Lumbar Spine Injuries in the Immature Athlete

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Financial Disclosure

I have no relevant financial relationship with commercial interests to disclose.

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Back Pain

- Common
- Causes
  - Muscle strains/ligamentous sprains
  - Spondylolysis
  - Spondylolisthesis
  - Disk herniations
  - Apophyseal ring fractures
  - Facet fractures
  - Scheuermann Kyphosis/Spine Deformity
  - Tumors/Malignancy
  - Infection/Spondylodiscitis

Review Article

Evaluation and Diagnosis of Back Pain in Children and Adolescents

Suken A. Shah, MD
Jeremy Saller, MD

Figure 1

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Back Pain

- Common
- Causes
  - Muscle strains/ligamentous sprains
  - Spondylolysis
  - Spondylolisthesis
  - Disk herniations
  - Apophyseal ring fractures
  - Facet fractures
  - ~~Scheuermann Kyphosis~~
  - ~~Tumors/Malignancy~~
  - ~~Infection/Spondylodiscitis~~

Table 1. Typical "red flags" in the history and physical exam associated with back pain in children.

Red flags	Possible cause
Duration >4 weeks	Tumor, infection, rheumatologic disorders
Fever, chills, night sweats	Tumor, infection
Awakening at night with bone pain	Tumor (osteoid osteoma)
Point tenderness	Tumor, infection, spondylolysis, stress fracture
Neurological symptoms	Herniated disc, syringohydromyelia, cauda equina syndrome
Cancer history in patient	Pathologic fracture
Radiation into anterior abdomen	Pancreatitis, cholecystitis, nephrolithiasis

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But first…

- Cauda Equina Syndrome
  - Rare
  - Severe compression
  - Saddle anesthesia
  - Bowel/bladder
  - Get to the hospital
- Paraspinal compartment syndrome
  - Rare
  - Case reports
  - But it happens
    - LBP
    - Local sensory loss
    - Rigid
  - Get to the hospital

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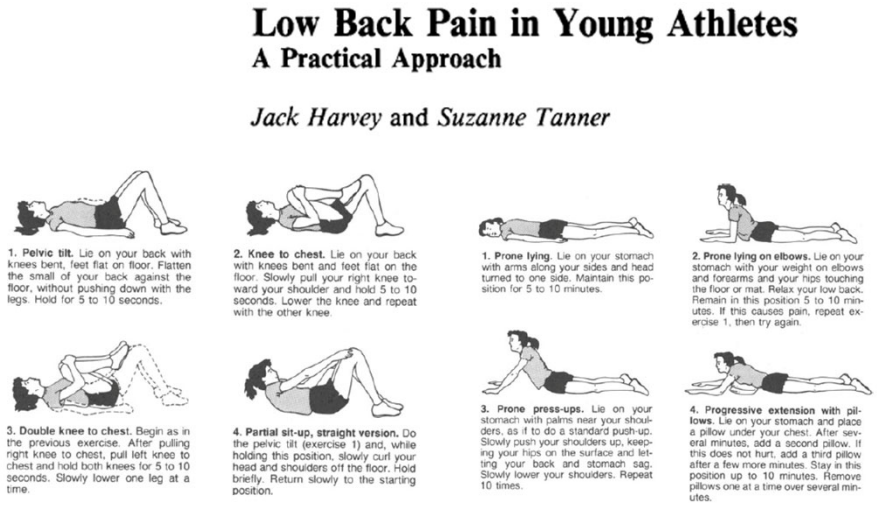
Muscle Strains

- Common
- History
- Physical exam
  - Palpation
  - Neuro exam
- Imaging
- Treatment
  - Activity
  - Ice
  - Heat
  - NSAIDs



Low Back Pain in Young Athletes
A Practical Approach

Jack Harvey and *Suzanne Tanner*

1. Pelvic tilt. Lie on your back with knees bent, feet flat on floor. Flatten the small of your back against the floor, without pushing down with the legs. Hold for 5 to 10 seconds.

2. Knee to chest. Lie on your back with knees bent and feet flat on the floor. Slowly pull your right knee toward your shoulder and hold 5 to 10 seconds. Lower the knee and repeat with the other knee.

1. Prone lying. Lie on your stomach with arms along your sides and head turned to one side. Maintain this position for 5 to 10 minutes.

2. Prone lying on elbows. Lie on your stomach with your weight on elbows and forearms and your hips touching the floor or mat. Relax your low back. Remain in this position 5 to 10 minutes. If this causes pain, repeat exercise 1, then try again.

3. Double knee to chest. Begin as in the previous exercise. After pulling right knee to chest, pull left knee to chest and hold both knees for 5 to 10 seconds. Slowly lower one leg at a time.

4. Partial sit-up, straight version. Do the pelvic tilt (exercise 1) and, while holding this position, slowly curl your head and shoulders off the floor. Hold briefly. Return slowly to the starting position.

3. Prone press-ups. Lie on your stomach with palms near your shoulders, as if to do a standard push-up. Slowly push your shoulders up, keeping your hips on the surface and letting your back and stomach sag. Slowly lower your shoulders. Repeat 10 times.

4. Progressive extension with pillows. Lie on your stomach and place a pillow under your chest. After several minutes, add a second pillow. If this does not hurt, add a third pillow after a few more minutes. Stay in this position up to 10 minutes. Remove pillows one at a time over several minutes.

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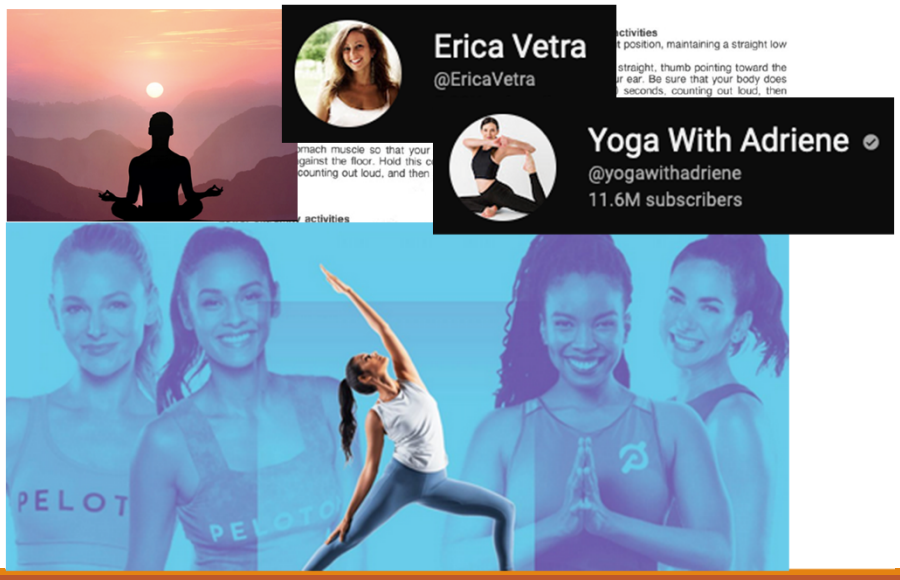
Muscle Strains

- Common
- History
- Physical exam
  - Palpation
  - Neuro exam
- Imaging
- Treatment
  - Activity
  - Ice
  - Heat
  - NSAIDs



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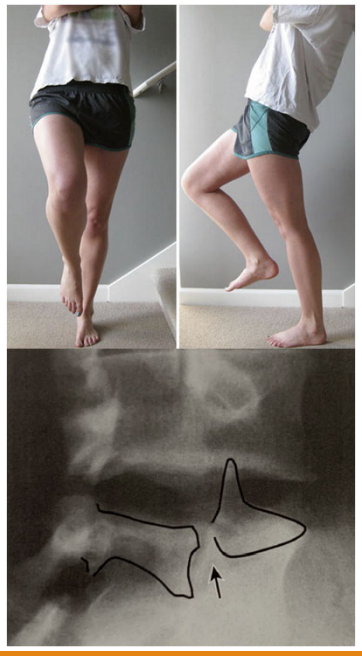
Spondylolysis

- What is it?
- History
  - Hyperextension sports
- Symptoms
- Physical exam
  - Tenderness
  - Hyperextension
    - Single leg
- Imaging
  - XR
  - SPECT
  - MRI
- Treatment
  - Rest/Stretching
  - Return to activities
  - Surgery?



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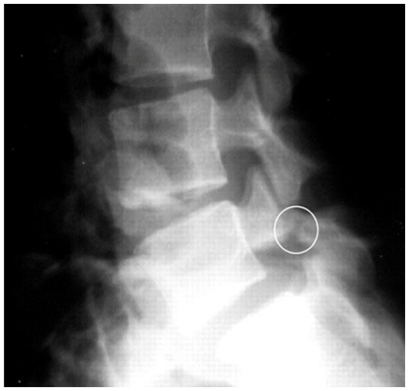
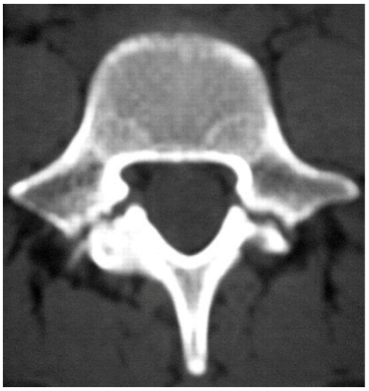
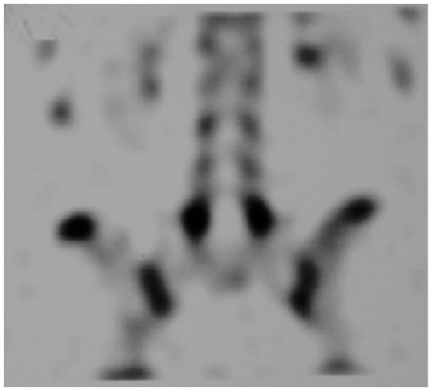
Spondylolysis

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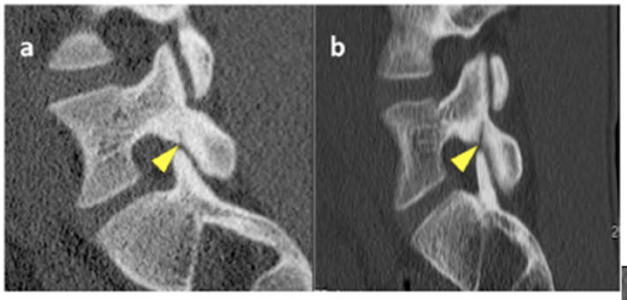
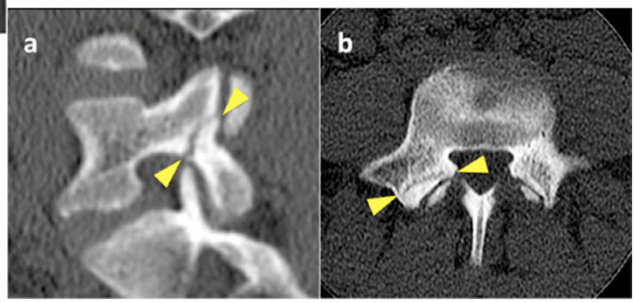
Spondylolysis





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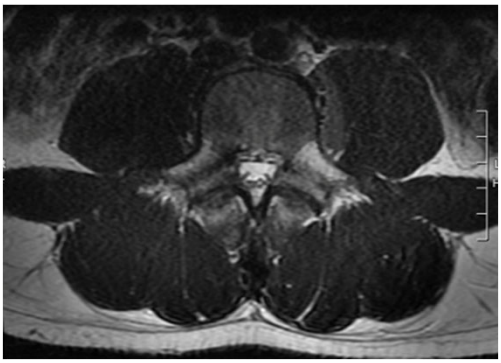
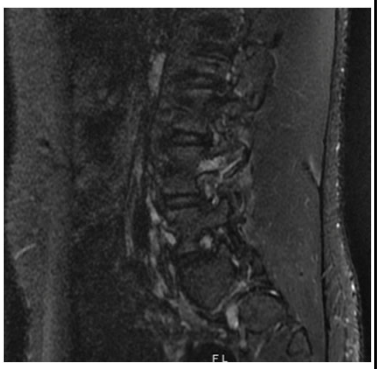
Spondylolysis

- Risk factors for +MRI
  - Male sex
    - OR 4.66
  - >4 weeks LBP
    - OR 5.67

Predictors of Spondylolysis on Magnetic Resonance Imaging in Adolescent Athletes With Low Back Pain

Takuji Yokoe,*† MD, Takuya Tajima,† MD, PhD, Hiroshi Sugimura,‡ MD, PhD, Shinichirou Kubo,§ MD, PhD, Shotarou Nozaki,§ MD, Nami Yamaguchi,† MD, PhD, Yudai Morita,† MD, and Etsuo Chosa,† MD, PhD





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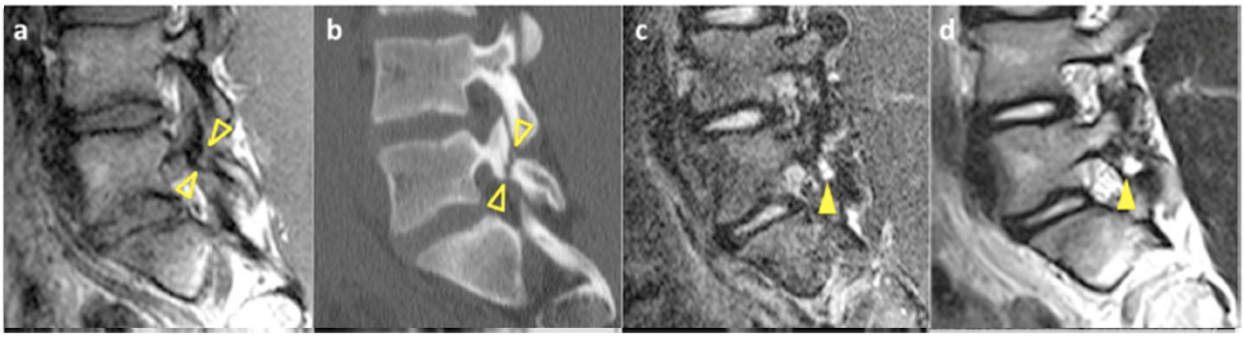
Spondylolysis



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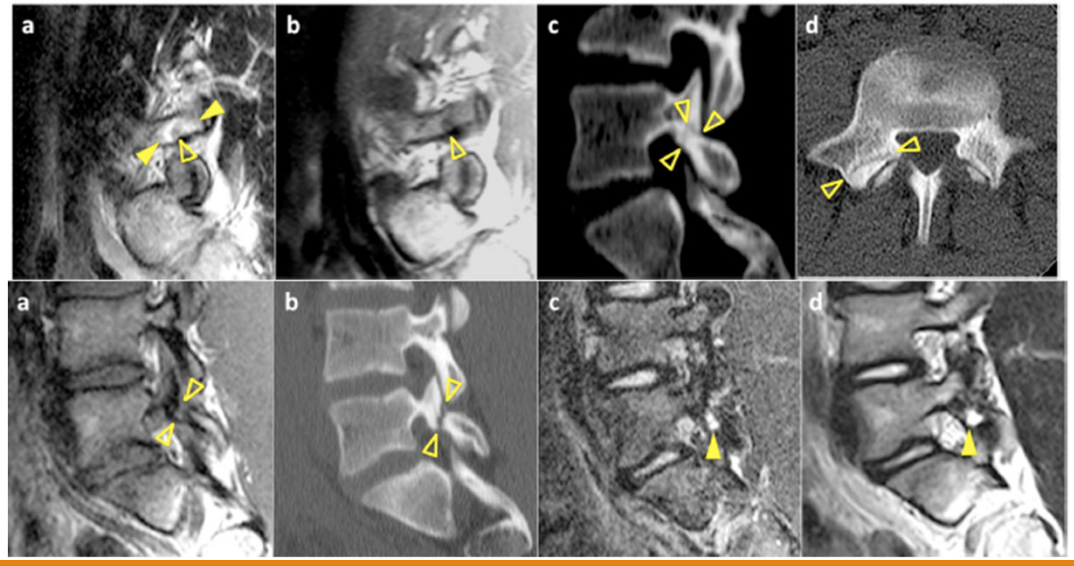
Spondylolysis



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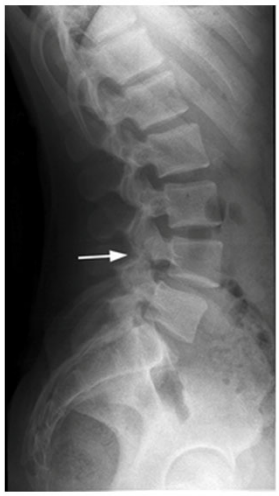
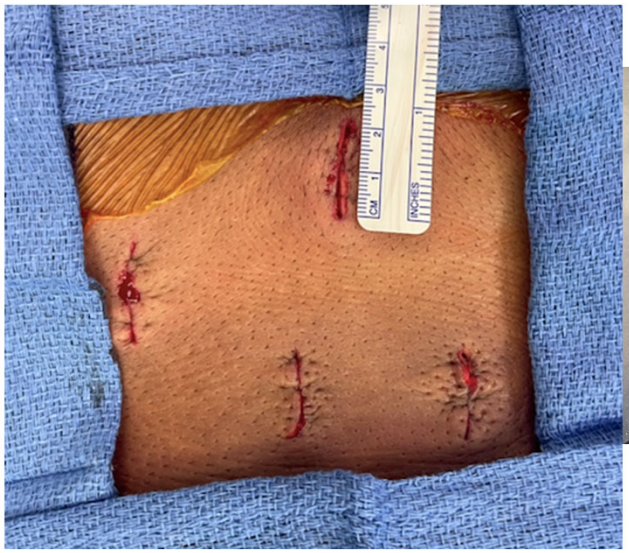
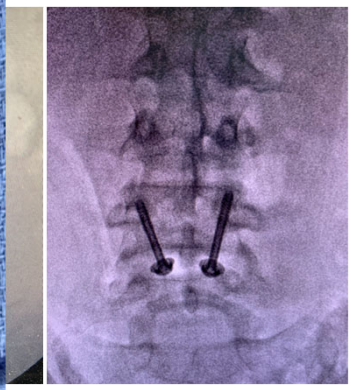
Spondylolysis







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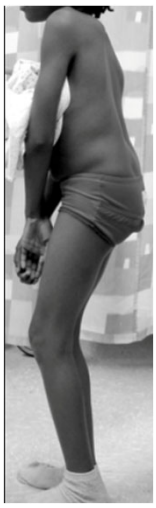
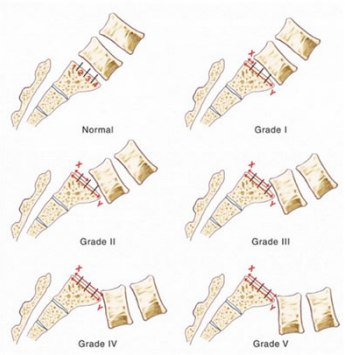
Spondylolisthesis

- What is it?
- Causes
- Symptoms
- Physical exam
- Imaging
  - XR
  - MRI
- Treatment
  - Symptoms
  - Progression





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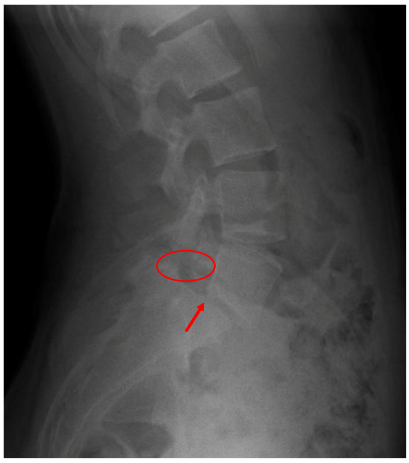
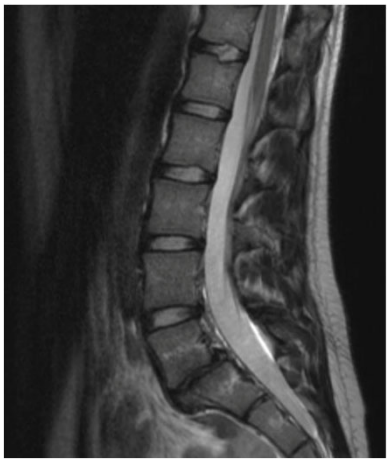
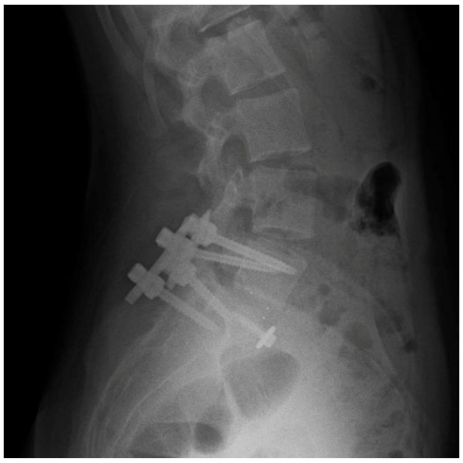
Spondylolisthesis







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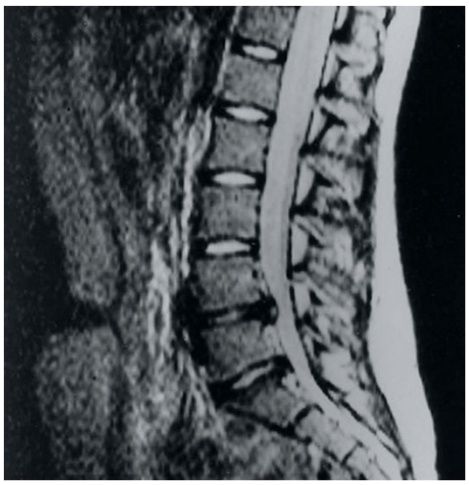
Disk Herniation

- What is it?
- History
  - Acute
  - Insidious
- Symptoms
  - Pain w/ radiation
  - Spasms
- Physical exam
  - Mobility
  - SLR
  - Neuro
- Imaging
  - XR
  - MRI
- Treatment
  - Conservative



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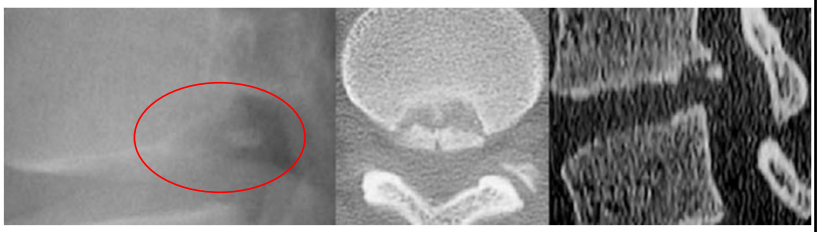
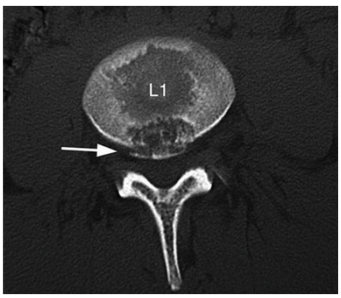
Apophyseal Ring

- What is it?
- Causes
  - Flexion/Axial compression
  - Microtrauma
- History
  - acute
- Symptoms
  - Pain
- Physical exam
- Imaging
  - XR
  - CT
- Treatment





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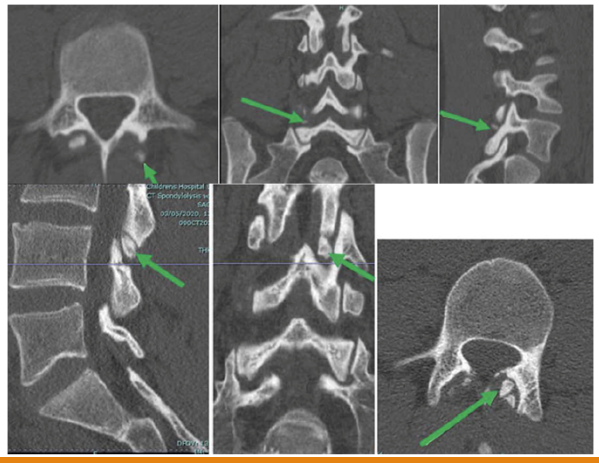
Facet Fractures

- What is it?
- Causes
  - Extension
- History
  - Chronic (6 months)
- Symptoms
- Physical exam
  - Tenderness
  - Pain w/ hyperextension
- Imaging
  - CT
- Treatment
  - Fragment excision

Outcomes of Operatively Managed Lumbar and Sacral Facet Fractures in Pediatric Athletes: A Case Series

Alexander Nazareth, MD,† Lindsay M. Andras, MD,*‡ Kenneth D. Illingworth, MD,*‡ Daniel J. Miller, MD,§ Patrick J. Cahill, MD,‖ and David L. Skaggs, MD, MMM¶*



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Thanks!

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