The Spine in the Pediatric Athlete

Financial Disclosure

Dr. Earl A. Stanley has no relevant financial relationships with commercial interests to disclose.

The Spine in the Pediatric Athlete

- Biomechanics
- Evaluation
  - History
  - Exam
  - Imaging
- Differential Diagnosis
- Treatment
The Spine in the Pediatric Athlete -

Biomechanics

- Athlete’s Spine.
- Linking with Hip Extensors.
- Recruits entire Core with Movement.

The Spine in the Pediatric Athlete –

Evaluation

- History – Duration?,
- What is it like?, Location?
- What sport?,
- What specific activity?,
- Mechanism of Injury?,
- During or after?
- Pain free?

- Associated Symptoms
  - Fever, Weight Loss
  - Night Pain
  - Unrelenting?
  - Weakness?

The Spine in the Pediatric Athlete –

Evaluation

- Physical Exam
  - Movement – Limited?
  - Loss of Rhythm?
  - Muscle spasm?
- Neurologic Exam
  - Sensory loss
  - Motor dysfunction
  - Muscle loss
  - Deformity – Foot, Legs

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The Spine in the Pediatric Athlete –

**Physical Exam**

- Movement – Limited?
- Loss of rhythm?
- Muscle spasm?

**Neurologic Exam**

- Sensory loss
- Motor dysfunction
- Muscle loss
- Deformity – Foot, legs

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The Spine in the Pediatric Athlete –

**Neurological Exam**

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The Spine in the Pediatric Athlete – Neurological Exam

The Spine in the Pediatric Athlete – Imaging

- Modalities include
  - Plain Radiographs
  - CT Scans
  - Nuclear Scans
  - MRI

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The Spine in the Pediatric Athlete – Imaging

- Modalities include
  - Plain Radiographs
  - CT Scans
  - Nuclear Scans
  - MRI

The Spine in the Pediatric Athlete

Imaging - Nuclear Scans

• Becoming the imaging choice for Pars fractures
• STIR images are particularly a good diagnostic tool.

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The Spine in the Pediatric Athlete – Differential Diagnosis

• Inflammatory
• Infection
• Neoplastic
• Degenerative
• Trauma
  – Acute
  – Chronic

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The Spine in the Pediatric Athlete

- Inflammatory
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- **Congenital**
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The Spine in the Pediatric Athlete

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The Spine in the Pediatric Athlete

- **Inflammatory**
- **Infection**
- **Neoplastic**
- **Degenerative**
- **Trauma**
  - **Acute**
  - **Chronic**

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- **Trauma** - **Chronic**
- **Stress fractures of the Pars inerarticularis and Pedicle**
- **Spondylysis** — occurs in about 5%
  - May be caused by repetitive activities

The Spine in the Pediatric Athlete

- **Spondylysis** — occurs in about 5%
  - May be caused by repetitive activities
  - Usually at L5
  - Found in approx. 25% of competitive female gymnasts.
  - Any athlete that sustains load in hyper-extension.
**The Spine in the Pediatric Athlete**

- **Spondylosis** — occurs in about 5%
  - May be caused by repetitive activities
  - Usually at L5
- **Treatment** —
  - If a stress reaction or unilateral: Protect with TLSO
  - Rehab core and hip extensors
  - McGill spine program.
  - **Bilateral**: Corset for comfort
  - Rehab
  - Pars injections help
  - Surgery — Bilateral Lateral Fusion or pars fusion

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**The Spine in the Pediatric Athlete**

- **Spondylosis** — Surgery — Bilateral Lateral Fusion or pars fusion
  - Non union rate is high
  - Better with instrumentation

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**The Spine in the Pediatric Athlete**

- **Spondylosis**
  - Bartolozzi Segment — congenital abnormality of lumbosacral junction.
  - Presents with symptoms similar to spondylosis.
  - Pain with activity, radiation into posterior thigh.
  - Neuro is normal.
The Spine in the Pediatric Athlete

• Spondylolysis
  - Different types
  - Severity of slip

<table>
<thead>
<tr>
<th>Grades</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>No defect seen, but thickening noted</td>
</tr>
<tr>
<td>Grade II</td>
<td>Small defect noted</td>
</tr>
<tr>
<td>Grade III</td>
<td>Larger defect noted</td>
</tr>
<tr>
<td>Grade IV</td>
<td>Fracture noted</td>
</tr>
</tbody>
</table>

The Spine in the Pediatric Athlete

• Spondylolysis
  - More disabling problem.
  - Treatment is similar for minimal slips.
  - Surgery is the definitive treatment.
  - Sustained fusion vs. Instrumentation/reduction?
  - Instrumentation with reduction improves results.

Case 1

16 yo female softball pitcher with back pain after vigorous play, began with basketball.
The Spine in the Pediatric Athlete

Case 1

Treatment:
- TLSO
- Rehab emphasizing McGill exercises.
- General conditioning within limits of discomfort.
The Spine in the Pediatric Athlete

Case 1

Treatment:
TLSO
Rehab emphasizing McGill exercises.
General conditioning within limits of discomfort.

Case 2

12 year old female presented with low back pain extending into posterior thighs. Partially relieved by rest and NSAIDs, but returns with all activities. Exam reveals a palpable step off, lumbar lordosis and a Dickson-Phalen sign. She was neurologically intact.

High Grade Adolescent Spondylolithesis

- 12 year old female presented with low back pain extending into posterior thighs.
- Relieved by rest and NSAIDs, but returns with all activities.
- Exam reveals a palpable step off, lumbar lordosis and a Dickson-Phalen sign.
- She was neurologically intact.
- Work up included an MRI.
Treatment

Radiographs in the Cast

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One year follow up PLSF

Sacrum Remodeled

Physical Exam

- One year following Wiltsie bilateral-lateral fusion L4-S1 followed by casting, bracing and home exercise program emphasizing hamstring stretching
A Few Last Thoughts.....

Thank You !!!