

# CERVICAL SPINE INJURIES

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- ▣ You are called to evaluate a 14 years old boy who was a passenger of a slow speed MVA. Cervical spine collar was applied by EMS at the scene. EMS reports no LOC and that the patient was able to walk before he sat down and asked for some water. The family reports that they were leaving a friend's birthday party. As they were pulling out of their parking spot on a busy one way street they heard a breaking sound and their car was hit on the right by the other car.

- ▣ No deployment of air-bags was reported. The patient is awake and alert and answers questions appropriately. His vital signs are WNL, pupils are reactive to light, and no neurological deficits were elicited on exam. His cervical spine is non-tender with no muscle spasms. His breath does not smell of alcohol and he denies any form of illicit drug use. He has a 5 cm long laceration on his right shoulder which is “painful and burning”. The patient is repeatedly asking if he can have the collar removed.

What is the next best step in management?

- a. Obtain CT C-spine to evaluate for a suspected cervical spine injury
- b. Obtain an MRI to evaluate for a suspected cervical spine injury
- c. Obtain a spine series (cross table lateral, AP, and open-mouth odontoid)
- d. Clear cervical spine collar and evaluate laceration
- e. Observe patient with hourly neurological exams before clearing cervical spine collar

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- ▣ The 4 year old brother of the patient above who was unrestrained in the back seat of the car is crying and is not consolable. His vital signs are WNL, but his physical exam is remarkable for R sided paralysis, decrease of R side sensation and decrease left sided pain and temperature sensation. His R Achilles, patellar, and triceps reflexes are missing but his brachioradialis and biceps reflexes are intact bilaterally.

What type of cord injury is likely to explain the findings on this physical exam?

- A. R hemisection of the cord at c6 level
- B. R hemisection of the cord at c7 level
- C. Anterior cord syndrome
- D. Central cord syndrome
- E. Complete cord syndrome

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# Cervical Spine Injuries Considerations in Pediatrics

- ▣ Anatomical differences
- ▣ Large heads – 50 % of adult size by 2 years of age while chest is 50% of adult size by 8 years of age
- ▣ Fulcrum at c2-3 at birth, moves lower to c5-6 by 8 years of age
- ▣ Weaker musculature
- ▣ Immature vertebral joints

# History:

Predisposing conditions:

- ▣ Down Syndrome – Atlantoaxial instability
- ▣ Hx of spine surgeries
- ▣ Cervical spine arthritis
- ▣ Other syndromes (Morquio, Larsen, Kippel-Feil)

# High Risk Injury Mechanisms

- ▣ Hyper flexion, hyper extension, axial loading, rotational trauma, chin trauma (Jaffe)

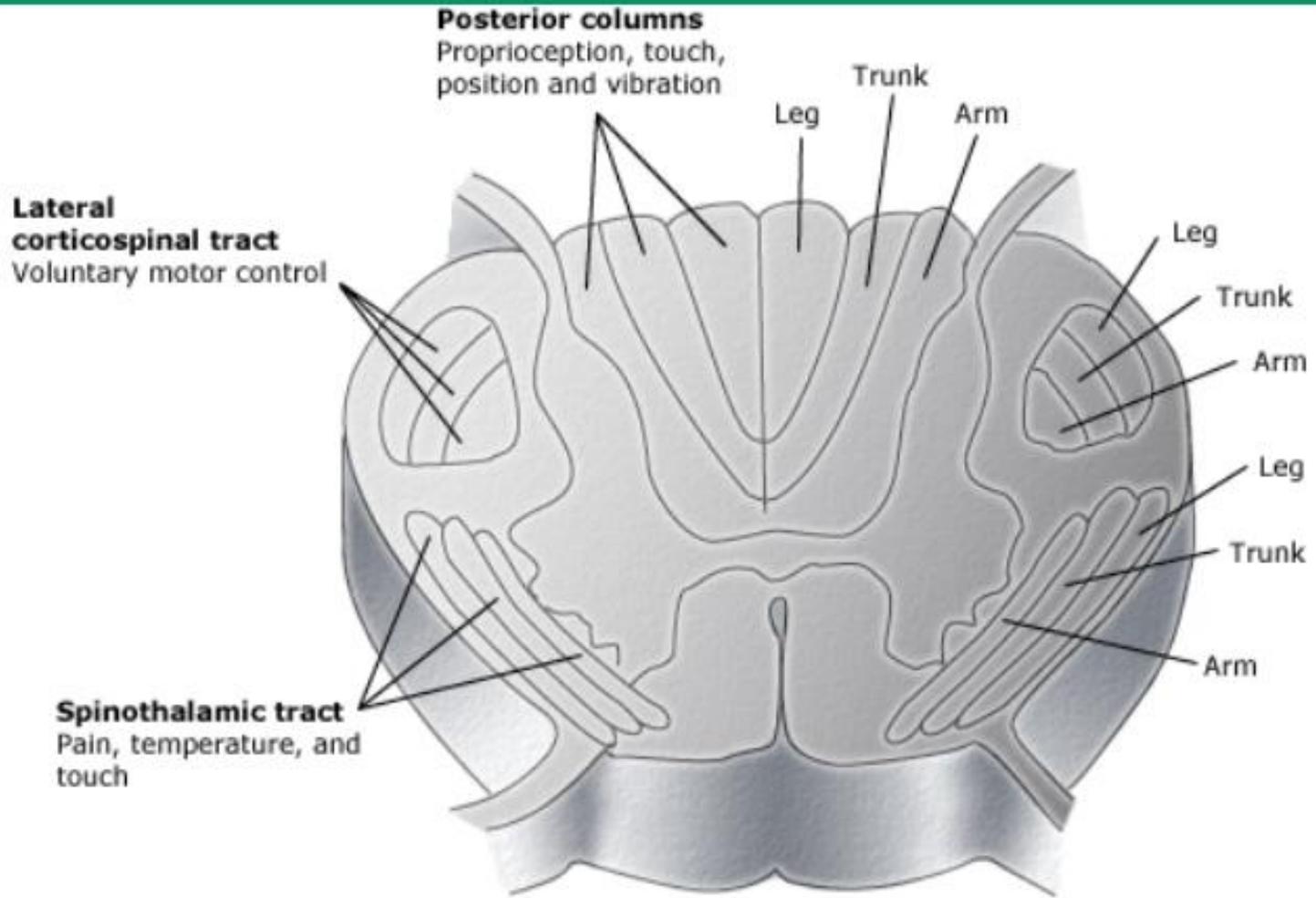
# Symptoms

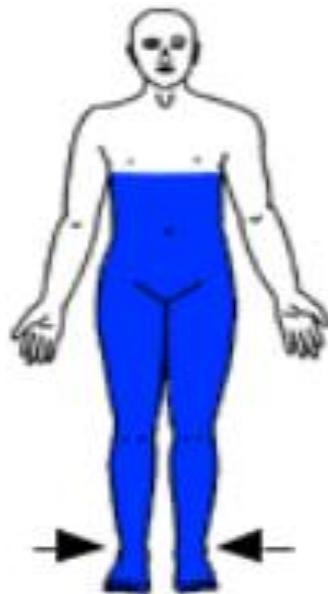
- ▣ Classic triad: Local pain, muscle spasms, decreases ROM
- ▣ Asymptomatic injury – study finds that in all asymptomatic cervical spines injuries high-risk mechanism and distracting injury were presents (Baker 1999)
- ▣ Watch for transient symptoms

# PE:

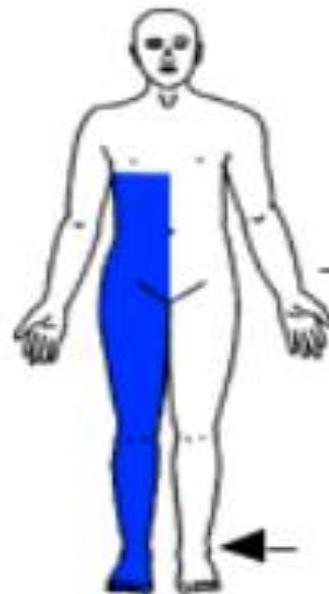
- ▣ Vital signs
- ▣ Neurological exam – Lower vs. Upper neuronal muscle injuries (muscle flaccidity), DTR, Muscle strength, sensory deficits, rectal tone
- ▣ Neurological syndromes
- ▣ Complete cord, central cord, Anterior cord, Brown-sequard.

# Cervical spinal cord

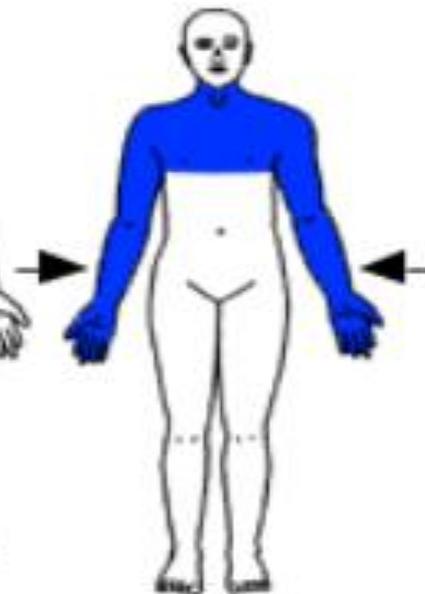




Complete spinal  
cord injury and  
anterior cord  
syndrome



Brown-Séquard  
syndrome



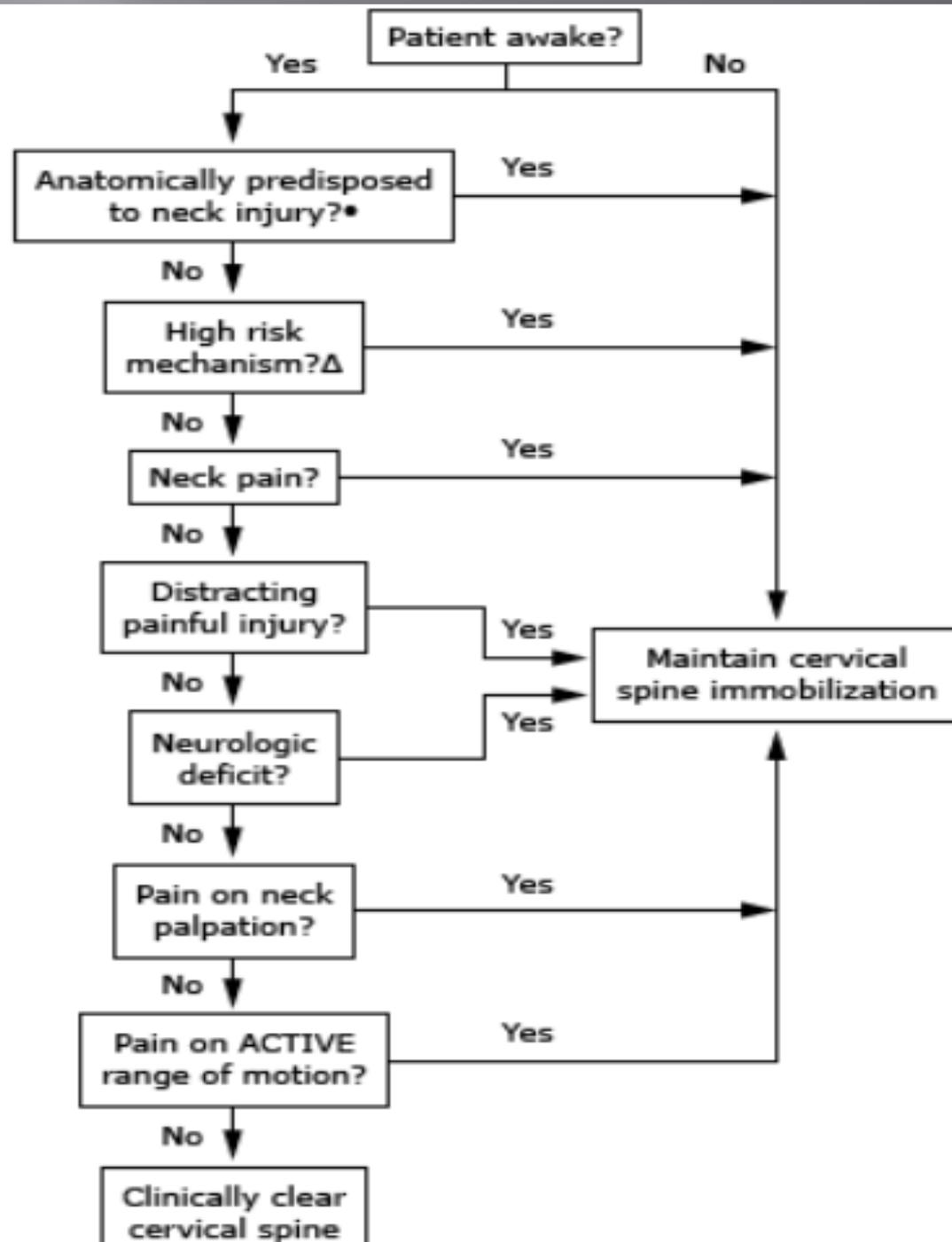
Central cord  
syndrome  
(syringomyelia)

Level of Lesion	Loss of Function		
	Motor*	Sensory level	Reflex*
<b>Cervical</b>			
C2		Occiput	
C3		Thyroid cartilage	
C4	Spontaneous breathing	Suprasternal notch	
		Posterior neck	
C5	Shrugging and external rotation of shoulders	Below clavicle	Biceps
		Middle deltoid	
C6	Elbow flexion Wrist extension	Thumb	Brachioradialis
C7	Elbow extension	Index and middle fingers	Triceps
	Wrist flexion		
C8	Finger flexion	Small finger and ulnar side of hand	

# To Radiograph or not Radiograph?

- ▣ Nexus criteria: No midline cervical tenderness, no focal neurological deficits, normal alertness, no intoxication, no painful distracting injury. If all criteria are met, very low probability of cervical spine injuries 99% sensitivity (Hoffman, 2000)

<b>Radiologic study</b>	<b>History and physical</b>
None	Low risk mechanism of injury, <b>and</b> No distracting pain or injuries, <b>and</b> Awake and able to verbalize and cooperate with exam, <b>and</b> No mental status changes, <b>and</b> No neck pain or limitation of movement,* <b>and</b> No neurologic deficits



# Sources

- Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI; Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. National Emergency X-Radiography Utilization Study Group. N Engl J Med. 2000;343(2):94
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- Jaffe DM, Binns H, Radkowski MA, Barthel MJ, Engelhard HH 3<sup>rd</sup>; Developing a clinical algorithm for early management of cervical spine injury in child trauma victims. Ann Emerg Med. 1987;16(3):270.
- Baker C, Kadish H, Schunk JE; Evaluation of pediatric cervical spine injuries. Am J Emerg Med. 1999;17(3):230.
- Alison Chantal Caviness, MD, MPH, PhD, Evaluation of cervical spine injuries in children and adolescents. February 2012 Uptodate.com

THANK YOU