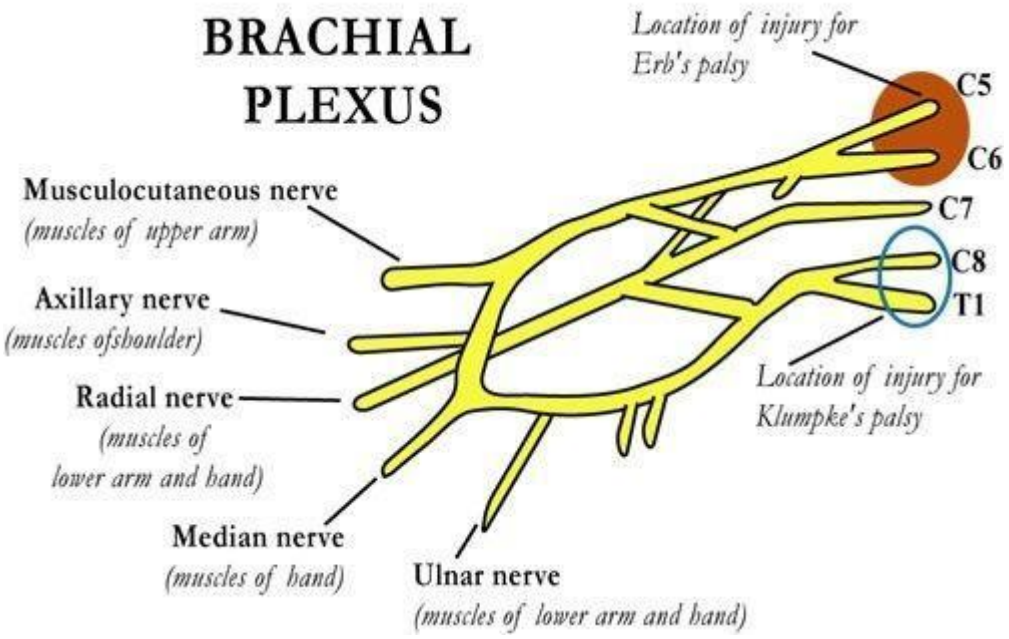
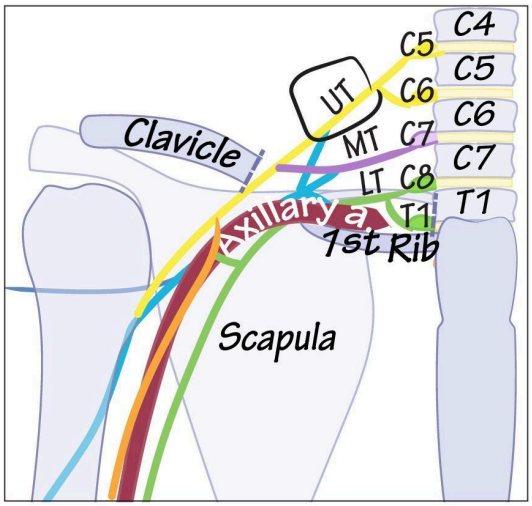
Anatomical basis of Erb’s and Klumpke’s palsy

Both are **upper-limb paralysis syndromes caused by injury to different parts of the brachial plexus**.

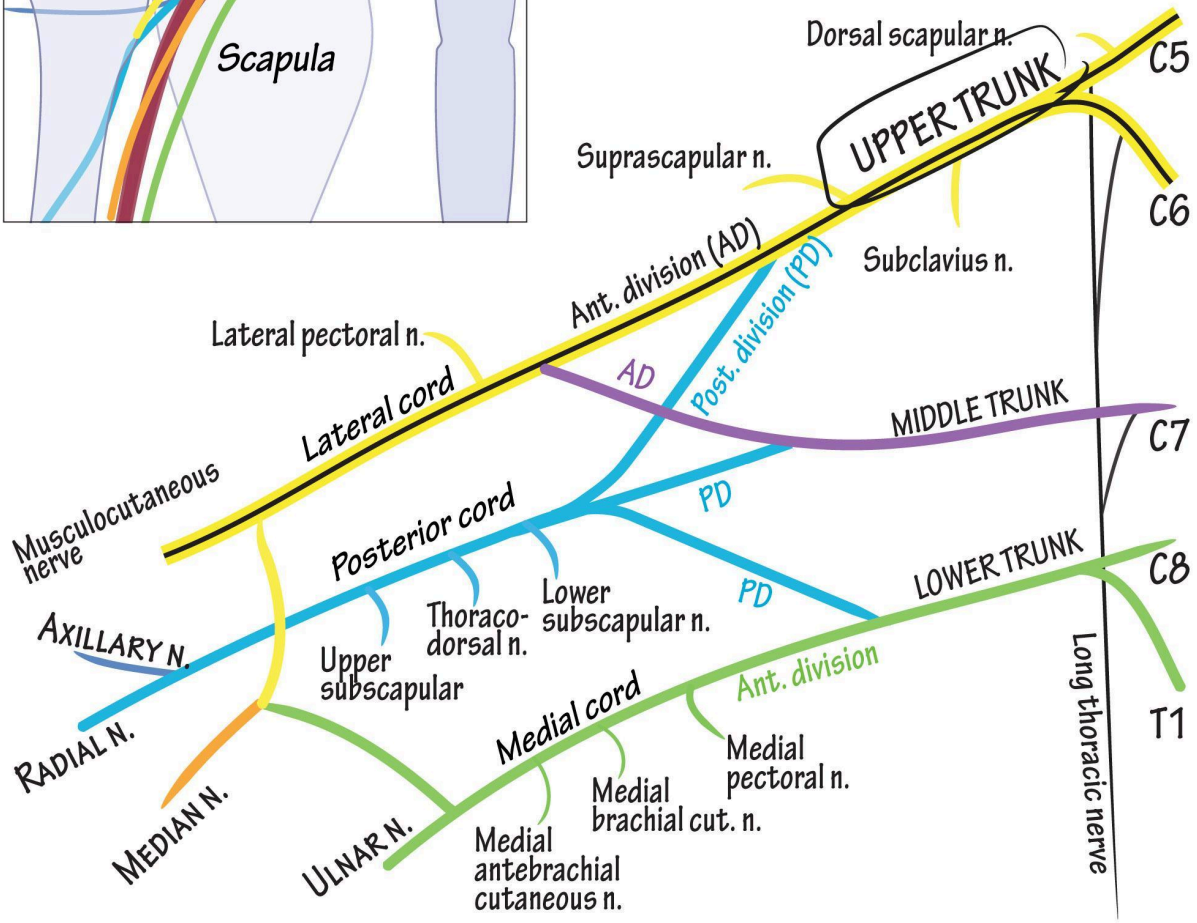


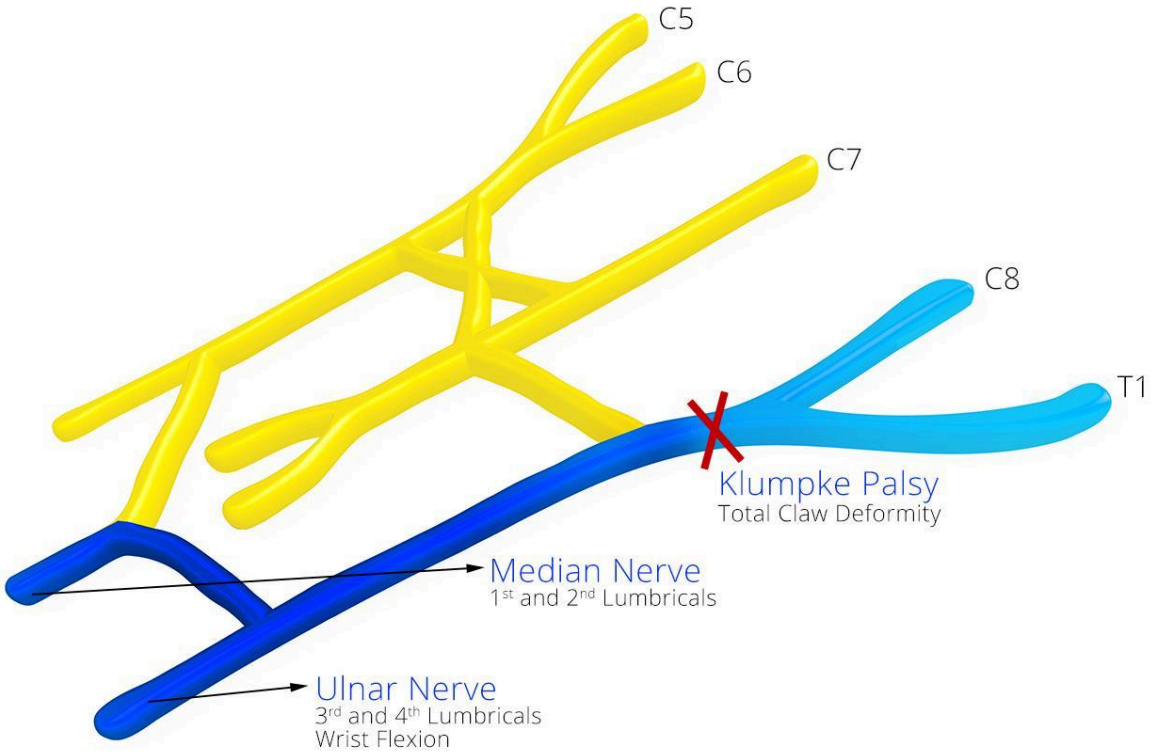


Upper Trunk

Erb's Palsy
"Waiter's Tip"

C5 C6

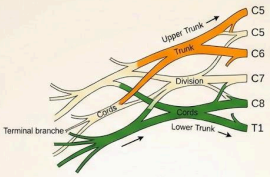


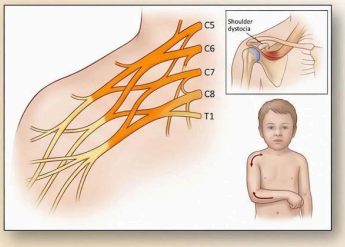


Brachial Plexus Injury Patterns

Upper Trunk Injury: Erb's Palsy

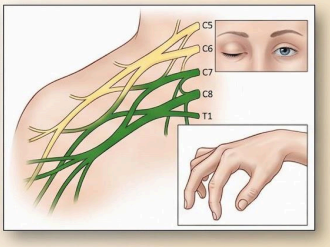
- Affects C5-C6 nerve roots
- Common in difficult births (shoulder dystocia)
- Presents as 'waiter's tip' posture
- Initial management: physiotherapy
- Surgery if no recovery by 3-6 months
- 90% of neonatal cases recover spontaneously



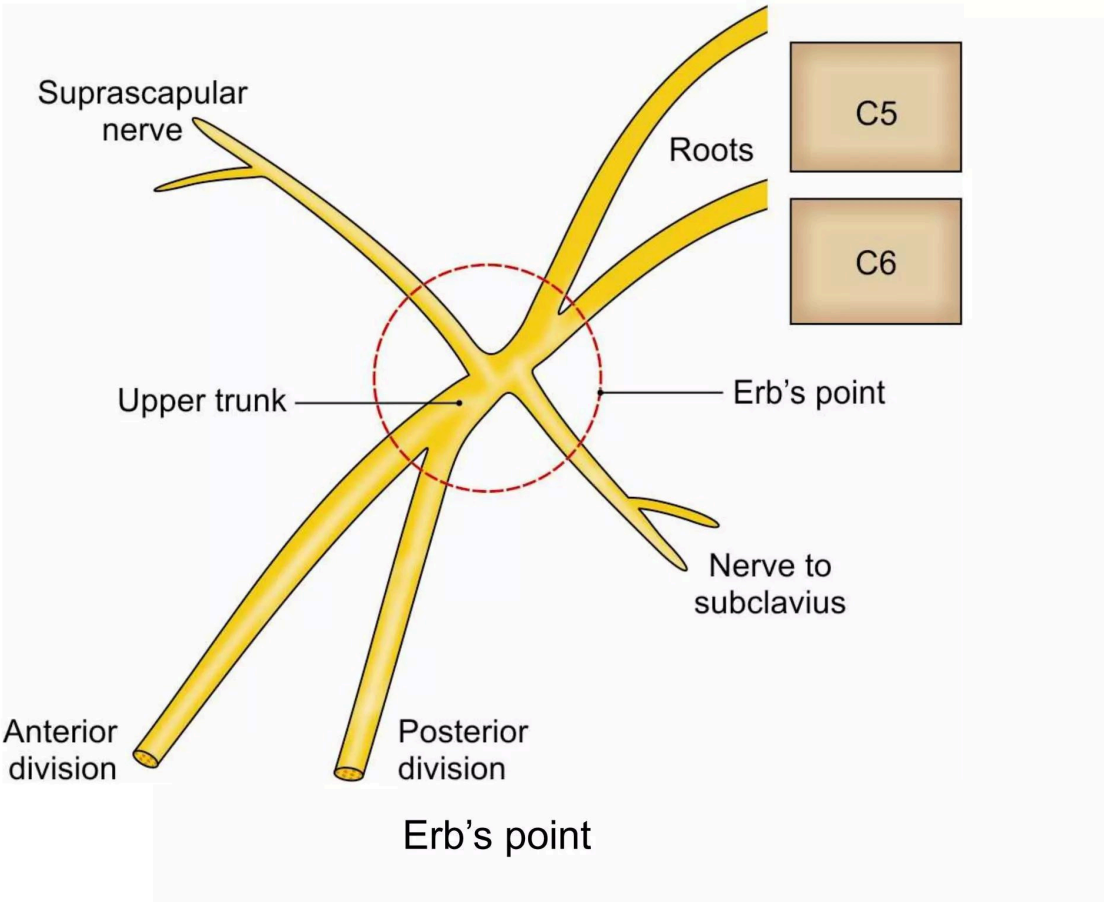


Lower Trunk Injury: Klumpke's Palsy

- Affects C8-T1 nerve roots
- Caused by arm forcibly pulled upwards
- Presents as 'claw hand' deformity
- Often associated with Horner's syndrome
- Treatment: complex surgical interventions
- Nerve and tendon transfers commonly used



9/14
Calibri, 18pt



Klumpke's palsy

- Lower trunk palsy
- Nerve roots involved - C 8, T1
- **Cause**
  - Cervical rib
  - Undue abduction of arm while holding something with hands during fall from height
- Muscle Involved
  - Paralysis of Intrinsic muscle of hand, ulnar flexors of wrist and fingers
- Symptom and Sign
  - Claw hand (medial two fingers more affected)
    - Due to unopposed action of long flexors fingers and extensors
    - Paralysis of all interossei and medial two lumbricals



1. Erb's palsy

Site of lesion

Upper trunk of brachial plexus

Main roots:

C5 + C6

The injury commonly occurs where the upper trunk is formed, classically due to excessive separation of the head and shoulder.

Nerves/muscles predominantly affected

Important nerves arising from C5–C6 contributions include:

- Suprascapular nerve
- Nerve to subclavius
- Axillary nerve
- Musculocutaneous nerve
- Part of radial nerve

Consequently, muscles involved include:

- Deltoid
- Supraspinatus
- Infraspinatus
- Biceps brachii
- Brachialis
- Brachioradialis
- Supinator

Characteristic posture

The affected upper limb assumes the classic:

“Waiter's tip” position

Due to paralysis of abductors, lateral rotators and flexors of the elbow:

- Arm **adducted**
- Arm **medially rotated**
- Elbow **extended**
- Forearm **pronated**
- Wrist may be flexed

Sensory loss

Predominantly over the **C5–C6 dermatomes**, especially the lateral aspect of the upper limb.

Reflex

Biceps reflex may be reduced or absent.

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2. Anatomical basis of Erb's palsy

The upper trunk contains fibres mainly from **C5 and C6**.

Traction on the neck/shoulder stretches these roots or the upper trunk.

↓

C5–C6 motor fibres are damaged

↓

Paralysis of muscles supplied predominantly by C5–C6

↓

Loss of shoulder abduction and lateral rotation + loss of elbow flexion

↓

“Waiter's tip” deformity

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3. Klumpke's palsy

Site of lesion

Lower trunk of brachial plexus

Main roots:

C8 + T1

It commonly results from excessive upward traction on the arm, stretching the lower trunk.

Nerves and muscles affected

The C8–T1 fibres contribute mainly to the nerves supplying the intrinsic muscles of the hand, particularly:

- Ulnar nerve
- Median nerve contributions to hand muscles

Therefore, the intrinsic muscles of the hand are predominantly affected.

Characteristic deformity

Paralysis of the interossei and lumbricals results in:

Claw hand

Typically:

- MCP joints → hyperextension
- IP joints → flexion

The deformity is particularly marked in the ring and little fingers when the ulnar-innervated intrinsic muscles are predominantly affected.

---

4. Sensory loss in Klumpke's palsy

Sensory loss occurs predominantly in:

- Medial side of forearm
- Medial side of hand
- Little finger and adjacent part of ring finger

This corresponds mainly to **C8–T1 distribution**, with the exact area depending on the extent of the lesion.

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5. Horner syndrome

A lower trunk lesion may be associated with **Horner syndrome** if the injury also involves the **T1 sympathetic pathway**.

Features include:

- Ptosis
- Miosis
- Anhidrosis of the affected side of the face

Anatomical basis

The sympathetic fibres destined for the head originate from the upper thoracic spinal cord and ascend through the cervical sympathetic pathway.

Damage involving **T1 sympathetic fibres** can therefore produce Horner syndrome.

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6. Erb's vs Klumpke's palsy

Feature	Erb's palsy	Klumpke's palsy
Site	Upper trunk	Lower trunk
Roots	**C5–C6**	**C8–T1**
Mechanism	Excessive separation of head and shoulder	Excessive upward traction on arm
Major muscles affected	Shoulder and elbow muscles	Intrinsic hand muscles
Characteristic deformity	**Waiter's tip**	**Claw hand**
Sensory loss	C5–C6/lateral upper limb	C8–T1/medial forearm & hand
Reflex	Biceps reflex ↓/absent	Often no characteristic major reflex change
Horner syndrome	Usually absent	May occur if T1 sympathetic fibres involved

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7. Clinical correlation

Erb's palsy

Classically associated with **traction injury during difficult childbirth**, particularly when the neck and shoulder are subjected to excessive traction. It can also occur after trauma to the neck/shoulder.

Klumpke's palsy

Classically associated with **traction on an abducted arm**, including obstetric injury. It may also follow trauma involving the lower brachial plexus.

High-yield viva

Erb's palsy:

C5–C6 → upper trunk → waiter's tip

Klumpke's palsy:

C8–T1 → lower trunk → claw hand ± Horner syndrome

Easy memory

Erb = Upper trunk = C5,6 = Waiter's tip

Klumpke = Lower trunk = C8,T1 = Claw hand

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