferior cerebellar peduncle.	1-cross to opposite side 2-ascend as far as the midbrain 3-then make a sharp turn caudally (the fibers cross the midline for the second time) 4-enter the superior cerebellar peduncle to terminate in the cerebellar cortex.
CONCLUSION	Posterior spinocerebellar tract convey sensory information to the same side of the cerebellum	Ventral spinocerebellar tract conveys sensory information to the same side of the cerebellum

Ascending Tracts Lesions				
Dorsal Column Tracts Lesion	Spinothalamic Tracts Lesion	Spinocerebellar Tracts Lesion		
Tabes Dorsalis	Syringomyelia	Friedrichs ataxia		
A late manifestation of syphilitic infection on the CNS. -Affects the lumbosacral dorsal spinal roots and dorsal columns of the spinal cordLeads to loss of proprioception which is manifested by a high Step Page and unsteady gait (Sensory Ataxia).	-The central canal becomes enlarged forming a cavity compressing (affects) the adjacent nerve fibres serving pain and temperature as they decussate in the ventral white commissure close to the central canal. -Leads to selective loss of: 1-pain and temperature in the upper limbs (dissociate sensory loss). 2-Light touch and proprioceptive sensations are retained. 3-Joints of the limbs become disorganized without discomfort (Charcot's joint).	-An inherited degenerated diseaseIt begins in child hood -Wheelchair is bound by 20 year of ageAffecting the spinocerebellar tractsLeading to: 1-incoordination of arms. 2-intense tremor. 3-wide base reeling gait ataxis		
Subacute Combined Degeneration of the spinal cord				
-A systemic disease results from B12 deficiency -Affects Dorsal column and Lateral columns (combined) Leads to Sensory Ataxia causing weak and spastic limbs -It is completely recovered by proper treatment with B12				
Multiple Sclerosis				
-An immune disease -Affects specifically fasciculus Cuneatus of the cervical regionLeads to loss of proprioception in hands and fingers (Asteriognosis)				