## 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)