Vertebral Ring Apophysis Avulsion Causing Severe Lumbar Spinal Canal Stenosis in an Adolescent Athlete

Stephanie Makowski, MS3

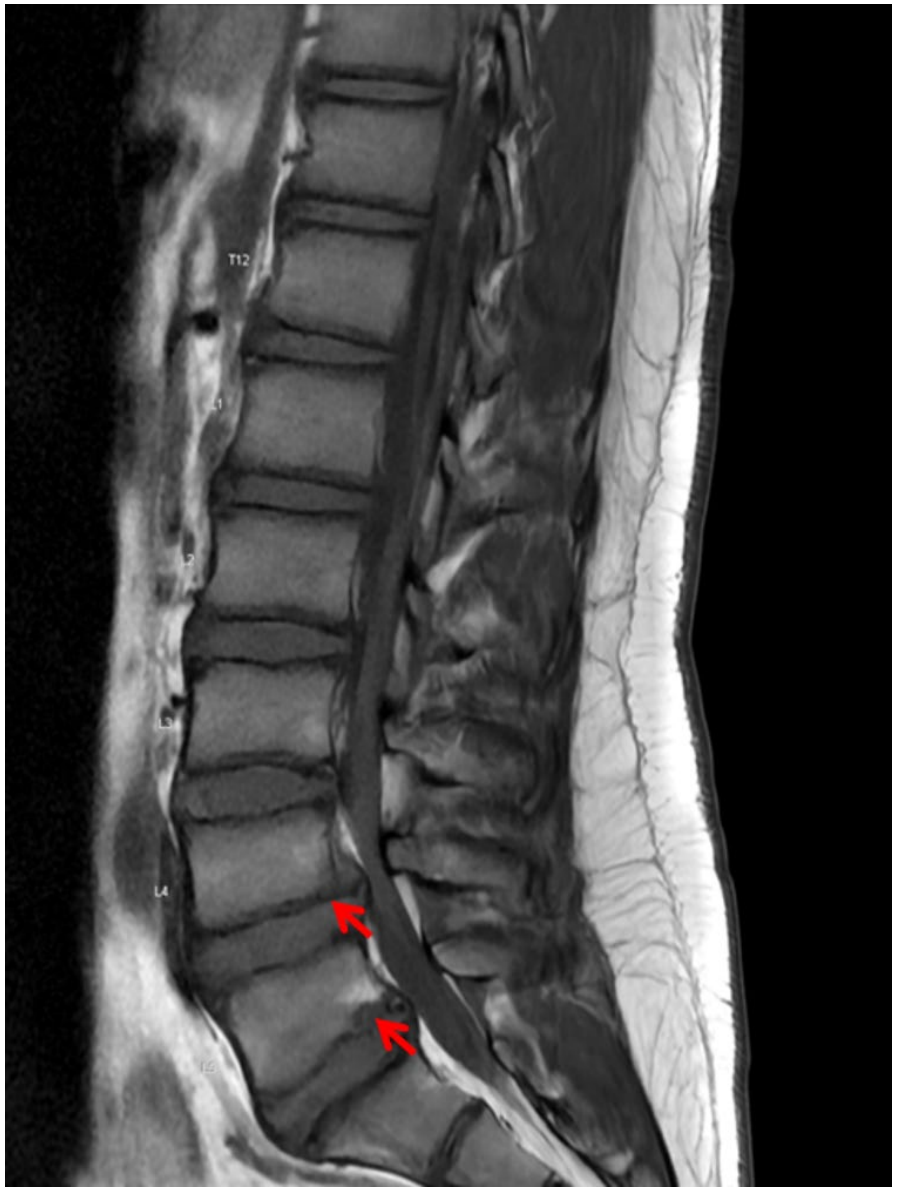
Kevin Hiatt, MD

Clinical Presentation

- 14-year-old male with no significant past medical history presented for evaluation of back pain lasting 3-4 weeks.
- Pain began during football practice when the patient felt a pop while doing box jumps.
- Pain then spread across the patient’s lower back and radiated down the lateral aspect of the left leg.
- Initially, the patient had transient decreased perineal sensation.

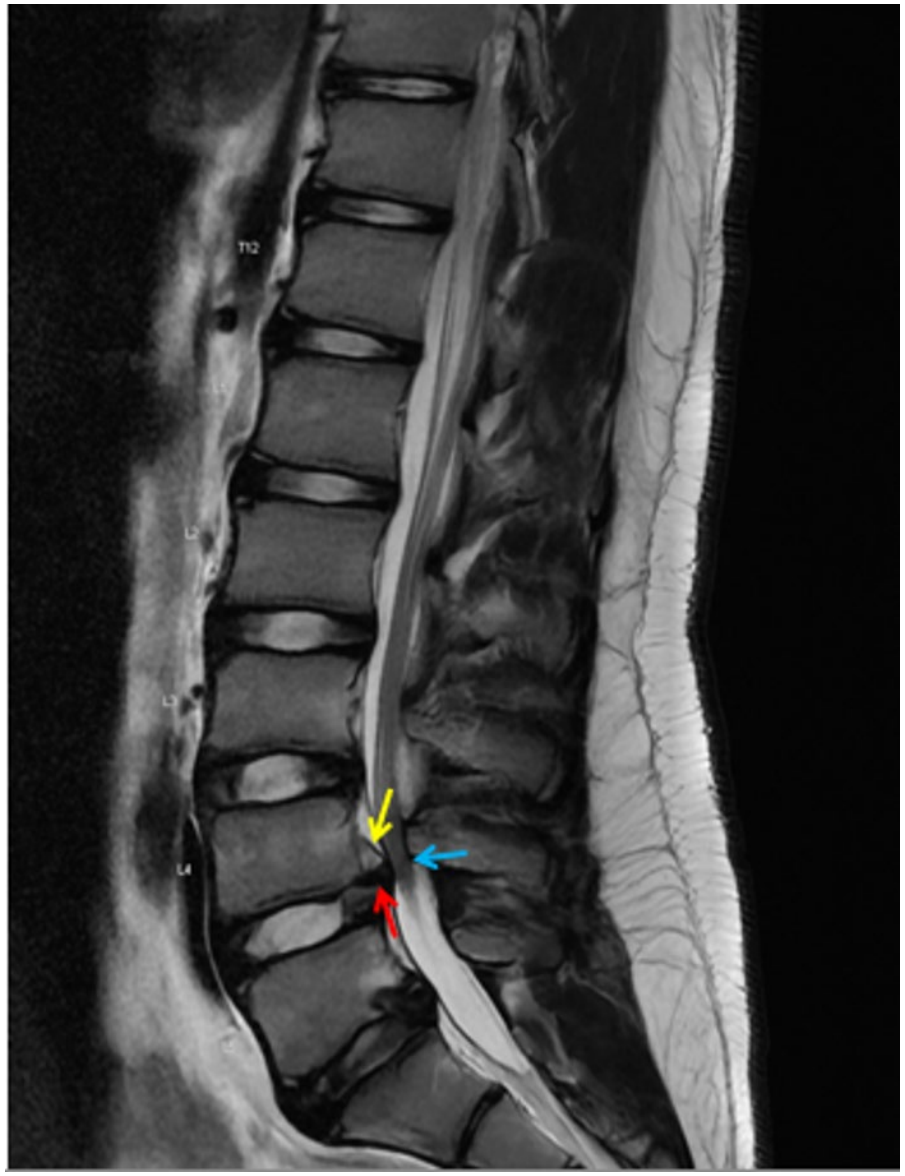
Sagittal T1

- Red arrows: irregularity in the posterior aspects of the L4 and L5 inferior endplates.



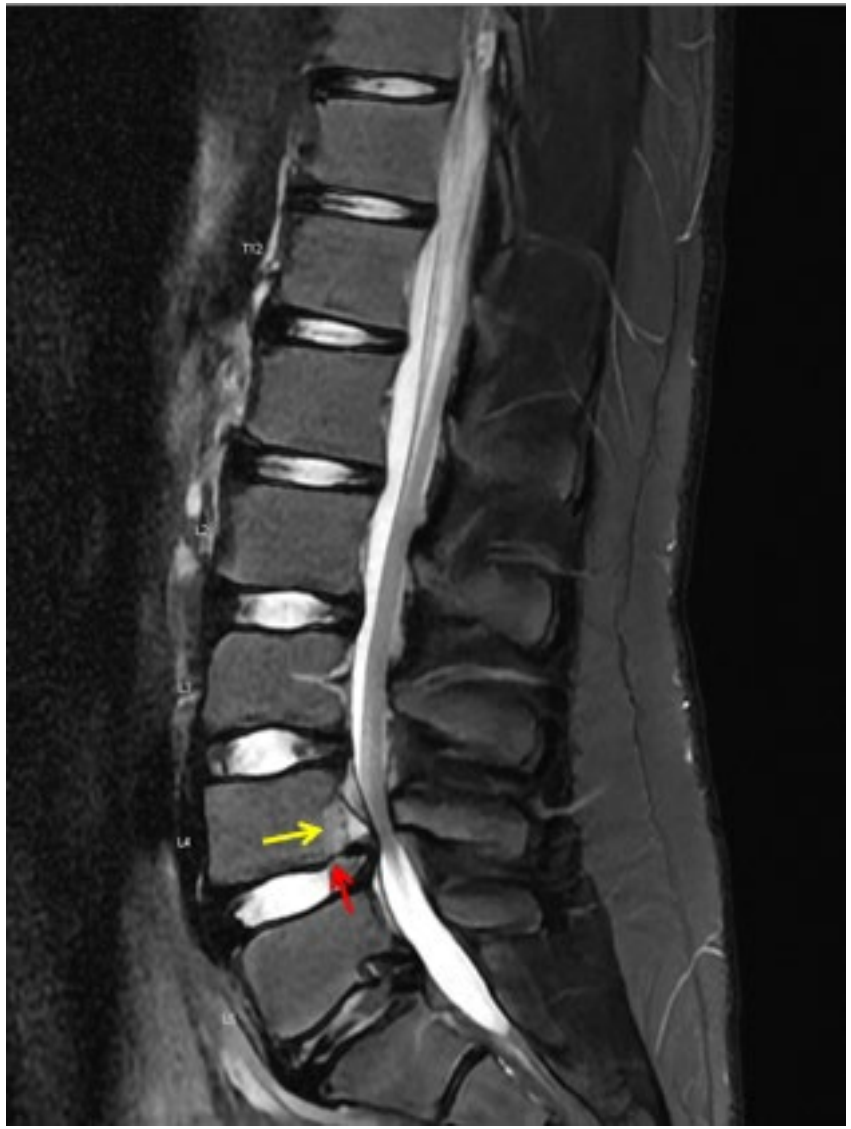
Sagittal T2

- Red arrow: avulsed L4 ring apophysis fragment.
- Yellow arrow: bulging posterior longitudinal ligament.
- Blue arrow: severe spinal canal stenosis.



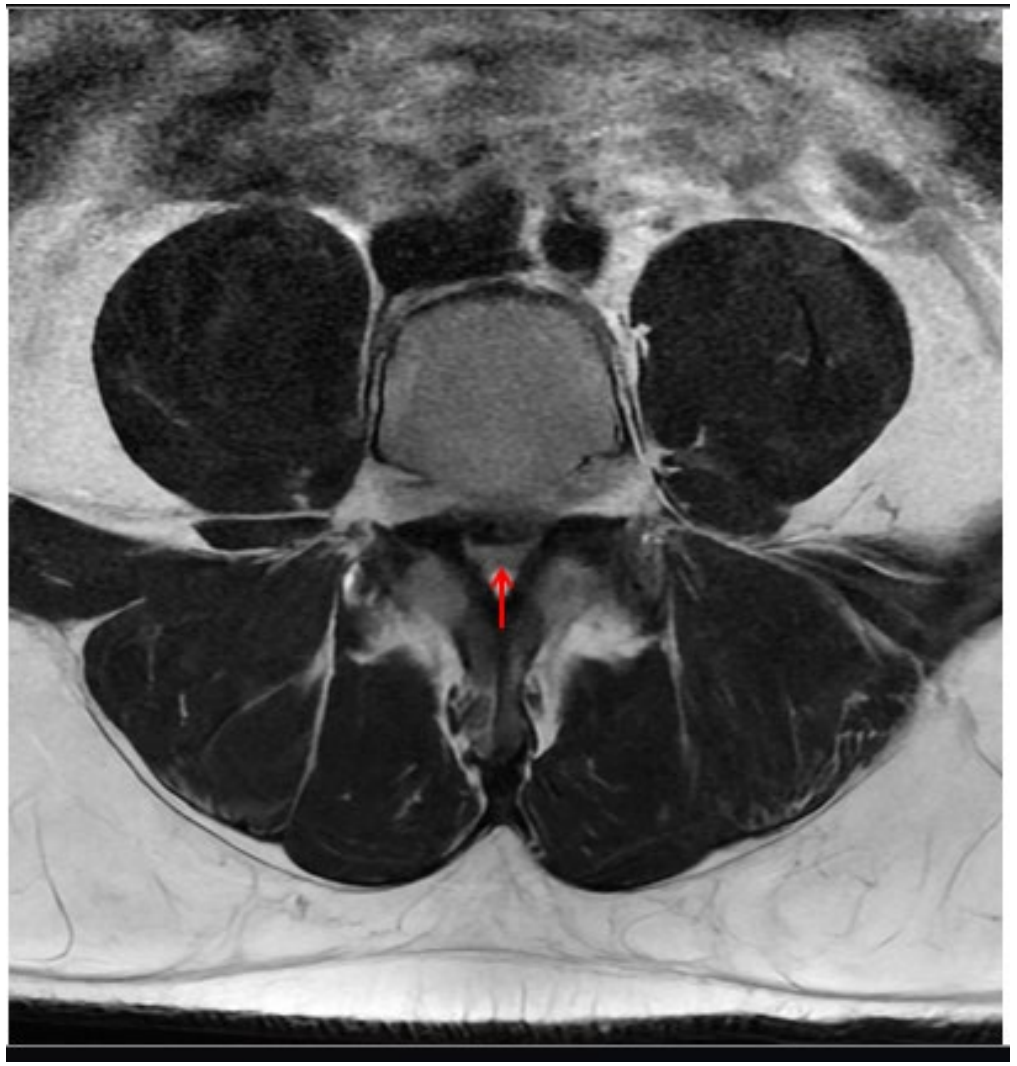
Sagittal STIR

- Red arrow: defect in the posterior aspect of the L4 inferior endplate.
- Yellow arrow: bone marrow edema in the posterior L4 vertebral body.



Axial T2

- Red arrow: spinal canal stenosis at the L4-L5 level, resulting from the posteriorly displaced osseous fragment, ligamentous structures, and disc material.



Imaging Discussion

- MRI showed an L4 inferior endplate ring apophysis avulsion with edema and posterior displacement, resulting in bulging of the posterior longitudinal ligament and severe narrowing of the spinal canal.
- A focal defect in the posterior aspect of L5 was thought to represent a chronic healed ring apophysis avulsion injury.
- CT was not performed because diagnosis was established with MRI.

Management

- Initial treatment generally consists of conservative management with rest and NSAIDs.
- If symptoms persist, surgical intervention may be considered.
- After poor symptom control with conservative management, the patient underwent surgical fracture reduction, which led to resolution of the spinal canal stenosis.

Patient Outcome

- The patient’s symptoms resolved completely postoperatively.
- The surgeon suspected that the patient might have a predisposition to this type of injury based on the MRI findings of a prior L5 ring apophysis avulsion.
- Given the possible predisposition, continued avoidance of contact sports was recommended.

Take Home Points

- Consider this diagnosis in adolescents 11-20 years old presenting with low back pain.
- The junction between the vertebral ring apophysis and vertebral body is a mechanically vulnerable interface in adolescents because fusion has not yet been completed, making the ring apophysis susceptible to fracture and displacement toward the spinal canal.
- Radiographs and MRI may be unrevealing in this condition.
- CT is superior for detecting an apophyseal fragment when the diagnosis is unclear.
- Coexisting disc pathology may lead to premature diagnosis of a disc herniation alone.

References

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2. Peh WCG, Griffith JF, Yip DKH, Leong JCY. Magnetic resonance imaging of lumbar vertebral apophyseal ring fractures. *Australas Radiol*. 1998;42(1):34-37. doi:10.1111/j.1440-1673.1998.tb00561.x.
3. Yen CH, Chan SK, Ho YF, Mak KH. Posterior lumbar apophyseal ring fractures in adolescents: a report of four cases. *J Orthop Surg (Hong Kong)*. 2009;17(1):85-89. doi:10.1177/230949900901700119.