9.3 Motor systems

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS corticospinal tract • upper motor neuron

Objective

Separate upper from lower motor neuron signs and localise the level.

1 Key knowledge and worked examples

■ The tract

Precentral gyrus → internal capsule → pyramids (~85–90 % decussate) → lateral corticospinal tract → anterior horn → muscle ✓.

■ Worked example: the two sign sets

UMN: spasticity, hyperreflexia, Babinski, minimal atrophy. LMN: flaccidity, fasciculations, atrophy, areflexia ✓. Basal ganglia scale amplitude; the cerebellum times movement (ipsilateral).

2 Practice

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]

3 Exam-style questions

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]

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]

Solutions

2.1

- At the pyramids (caudal medulla); ~85–90 % of fibres ✓.

2.2

- UMN: Babinski / hyperreflexia / spasticity; LMN: fasciculations / atrophy / areflexia ✓.

2.3

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

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.

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 ✓.

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