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Transient Quadriplegia in a Collegiate Football Player

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Primary Care Sports Medicine Fellowship

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Disclosures

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- Neither I nor any family members have financial disclosures

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- Special thanks to my fellowship director Scott Rand, MD

History of Present Illness

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22 year old football player was tackled during a game and lost consciousness. He was motionless on the field and quickly assessed by medical staff. He was carefully moved into the supine position while stabilizing the cervical spine. After regaining consciousness, he reported markedly decreased sensation in the upper and lower extremities. He was unable to move the lower extremities and had 2/5 grip strength in the upper extremities.

History of Present Illness

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He was then transported via ambulance to the emergency department for emergent imaging and evaluation. Upon arrival, he had regained some sensation and strength.

Neurologic Exam

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- Blood pressure 153/82, pulse 69, temperature 97.8 ° F, resp. rate 18, height 5' 10", SpO2 97 %
- Alert and oriented
- Pupils brisk OU
- No droop

Neurologic Exam

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Upper Extremity Motor Exam

	Right	Left
Deltoid (C5, 6)	5	5
Biceps (C5,6)	5	5
Triceps (C7,8)	5	5
Wrist extensor (C6)	5	5
Finger flexor (C8)	3	3
Finger Abduction (C8,T1)	3	3

Neurologic Exam

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Lower Extremity Motor Exam

	Right	Left
Illiopsoas (L2,3)	4	4+
Quadriceps (L3,4)	4+	5
Dorsiflexion (L4,5)	4+	5
EHL (L5,S1)	5	5
Gastrocnemius (S1,2)	5	5

Neurologic Exam

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- T9 sensory level (decreased pinprick sensation)
- Reflexes diminished throughout
- Tenderness to palpation in upper thoracic and lower lumbar/sacral spine
- Rectal tone intact with voluntary contraction

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Questions?

Differential Diagnoses

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1) Concussion
2) Vertebral fracture
3) Irreversible spinal cord injury
4) Spinal cord contusion
5) Transient quadriplegia/quadriparesis

Emergent Imaging

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- CT head: No intracranial hemorrhage, extra-axial collection, or mass-effect is seen. No acute cortical infarct is identified. No hyperdense vessel is seen. No fracture is seen. No air-fluid level is seen in the visualized portions of the paranasal sinuses. Mastoid air cells are clear.
- CT cervical spine: The visualized portions of the posterior fossa unremarkable. The soft tissues of the neck demonstrate no abnormality. The lung apices are clear. There is no acute fracture or subluxation. The bony alignment is maintained. There are no osseous lesions present.

MRI Cervical Spine

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Mild degenerative changes superimposed on mild congenital spinal canal narrowing, most pronounced at C3-C4 where there is mild spinal canal stenosis and moderate bilateral neural foraminal narrowing

MRI Cervical Spine

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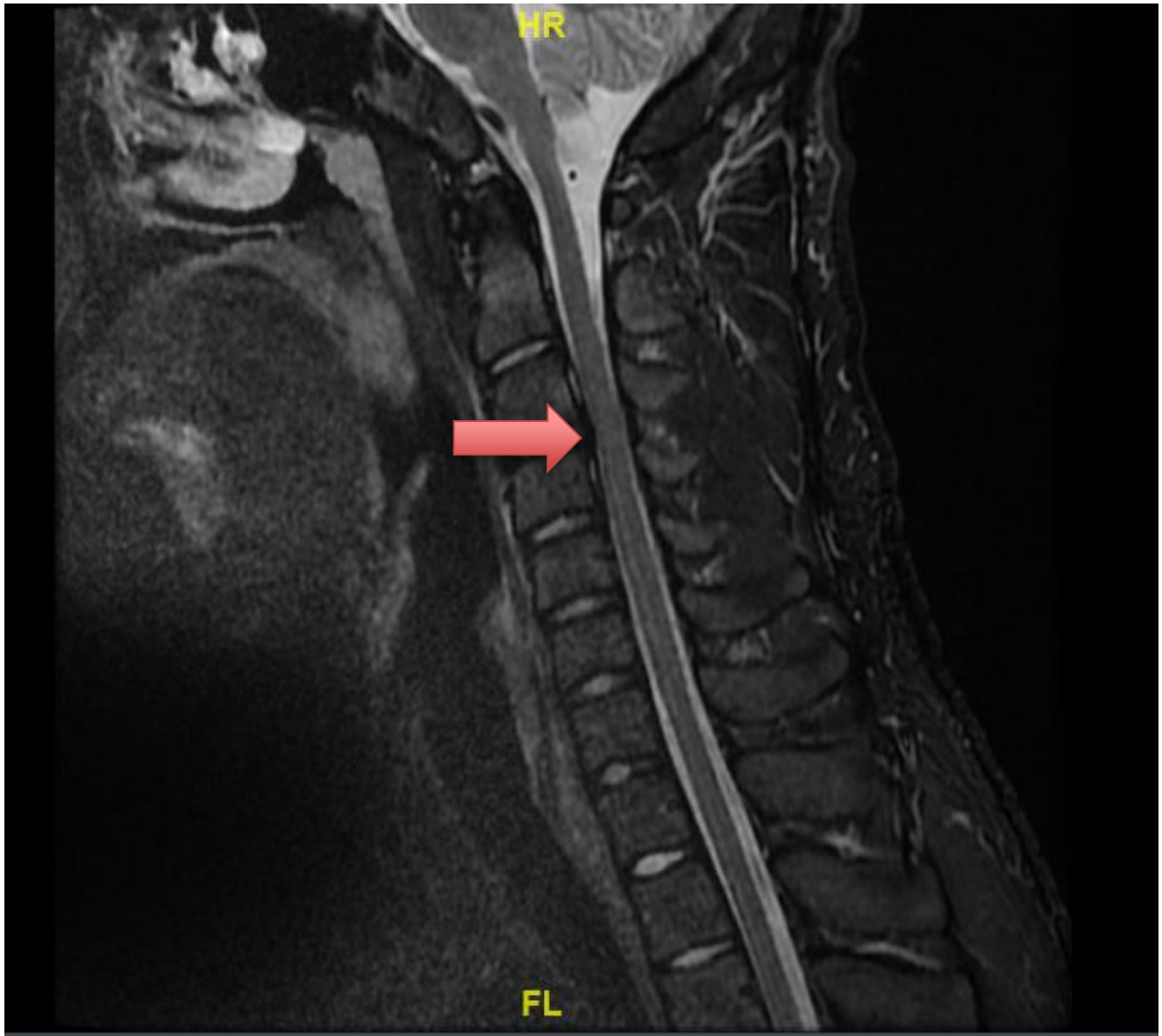

MRI Thoracic Spine

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Minimal degenerative changes of the thoracic spine at T4-T5 and T5-T6 without significant spinal canal stenosis or underlying cord signal abnormality. Mild suspected congenital spinal canal narrowing.

MRI Lumbar Spine

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Multilevel degenerative changes of the lumbar spine superimposed on mild to moderate congenital spinal canal stenosis, most pronounced at L3-L4 where central posterior disc protrusion results in severe spinal canal stenosis and L4-L5 where posterior disc bulge results in moderate spinal canal narrowing.

MRI Lumbar Spine

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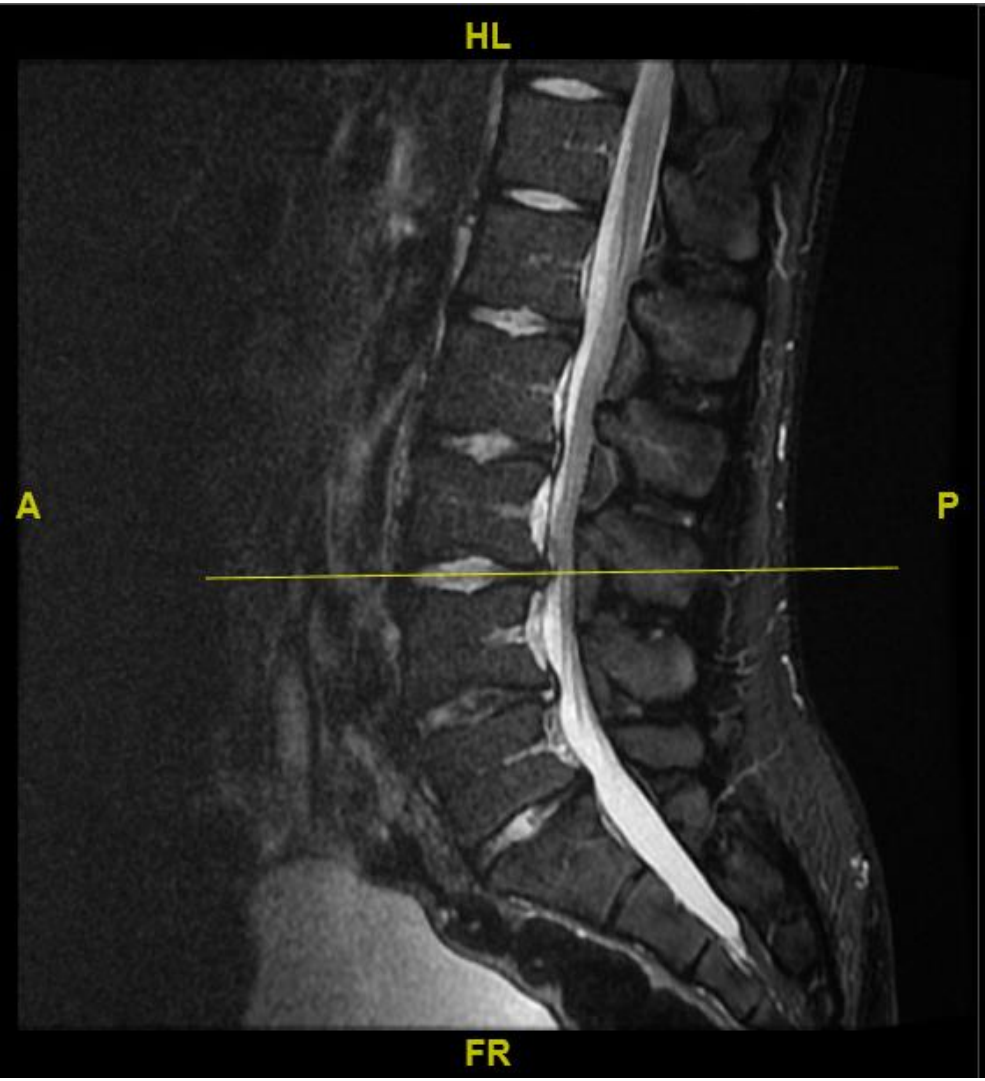

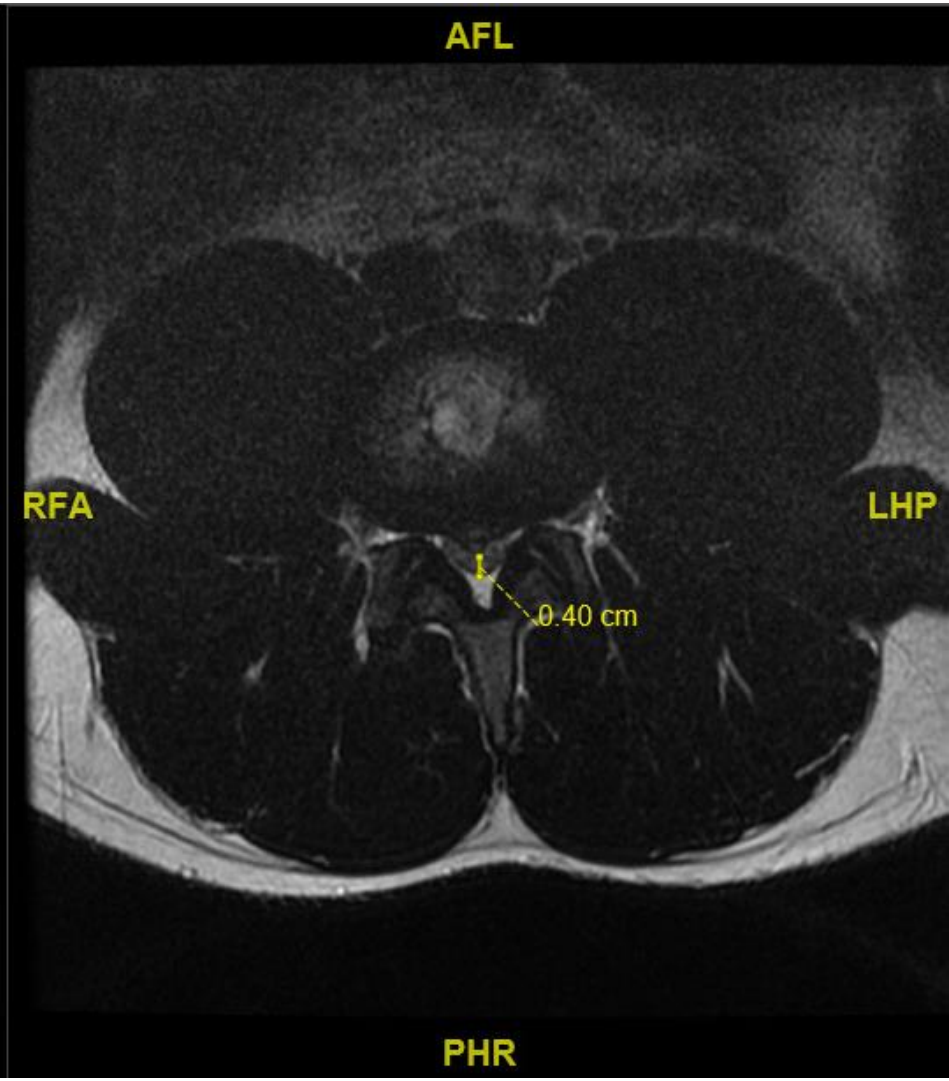

Clinical Course

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- He regained full motor function and strength within a matter of hours and was cleared for discharge home by physical therapy and neurosurgery.
- Recommendation for “extreme caution with contact sports”

Final Diagnoses

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- Concussion
- Transient Quadriplegia/paresis in setting of moderate to severe congenital stenosis and multilevel disc disease

Transient Quadriplegia

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- Also referred to as cervical cord neuropraxia
- Overall very rare, incidence of 2 per 100,000 collegiate football players [4]
- Most common mechanism is axial compression [1, 5]

Transient Quadriplegia

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- Bilateral burning/stinging of 2 or 4 extremities with variable degree of weakness [2, 5]
- Most symptoms last 10-15 minutes but may persist up to 48 hours [2, 5]
- Risk factors include fracture, congenital/functional stenosis, fusion, instability, spondylosis [4]

Transient Quadriplegia

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- There are no RCTs that establish RTP to contact sports following an episode of TQ
- Most data is expert opinion based on observational studies regarding high risk features, mostly seen on imaging

Stenosis

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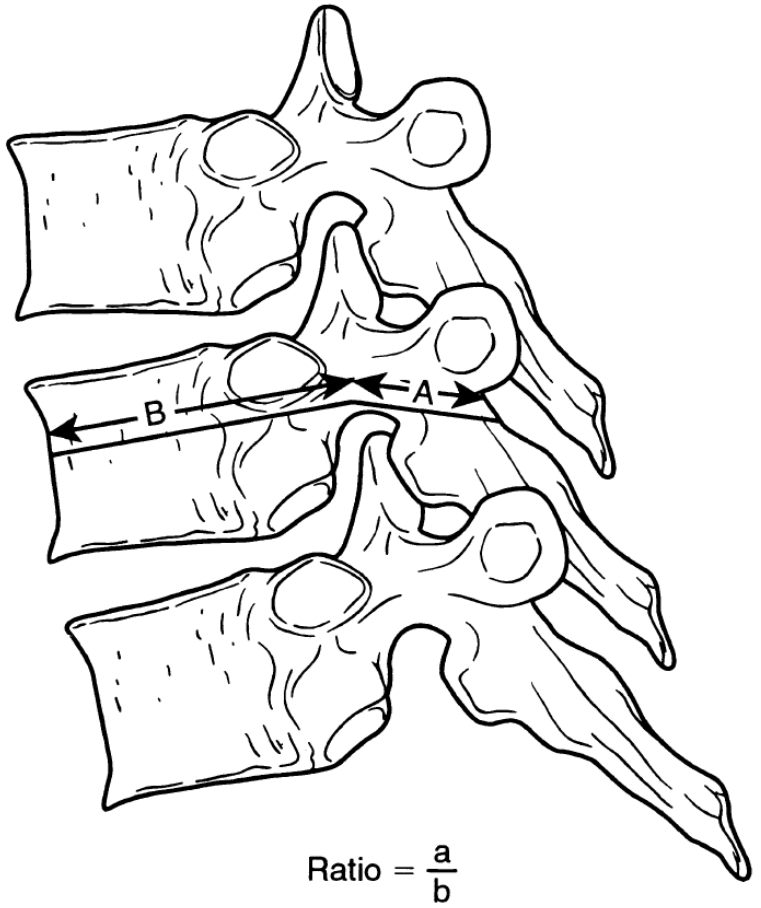
- Torg and Pavlov demonstrated that a Torg ratio < 0.8 associated with higher risk of significant neurological injury, in particular TQ [2, 3, 4, 5]
- Overall, an AP canal diameter of <13mm is considered stenotic [2, 3, 4]



Back to our patient...

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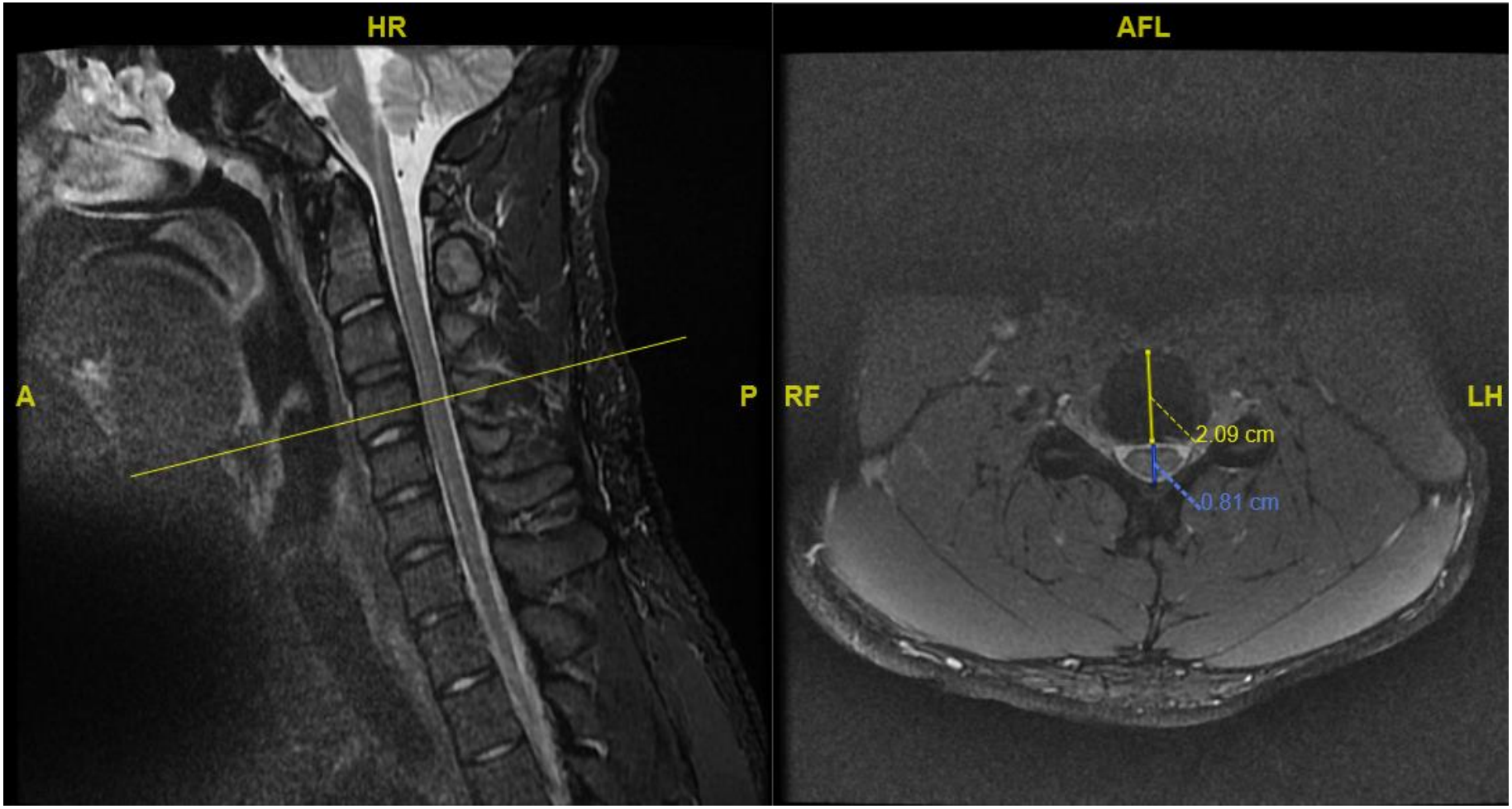

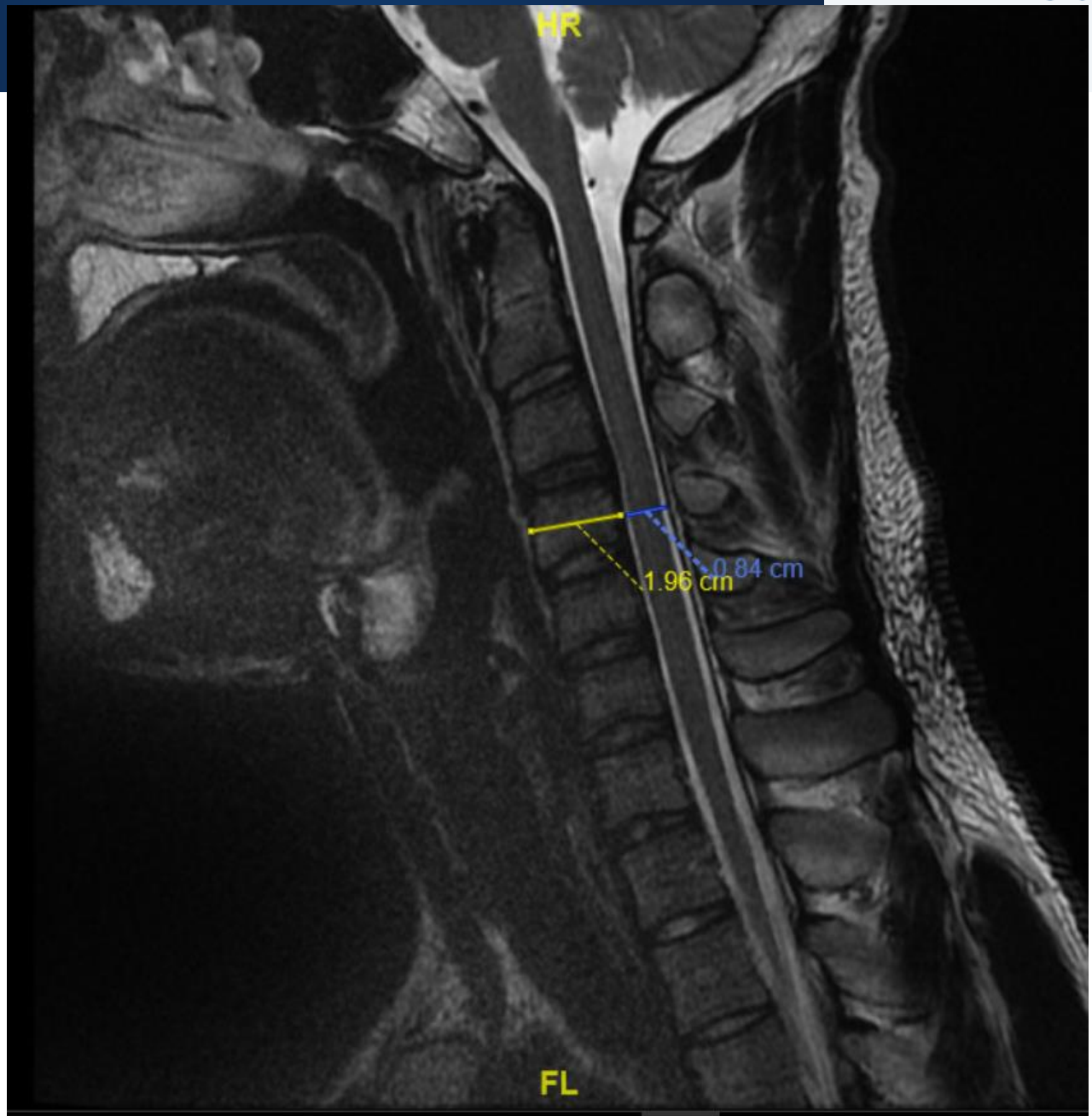
HR
1.96 cm
0.84 cm
FL

Absolute Contraindications [1, 2, 3, 4, 5]

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- Recurrent episodes of TQ
- Persistent C spine pain, loss of ROM or symptoms (>36 hours)
- Certain surgeries (fusions, laminectomies)
- Ligamentous laxity
- Bony abnormalities resulting in cord compression
- Spinal canal diameter <13mm
- Symptomatic cervical disc herniation

Relative Contraindications [1, 2, 3, 4, 5]

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- Symptoms lasting > 24 hours
- 3 or more stingers or 2 episodes of TQ without residual deficits
- Healed 1-2 level fusion
- Documented neuropraxia with disc disease or degenerative changes
- Torg ratio <0.8 and 1 episode of neuropraxia

No Contraindication [1, 2, 3, 4, 5]

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- Torg ratio < 0.8 without symptoms
- Healed fractures without deformity
- Spina bifida occulta
- Single level cervical fusion
- Fewer than 3 episodes of burner/stinger with resolution in <24 hours
- Single episode of TQ without residual deficits or abnormalities on imaging
- Asymptomatic without stenosis
- Degenerative disc disease with only occasional neck stiffness

Clinical Follow Up and Outcome

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- He was evaluated by spine surgeon in clinic for follow up. Given his episode of transient quadriplegia/paresis in the setting of congenital stenosis and disc disease, he cannot return to collision sports unless he undergoes spinal decompression surgery.

- The patient elected not to proceed with surgery and will discontinue playing collegiate football. His concussion symptoms resolved in less than 1 week.

Sources

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