★ *Motor system*

Upper motor neuron lesions	• Pseudobulbar palsy: bilateral UMN lesions of CN 9,10,11,12: a slow, harsh, strangulated speech with difficulty pronouncing consonants, dysphagia, and may be accompanied by a brisk jaw jerk and emotional lability. The tongue is contracted and stiff. • Spasticity (exaggerated response to stretch with increased tone), clonus and brisk reflexes. • Primitive reflexes, such as Babinski sign (extensor plantar response). • Muscle weakness of relatively large group of muscles, preferentially affects extensors in arms and flexors in legs. • No wasting (may be disuse wasting in longstanding lesions). • Hemiplegic gait (unilateral UMN lesion). • Scissor-like gait (bilateral UMN lesion). • Superficial abdominal reflexes (T8-T12) are lost. • Pronator drift is an early feature of UMN lesions and it has a good sensitivity and specificity.
Lower motor neuron lesions	• Bulbar palsy: bilateral LMN lesions of CN 9,10,11,12: Weakness of the tongue results in difficulty with lingual sounds, and a palatal weakness gives a nasal quality to speech, dysphagia. Jaw jerk and emotional lability are absent. • Muscle weakness in distribution of nerve root or peripheral nerve (individual and specific muscle). • muscle wasting, reduced tone (flaccidity), fasciculation, and reduced or absent reflexes. • Steppage gait (foot drop owing to LMN lesion).
Basal ganglia lesions	• Reduced movement (such as parkinsonism), or less commonly, excessive movement (such as ballism or tics).
Cerebellar disease	• Unsteadiness on standing with the eyes open. (not usually associated with positive Romberg's test). • Wide-based, unsteady ataxic gait 'drunken', poor tandem gait. • Intention tremor (maximal on movement and on approaching the target (hunting tremor)). • Hypotonia may be present. • Reflexes may be pendular and the muscle contraction and relaxation tend to be slow (but not sensitive or specific). • Dysdiadochokinesis (impairment of rapid alternating movements). • Dysarthria and nystagmus. • Rebound phenomenon.
Myasthenia gravis	• Fatiguing speech becoming increasingly nasal, and may disappear altogether. • Fatigable weakness (causes power to fluctuate, which is an exception). • Eyelids ptosis. • Weakness in the muscles of mastication with fatigable chewing. • Weakness in neck flexion or extension, the latter causes head drop.

	Note: always consider myasthenia gravis in patients with symptoms of bulbar dysfunction, even if the examination seems normal.
Muscular dystrophies (in general)	• Waddling gait (bilateral proximal weakness), Trendelenburg sign. • Pseudohypertrophy may occur but the muscles are weak.
Myotonic dystrophy	• Distal muscle wasting (exception to muscle disorders which usually result in proximal wasting), often with temporalis wasting. • Myotonia (inability of muscles to relax normally), Patients may notice difficulty in letting go of things with their hands, or a stiff gait. • Eyelids ptosis. associated with frontal balding and sustained handgrip. • Wasting and weakness of the sternomastoids.
Parkinsonism	• Dysarthria and dysphonia, low volume monotonous voice, words running into each other (festination of speech), and marked stuttering/hesitation. • Initiation of walking may be delayed, stooped posture, shuffling gait/ festinant gait (reduced stride length), loss of arm swing, postural instability, freezing. • Postural instability on the pull test, especially backwards. • Slow, coarse 'pill-rolling' tremor, worse at rest, usually asymmetrical in the upper limb. • Tremor of the resting or protruded tongue may occur in Parkinson's disease, although jaw tremor is more common. • 'Lead pipe' rigidity, or in the presence of tremor, 'cog wheeling' rigidity. • Glabellar tap (a primitive reflex), unreliable sign of Parkinson's. • Loss of spontaneous facial movements, including a slowed blink rate, and involuntary facial movements (levodopa-induced dyskinesias).

★ *Sensory system*

Large-fibre neuropathy (such as Guillain-Barre syndrome)	• vibration and joint position sense may be disproportionately affected. • Patients may report staggering when they close their eyes during hair washing or in the dark (Romberg's sign). • When joint position sense is affected in the arms, pseudoathetosis may be demonstrated by asking the patient to close their eyes and hold their hands outstretched; the fingers/arms will make involuntary, slow, wandering movements, mimicking athetosis.
Small-fibre neuropathy (MCCs are DM and HIV)	• Pain and temperature sensations are mainly affected, the only finding may be Reduced pinprick and temperature sensation. • there may also be autonomic involvement.

Traumatic and compressive spinal cord lesions	• loss or impairment of sensation in a dermatomal distribution below the level of the lesion. • A zone of hyperasthesia may be found immediately above the level of sensory loss.
Syringomyelia (a fluid filled cavity within the spinal cord)	• dissociated pattern of altered spinothalamic (pain and temperature) sensation and motor function, with sparing of dorsal column (touch and vibration) sensation. Note: **anterior spinal artery syndrome** has a similar presentation.
Brown-Sequard syndrome (one half of the spinal cord is damaged)	• Ipsilateral UMN weakness • Ipsilateral loss of touch, vibration and joint sense. • Contralateral loss of pain and temperature.
Lower brainstem lesions	• Ipsilateral numbness on one side of the face (V nerve nucleus). • Contralateral body numbness (spinothalamic tract).
Thalamic lesions	• Patchy sensory impairment on the opposite side with unpleasant, poorly localized pain, often of a burning quality.
Cortical parietal lobe lesions	• Typically cause sensory inattention. • May also affect joint position sense, two point discrimination, stereognosis (tactile recognition) and localization of point touch.

★ *Peripheral nerves*

Carpal tunnel syndrome (median nerve compression)	• Sensory symptoms and pain in the hands, occasionally radiating up the arm- typically at night. (check box 7.11) • Wasting of thenar eminence. • Weakness of thumb abduction (abductor pollicis brevis). • Weak opposition (opponens pollicis). • Altered sensation on the distribution of median nerve. (Check figure 7.27)
Ulnar nerve compression	• Wasting of interossei (dorsal guttering). • Weakness of finger abduction and adduction. • Sensory loss on the distribution of ulnar nerve.
Radial nerve compression	• Wrist drop. • Loss of triceps tendon jerk. • Weakness of brachioradialis (elbow flexor) and the extensors of the arm (triceps), wrist and fingers. • Sensory loss over the dorsum of the hand.
Common peroneal nerve compression	• Foot drop (weakness of ankle dorsiflexion and eversion). • Weakness in the extension of the big toa (extensor hallucis longus). • Sensory loss over the dorsum of the foot.
Compression of the lateral cutaneous nerve of the thigh	• Paraesthesia in the lateral thigh (meralgia paraesthetica, which means burning numbness).