Case Studies: Low Back Pain in the Athlete

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Nothing to disclose
Case #1 History

15 y/o male presents for evaluation of his low back pain. His pain has been present for several months. The low back pain started while playing summer basketball and then worsened while running cross country in the fall. His pain was persisting at the start of the basketball season. He described localized right low back pain without buttock or lower extremity pain. His pain was worse with running and twisting activities. No increased pain with coughing or sneezing. No bowel or bladder dysfunction.
Case #1 Physical Exam

- Normal lordosis. Mild tenderness on palpation of L4-5 on the right. Standing lumbar flexion was 70 degrees with mild right low back pain. Standing extension and one leg hyperextension testing was 30 degrees also with mild right low back pain. Lower extremity reflexes were all 2+/4. No lower extremity weakness was present with manual muscle testing. Sensation in the lower extremities was intact and symmetric. Sitting and supine SLR reproduced hamstring stretch at 60 degrees bilaterally. Hips showed FROM without pain. Patrick’s testing was negative bilaterally. The patient did complain of localized L4-5 pain with prone extension to 30 degrees.
Case #1 Next Step, X-rays?

• A. No x-rays indicated
• B. Lumbar x-rays- AP and Lateral Views only
• C. Lumbar x-rays- AP, Lateral and Bilateral Oblique Views
• D. Lumbar x-rays- AP, Lateral with Flexion/Extension and Bilateral Oblique Views
B. AP and lateral x-rays only

• “The radiographs may or may not show the presence of a spondylolysis. However, the lateral view evaluates for the presence of spondylolisthesis indicating bilateral spondylolysis. Previously, oblique views were recommended. However, these views are not usually helpful as they may be normal even in the presence of spondylolysis. Given the additional radiation exposure without added value, these oblique views are no longer typically obtained.”

Case #1 Lumbar Spine AP and Lateral X-rays
Working/Differential Diagnosis

• A. Lumbar Strain
• B. Pars Interarticularis Stress Fracture-Spondylolysis
• C. Lumbar Disc Protrusion
• D. Facet Joint Pain
B. Pars Interarticularis Stress Fracture-Spondylolysis

- “33% of young patients that complained of sports-related low back pain for >7 days had lumbar stress injuries. Clinicians should be aware of the existence of these injuries.”


- “Primary care physicians should recognize that approximately 40% of pediatric patients presenting with low back pain persisting for longer than 2 weeks may have spondylolysis…”

Case #1 Next Step ? Advanced Imaging

- A. MRI Lumbar Spine
- B. CT Scan Lumbar Spine
- C. SPECT Bone Scan Lumbar Spine
- D. No advanced imaging indicated. Treat with 6 weeks of physical therapy.
A. MRI Lumbar Spine

• “MRI is an effective method (92% sensitivity) for detecting pars injuries. It can detect stress reactions when a fracture is not visible on CT scan, allowing early treatment of these prelysis lesions. The 92% sensitivity of MRI is comparable with that of other diagnostic modalities such as bone scan, with the advantage of no radiation exposure. MRI should be strongly considered as the advanced imaging modality of choice in the evaluation of patients with suspected spondylolysis.”

Case #1 MRI Lumbar Spine - Prominent Edema Bilateral Pars Interarticularis and Soft Tissues at L5

Right Sagittal Stir Image  Left Sagittal Stir Image
Case #1 Pars Stress Fractures at L5 Bilateral- Is Further Imaging Needed?

• A. No further imaging needed.
• B. Limited CT scan at L5 to evaluate for the presence of partial or complete spondylolysis.
Case #1 Limited CT Scan at L5 to evaluate for Spondylolysis

Complete Spondylolysis L5 on Right

Complete Spondylolysis L5 on Left
Case #1 Treatment of Pars Interarticularis Stress Fracture with/without Spondylolysis

1. Out of Sports, How long?
   - Complete Spondylolysis: 4-6 months
   - Partial Spondylolysis: 3-4 months
   - Pars stress fracture without Spondylolysis: 2-3 months

2. Brace - “Braces may be used to help reduce pain and allow for bony healing.” Warm/Form L/S support is well tolerated.

3. Physical Therapy - Is helpful after pain is improved, usually after 4-6 weeks, for hamstring flexibility and core stabilization.

4. Bone Stimulator - Makes sense to use, but currently not listed as indication for bone stimulator.

5. Vitamin D - Vitamin D level should be considered with supplement for deficiency, 1,000-5,000 iu/day.

6. Follow-up Limited CT at 3 months to assess healing.
Case #1 Follow-up Limited CT L5 at 3 months to assess healing of bilateral Spondylolysis

Healing Right L5 Spondylolysis  Healing Left L5 Spondylolysis
17 y/o female with history of low back pain for the past month. She is a 3 sport high school athlete and states her low back pain started during her track season while participating in long jump, triple jump and sprinting events. She described right worse than left low back pain which was worse with running and jumping activities. She drinks milk with every meal.
Case #2- Exam

- Lumbar spine: Mild tenderness on palpation of L5 on the right worse than the left. Standing lumbar flexion was 70 degrees with mild pain. Standing extension was 40 degrees with more prominent right worse than left low back pain. Lower extremity neuro exam was normal. Straight leg raises were negative to 70 degrees bilaterally. The patient did complain of increased low back pain with gentle forced prone extension.
Case #2- AP and Lat X-rays
Case #2- MRI L-Spine

Right Sagittal Stir Image

Left Sagittal Stir Image
Case #2- Limited CT Scan L5

Right Sagittal- No Spondylolysis

Left Sagittal- Partial Spondylolysis
Case #2- Treatment

• Out of sports for minimum 6-8 weeks- Avoid any backward bending activities
• Physical Therapy referral- Stabilization, Hamstring flexibility
• Declined L/S Support
• Vitamin D level- 30 (normal 30-80) Start 1,000 i.u. daily for 3 months
• Schedule follow-up Limited CT at L5 in 2-3 months
Case #2- Follow-up limited CT L5

Right Sagittal

Left Sagittal
Low Back Pain in the Athlete-
Summary

- High index of suspicion for pars interarticularis stress fracture.
- Pain generally worse with extension of the lumbar spine- Stork test, Lumbar Spurling’s.
- X-rays- AP and Lateral views sufficient. If Spondylolisthesis, no urgent need for MRI.
- MRI- best advanced imaging study. Stir images. If positive consider:
  - Limited CT scan at affected level only, to evaluate for Complete Spondylololysis, Partial Spondylolysis vs no Spondylolysis which guides treatment.
- Out of sports: Complete Spondylolysis: 4-6 months, Partial Spondylolysis 3-4 months, No Spondylolysis (Stress Fracture only) 2-3 months.
- Consider Lumbosacral Support in neutral to slight flexion especially if ongoing low back pain. Wear mainly during the day.
Low Back pain in Athlete Summary
Continued

• Consider Bone Stimulator especially for Complete Spondylolysis. Not always covered by insurance due to current indications for use.
• Consider Vitamin D level- Treat Deficiency, 1,000-5,000 iu daily.
• Physical Therapy for rehab/lumbar stabilization prior to return to play.
• Consider follow-up Limited CT to assess healing of Spondylolysis at 3 months.
• Assess technique in sports to avoid low back hyperextension to try and prevent recurrence of stress fracture.
• If no Pars stress fracture on MRI treat disc protrusion/other.
Case #3

- 14-year-old male football player presents with 1 month of low back pain. He has a history of low back pain during the prior football season.
- Lumbar spine exam showed a decreased lumbar lordosis. Standing flexion was negative to 60 degrees. Standing extension was 40 degrees with minimal increased low back pain. Lower extremity neuro exam was normal. Straight leg raising was negative.
Case #3 AP and Lateral X-rays
Progression to Spondylolisthesis

- Pars Interarticularis
- Spondylosis
- Spondylolisthesis
Spondylolisthesis

Grades of Spondylolisthesis

- Normal
- Grade 1: 25% Slip
- Grade 2: 50% Slip
- Grade 3: 75% Slip
- Grade 4: Greater than 75% Slip
Spondylolisthesis

- Physical Therapy for lumbar stabilization mainstay of treatment may need to avoid heavy squats in weightlifting.
- Limitations on sports participation: Football, Gymnastics, Competitive Weightlifting.
- Need to monitor for progression of slip. Fusion considered at above grade 2.
- Consultation with Spine Surgeon or Peds Ortho helpful.
Case #4 - History

• 17-year-old male presents for evaluation of left-sided low back pain that started at the end of his junior year in basketball and worsened with the start of the indoor track season. He described localized left low back pain with occasional radiation into the lateral left buttock. His pain was worse with running and jumping activities.
Case #4- Exam

- Lumbar spine exam showed mild to moderate tenderness on palpation of L5 on the left. Standing lumbar flexion was negative to 70 degrees. Standing extension was 30 degrees reproducing the patient's left low back pain. Positive stork test on the left for localized left low back pain. Lower extremity neuro exam was normal. Supine straight leg raises did reproduce some mild left buttock pain at 70 degrees on the left and was negative on the right. The patient complained of mild increased left low back pain with prone extension to 40 degrees.

**Stork Standing Test**

- **Test Positioning:** Subject stands on one leg with sole of nonweightbearing foot resting on the medial aspect of knee of weightbearing limb.
- **Action:** Subject maintains balance on one leg and simultaneously performs slight lumbar extension. Test is repeated bilaterally.
- **Positive Finding:** Complaints of pain in lumbar region may be related to the pars interarticularis region, which is sometimes associated with spondylolysis.
Case #4 X-rays AP and Lateral
Case #4 MRI Lumbar Spine

Right Sagittal Stir Image

Left Sagittal Stir Image
Case #4 MRI Further Images

T2 Sagittal Image

T2 Axial Image L5-S1 Foraminal Protrusion
Case #5 MRI Lateral Disc Protrusion in 16 y/o Football Player

T2 Sagittal Image

T2 Axial Image L5-S1
Thanks

Danke schön