

Stingers and Burners

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48th Annual
Symposium on Sports Medicine
January 22-24, 2021

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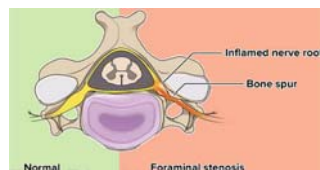
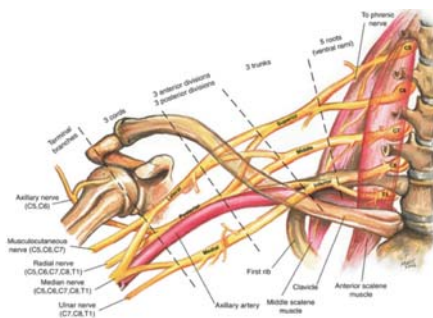
Introduction to stingers/burners

- **Symptoms:** Upper extremity numbness, burning pain, weakness
- **Etiology:** Traumatic upper trunk brachial plexopathy from injury to cervical nerve root or the brachial plexus typically occurs during tackling
- **Clinical Course:** Pain often resolves in seconds-minutes, motor strength normal within 24h
- **Incidence:** American collegiate football players is 49-65% during an individual career with recurrence rate up to 87%



Anatomy

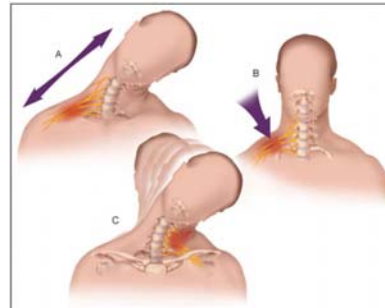
- The brachial plexus arises from the C5-T1 nerve roots, providing motor and sensory function to the arm
- C4-5 neuroforamina is often smaller than surrounding foramina, therefore C5 root most affected
 - Deltoid (axillary nerve)
 - Shoulder abduction
 - Biceps (musculocutaneous nerve)
 - Elbow flexion



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Mechanisms of Injury

- Traction to the brachial plexus from ipsilateral shoulder depression and contralateral lateral neck flexion
- Direct blow
- Compression of the cervical roots or brachial plexus from ipsilateral lateral flexion and hyperextension



Evaluation & Presentation

- Stingers
 - pain, weakness, or paresthesias in one upper extremity
 - Assess sensory & motor function, vascular status and **duration** of symptoms
 - Usually no neck pain and transient
- Cervical Spine Injury
 - **bilateral** UE, any LE involvement, or if player has **neck pain**
 - + Spurling test (radiating pain with downward compression of head with neck turned to side and extended)
 - If c-spine injury *other than* stinger is suspected, immobilize with rigid collar (keep helmet on)



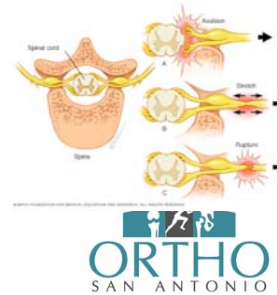
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Nerve Injury Classification

Classification of Stinger Injury Defined by Nerve Injury, Physical Examination, Electromyographic Findings, and Prognosis for Recovery²²

Grade	Nerve Injury	Physical Examination Findings	Electromyographic Findings	Prognosis
1	Neurapraxia	Transient incomplete motor/sensory deficits	Normal	Most resolve within minutes
2	Axonotmesis	Persistent incomplete motor/sensory deficits	Positive waves with fibrillation	Most resolve within several wk. Recovery can take up to 12-18 mo
3 (A)	Neurotmesis	Permanent complete motor/sensory deficits	Acute denervation	Complete loss of function, recovery unlikely
3 (B)	Nerve root avulsion	Permanent complete motor/sensory deficits	Acute denervation	Complete loss of function, irrecoverable

- Classification based on degree of nerve injury
 - Neurapraxia: nerve stretch without axonal disruption
 - Axonotmesis: injury to axon and myelin sheath
 - More significant motor deficits +/- sensory loss
 - Neurotmesis: complete transection of nerve
 - Permanent motor or sensory deficits



Return to Play

- Currently, no standardized criteria accepted
- General consensus - athletes with **complete** resolution of symptoms (full motor strength, normal sensation, painless cervical ROM) may return to immediate play
 - No imaging necessary
- If symptoms persist, hold from play and re-evaluate at the end of game
 - If any neck pain – refer for imaging and neuro evaluation
 - Isolated extremity symptoms – monitor for 24 hours and if still symptomatic - full neuro work up and imaging are indicated
- Imaging/Studies
 - C-spine XR, MRI, and possible CT if concern for fracture
 - Consider electromyography (EMG) studies within 2-4 weeks of injury
 - Identifies type of nerve injury and level of injury



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Evaluation

- If symptoms persist re-evaluate at the end of game
 - If any neck pain – refer for imaging and neuro evaluation
 - Isolated single extremity mild symptoms – monitor for 24 hours and if still symptomatic - full neuro work up and imaging
- Imaging/Studies
 - C-spine XR, MRI, and possible CT if concern for fracture
 - Consider electromyography (EMG) studies within 2-4 weeks of injury
 - Identifies type of nerve injury and level of injury



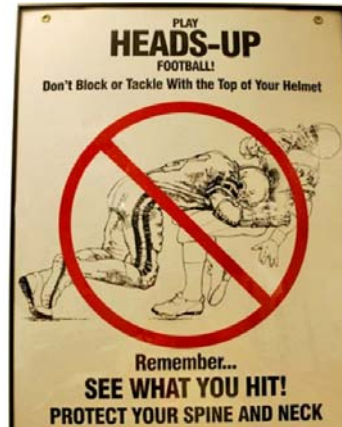
Treatment

- Most treatment is non-surgical
 - Rest, pain control, physical therapy
- Severe injuries may require operative intervention, i.e. nerve exploration, repair, or nerve transfers
- Use EMG to determine pre- vs post-ganglionic injuries
 - Pre: damage to root proximal to dorsal root ganglion, low chance of regeneration
 - Benefit from **early** operative intervention (nerve transfer)
 - Restore elbow flexion, shoulder ER and abduction
 - Post: damage is distal to dorsal root ganglion, more potential for regeneration
 - May follow with serial exams



Prevention

- Spear tackling was primary cause of c-spine injury before banned
- Modern tackling techniques emphasize impact to the front of the shoulder vs directly on top of head
 - Should limit risk of lateral flexion of neck and downward traction of arm
 - Avoid dropping the shoulder



References

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