

Nerves

Questions

- 416. The lesion in Klumpke's paralysis is at (AP 88)**
- Cervical plexus
 - Lower brachial
 - Upper brachial
 - Sacral plexus
- 417. Nerve which responds best to repair is (NIMS 96)**
- Median
 - Ulnar
 - Sciatic
 - Radial
- 418. Following an incised wound in the front of wrist, the subject is unable to oppose the tips of the little finger and the thumb. The nerve (s) involved is/are (UPSC 2000)**
- Ulnar nerve
 - Median nerve
 - Median and ulnar nerve
 - Radial and ulnar nerves
- 419. Injury of median nerve at wrist is best detected by (AI 97)**
- Action of abductor pollicis brevis
 - Action of flexor pollicis brevis
 - Loss of sensation of radial half of palm
 - Loss of sensation of tip of ring finger
- 420. In ulnar nerve lesions, which of the following is seen (MAHE2001)**
- Flexion at metacarpophalangeal joints and extension at interphalangeal joints of hand
 - Extension at metacarpophalangeal joints and flexion at interphalangeal joints of hand
 - Flexion at metacarpophalangeal joints and interphalangeal joints of hand
 - Extension at metacarpophalangeal joints and interphalangeal joints

- 421. Following indicate better prognosis in nerve injury except (JIPMER 93)**
- Neuropraxia
 - Younger age
 - Pure motor N Injury
 - Proximal Nerve injury
- 422. Radial nerve injury of this type recovers with conservative management (KAR 94)**
- Neurotmesis
 - Crush injury
 - Neuropraxia
 - Chemical injury
- 423. Nerve abscess is seen in the ... nerve (KERALA 87)**
- Median
 - Ulnar
 - Lateral fibular
 - Sciatic
- 424. A man giving a history of having been assaulted shows signs of having anterior dislocation of the shoulder. He complains of paresthesia over the lateral aspect of his forearm and difficulty in flexing his elbow and wrist. The nerve involved is (AIIMS 99)**
- Ulnar
 - Axillary
 - Musculocutaneous
 - Median
- 425. Meralgia paraesthetica is an entrapment neuropathy of the (AIIMS 86)**
- Musculocutaneous nerve
 - Ilio inguinal nerve
 - External cutaneous nerve
 - Lateral popliteal nerve
- 426. A 25-year old lady sustained a lacerated wound on the back of right thigh by the horn of a bull. The wound was sutured. Two months later she developed foot drop and an ulcer on the dorsum of the foot. The most likely diagnosis is (UPSC 97)**
- Chronic ischaemia to limbs due to popliteal artery injury
 - Partial injury to sciatic nerve
 - Complete division of sciatic nerve
 - Injury to hamstring muscles

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- 427. Extension of the Metacarpophalangeal joint is lost in injury to (AIIMS 2000)**
- Radial nerve
 - Ulnar nerve
 - Median nerve
 - Posterior interosseous nerve
- 428. In shaft of humerus fracture, Nerve injured commonly (MAHE 99)**
- Median
 - Ulnar
 - Musculo cutaneous
 - Radial
- 429. The "Card Test" tests the function of (UPSC 95)**
- Median nerve
 - Ulnar nerve
 - Axillary nerve
 - Radial nerve
- 430. Pointing index is due to (KERALA 94)**
- Ulnar nerve injury
 - Radial nerve injury
 - Median nerve injury
 - Injury to flexor digitorum profundus
- 431. After complete division of a nerve, retrograde degeneration occur as high as ... node of ranvier (AIIMS 86)**
- 1st
 - 2nd
 - 3rd
 - 4th
 - 5th
- 432. Feature of Radial N. injury at spiral groove (TN 99)**
- Thumb, finger, wrist drop
 - No Wrist drop
 - Wrist drop + Extensors of Forearm paralysis
 - Sensory loss over deltoid
- 433. Peripheral nerves can withstand Ischemia up to (JIPMER 93)**
- 30 minutes
 - 1 hour
 - 2 hours
 - 4 hours

- 434. Radial nerve injury above elbow lead to (AI 93,AFMC 2000)**
- Ape thumb
 - Trigger finger
 - Wrist drop
 - Claw hand
- 435. Most commonly injured nerve in anterior dislocation shoulder is (AI 96)**
- Nerve of Bell
 - Axillary nerve
 - Radial nerve
 - Median nerve
- 436. Axillary nerve injury at its origin leads to paralysis of (PGI 93)**
- Deltoid
 - Latissmus dorsi and deltoid
 - Deltoid and Teres Minor
 - Deltoid & Teres Major
- 437. In causalgia, the nerves most commonly affected are (AIIMS 87)**
- Radial and ulnar
 - Median and sciatic
 - Radial and peroneal
 - Ilioinguinal and sural
- 438. The term neuropraxia means (MAHE2001)**
- Complete division of nerves
 - Functional disruption
 - Division of nerve fibers with intact nerve sheath
 - Anatomical disruption of nerve sheath
- 439. Which nerve is commonly injured in Fracture shaft of Humerus (PGI 93)**
- Axillary nerve
 - Median nerve
 - Ulnar nerve
 - Radial nerve
- 440. Froment's sign is used to detect (TN 99,KAR 2002)**
- Ulnar N
 - Median N
 - Radial N
 - Axillary N

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- 441. Dislocation of which one of the following carpal bones can present as median nerve palsy (UPSC 95)**
- Scaphoid
 - Hamate
 - Lunate
 - Trapezium
- 442. The following is true of brachial plexus (KERALA 89)**
- Cervical rib involves lateral cord
 - Musculocutaneous nerve arises from medial cord
 - Radial nerve arises from posterior cord
 - Post fixed plexus is formed by $C_{4,5,6,7,8}, T_1$
- 443. In Seddon's classification complete division of nerve is (PGI 93)**
- Neuropraxia
 - Axontemesis
 - Neurotemesis
 - None of the above
- 444. Winging of Scapula is due to paralysis of (AI 93,AFMC 2000)**
- Latissimus dorsi
 - Pectoralis major
 - Pectoralis minor
 - Serratus anterior
- 445. Total claw hand is caused by injury to(AI 93)**
- Radial nerve
 - Ulnar and Radial nerve
 - Ulnar and median nerve
 - Radial and median nerve
- 446. Tinnels sign indicates (KERALA 91)**
- Atrophy of nerves
 - Neuroma
 - Injury to nerves
 - Regeneration of nerves
- 447. Meralgia parasthetica is because of entrapment of (MP 2002)**
- Posterior cutaneous nerve of thigh
 - Intermediate cutaneous nerve of thigh
 - Medial cutaneous nerve of thigh
 - Lateral cutaneous nerve of thigh

448. In fibular fracture the nerve damaged is (SGPGI 2003)

- a. Common peroneal nerve
- b. Anterior tibial nerve
- c. Sural nerve
- d. Posterior tibial nerve

Nerves

Answers

416. (B) Lower Brachial

Reference: Bailey and Love 24th Edition Page 416

- ◆ Erb-Duchenne palsy
 - Upper Brachial Cord
 - C₅-C₆ roots and upper trunk
- ◆ Klumpke's paralysis
 - Lesion of lower roots

417. (D) Radial Nerve

Reference: Maheswari 3rd Edition Page 61

The following factors dictate recovery following a nerve repair

- ◆ Age
 - Better prognosis in younger age groups
- ◆ Tension at the suture line
 - Better prognosis with low tension
- ◆ Time since injury
 - After 18 months only sensory functions can be expected
- ◆ Location of injury
 - Better prognosis with distal injuries
- ◆ Type of Nerve
 - A primary motor nerve like radial nerve has a better prognosis than a mixed nerve
- ◆ Condition of the nerve ends
 - The more the crushing and infection, the poorer the prognosis
- ◆ Associated conditions
 - Infection, ischaemia etc indicate poor prognosis

418. (B) Median Nerve

Reference : Gray 38th Edition Page 1272

- ◆ To oppose the tips of little finger and thumb, we need the action of opponens pollicis which is supplied by the Median Nerve
- ◆ Also median nerve is injured in wounds in the front (anterior aspect) of wrist

Muscle Group and Number (No.) of muscle in each group						Muscles Supplied by Median Nerve		Muscles Supplied by Ulnar Nerve		Muscles supplied by Radial Nerve	
Group	No	Group	No	Name	No.	Name	No.	Name	No.	Name	No
Forearm Muscles	20	Flexors	8	Superficial Flexors	5	1. Pronator Teres	4	Flexor Carpi Ulnaris	1		
						2. Flexor Carpi Radialis					
				3. Palmaris Longus							
				4. Flexor Digitorum Superficialis							
		Deep Flexors	3	1. Lateral Half of Flexor Digitorum Profundus	2+ 1/2	1. Medial Half of Flexor Digitorum Profundus	1/2				
				2. Flexor Pollicis Longus							
				3. Pronator Quadratus (All by Anterior Interosseous Nerve)							

	Extensor	12	Superficial Extensors	7				7
			Deep Extensors	5				5

Hand Muscles	20	Thenar Region	4	Thenar Muscles	3	1. Abductor Pollicis Brevis 2. Flexor Pollicis 3. Opponens Pollicis	3			
							1	Adductor Pollicis (Deep Branch)	1	
		Hypothenar Region	4	Hypothenar Muscles	3		3	1. Abductor Digiti Minimi 2. Flexor Digiti Minimi 3. Opponens Digiti Minimi (All by Deep Branch)	3	

419. (A) Action of Abductor pollicis Brevis*Reference: Maheswari 3rd Edition Page 54*

- ◆ Pen Test is used for testing the action of this muscle

420. (B) Extension at metacarpophalangeal joints and flexion at interphalangeal joints*Reference: Gray 38th Edition Page 1273*

- ◆ This leads to Claw hand formation as the action of the lumbricals (holding the pen) is lost and the finger joints are acted upon by forces from other muscles which are not paralysed
- ◆ Lumbricals flex the Metacarpophalangeal joints and extend the interphalangeal joints enabling the person to hold the pen
- ◆ In case of lesions of lumbricals, the Metacarpophalangeal joints go into extension due to the action of the extensor muscles and the interphalangeal joints are flexed by Flexor Digitorum Superficialis and Flexor Digitorum Profundus

Ulnar Nerve

The Ulnar Nerve arises from the medial cord (C8, T1) but, it often receives fibres from the ventral ramus of C7. It runs distally through the axilla medial to the axillary artery and between it and the vein, continuing distally medial to the brachial artery as far as midarm; here it pierces the medial intermuscular septum, inclining medially as it descends anterior to the medial head of the triceps to the interval between the medial epicondyle and the olecranon, with the superior ulnar collateral artery. At the elbow it is in a groove on the dorsum of the epicondyle. It enters the forearm between the two heads of the flexor carpi ulnaris superficial to the posterior and oblique parts of the ulnar collateral ligament. It descends the medial side of the forearm on the flexor digitorum profundus, covered proximally by the flexor carpi ulnaris; its lower half, covered by skin and fasciae, is lateral to this muscle. In the upper third of the forearm, it is distant from the ulnar artery but distal to this is close to its medial side. About 5 cm proximal to the wrist it gives off a dorsal branch which continues distally into the hand, anterior to the flexor retinaculum on the lateral side of the pisiform bone and posteromedial to the ulnar artery. It passes behind the superficial part of the retinaculum with the artery and divides into superficial and deep terminal branches. Its relation to the brachial artery and medial epicondyle makes it easy to map out in its proximal course; a line from the medial epicondyle to the lateral edge of pisiform represents its distal course.

Branches of Ulnar Nerve are: articular, muscular, palmar cutaneous, dorsal, superficial terminal and deep terminal.

◆ Articular Branches

- These branches to the elbow joint issue from the nerve between the medial epicondyle and olecranon. Others are described below.

- ◆ Muscular Branches
 - Usually two, these begin near the elbow; one supplies the flexor carpi ulnaris, the other the medial half of the flexor digitorum profundus.
- ◆ Palmar Cutaneous Branch
 - This arises about midforearm, descends on the ulnar artery, which it supplies, and perforates the deep fascia to end in the palmar skin, after communicating with the palmar branch of the median nerve. It sometimes supplies the palmaris brevis.
- ◆ Dorsal Branch
 - This arises about 5 cm proximal to the wrist, passes distally and backwards, deep to the flexor carpi ulnaris, perforates the deep fascia, descends along the medial side of the back of the wrist and hand and then divides into two, or often three, dorsal digital nerves. One supplies the medial side of the little finger, the second adjacent sides of the little and ring, while the third, when present, supplies adjoining sides of the ring and middle finger but may be replaced, wholly or partially, by a branch of the radial nerve, always communicating with it on the dorsum of the hand. In the little finger the dorsal digital nerves extend only to the base of the distal phalanx and in the ring finger to the base of the middle phalanx; most distal parts of these digits are supplied by dorsal branches of the proper digital branches of the ulnar and, on the lateral side of the ring finger, median nerves.
- ◆ Superficial Terminal Branch
 - This supplies the palmaris brevis and the medial palmar skin, dividing into two palmar digital nerves, which can be palpated against the hook of the hamate bone; one of these supplies the medial side of the little finger, the other (a common palmar digital nerve) sends a twig to the median nerve and divides into two proper digital nerves for the adjoining sides of little and ring fingers. The proper digital branches are distributed like those of the median nerve.
- ◆ Deep Terminal Branch
 - With the deep branch of the ulnar artery, this passes between the abductor digiti minimi and flexor digiti minimi and then perforates the opponens digiti minimi to follow the deep palmar arch dorsal to the flexor tendons. At its origin it supplies the three short muscles of the little finger. As it crosses the hand, it supplies the interossei and the third and fourth lumbricals; it ends by supplying the adductor pollicis, the first palmar interosseous and usually the flexor pollicis brevis. It sends articular filaments to the wrist joint.
 - The medial part of the flexor digitorum profundus is supplied by the ulnar nerve, as are the third and fourth lumbricals which

are connected with the tendons of this part of the muscle. Similarly, the lateral part of the flexor digitorum profundus and the first and second lumbricals are supplied by the median nerve. The third lumbrical is often supplied by both nerves. The deep terminal branch is said to give branches to some intercarpal carpometacarpal and intermetacarpal joints, though, as with the median nerve, precise details are uncertain. Vasomotor branches, arising in the forearm and hand, supply the ulnar and palmar arteries.

Lesions of the Ulnar Nerve

Ulnar nerve lesions occur at four sites,

1. Behind the medial epicondyle,
2. In the cubital tunnel,
3. At the wrist and
4. In the hand.

At the Elbow

The ulnar nerve is in a vulnerable position as it lies between the median epicondyle and the olecranon: it lies on bone covered only by a thin layer of skin.

It is easily damaged if the ulnar groove is shallow and the nerve may become more prominent than the medial epicondyle or the olecranon when the elbow is fully flexed.

Sometimes the nerve may override the medial epicondyle in full flexion. Loss of the ulnar groove may be associated with arthritis of the elbow joint, often due to an old fracture, in which case there may be incomplete extension of the elbow with a wide carrying angle.

The nerve is easily palpable and is often thickened.

Motor

There is usually weakness of flexor digitorum profundus to the ring and little fingers, and if these muscles are involved the lesion must be at the elbow.

Sensory

Sensation Impaired in

Palmar Aspect

Medial palmar skin,
Medial side of the little finger,
Adjoining sides of little and ring fingers

Dorsum

Medial side of the little finger,
Adjacent sides of the little and ring,
Adjoining sides of the ring and middle finger

Cubital Tunnel Syndrome

This is an entrapment neuropathy of the ulnar nerve in the tunnel formed by the tendinous arch connecting the two heads of flexor carpi ulnaris at their humeral and ulnar attachments. The clinical features are precisely the same as a lesion in the ulnar groove and

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again, involvement of flexor digitorum profundus to the ring and little fingers is variable.

Lesions at these two sites cannot be reliably distinguished neurophysiologically, but in the cubital tunnel syndrome the elbow joint is usually normal: elbow movements are full with a normal carrying angle; the ulnar nerve feels normal in the ulnar groove; it does not sublux; nor does it become superficial on elbow flexion.

At the Wrist

Site

The ulnar nerve may be compressed in Guyon's canal by a ganglion.

Motor

All the small hand muscles innervated by the ulnar nerve are involved.

Preservation of flexor digitorum profundus to the ring and little fingers
The dorsal cutaneous branch and the palmar branch of the ulnar nerve are both spared since the lesion is distal to their origin from the main trunk of the ulnar nerve in midforearm.

In the Hand

The deep motor branch of the ulnar nerve may be compressed against the pisiform and hamate bones when the hand is used as a mallet, or if a vibrating tool or motorcycle handlebar is held in such a way that the hypothenar eminence is off the edge of the handle. The sensory branches are always spared and involvement of the hypothenar muscles is variable depending on the level at which branches to these muscles arise.

421. (D) Proximal Nerve Injury

Reference: Maheswari 3rd Edition Page 61

See Question 417

422. (C) Neuropraxia

Reference: Maheswari 3rd Edition Page 51

Type of Injury	Pathology	Degeneration	Neuroma	Prognosis
Neurapraxia	Physiological interruption; anatomically normal	Nil	Nil	Recovery complete within 6 weeks
Axonotmesis	Axons broken and nerve intact	Proximally + Distally	Neuroma in continuity	Recovery +/- Motor march +
Neurotmesis	Axons as well as nerve broken	Proximally + Distally	End or Site Neuroma	Recovery Poor

423. (B) Ulnar Nerve

Reference: Harrison 16th Edition Page 969 (Not in previous editions)

- ◆ Patients with various forms of leprosy, but particularly those with BT form, may develop abscesses of nerves (most commonly the ulnar) with an adjacent cellulitic appearance of the skin.
- ◆ In such conditions, the affected nerve is swollen and exquisitely tender. Although glucocorticoids may reduce signs of inflammation, rapid surgical decompression is necessary to prevent irreversible sequelae.

424. (C) Musculocutaneous

Reference: Gray 38th Edition Page 1269

- ◆ Musculocutaneous Nerve comes from the lateral cord opposite the lower border of the pectoralis minor and is derived from the fifth to the seventh cervical ventral rami. It pierces the coracobrachialis and descends laterally between the biceps and brachialis to the lateral side of the arm; just below the elbow it pierces the deep fascia lateral to the tendon of biceps, continuing as the lateral cutaneous nerve of the forearm. A line drawn from the lateral side of the third part of the axillary artery across the coracobrachialis and biceps to the lateral side of the biceps tendon is a surface projection for the nerve, but this is varied by its point of entry into the coracobrachialis.
 - It supplies the coracobrachialis, both heads of biceps and most of the brachialis. The branch to the coracobrachialis leaves the musculocutaneous before it enters the muscle; its fibres are from the seventh cervical ramus and may branch directly from the lateral cord.
 - Branches to the biceps and brachialis leave after the musculocutaneous pierces the coracobrachialis; the branch to the brachialis supplies the elbow joint.
 - The nerve also supplies a small branch to the humerus, entering with the nutrient artery.
- ◆ Lesions of the Musculocutaneous Nerve : An isolated lesion of the musculocutaneous nerve is rare, but may occur in injuries to the upper arm and shoulder including fracture of the humerus, and it may also be found in patients with neuralgic amyotrophy. There is marked weakness of elbow flexion because of paralysis of the biceps brachii and much of brachialis. There is sensory impairment on the extensor aspect of the forearm in the distribution of the lateral cutaneous nerve of the forearm. The pain and paraesthesiae may be aggravated by elbow extension.
- ◆ If you are wondering as to how wrist flexion is being affected in this case, you should know that the **musculocutaneous nerve has frequent variations**. It may run behind the coracobrachialis or adhere for some distance to the median nerve and pass behind

the biceps. **Some fibres of the median nerve may run in the musculocutaneous nerve**, leaving it to join their proper trunk; less frequently the reverse occurs, the median nerve sending a branch to the musculocutaneous. Occasionally it supplies the **pronator teres** and may replace radial branches to the dorsal surface of the thumb.

- ◆ Lateral Cutaneous Nerve of the Forearm passes deep to the cephalic vein, descending along the radial border of the forearm to the wrist, supplying the skin of the forearm's anterolateral surface and connecting by branches around its radial border with the posterior cutaneous nerve of the forearm and the terminal branch of the radial nerve. Its trunk gives rise to a slender recurrent branch which extends along the cephalic vein as far as the middle third of the upper arm, distributing filaments to the skin over the distal third of the anterolateral surface of the upper arm close to the vein. Although observed in the nineteenth century, this recurrent branch has more recently been omitted from most descriptions of the nerve supply of the upper limb. At the wrist joint the lateral cutaneous nerve of the forearm is anterior to the radial artery and some filaments, piercing the deep fascia and accompanying this to the dorsum of the carpus. The nerve then passes to the base of the thenar eminence, ending in cutaneous rami. It connects with the terminal branch of the radial nerve and the palmar cutaneous branch of the median nerve.

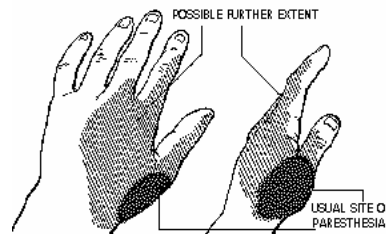
425. (C) External Cutaneous Nerve

Reference: Gray 38th Edition Page 1280

- ◆ Lateral Femoral Cutaneous Nerve comes from the dorsal branches of the second and third lumbar ventral rami, and emerges from the lateral border of psoas major, crossing the iliacus obliquely towards the anterior superior iliac spine. It supplies the parietal peritoneum in the iliac fossa. The right nerve passes posterolateral to the caecum, separated from it by the fascia iliaca and peritoneum; the left passes behind the lower part of the descending colon. Both pass behind or through the inguinal ligament, variably medial to the anterior superior iliac spine (commonly about 1 cm) and anterior to or through the sartorius into the thigh, dividing into anterior and posterior branches. The anterior branch becomes superficial about 10 cm distal to the anterior superior iliac spine, supplying the skin of the anterior and lateral thigh as far as the knee. It connects terminally with the cutaneous branches of the anterior division of the femoral nerve and the infrapatellar branch of the saphenous nerve, forming the patellar plexus. The posterior branch pierces the fascia lata higher than the anterior, dividing to supply the skin on the lateral surface from the greater trochanter to about midthigh. It may also supply the gluteal skin.

- ◆ Lesions of the Lateral Cutaneous Nerve of the Thigh : This nerve is seldom involved in its retroperitoneal course through the pelvis. It leaves the pelvis just medial to the anterior superior iliac spine and either **passes through or deep to the inguinal ligament, where it may become compressed. There is an area of impaired sensation, often with pain and paraesthesiae on the anterolateral aspect of the thigh (meralgia paraesthetica). The area involved is immensely variable, but is usually confined to the distal cutaneous distribution of the anterior branch of the lateral cutaneous nerve. This area does not extend across the midline anteriorly, it does not extend below the knee and it does not extend behind the hamstring tendons laterally.** Exceptionally the posterior branch of the lateral cutaneous nerve of the thigh may be affected separately; this supplies a thin strip from the greater trochanter of the femur down about two-thirds of the way to the knee. This branch leaves the main trunk of the nerve, usually distal to the inguinal ligament, and it then turns laterally to pierce the tensor fasciae latae muscle where it may become entrapped.

Cheiralgia paresthetica, a mononeuropathy of the superficial branch of the radial nerve, is an uncommon problem, usually resulting from local trauma to the wrist. It is also called as Handcuff Neuropathy and the patient may complain of pain around the thumb while **tight handcuffs were in place.** The pain decreased with handcuff removal, but there is residual paresthesia or decreased sensation over the radial side of the thumb metacarpal (or a more extensive distribution). The same injury may also be produced by pulling on a **ligature around the wrist, or wearing a tight watch-band.**



426. (A) Chronic ischemia to limbs due to popliteal artery injury

Reference: Bailey and Love 24th Edition Page 590

- ◆ There can be more than one answer to this question.
- ◆ In any nerve injury or muscle injury sustained as a result of trauma, the paralysis is immediate. Few nerve injuries may manifest two months after injury
- ◆ Thus we are choosing the vascular cause for the present lesion

427. (A) Radial Nerve (D) Posterior Interosseous Nerve

Reference: Gray 38th Edition Page 1274

Also see Question 418

- ◆ Please note that the finger extensors are affected whether the lesion is in Radial Nerve or in Posterior Interosseous Nerve

Radial Nerve

BDChaurasia describe the branches of Radial Nerve only under the following headings

A Before Spiral Groove

- ◆ Long head of Triceps
- ◆ Medial Head of Triceps

B. In Spiral Groove

- ◆ Long Head of Triceps
- ◆ Lateral Head of Triceps
- ◆ Medial Head of Triceps
- ◆ Anconeus

C. After Spiral Groove

- ◆ Brachialis
- ◆ Brachioradialis
- ◆ Extensor Carpi Radialis

Gray describes the muscular branches as below

These supply the triceps, anconeus, brachioradialis, extensor carpi radialis longus and brachialis in medial, posterior and lateral groups.

- ◆ Medial muscular branches
 - Arise from the radial nerve on the medial side of the arm.
 - They supply the
 - Medial head of Triceps -the branch to the medial being a long, slender filament which, lying close to the ulnar nerve as far as the distal third of the arm, is often termed the ulnar collateral nerve.
 - Long heads of the triceps,
- ◆ A large posterior muscular branch
 - Arises from the nerve as it lies in the humeral groove.
 - It divides to supply the
 - Medial and
 - Lateral heads of the triceps and the

- o Anconeus, that for the latter being a long nerve which descends in the medial head of the triceps and partially supplies it; it is accompanied by the middle collateral branch of the arteria profunda brachii and passes behind the elbow joint to end in the anconeus.
- ◆ Lateral muscular branches
 - Arise in front of the lateral intermuscular septum;
 - Supply the
 - o Lateral part of the brachialis,
 - o Brachioradialis and
 - o Extensor carpi radialis longus.

Lesions of Radial Nerve

- ◆ At Axilla
 - o Loss of Elbow Extension
 - o Loss of Sensation in the lateral and posterior Part of Arm
 - o Loss of Wrist Extension - Wrist Drop
 - o Loss of Thumb Extension - Thumb drop
 - o Loss of Finger Extension - Finger drop
 - o Loss of Sensation in the first dorsal web space
- ◆ At the lower end of Spiral Groove
 - o Loss of Wrist Extension - Wrist Drop
 - o Loss of Thumb Extension - Thumb drop
 - o Loss of Finger Extension - Finger drop
 - o Loss of Sensation in the first dorsal web space
- ◆ After Spiral Groove Before Piercing the Supinator and before the origin of sensory branch
 - o Diminished Wrist Extension - Wrist Deviates radially when extended
 - o Loss of Thumb Extension - Thumb drop
 - o Loss of Finger Extension - Finger drop
 - o Loss of Sensation in the first dorsal web space
- ◆ After Piercing the Supinator (Posterior Interosseus Nerve)
 - o Loss of Thumb Extension - Thumb drop
 - o Loss of Finger Extension - Finger drop
- ◆ Superficial Branch

It lies superficially and relatively unprotected overlying the lateral aspect of the radius, where it is easily compressed by tight bracelets, watch straps and handcuffs, Called as Cheralgia Paraesthetica (compare with Meralgia Paraesthetica)

 - o Loss of Sensation in the first dorsal web space
 - o If the lesion is proximal in this nerve, sensation may be impaired over a variable area of skin over the lateral side of the dorsum of the hand.

428. (D) Radial Nerve

Reference: Gray 38th Edition Page 1274

Please note that Radial Nerve in Spiral Groove is associated with lot of 'S'. The nerve is involved in lesions of

- ◆ Fracture Shaft of Humerus fractures
- ◆ Saturday night palsy
- ◆ Syringe (Injection) palsy
- ◆ Surgical Positions like Tredenlenberg
- ◆ 'S' march (Esmarch) Tourniquet palsy

429. (B) Ulnar Nerve

Reference: Maheswari 3rd Edition Page 55

Tests for Ulnar Nerve Include

- ◆ **Card Test** is done to test the palmar interossei (adductors). In this test the examiner inserts a card between the two extended fingers and the patient is asked to hold it as tightly as possible while examiner tries to pull the card out
- ◆ **Egawa Test** is for dorsal interossei (abductor) of the middle finger. With the hand kept flat on a table with palmar surface down, the patient is asked to move his middle finger sideways
- ◆ **Book Test** is a test for ulnar nerve palsy which specifically tests the action of adductor pollicis. The patient is asked to hold a piece of paper between the thumb and a flat palm and the paper is pulled away. Normal individual will be able to hold the paper with little or no difficulty. However, In ulnar nerve palsy the patient will flex the thumb to try to maintain a hold on the paper and this is called as Froment's sign.

430. (C) Median Nerve injury

Reference: Maheswari 3rd Edition Page 54

- ◆ In case of a Median Nerve lesion, the nerve supply to the lateral half of FDP (Flexor Digitorum Profundus) is lost and that means there loss of flexion of the Distal Interphalangeal (DIP) Joint of the Index Finger (and to a certain extent) the Middle Finger
- ◆ Now when you ask the patient to clasp his hand, (Ochner's Clasp Test) there is flexion in all other joints of the hand except the Distal Interphalangeal Joint and the Index Finger "points" instead of being flexed à this is called as Pointing Index Sign
- ◆ As the patient is unable to flex the Distal Interphalangeal Joint à the Index and (to a certain extent) the middle finger are extended and this gives rise to the Benediction Attitude, the attitude the priest (clergyman) keeps his hand when blessing

Lesions of the Median Nerve

Median nerve lesions occur at two sites,

1. In the forearm (Pronator Syndrome) and
2. At the wrist. (Carpal Tunnel Syndrome)

Pronator Syndrome

This is an uncommon entrapment neuropathy of the median nerve
Sites

The nerve may be involved at any of these sites.

1. As it passes alongside the fibrous band connecting the biceps tendon to the forearm fascia,
2. As it passes down between the two heads of pronator teres
3. As it passes through a fibrous arch formed by flexor digitorum superficialis.

Symptoms and Signs**Motor**

There is weakness of all the muscles innervated by the median nerve, including abductor pollicis brevis and the long finger flexors.

Sensory

There is also sensory impairment on the palm of the hand (spared in the carpal tunnel syndrome because the palmar cutaneous branch of the median nerve arises above the carpal tunnel and lies superficial to it.)

Anterior interosseous nerve palsy

The anterior interosseous nerve usually arises from the median nerve proximal to the site of compression in the pronator syndrome; it may be affected with the median nerve or by itself.

Causes

1. Due to external pressure (a form of Saturday night palsy),
2. Sometimes by tight grip in association with pronation without obvious cause.
3. May be a manifestation of neuralgic amyotrophy and tends to resolve spontaneously over several months.

Motor:

An anterior interosseous nerve palsy causes weakness of pinch grip due to involvement of flexor pollicis longus and flexor digitorum profundus to the index finger.

Please note that

Innervation of flexor digitorum profundus to the middle finger is rather variable, (also by Ulnar Nerve) therefore this muscle may or may not be weak.

The branches to these three muscles (FDP, FPL, PQ) may arise separately from the median nerve, so that isolated weakness of the terminal phalanx to the thumb or index finger may occur. The pronator quadratus is also involved but is not clinically significant.

Carpal Tunnel Syndrome

This is the most common entrapment mononeuropathy caused by the compression of the median nerve as it passes through the fibro-osseous tunnel beneath the flexor retinaculum.

Causes

The carpal tunnel may be narrowed by

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1. Arthritic changes in the wrist joint, particularly rheumatoid arthritis;
2. Soft tissue thickening as may occur in myxoedema and acromegaly;
3. Edema and obesity including pregnancy.

Pathology

Normally the nerve slides smoothly in and out of the carpal tunnel with flexion and extension of the wrist; when the nerve is compressed there is an additional damage to the nerve with flexion and extension.

The dominant hand is usually affected first, probably because this hand is used more frequently and more vigorously.

Motor

There is wasting and weakness of abductor pollicis brevis

Sensory

Impairment of sensation in the

1. Thumb,
2. Index Finger,
3. Middle Finger and
4. Median side of the Ring finger,
(the palmar branch of the median nerve is spared since it does not pass through the carpal tunnel.)

431. (A) 1st

Reference: Maheswari 3rd Edition Page 50

- ◆ The part of the neuron distal to the point of injury undergoes secondary or Wallerian degeneration
- ◆ The proximal part undergoes primary or retrograde degeneration for a single node

432. (A) Thumb, Finger, Wrist Drop

Reference: Gray 38th Edition Page 12 74

Also see Question 418, 427, 428

433. 3 hours

Reference: Apley 8th Edition Page 256

Here we can go for Choice C as the answer

434. (C) Wrist Drop

Reference: Gray 38th Edition Page 1274

Also see Question 418, 427, 432

435. (B) Axillary Nerve

Reference: Maheswari 3rd Edition Page 76

- ◆ The commonest causes of axillary nerve lesions are trauma and neuralgic amyotrophy. There is wasting and weakness of deltoid, which is usually clinically evident, and a patch of sensory loss on

the outer aspect of the arm. This can be differentiated from a C5 root lesion by finding normal function in the distribution of the suprascapular nerve.

436. (C) Deltoid and Teres Minor

Reference: Gray 38th Edition Page 1269

◆ Axillary (Circumflex Humeral) Nerve arises from the posterior cord, its fibres being derived from the fifth and sixth cervical ventral rami. It is at first lateral to the radial nerve, posterior to the axillary artery and anterior to the subscapularis, at whose lower border it curves back inferior to the humeroscapular articular capsule and, with the posterior circumflex humeral vessels, traverses a quadrangular space bounded above by the subscapularis (anterior) and teres minor (posterior), below by the teres major, medially by the long head of triceps and laterally by the humeral surgical neck. The nerve finally divides into anterior and posterior branches. The anterior branch, with the posterior circumflex humeral vessels, curves round the humeral neck, deep to the deltoid, to its anterior border, supplying it and giving a few small cutaneous branches which pierce the muscle to ramify in the skin over its lower part. **The posterior branch supplies the teres minor and the posterior part of the deltoid**; on the branch to the teres minor an enlargement or pseudoganglion usually exists. The posterior branch pierces the deep fascia low on the posterior border of the deltoid, continuing as the upper lateral cutaneous nerve of the arm and supplying the skin over the lower part of the deltoid and the upper part of the long head of triceps. The axillary trunk supplies a branch to the shoulder joint below the subscapularis.

437. (B) Median and Sciatic

Reference: Apley 8th Edition Page 227 and Bailey and Love 24th Edition Page 590 and Harrison 15th Edition Paeg 2499 (not in 16th edition)

◆ A certain percentage of patients with peripheral nerve injury develop a severe burning pain (causalgia) in the region innervated by the nerve. The pain typically begins after a delay of hours to days or even weeks. The pain is accompanied by swelling of the extremity, periarticular osteoporosis, and arthritic changes in the distal joints. A similar syndrome called reflex sympathetic dystrophy can be produced without obvious nerve damage by a variety of injuries, including fractures of bone, soft tissue trauma, myocardial infarction, and stroke. Although the pathophysiology of this condition is poorly understood, the pain can be relieved within minutes by blocking the sympathetic nervous system. This implies that sympathetic activity activates nociceptors even if they

are not obviously damaged. These results also suggest that the sympathetic nervous system can, under some circumstances, play an active role in inflammation

- ◆ Causalgia may complicate partial lesions of Sciatic Nerve (as per Bailey and Love)
- ◆ Incomplete lesions of the median nerve between the axilla and wrist may result in causalgia (a particularly severe type of burning pain) as per *Harrison 15th Edition Page 2499*
- ◆ Causalgia is “a syndrome of sustained burning pain after a traumatic nerve injury combined with vasomotor and sudomotor dysfunction and later trophic changes”
- ◆ Causalgias are divided into two forms:
 - **Causalgia major** involves peripheral nerve injury with electrical “crosstalk” (ephapse) that causes severe hyperactivity of sympathetic system (hyperpathia, vasoconstriction, and movement disorder). The major form is severe, usually caused by injury with high velocity sharp objects (e.g., butcher’s knife), vibratory component major trauma (e.g., bullet), or high-voltage nerve lesions (electrocution).
 - **Causalgia minor** involves the same principle as causalgia major, but milder injury, e.g., injury to the dorsum of hand or foot, nerve root contusion, patient falling from a height on gluteal region resulting in “guillotine” effect, bruising of nerve root caught at the narrowed intervertebral foramen.
- ◆ The difference between the two categories is a matter of degree and severity. To classify causalgia as an independent illness is artificial, and causalgia is nothing but a severe form of RSD. In this severe form of RSD, the course of the disease is quite accelerated from stage 1 through 4 in a matter of weeks or months. S. Weir Mitchell in 1872 first reported rapid development of atrophic changes in the skin, nails, and soft tissues of the extremity in a matter of days to weeks.
- ◆ Whereas in RSD of disuse the extremity is cold, in ephaptic dystrophy the thermography reveals in the distal portion of the extremely cold extremity that there is an isolated hot spot that points to the area of scar formation and ephaptic peripheral nerve dysfunction. In this area the vasoconstrictive capability of the sympathetic nerve is paralyzed, and there is a topical hot spot. This hot spot can be appreciated only by thermography.
- ◆ This type of RSD is quite painful and very difficult to treat. It demands multidisciplinary therapy as well as early diagnosis. The ephaptic form is characterized by increased heat emission at the area of ephaptic lesion (electric short). As the condition becomes chronic, the distal portion of the extremity involved and the contralateral extremity becomes cold, but the ephaptic spot stays hyperalgesic and warm.

438. (B) Functional Disruption*Reference: Maheswari 3rd Edition Page 51*

Also See Question 422

Type of Injury	Pathology	Degeneration	Neuroma	Prognosis
Neurapraxia	Physiological interruption; anatomically normal	Nil	Nil	Recovery complete within 6 weeks

439. (D) Radial Nerve*Reference: Gray 38th Edition Page 1274*

Also see Question 418, 427, 428, 432, 434

440. (A) Ulnar Nerve*Reference: Maheswari 3rd Edition Page 56*

Also See Question 429

441. (C) Lunate*Reference: Bailey and Love 24th Edition Page 532*

Also See Question 326

442. (C) Radial Nerve arises from the posterior Cord*Reference: Gray 38th Edition Page 1268 and Das Concise Textbook of Surgery 3rd Edition page 177*

- ◆ The brachial plexus is a union of the lower four cervical ventral rami and the greater part of the first thoracic ventral ramus; the fourth ramus usually gives a branch to the fifth and the first thoracic frequently receives one from the second.
- ◆ Cervical Rib involves the lower trunk (Das)
- ◆ Musculocutaneous nerve arises from the Lateral Cord
- ◆ Contributions to the plexus by C4 and T2 vary; **when the branch from C4 is large, that from T2 is frequently absent and the branch from T1 is reduced, forming a prefixed type of plexus.** If the branch from C4 is small or absent, the contribution of C5 is reduced but that of T1 is larger and one from T2 is always present; this arrangement constitutes a postfixed type of plexus.

443. (C) Neurotemesis*Reference: Maheswari 3rd Edition Page 51*

Also See Question 422 and 438

- ◆ The other classification (apart from Seddon) used is Sunderland's Classification of nerve injuries

444. (D) Serratus Anterior*Reference: Gray 38th Edition Page 1268*

- ◆ When serratus anterior is paralysed, the medial border of the scapula, and especially its lower angle, stand out prominently.

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The patient cannot raise the arm fully or push effectively; attempts to do so produce further projection, known as 'winging' of the scapula. It is best demonstrated by asking the patient to push against resistance with the arm extended at the elbow and flexed to 90° at the shoulder.

- ◆ The long thoracic nerve is the most common nerve to be affected by neuralgic amyotrophy.

445. (C) Ulnar and Median Nerve

Reference: Maheswari 3rd Edition Page 51

Types and Causes of Claw Hand

- ◆ True Claw Hand or Total Claw Hand
 - Both Median and Ulnar nerves are affected due to causes like
 - Syringomyelia
 - Amyotrophic lateral sclerosis
 - Peripheral Neuritis etc
- ◆ Ulnar Claw Hand (also called Claw like Hand)
 - Only Ulnar nerve is affected

446. (D) Regeneration of the Nerves

Reference: Maheswari 3rd Edition Page 57

- ◆ Tinel's test is a sign of nerve recovery. In this test, if the site of the nerve injury is tapped then there is tingling along the course of the nerve.
- ◆ This test can also be used in the diagnosis of carpal tunnel syndrome. In this instance tapping over the carpal tunnel causes tingling in the thumb and radial two and a half fingers.

447. (D) Lateral Cutaneous Nerve of Thigh

Reference: Gray 38th Edition Page 1280

Also See Question 425

448. (A) Common Peroneal Nerve

Reference: Maheswari 3rd Edition Page 37

Nerve damaged	Trauma	Effects
Axillary Nerve	Dislocation of the shoulder	Deltoid Paralysis
Radial Nerve	Fracture shaft of the humerus	Wrist Drop
Median Nerve	Supracondylar fracture of humerus	Pointing Index
Ulnar Nerve	Fracture medial epicondyle humerus	Claw Hand
Sciatic Nerve	Posterior dislocation of the hip	Foot Drop due to weakness of dorsiflexors of the foot
Common Peroneal Nerve	Knee Dislocation and Fracture of neck of fibula	Foot Drop

Few Tables

- ◆ Incidence of Peripheral Nerve Injuries
- ◆ Radial Nerve is commonly injured
- ◆ Ulnar Nerve 30 percent
- ◆ Median Nerve 15 percent
- ◆ Peroneal Nerve
- ◆ Lumbosacral Plexus 3 percent
- ◆ Tibial Nerve

Typical deformities

- ◆ Wrist drop, Finger drop and thumb drop – Radial Nerve injury
- ◆ Claw Hand – Ulnar Nerve injury
- ◆ Foot Drop – lateral popliteal nerve injury
- ◆ Ape Thumb – Median Nerve Injury
- ◆ Winging of Scapula – Long Thoracic Nerve of Bell Injury
- ◆ Pointing Index or Oschner;s Clasp test – Median Nerve Injury
(along with Benediction test and Pen test)
- ◆ Policeman tip – Brachial Plexus Injury

Simple Screening Tests

- ◆ Ulnar Nerve Injury – loss of pain at the tip of the little finger
- ◆ Median Nerve Injury – loss of pain at the tip of index finger
- ◆ Radial Nerve Injury – Inability to extend the thumb (hitch hiker's sign)