

Exercise walk-through

9.3

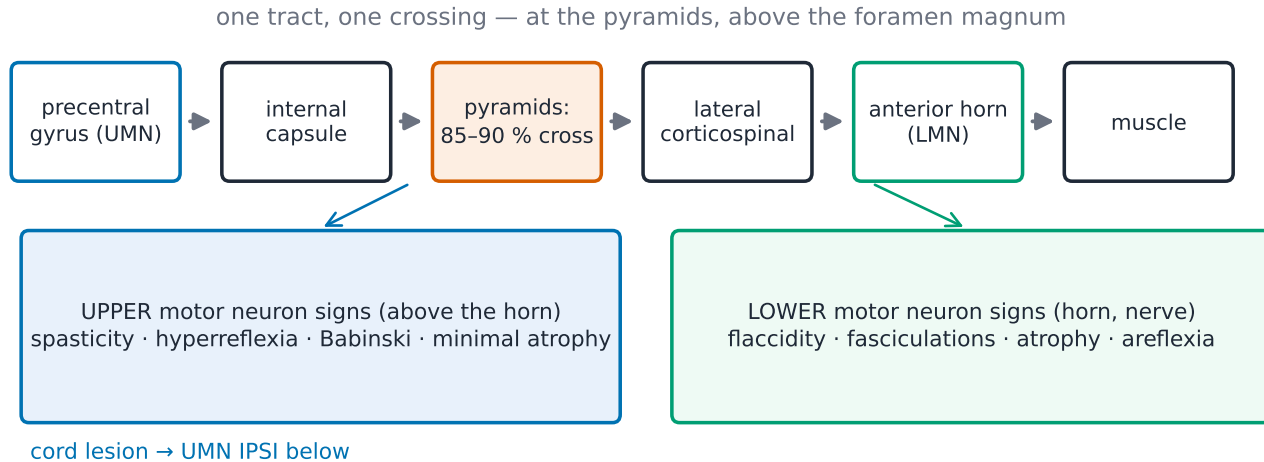
Motor systems

University Medicine

Motor systems: one tract, two neuron classes

- 1 **Corticospinal** Precentral → internal capsule → pyramids (85-90 % decussate) → lateral column → anterior horn → muscle.
- 2 **Signs** UMN: spastic, hyperreflexic, Babinski, minimal atrophy. LMN: flaccid, wasting, fasciculations, areflexia.
- 3 **Computers** Basal ganglia scale amplitude (dopamine low → Parkinson; striatum lost → chorea); cerebellum times movement, ipsilaterally (dysmetria, **intention tremor**).

The corticospinal tract and the UMN-LMN fork



basal ganglia SCALE amplitude (dopamine low → Parkinson · striatum lost → chorea)
cerebellum TIMES movement, ipsilateral: dysmetria · intention tremor · dysdiadochokinesia

Precentral to anterior horn with one crossing at the pyramids.

Exercises 2.1-2.3

2.1 Where does the corticospinal tract cross, and in what proportion? [3]

2.2 Give one UMN and one LMN sign you would accept as evidence. [3]

2.3 A tremor only during movement with dysmetria – which structure? [3]

Exercises 2.1-2.3

2.1 Where does the corticospinal tract cross, and in what proportion? [3]

2.1

- At the pyramids (caudal medulla); ~85–90 % of fibres ✓.
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2.2 Give one UMN and one LMN sign you would accept as evidence. [3]

2.2

- UMN: Babinski / hyperreflexia / spasticity; LMN: fasciculations / atrophy / areflexia ✓.
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2.3 A tremor only during movement with dysmetria – which structure? [3]

2.3

- The cerebellum (timing): intention tremor with dysmetria ✓.

Exercise 3.1

3.1 A fictional left C5 cord compression.

Explain why biceps wasting and an absent biceps jerk appear at C5 (LMN at the level) while the left leg below shows spasticity, hyperreflexia and a Babinski sign (UMN below, already crossed). State why the leg signs are IPSilateral. [8]

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3.1

- At C5 the anterior horn is compressed → LMN: wasting, absent biceps jerk ✓.
- Below the level the lateral corticospinal tract is compressed → spasticity, hyperreflexia, Babinski ✓.
- IPSilateral because the tract crossed at the medulla – contralateral signs localise above the foramen magnum ✓.
- The two sign sets at one level name a cord lesion.

Exercise 3.2

3.2 Two fictional patients: one with a rest tremor that improves on movement plus slowness; one with an intention tremor and dysdiadochokinesia.

Assign each to basal ganglia or cerebellum with reasoning. State the expected laterality of cerebellar signs relative to the lesion. [7]

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3.2

- Rest tremor improving with movement + slowness = basal ganglia (dopamine low, Parkinson pattern) ✓.
- Intention tremor + dysdiadochokinesia = cerebellum (timing) ✓.
- Cerebellar signs are IPSilateral to the lesion – its connections double-cross ✓.