Axillary and Median Nerve

Musculoskeletal block - Anatomy - lecture 6

Editing file
Objectives

By the end of the lecture, students should be able to:

✓ Describe the origin, course, relations, branches and distribution of the axillary & median nerves

✓ Describe the common causes and effects of injury to the axillary and median nerves
Brachial plexus

Remember To Drink Cold Beer
Axillary Nerve

<table>
<thead>
<tr>
<th>Origin</th>
<th>Course</th>
<th>Branches</th>
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</thead>
<tbody>
<tr>
<td>(C 5 &amp; 6)</td>
<td>Posterior cord of brachial plexus.</td>
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<td>- It passes <em>inferiorly</em> and <em>laterally</em> along the posterior wall of the axilla to exit.</td>
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<td>- Then, it passes <em>posteriorly</em> around the <em>surgical neck</em> of the humerus.</td>
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<td>- It is accompanied by the <em>posterior circumflex humeral artery</em>.</td>
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<tr>
<td>(Motor)</td>
<td>to the <em>deltoid</em> and <em>teres minor</em> muscles.</td>
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<td>(Sensory)</td>
<td>superior <em>lateral cutaneous</em> nerve of arm that loops around the posterior margin of the <em>deltoid</em> muscle to innervate <em>skin</em> in that region.</td>
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<tr>
<td>Lesions</td>
<td>affects</td>
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<td>---------------------------------------------</td>
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<td>The axillary nerve is usually injured due to:</td>
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<tr>
<td>• Fracture of surgical neck of the humerus</td>
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<td>• Downward dislocation of the shoulder joint</td>
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<td>• Compression from the incorrect use of crutches</td>
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**Motor:**
1. Impaired abduction of the shoulder (∠15-90°)
   Note: the patient CANNOT raise his arm over 30°.
2. Paralysis of the **deltoid** and **teres minor** muscles
   (The paralyzed deltoid wastes rapidly
   As the deltoid **atrophy**, the **rounded** contour of the shoulder is **flattened** compared to the uninjured side).

**Sensory:**
Loss of sensation over the lateral side of the proximal part of the arm.
Median Nerve

The median nerve is formed **anterior** to the third part of the **axillary artery** by the union of lateral and medial roots.

- The **lateral root** (C5, 6&7), arises from the lateral cord of the brachial plexus.
- The **medial root** (C8 & T1), arises from the medial cord of the brachial plexus.

originating from the **lateral** and **medial** cords of the brachial plexus.

Note: **Axillary artery** is named **Brachial artery** when it reaches the arm.
**Median Nerve**

**In the arm**

It enters the arm from the axilla at the inferior margin of the teres major muscle. It passes vertically down the medial side of the arm in the anterior compartment and is related to the brachial artery throughout its course:

- **In proximal regions (In upper 1/2 of the arm),** it lies immediately lateral to the brachial artery.
- **In more distal regions (In the middle of the arm),** it crosses the medial side of the brachial artery.
- **In the lower 1/2** it descends on the medial side of the brachial artery.
- It descends anterior to the elbow joint.

**Note that**

- The median nerve has NO major branches in the arm or axilla, but a branch to one of the muscles of the forearm, the (Pronator Teres), this branch may originate from the nerve immediately proximal to the elbow joint.
Median Nerve

**In the forearm**

Median nerve passes into the forearm anterior to the elbow joint (between the 2 heads of pronator teres) where it branches innervates most of the muscles in the anterior compartment of the forearm (6.5 muscles) **except** the:

- Flexor Carpi Ulnaris
- the medial half of the Flexor Digitorum Profundus (which are innervated by the ulnar nerve).

**In the hand**

The median nerve continues into the hand by passing deep to the flexor retinaculum. It innervates:

- Three thenar eminence muscles associated with the thumb.
- Lateral **two** lumbrical muscles associated with movement of the index and middle finger.
- Skin over the palmar surface of the lateral three and one-half digits and over the lateral side of the palm and middle of the wrist.

(The lateral 2/3rd of the palm of the hand.)
**Median Nerve Lesions**

Injury of the median nerve at different levels causes different syndromes -

**In the arm and forearm the median nerve is usually not injured by trauma, why?**

Because of its relatively deep position.

<table>
<thead>
<tr>
<th>Sites of damage</th>
<th>Serious effects</th>
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<tbody>
<tr>
<td><strong>In the carpal tunnel (deep in the flexor retinaculum)</strong></td>
<td><strong>Loss of opposition of the thumb:</strong> The delicate pincer-like action is not possible.</td>
</tr>
<tr>
<td><strong>At the wrist above the flexor retinaculum</strong></td>
<td><strong>Loss of sensation:</strong> from the thumb and lateral 3½ fingers &amp; lateral ⅔ of the palm.</td>
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<tr>
<td><strong>In the elbow region (supracondylar fracture of the humerus)</strong></td>
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</table>
Lesion

About

Motor

Sensory and tropic

**Median Nerve Lesion in the Elbow Region**

**Lesion**

**Motor**

**Sensory and tropic**

Distended in supracondylar fracture of humerus

**Muscles affected are:**

- **Pronator muscles of the forearm** (they will always be supinated)
- **All long flexors of the wrist and fingers except flexor carpi ulnaris and medial half of flexor digitorum profundus**

- **Loss of pronation.**
- **Hand is kept in supine position.**
- **Wrist shows weak flexion, and ulnar deviation.** (cause there is no muscle to antagonise the action of the ulnaris)
- **Loss of flexion on the interphalangeal joints of the index and middle fingers.**
- **Weak flexion of ring and little fingers.**
- **Thumb is adducted** (cause the adductor muscle is not supplied by the median nerve) and laterally rotated, with loss of flexion of terminal phalanx and loss of opposition.
- **Wasting of thenar eminence.**
- **Hand looks flattened and “apelike”, and presents an inability to flex the three most radial digits when asked to make a fist.**

- **Sensory:**
  - Loss of sensation from:
    - The **radial side ⅔ of the palm.**
    - **Palmar** aspect of the lateral 3½ fingers.
    - Distal part of the dorsal surface of the lateral 3½ fingers.

- **Trophic Changes:**
  - Dry and scaly skin
  - Easily cracking nails
  - Atrophy of the pulp of the fingers

**Extra**
<table>
<thead>
<tr>
<th><strong>Lesion</strong></th>
<th><strong>About</strong></th>
<th><strong>Motor</strong></th>
<th><strong>Sensory</strong></th>
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<td>Median Nerve Lesion at the Wrist</td>
<td>Often injured by penetrating wounds (stab wounds or broken glass) of the forearm. (لما الشخص يحاول ينتحر)</td>
<td>Thenar muscles are <strong>paralyzed</strong> and <strong>atrophy happens</strong> with time so that the thenar eminence becomes <strong>flattened</strong>. <strong>Opposition and abduction of thumb</strong> are <strong>lost</strong>, and <strong>thumb and lateral two fingers</strong> are arrested in adduction and hyperextension position. <strong>“Apelike hand”</strong></td>
<td><strong>Sensory:</strong> Loss of sensation from:</td>
</tr>
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<td><strong>NOTE:</strong> You have to know each deformity and the muscles/nerves involved.</td>
<td></td>
<td></td>
<td>- The <strong>radial side</strong> of the palm.</td>
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<td></td>
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<td></td>
<td>- <strong>Palmar</strong> aspect of the lateral 3½ fingers.</td>
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<td>- <strong>Distal</strong> part of the dorsal surface of the lateral 3½ fingers.</td>
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<td><strong>Trophic Changes:</strong></td>
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<td></td>
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<td>- Atrophy of the pulp of the fingers are the same as in the elbow region injuries.</td>
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<td><strong>Median Nerve Lesion deep in flexor retinaculum “Carpal Tunnel Syndrome”</strong></td>
<td>The <strong>most common</strong> neurological problem associated with the median nerve is the compression beneath the flexor retinaculum at the wrist. The symptoms first appear as sensory but when it progresses further the motor symptoms appear.</td>
<td><strong>Weak</strong> motor function of thumb, index &amp; middle fingers.</td>
<td>Burning pain or ‘<strong>pins and needles</strong>’ along the distribution of median nerve to lateral 3½ fingers.</td>
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<td>No sensory changes over the palm as the <strong>palmar cutaneous branch</strong> is given before the median nerve enters the carpal tunnel.</td>
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**SUMMARY**

**Axillary nerve**
- **Origin:** posterior cord.
- **Spinal segments:** C5 & C6.
- **Motor:** Deltoid, teres minor.
- **Sensory:** Skin over upper lateral part of arm (superior lateral cutaneous nerve of arm)

**Median nerve**
- **Origin:** medial and lateral cords.
- **Spinal segments:** (C5, C6, C7, C8 and T1).
- **Motor:** All muscles in the anterior compartment of the forearm (Except flexor carpi ulnaris and medial half of flexor digitorum profundus), three thenar muscles of the thumb and two lateral lumbral muscles.
- **Sensory:** Skin over the palmar surface of the lateral three and one-half digits and over the lateral side of the palm and middle of the wrist.
**Question 1:** The median nerve continues into the hand by passing deep to the?
A. Flexor retinaculum  
B. Brachialis  
C. Coracobrachialis  
D. Extensor digitorum longus

**Question 2:** The median nerve originate from:
A. Lateral cord  
B. Medial cord  
C. Both B & A  
D. Posterior cord

**Question 3:** Which one of the following is a sensory supply of the median nerve?
A. 3 thenar Muscles  
B. 3 hypothenar Muscles  
C. Palmer lateral 3 and a half digit  
D. Palmer medial 1 and a half digit

**Question 4:** A physician examined an X ray and saw that the patient had a fracture in the surgical neck, which nerve will he be worried about?
A. brachial  
B. Radial  
C. Musculocutaneous  
D. Axillary

**Question 5:** Loss of pronation is a motor effect of:
A. Median nerve injury in elbow  
B. Median nerve injury at the wrist  
C. Axillary nerve injury  
D. Median nerve injury in the carpal tunnel

**Question 6:** A patient complaining of pins and needles sensation along the medial side of the upper limb and the 3 lateral fingers, that would indicate:
A. Median Nerve Lesion in the Elbow Region  
B. Carpal tunnel syndrome  
C. Surgical neck fracture  
D. Median Nerve Lesion at the wrist

### SAQ

**Question 1:** One of the trophic changes in Median Nerve Lesion in the Elbow Region?
Dry and scaly skin

**Question 2:** Where are the axillary motor branches located?
In the deltoid and teres minor muscles.

**Answers:**
Q1. A  
Q2. C  
Q3. C  
Q4. D  
Q5. A  
Q6. B
Team members

Boys team:
- Khalid AL-Dossari
- Naif Al-Dossari
- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Suhail Basuhail
- Ali Aldawood
- Khalid Nagshabandi
- Mohammed Al-huqbani
- Jehad Alorainy
- Khalid AlKhani
- Omar Alammar

Girls team:
- Ajeed Al Rashoud
- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Rawan Al Zayed
- Reema Al Masoud
- Renad Al Haqbani
- Nouf Al Humaidhi
- Fay Al Buqami
- Jude Al Khalifah
- Nouf Al Hussaini
- Alwateen Al Balawi
- Rahaf Al Shabri
- Danah Al Halees
- Haifa Al Waily
- Rema Al Mutawa
- Amirah Al Dakhilallah
- Maha Al Nahdi
- Renad Al Mutawa
- Ghaida Al Braithen
- Reham Yousef

Team leaders
- Abdulrahman Shadid
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Special thank for Anatomy team 436

Good luck

Give us your feedback: