

Neuroanatomy: Corticospinal & Corticobulbar Tracts

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Major Objectives

1. Appreciate the functions of the corticospinal & corticobulbar tracts.
2. Distinguish corticospinal and corticobulbar tracts.
3. Identify the locations of both tracts through the forebrain, brainstem and spinal cord.
4. Identify the level of decussation of the corticospinal tract, and it's clinical importance.

Pathway Overview

Corticospinal

- ✦ Begin in primary motor cortex.
- ✦ Travel through the posterior limb of the internal capsule (somatotopic).
- ✦ Descend through the middle 3/5 of the crus cerebri (somatotopic).
- ✦ Travel through the brainstem as the descending pyramidal system.
- ✦ Decussate at the caudal medulla in the pyramidal decussation.
- ✦ Descend in the spinal cord as the corticospinal tract
- ✦ Synapse on α -motor neurons
- ✦ Exit spinal cord in ventral rami

Upper
Motor
Neuron

Lower
Motor
Neuron

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Upper
Motor
Neuron

Lower
Motor
Neuron

Crosses
Midline

Pathway Overview

Corticobulbar

- ✦ Begin in primary motor cortex.
- ✦ Travel through the posterior limb of the internal capsule (somatotopic).
- ✦ Descend through the middle 3/5 of the crus cerebri (somatotopic).
- ✦ Travel through the brainstem and synapse on brainstem nuclei.
- ✦ α -Motor neurons project along cranial nerves for facial movements and voice production.
- ✦ **All cranial nerve nuclei receive bilateral UMN input***

Upper
Motor
Neuron

Lower
Motor
Neuron

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Upper
Motor
Neuron

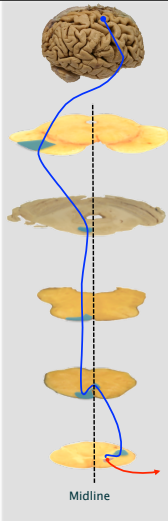
Lower
Motor
Neuron

*Part of CN VI is the exception

Overview

Corticospinal

- ❖ Primary motor cortex
- ❖ Posterior limb of the internal capsule (somatotopic).
- ❖ Middle 3/5 of the crus cerebri (somatotopic).
- ❖ Brainstem: descending pyramidal system.
- ❖ Caudal medulla: Pyramidal decussation.
- ❖ Spinal cord: corticospinal tract
- ❖ Synapse on α -motor neurons in ventral horn
- ❖ Exit spinal cord in ventral rami



Midline

Pearls & Problems

Don't	<ul style="list-style-type: none"> ✓ Try to learn all the details on your first pass.
Do	<ul style="list-style-type: none"> ✓ Try to sketch out each brain, brainstem, and cord level we showed today and indicate on those sketches the corticospinal tract location.
Don't	<ul style="list-style-type: none"> ✓ Worry if the tracts don't make perfect sense the first time around.
Do	<ul style="list-style-type: none"> ✓ Once you have the tract locations down and the decussation makes sense, add the somatotopic "fluff" details.