Lumbar Back Pain in Young Athletes

Eric M. Kephart DO MS
CAQ in Sports Medicine
Blair Orthopedics
Altoona, PA

OMED 2012
San Diego CA
AOASM
Tuesday October 9th
1:00pm
Lumbar Back Pain in Young Athletes

Learning Objectives

• Epidemiology
• Anatomy
• History
• Physical Exam
• Imaging
• Diagnosis
• Treatment
• Return to Play
Lumbar Back Pain in Young Athletes

Differential Diagnosis

• Lumbosacral Sprain
• Lumbar Somatic Dysfunction
• Lumbar Spondylolisthesis
• Lumbar Spondylolysis
• Scoliosis
• Lumbar Scheuermann’s Disease
• Juvenile Rheumatoid Arthritis
• Ankylosing Spondylitis
• Malignancy
• Disk herniation
• Apophyseal Ring Fracture
• Congenital Abnormalities
Lumbar Back Pain in Young Athletes

Epidemiology

- Each year in US over 30 million children and teenagers participate in organized sports
- Sports are the leading cause of injury in adolescents
- Chronic overuse injuries are increasing in young athletes
- Incidence of back pain among young athletes participating in sports has been shown to be twice as high as in the general population of the same age

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Bone
- 5 Lumbar Vertebrae
- Sacrum
- Sacroiliac Joint
- Facet Joints
Lumbar Spine Pain in Young Athletes

Muscle
- Latissimus dorsi
- External abdominal oblique
- Gluteus medius/maximus
- Serratus
- Internal abdominal oblique
- Erector spinae
- Multifidus and rotatores
- Quadratus lumborum
- iliopsoas

Anatomy

Eric M. Kephart DO
Lumbar Spine Pain in Young Athletes

Anatomy

- Posterior longitudinal ligament runs vertically and posterior to vertebral body providing structure and support
- Remember the posterior longitudinal ligament begins to narrow in the lumbar spine
- Incidence of lumbar spine herniations is greater for lower lumbar vertebrae

Ligament

- Supraspinous ligament
- Interspinous ligament
- Ligamentum flavum
- Posterior longitudinal ligament
- Anterior longitudinal ligament
Lumbar Spine Pain in Young Athletes

Spinal Nerve

Intervertebral Disc

Anatomy

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

History

- Age & Sex
- Type of activity or sport
- Amount of training/participation per day/week/year
- Chronicity, timing, location, quality and severity of symptoms
- Any associated symptoms: fever, weight loss, night pain
- Activities that worsen or improve symptoms
- Limitations in participation
- Medical, Surgical, Family history

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Physical

• Visual inspection
• Palpation
• Range of motion
• Strength
• Neurologic assessment
• Vascular assessment
• Gait assessment
• Special Tests
  – Standing flexion test
  – Seated flexion test
  – Dural tension tests
  – Patrick test
  – Stork test
  – Thomas test
Lumbar Back Pain in Young Athletes

Somatic Dysfunction

- Osteopathic physicians can treat this condition simultaneously using both conventional primary care approaches and complimentary spinal manipulation

- OMT is safe and effective

- OMT is billable

Eric M. Kephart DO
Lumbar Somatic Dysfunction

- Tissue texture abnormality, asymmetry, restriction of motion, and tenderness (TART)

- 3 most commonly used OMT techniques: soft tissue, HVLA, and muscle energy

- Major motion of the lumbar spine is flexion/extension

Lumbar Back Pain in Young Athletes
Diagnosis

Eric M. Kephart DO
Low Back Pain in Young Athletes

Somatic Dysfunction

• Psoas Syndrome (flexion contracture)
  – Presents as low back pain that radiates to groin
  – Associated with somatic dysfunction L1 or L2, sacral dysfunction
  – Counterstrain effective for acute symptoms
  – Stretching an acute psoas spasm may exacerbate symptoms
  – Treat the higher Lumbar SD with muscle energy or HVLA

Eric M. Kephart DO
• Innominate Somatic Dysfunction
  — Same side as positive standing flexion test
  — Rotation occurs about the inferior transverse axis
  — Muscle energy is effective
Low Back Pain in Young Athletes

Somatic Dysfunction

• Sacral Somatic Dysfunction
  – Associated L5 somatic dysfunction
  – Treat L5 somatic dysfunction first
  – Muscle Energy and HVLA techniques are effective
    • Positive seated flexion test is opposite the sacral oblique axis
    • Rotation of L5 and sacrum are opposite
    • L5 SB and sacral oblique axis will be same side

Eric M. Kephart DO
• 17 year old cross country runner
• CC: low back pain
• Pain is sharp does not radiate and began yesterday after 5 mile run

Case Study

• Exam
  – positive standing flexion test on right
  – Right ASIS inferior
• Diagnosis
  – Right anterior innominate
• Treatment
  – OMT Muscle Energy
Lumbar Back Pain in Young Athletes

Diagnosis

Spondylolysis
• Pars interarticularis defect/stress fracture
  – History
  – Exam
    • The Stork Test
  – Imaging
    • Lateral oblique x-rays (scotty dog)
    • SPECT scan
    • CT

Eric M. Kephart DO
Can you find the collar of the Scotty Dog?

Eric M. Kephart DO
Low Back Pain in Young Athletes
Lumbar Back Pain in Young Athletes

Diagnosis

Spondylolysis
- Pars interarticularis defect/stress fracture
  - Treatment
    - Restrict sport activity
    - Brace
      » TLSO
    - Bone stimulator
    - Rehabilitation

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Diagnosis

Spondylolysis
• Pars interarticularis defect/stress fracture

– Prognosis
  » Unilateral Pars defects are more likely to have bone healing
  » Fibrous union allows the majority of athletes to return to sport

– Return To Play
  » Varying time frames in the literature
  » Consensus: 6 months return to sport

Eric M. Kephart DO
17 year old Junior HS football (defensive corner back) and T&F (sprinter) athlete presents complaining of LBP. Pt. was seen by his pediatrician for left sided LBP after squatting with heavy weight in the spring, had “normal” x-rays, received PT/Rehab and improved. He presented with LBP complaint again in late summer after the first week of football two-a-days: chief complaint was right sided LBP. Exam: Neurologically ->no deficits, Musculoskeletal B/L hamstring contracture, excellent balance, pain with extension and positive Stork test B/L.

Eric M. Kephart DO
Case Study

- Lateral oblique X-ray: pars defect on the left without spondylolithesis,
- SPECT scan positive B/L L5 uptake
- CT scan confirmed spondylolysis B/L L5 without spondylolithesis
- Management: removed from contact sport, back brace (TLSO) and bone stimulator
- We had long discussion that his football season was over for this year.
- Pt. was non-compliant with treatment plan.
- Repeat 3 month CT scan showed no change; B/L spondylolysis of L5 without spondylolithesis.
Case Study

• Patient began intensive PT/Rehab
• He was released to participate in T&F in the spring
• He is currently pain free and playing in his senior year of HS football

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Diagnosis

Spondylolisthesis
• The anterior or posterior displacement of a vertebra in relation to the vertebra below

• 5 types
  • Dysplastic
  • Isthmic
  • Degenerative
  • Traumatic
  • Pathologic

Eric M. Kephart DO
Spondylolisthesis

- Grade I-V based on percentage of forward slip as seen on lateral radiographs
  - Grade I (0%-25%)
  - Grade II (26%-50%)
  - Grade III (51%-75%)
  - Grade IV (76%-100%)
  - Grade V is Spondyloptosis
Spondylolisthesis

Grade ?

Grade ?

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Spondylolisthesis

- Return to Play
  - Most in this age group are Grade I
  - Follows same guidelines as spondyloysis

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Scoliosis

• Classification
  • Congenital
  • Idiopathic
  • Infantile
  • Juvenile
• Adolescent
• Neuromuscular

• History
  – Incidental finding on physical
  – USPSTF does not recommend routine radiographic screening for scoliosis

• Physical
  – Standing flexion test
Scoliosis

**Cobb Angle**
- Angle between two lines drawn perpendicular to the upper end plate of the upper most vertebra involved and the lower end plate of the lowest vertebra involved

**Risser Stage**
- The amount of calcification present in the iliac apophysis and measures the progression of ossification from antero-lateral to postero-medial
Scoliosis

Cobb Angle

Risser stage

Eric M. Kephart DO
### Lumbar Back Pain in Young Athletes

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cobb</th>
<th>Risser</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>Immature</td>
<td>Observe</td>
<td></td>
</tr>
<tr>
<td>25-30</td>
<td>Immature</td>
<td>Brace</td>
<td></td>
</tr>
<tr>
<td>30-40</td>
<td>Immature</td>
<td>Brace</td>
<td></td>
</tr>
<tr>
<td>&gt;40</td>
<td>Immature</td>
<td>Surgery</td>
<td></td>
</tr>
<tr>
<td>&gt;50</td>
<td>Mature</td>
<td>Surgery</td>
<td></td>
</tr>
</tbody>
</table>

### Return to Play

- Dependant upon treatment
  - Observe no restriction
  - Sport restriction while in brace
  - Surgery is multi-disciplinary approach

Eric M. Kephart DO
Lumbar Back Pain in Young Athletes

Eric M. Kephart DO MS
CAQ in Sports Medicine
Blair Orthopedics
Altoona, PA