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 Bell's Palsy
 Neuroanatomy
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DESCENDING TRACTS

Descending tracts have three neurons:

1. 1st order neurons (UMN): cell bodies are in the cerebral cortex and other supra spinal areas
2. 2nd order neurons: short and situated in the anterior grey column of the spinal cord
3. 3rd order neuron (LMN): situated in the anterior grey column and innervate the skeletal muscles through anterior roots of the spinal nerves

Corticospinal tract: rapid, skilled and voluntary movements

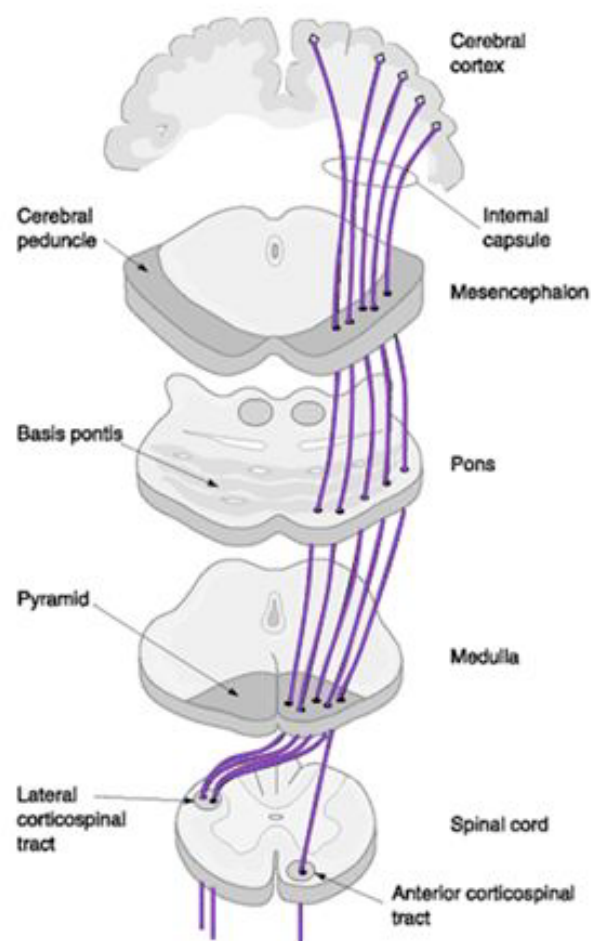
1st order neuron

Axons arise from the pyramidal cells of the cerebral cortex (situated in the 5th layer), 2/3 from the pre central gyrus and 1/3 from the post central gyrus:

1. 1/3 of fibers arise from the 1stry motor cortex (Area 4)
2. 1/3 of fibers arise from the 2ndry motor cortex (Area 6)
3. 1/3 of fibers arise from the parietal lobe
 (Area 1, 2 and 3).

Descending fibers converge in the corona radiata and pass through the posterior limb of the internal capsule; organization of fibers within the internal capsule:

1. close to genu (medial): concerned with the cervical parts of the body
2. away from the genu (lateral): concerned with the lower extremity.



The tract then passes through the middle 3/5 of the basis pedunculi of the midbrain; organization of fibers in the midbrain:

1. medially: cervical parts of the body
2. laterally: lower limbs.

When the tract enters the pons, it's broken into many bundles by the transverse pontocerebellar fibers. In the medulla oblongata, the bundles group together to form the pyramids. At the junction of the MO and the spinal cord, most fibers cross the midline at the decussation of the pyramids and enter the lateral white column of the spinal cord to form the lateral corticospinal tract (LCST). LCST descends length of the spinal cord and terminates in the anterior grey column of all the spinal segments.

The fibers which didn't cross, descend in the anterior white column of the spinal cord as the anterior corticospinal tract (ACST). Fibers of the ACST eventually cross and terminate in the anterior grey column of the spinal cord segments in the cervical and upper thoracic regions.

2nd order neuron:

It's an internuncial neuron.

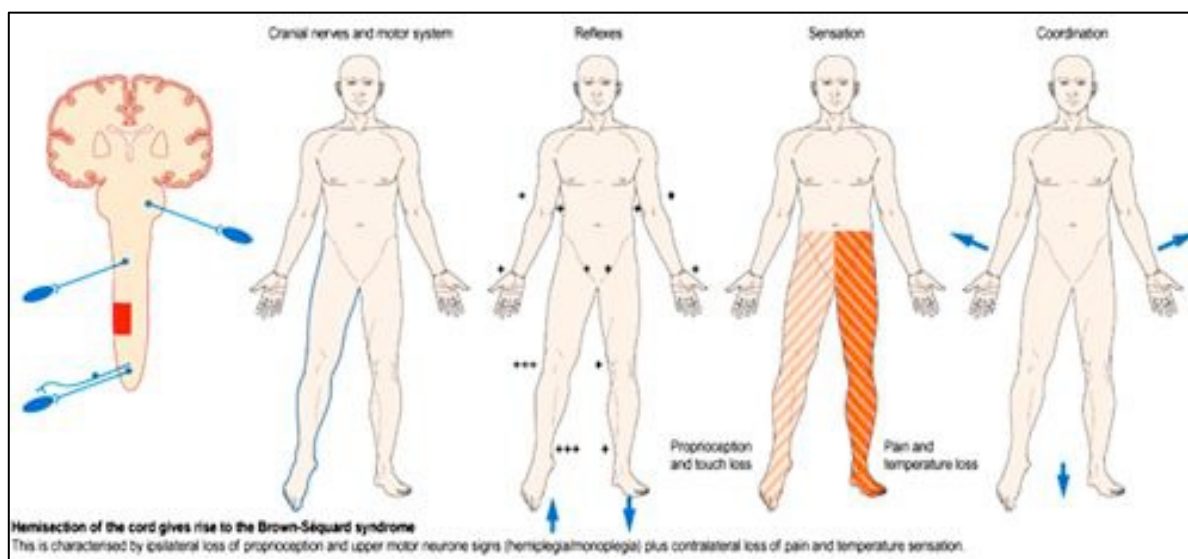
3rd order neuron:

It's a alpha or gamma motor neuron.

Other descending pathways to the spinal cord

Pathway	Function	Origin	Site of crossover	Destination
1. Reticulospinal tract	Influence (+/-) voluntary movements & reflex activities Hypothalamus control sympathetic & PS outflows	Reticular formation (RF)	At various levels (Some)	Alpha & gamma motor neurons
2. Tectospinal tract	Reflex postural movements on sight	Superior colliculus	Soon after origin	
3. Rubrospinal tract	Facilitates activities of flexors & inhibit extensors	Red nucleus	Immediately	
4. Vestibulospinal tract	Facilitates activities of extensors & inhibit flexors	Vestibular nuclei	Uncrossed	
5. Olivospinal tract		Inferior olivary nuclei	Cross in brain stem	
6. Descending autonomic fibers	Control sympathetic & PS system	Cerebral cortex, hypothalamus, RF & amygdaloid complex		Sympathetic & PS outflows

Brown sequard syndrome (hemi section of the spinal cord)



Features:

1. Ipsilateral LMN paralysis and muscular atrophy in the corresponding part of the body to the damaged segment of the spinal cord
2. Ipsilateral spastic paralysis below the of the level lesion (γ motor neuron inhibition is lost)
3. Ipsilateral loss of cutaneous sensation below the of the level lesion
4. Ipsilateral loss of dorsal column sensation below the of the level lesion
5. Contralateral pain, temperature, touch and pressure sensations are lost below the of the level lesion

Tracts which are affected:

1. Dorsal column: ipsilateral
2. Lateral spinothalamic tract: contralateral
3. Anterior spinothalamic tract: contralateral
4. Anterior spinocerebellar tract: contralateral
5. Posterior spinocerebellar tract: ipsilateral
6. Anterior corticospinal tract: ipsilateral
7. Posterior corticospinal tract: ipsilateral
8. Autonomic nervous system: ipsilateral

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