Upper motor lesions (UMNL)

Site of lesion: Cerebral hemispheres, cerebellum, brainstem, spinal cord (above anterior horn)

Tone: Increased (spacticity) ± clonus (involuntary muscle movement)

Muscle weakness:
- All muscle groups of the lower limb - more marked in the flexor muscle
- In the upper limb weakness is more marked in the extensors

Deep tendon reflexes: Increased (but superficial reflexes such as *abdominal reflexes* are usually absent)

Plantar response: Extensor (upping toe)

Fasciculation: Absent

Wasting: Late - mainly because of disuse

Damage: Leads to characteristic set of clinical symptoms known as ***UMN syndrome***

Upper motor neuron

UMN syndrome

Acute manifestations:

1. *Spinal shock* - hypotonia & loss of all reflexes on contra-lateral side

2. *Relative sparing of trunk muscles* - trunk muscles are bilaterally innervated by anterior corticospinal tract, thus lesion of one side of the tract has minimal manifestation; distal muscles, fingers, toes, fine articulations & flexors more than extensors are handled by lateral corticospinal tract, thus affected more

Late manifestations:

1. Babinski sign

2. Spasticity

3. Hyporeflexia or superficial reflexes

4. Contralateral or ipsilateral involvement

5. Involvement below the lesion

6. Decorticate posture (person is stiff with bent arms, clenched fists, and legs held out straight)

7. Decerebrate posture (arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward)

Lesions

Focal lesion: Disease/pathology that can develop in ***one specific*** area of CNS *(e.g. nerve compression due to sclerosis)*

Multifocal lesion: Disease/pathology that can develop in ***multiple specific*** areas of the nervous system *(e.g. multiple sclerosis)*

Diffuse lesion: Disease/pathology that has ***dispersed*** affect on the nervous system *(e.g. polyneuropathy due to diabetes)*

Disease course & tempo

Degenerative condition:
- Slow
- Gradual onset
- Progressively worsening neurological signs

Vascular condition:
- Abrupt/sudden onset
- Flactuating pattern of neurological signs

Inflammatory condition:
- Gradual relapsing-remitting pattern of neurological signs
- (symptoms getting worse followed by recovery, after each relapse it gets worse)

Lower motor neuron lesion (LMNL)

Site of lesion: Anterior horn cell, nerve roots, peripheral nerves, neuromuscular junction, muscles

Tone: Decreased (flaccidity)

Muscle weakness:
- More distally than proximally
- Both flexors & extensors affected

Deep tendon reflexes: Reduced or absent

Plantar response: Normal or absent

Fasciculation: May be present in anterior horn cell lesions

Wasting: Usually present

Damage: Usually causes hyporeflexia, flaccid paralysis, & atrophy

Lower motor neuron

Neuromuscular junction lesion

Muscular lesion

Applied example 1

Case: 72-year-old male presents with a **right side face** and **arm weakness** - came on over a **few months**

Pathological process: Tumour

Applied example 2

Case: patient presents with a change in **cognition, speech, memory, behaviour/personality,** & **mood**

Pathological process: UMNL, frontal lobe (efferent/motor)

Applied example 3

Case: patient presents with changes in **CN III - XII function**

Pathological process: UMNL, brainstem / spinal lesion

Applied example 4

Case: patient presents with **focal tingling between 4th and 5th finger** (no motor abnormalities)

Pathological process: LMNL, peripheral lesion (ulnar nerve)