THE MOTOR SYSTEM

Assess the motor system

- inspection and palpation of muscles
- assessment of tone
- testing movement and power
- examination of reflexes
- testing coordination.

Lower motor neurone lesions may cause muscle wasting. This is not seen in acute upper motor neurone lesions, although disuse atrophy may develop with longstanding lesions.

- Fasciculation Fasciculation is irregular twitches under the skin overlying resting muscles caused by individual motor units firing spontaneously
- Myoclonic jerks These are sudden shock-like contractions of one or more muscles which may be focal or diffuse and occur singly or repetitively.
- Tremor Tremor is an oscillatory movement about a joint or a group of joints resulting from alternating contraction and relaxation of muscles

11.19 Causes of muscle weakness

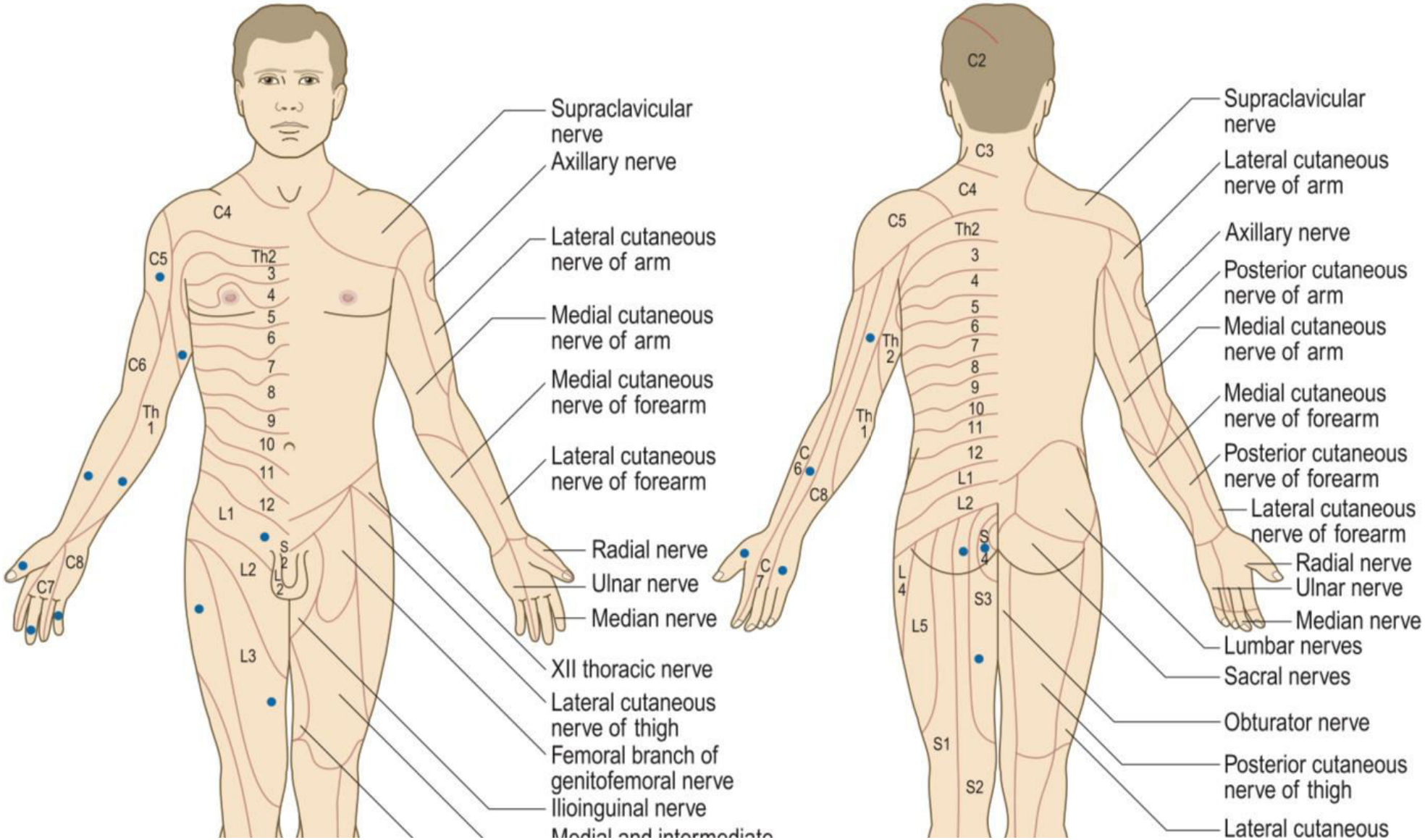
Anatomical aetiology	Associated features	Common causes
Lower motor neurone	Wasting	Peripheral neuropathies or mononeuropathies
	Fasciculation	Radiculopathies
	Hypotonia	Anterior horn cell damage, e.g. poliomyelitis or motor neurone disease
	Reflexes absent or diminished	
Upper motor neurone	'Patterned' weakness (flexed arm, extended leg)	Stroke
	No muscle wasting	Spinal cord pathology
	Hyperreflexia	Multiple sclerosis
	Hypertonia	Brain tumour
Myopathies	Usually proximal weakness	Muscular dystrophies
		Inflammatory myopathies
		Corticosteroids
		Alcohol
Functional weakness	Inconsistent weakness	Conversion disorders
	Hoover's sign	
	No 'hard' neurological signs	

11.27 Neuropathic symptoms

Paraesthesia	Tingling, or pins and needles Spontaneous or provoked Not unduly unpleasant or painful
Dysaesthesia	Unpleasant paraesthesia
Hypoaesthesia	Reduced sensation to a normal stimulus
Analgesia	Numbness or loss of sensation
Hyperaesthesia	Increased sensitivity to a stimulus
Allodynia	Painful sensation resulting from a non-painful stimulus
Hyperalgesia	Increased sensitivity to a painful stimulus

11.17 Summary of all 12 cranial nerves

Nerve	Examination	Abnormalities/symptoms
I	Sense of smell, each nostril	Anosmia/parosmia
II	Visual acuity Visual fields Pupil size and shape Pupil light reflex Fundoscopy	Partial sight/blindness Scotoma; hemianopia Anisocoria Impaired or lost Optic disc and retinal changes
III	Accommodation reflex	Impaired or lost
III, IV and VI	Eye position and movements	Strabismus, diplopia, nystagmus
V	Facial sensation Corneal reflex Muscles of mastication Jaw jerk	Impaired, distorted or lost Impaired or lost Weakness of chewing movements Increased in upper motor neurone lesions
VII	Muscles of facial expression Taste over anterior two-thirds of tongue	Facial weakness Ageusia
VIII	Whisper and tuning fork tests Vestibular tests	Impaired hearing/ deafness Nystagmus and vertigo
IX	Pharyngeal sensation	Not routinely tested
X	Palate movements	Impaired unilaterally or bilaterally
XI	Trapezius and sternomastoid	Weakness of neck movement
XII	Tongue appearance and movement	Dysarthria and chewing/ swallowing problems


Supraclavicular nerve
Axillary nerve
Lateral cutaneous nerve of arm
Medial cutaneous nerve of arm
Medial cutaneous nerve of forearm
Lateral cutaneous nerve of forearm
Radial nerve
Ulnar nerve
Median nerve
XII thoracic nerve
Lateral cutaneous nerve of thigh
Femoral branch of genitofemoral nerve
Ilioinguinal nerve
C4
C5
Th2
3
4
5
6
7
8
9
10
11
12
L1
L2
L3
C6
Th 1
C8
C7
S 2
L 2
C2
C3
C4
C5
Th2
3
4
5
6
7
8
9
10
11
12
L1
L2
Th 2
Th 1
C 6
C8
C 7
S 4
L 4
L5
S3
S1
S2
Supraclavicular nerve
Lateral cutaneous nerve of arm
Axillary nerve
Posterior cutaneous nerve of arm
Medial cutaneous nerve of arm
Medial cutaneous nerve of forearm
Posterior cutaneous nerve of forearm
Lateral cutaneous nerve of forearm
Radial nerve
Ulnar nerve
Median nerve
Lumbar nerves
Sacral nerves
Obturator nerve
Posterior cutaneous nerve of thigh
Lateral cutaneous