# Stingers: The Commonplace Brachial Plexus Injuries in Athletes

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# Led Zeppelin!!!


# “Black Dog”
# Led Zeppelin IV

* Hey, hey, mama said the way you move
* Gonna make you sweat, gonna make you groove

* Ah, ah, child, way you shake that thing
* Gonna make you BURN, gonna make you STING

# Stingers / Burners

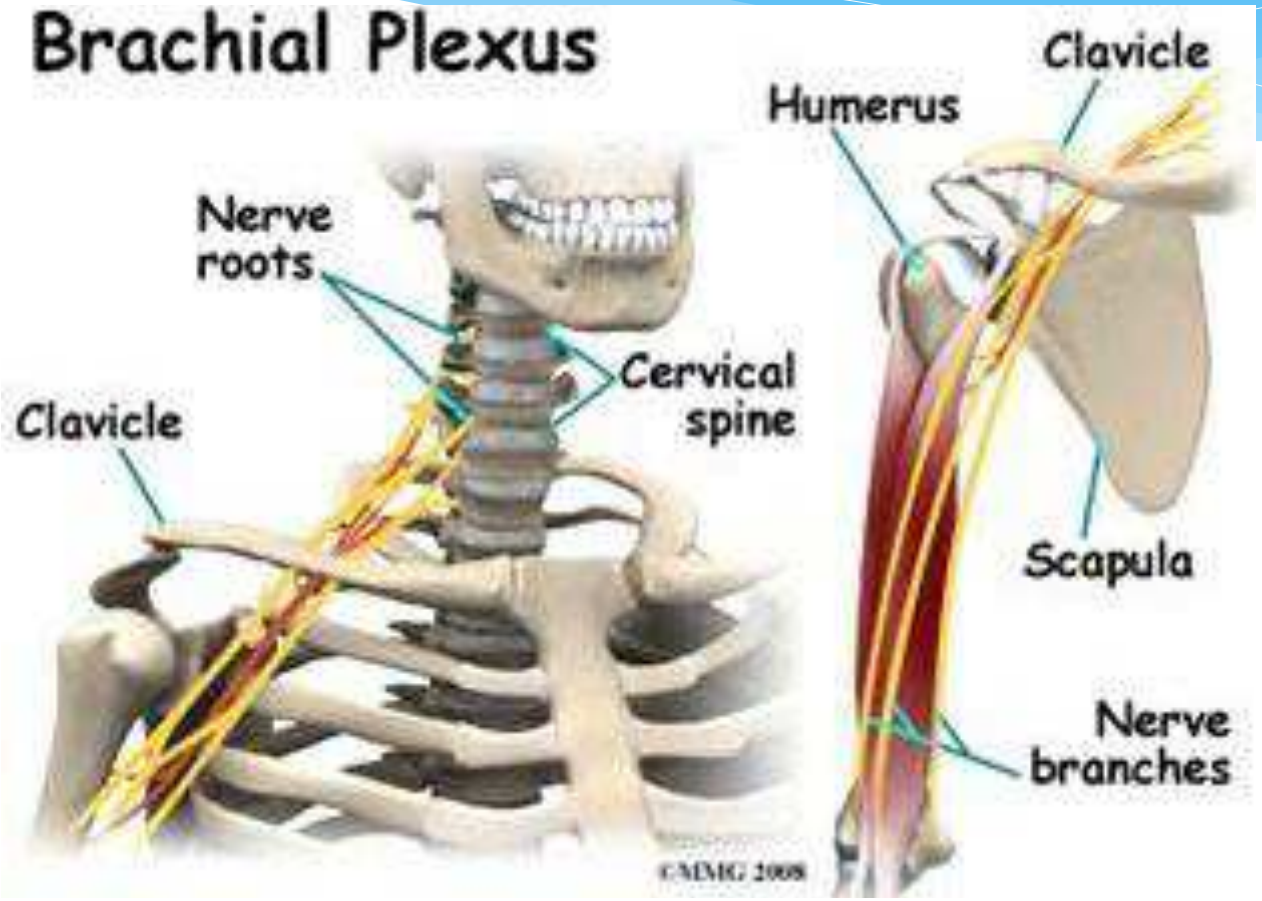
* Injury to the brachial plexus
* Usually caused by trauma
* Very common in contact sports

# Brachial Plexus

* Grouping of nervous system extending from Cervicothoracic cord (C5-T1) into the upper extremities

* Provides all motor, sensory, and autonomic input to the upper extremities

# Brachial Plexus

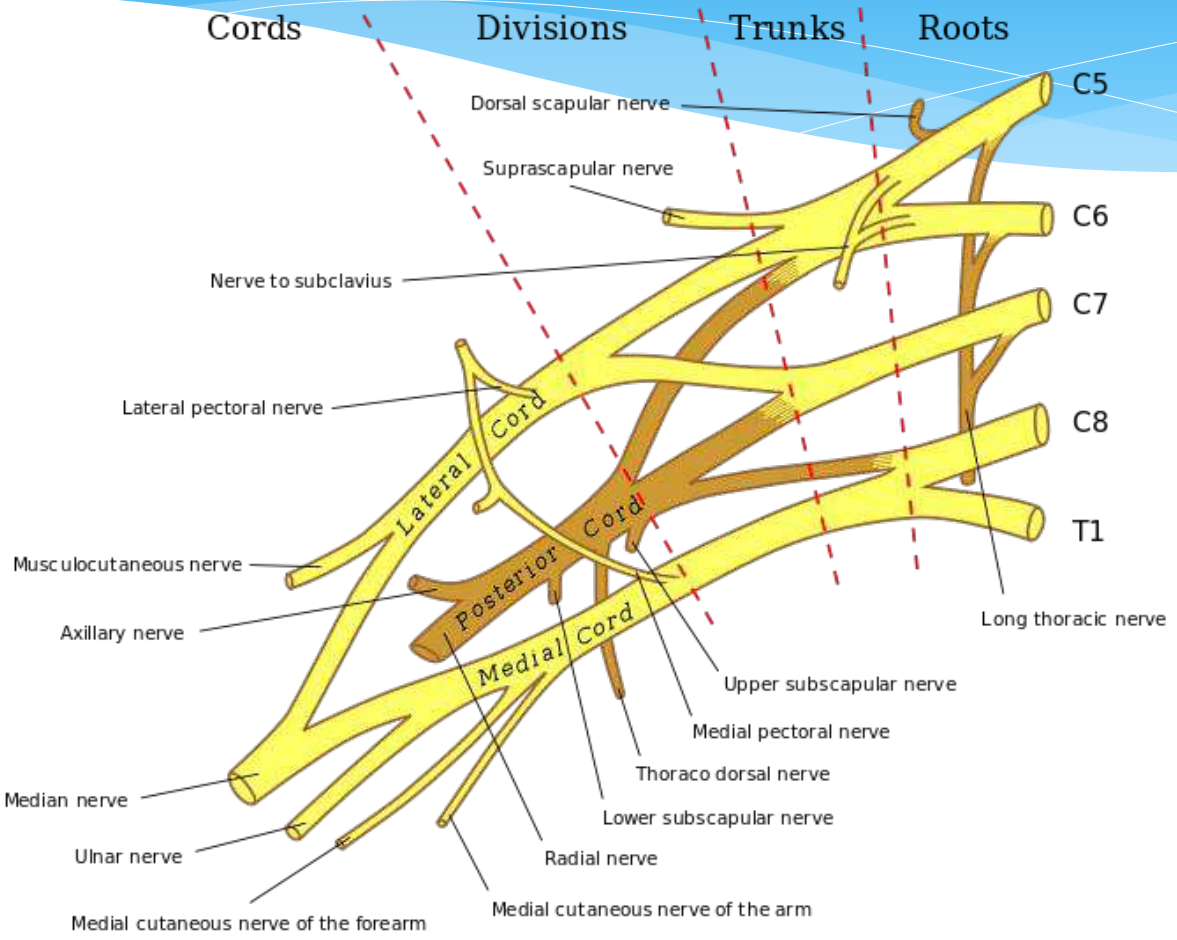


# Brachial Plexus

* Divided into Roots, Trunks, Divisions, Cords, and Nerves

* Roots from different spine levels intermix and re-group until ultimately forming the major nerves of the upper extremity

# Brachial Plexus



# Brachial Plexus Innervation

| Level | Nerve | Origin | Motor | Sense |
|---|---|---|---|---|
| Root | Long thoracic nerve | C5, C6, C7 | Serratus anterior muscle | |
| | Dorsal scapular nerve | C4, C5 | Levator scapulae and rhomboid muscles | |
| | Branch to phrenic nerve | C5 | Diaphragm | |
| Trunk | Suprascapular nerve | C5, C6 | Supraspinatus and infraspinatus muscles | |
| | Nerve to the subclavius | C5, C6 | Subclavius muscle | |
| Cord | Lateral pectoral nerve | C5, C6, C7 | Pectoralis major and pectoralis minor muscles | |
| | Medial pectoral nerve | C8, T1 | Pectoralis major and pectoralis minor muscles | |
| | Thoracodorsal nerve | C6, C7, C8 | Latissmus dorsi muscle | |
| | Subscapular nerves | C5, C6 | Subscapularis and teres major muscles | |
| Branch | Axillary nerve | C5, C6 | Deltoid and teres minor muscles | Deltoid region and superior posterior arm |
| | Musculocutaneous nerve | C5, C6, C7 | Anterior compartment of the arm (flexion of the elbow) | Lateral forearm |
| | Radial nerve | C5, C6, C7, C8, T1 | Posterior compartment of the arm and forearm (extension of the elbow, wrist and digits) | Posterior arm and forearm<br>Lateral two-thirds of dorsum of hand and fingers |
| | Median nerve | C5, C6, C7, C8, T1 | Anterior compartment of the forearm (flexion of the of the wrist and digits) with two exceptions (flexor carpi ulnaris and ulnar half of flexor digitorum profundus) | Lateral two-thirds of palm of hand and fingers |
| | Ulnar nerve | C8, T1 | Most of the intrinsic muscles of the hand<br>Flexor carpi ulnaris and ulnar half of flexor digitorum profundus | Medial surface of dorsum and palm of hand |

# Brachial Plexus Injuries/Disorders

* Traumatic
* Compression
* Iatrogenic
* Radiation
* Neoplasm
* Paraneoplastic
* Infection
* Autoimmune reaction
* Congenital malformation
* Genetic conditions

# Traumatic Injuries

* Mechanical injury to myelin sheath or axon

* Traction
* Compression
* Transection

# Traumatic Injuries

* **Stingers/burners**
* **Midshaft clavicle fractures**
  - transection or compression of cords/divisions
* **Shoulder dislocation**
  - most often compression of axillary nerve
* **Obstetrical**
  - Shoulder dystocia—traction/compression
* **Penetrating injuries**
  - knife/bullet wounds, etc.

# Other Injuries/Disorders

* **Compression/entrapment**
  - Thoracic outlet syndrome
  - Rucksack syndrome—upper plexus (backpacks)
* **Iatrogenic**
  - postoperative (mechanical injury vs. positioning)
* **Radiation**
* **Neoplastic**
  - primary or metastatic lesions

# Sport-related Stingers

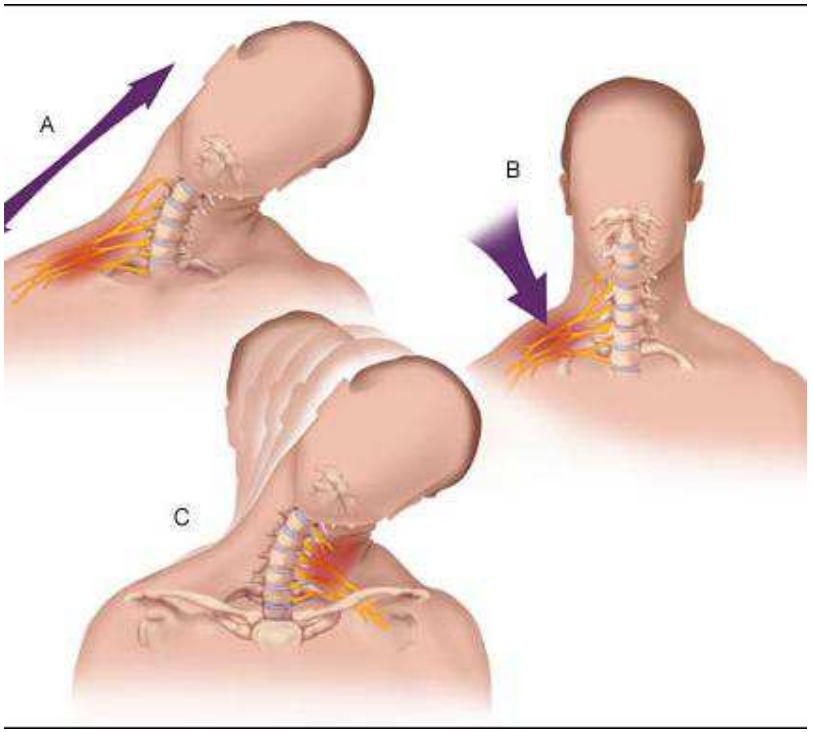
* Very common in contact sports
* Vastly underreported
* Annual incidence 49-65% in football players
* 7.2% of all football injuries

# Sport-related Stingers

* **Unilateral** weakness, pain, burning in upper extremity
* Typically resolve within a few minutes

# Sport-related Stingers

* Traction, compression, or direct trauma
* Usually affects upper trunk (C5 and C6 roots)



# Evaluation

* Remove from activity
* Sideline neuromuscular exam
* Red flags:
  - Bilateral symptoms (cervical involvement?)
  - Focal tenderness (structural injury?)
* Re-examine to confirm resolution
* Return to play once full range of motion and strength are restored

# When to be Concerned

* Persistent symptoms
* Suspicion of cervical or CNS involvement
* Recurrent injuries

# Prevention

* Tacking techniques
* Neck strengthening
* Protective equipment
* Full recovery prior to returning after injury