Back Pain in Children & Adolescents

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Agenda

• Common causes of back pain in children & adolescents
• Importance of the neurological exam
• Differences between children & adults
Muscular Anatomy of the Back

Deep Muscles
- Splenius capitis
- Splenius cervicis
- Levator scapulae
- Rhomboid minor
- Rhomboid major
- Erector spinae
- Serratus posterior inferior

Superficial Muscles
- Trapezius
- Spine of scapula
- Deltoid
- Infraspinatus
- Teres minor
- Teres major
- Latissimus dorsi
- Thoracolumbar fascia
- External oblique
- Internal oblique
- Gluteus medius

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History

- Where?
- When?
- How (mechanism or associated activity)?
- How bad? (0-10)
- How bad? (0-10)
- Radiation?
- Better with?
- Worse with?
- Sleep position?
Back Examination

- Inspection – posture, curvature, shoulder height, handedness
- Palpation – spinous processes, SI joints, paraspinal mm
- ROM – flex, ext, rot, bending
- Adam’s forward bend test – scoliosis, “false ankylosis”
- Extension maneuvers – single-leg hyperextension, quadrant test
- Sciatica – straight-leg raise, popliteal angle
Thoracic Back Pain

- Common in teens
- Rule out scoliosis, get X-rays, assess neuro
- Usually related to poor posture, fatigue, weak core
- Analgesics, rest (sleep), PT, activity mod, posture training
16 yo FB, Track, Low Back Pain

• Injured back doing pole vault “on the way up”
• Severe low back pain, 9/10
• No rad
Physical Exam

- TTP L4-5 midline & paraspinous
- + pain with extension, less with flexion
- + single-leg hyperext test, R > L, + quadrant test R > L
- Tight hamstring R > L
- Normal neuro exam
DDX Low Back Pain

- Mechanical Low Back Pain
- Spondylolysis, spondylolisthesis
- Herniated lumbar disk
- Discitis
- Spinous process fracture
- Other – ostemo, pelvis disease (fem)
Spondylolysis

- Superior articular process (ear of Scottie dog)
- Pedicle (eye)
- Transverse process (head)
- Isthmus (neck)
- Lamina and spinous process (body)
- Inferior articular process (foreleg)
- Opposite inferior articular process (hind leg)
# Spondylolysis
## Wiltse-Newman Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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</table>
| **Type I** | • Dysplastic  
• Secondary to congenital abnormalities of lumbosacral articulation including maloriented or hypoplastic facets, sacral deficiency, poorly developed pars  
• Posterior elements are intact (no spondylolysis)  
• More significant neurologic symptoms |
| **Type II-A** | • Isthmic - Pars Fatigue Fx |
| **Type II-B** | • Isthmic - Pars Elongation due to healed stress fx |
| **Type II-C** | • Isthmic - Pars Acute Fx |
| **Type III** | • Degenerative |
| **Type IV** | • Traumatic |
| **Type V** | • Neoplastic |
Imaging

• Rarely seen on AP, lateral
• More likely to see on oblique views
• Bone scan is imaging of choice
Spondylolisthesis – Meyerding Classification

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Grade I</td>
<td>&lt; 25%</td>
</tr>
<tr>
<td>Grade II</td>
<td>25-50</td>
</tr>
<tr>
<td>Grade III</td>
<td>50-75%</td>
</tr>
<tr>
<td>Grade IV</td>
<td>75-100%</td>
</tr>
<tr>
<td>Grade V</td>
<td>Spondylo-ptosis</td>
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</tbody>
</table>
Spondylolysis Treatment

• Widely varying opinions on treatment

• Very little good evidence

• Rad studies seem to indicate more rapid resolution with bracing
Spondy Treatment w/Brace

- Complete Rest & 23/7 brace until pain minimal with ADL’s
- PT to slowly regain strength, flexibility, postural control, balance
- Gradually diminish brace wear while increasing activity until jogging tolerated in brace without pain
Mechanical Low Back Pain

- a.k.a “facet syndrome” – probable irritation of facet joints from repetitive hyperextension
- Presentation similar to spondylolysis except negative imaging
- Associated with tight hip flexors, hamstrings, weak core
Mechanical Low Back Pain

Treatment

- Rest
- Improving hamstring & hip flexor tightness (PT)
- Improving core stability
- Avoiding hyperextension
17 yo FB, LBP with Squat Lifting

• Low lumbar pain, sudden onset, 9/10
• Some radiating into R leg to knee
• Better with rest, prone position
• Poor pain control
Herniated Lumbar Disk

• Presents very similarly to HNP in adults
• May or may not have true sciatica
• More painful with flexion than extension
• Disk rupture unusual in teens
Treatment HNP Teens

- Rest
- Analgesics
- Oral steroids
- Lumbar support
- PT: McKenzie extension exercises & core strength
- Return to normal activity – avoid power lifts, 1 RM (“maxing out”)
16 yo VB Player

- R low back pain, SI joint, up to 8/10
- Insidious onset x 2 mo.
- Not worse with activity
- Night pain
- Better with ibuprofen
- PE – SI joint TTP, normal ROM, absent Achilles reflex
Neurological Examination

- Motor – MMT
- Sensation – LT both sides
- Reflexes – Patellar, Achilles, umbilical, anal
- Must document neurological exam
- Abnormal neurological exam suggest discopathy, myelopathy, extrinsic nerve impingment
16 yo with Low Thoracic Back Pain

• Insidious onset x 2 months
• Better with rest, worse with activity
• Interfering with sleep
• PMHX: substance abuse, suicide attempt, juvi
16 yo Thoracic Back Pain – PE

- Mild asymmetrical paraspinous mm spasm, tender
- Poor posture, good ROM, tight hamstrings
- Reflexes difficult to elicit but symmetrical
- X-rays normal
- Rest, analgesics, back & hamstring stretching, f/u 2 weeks
## Comparison of Back Pain, Children vs Adults

<table>
<thead>
<tr>
<th>Rank</th>
<th>Children</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lumbar strain</td>
<td>Lumbar strain</td>
</tr>
<tr>
<td>2</td>
<td>Spondylolysis</td>
<td>Lumbar disk</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical LBP</td>
<td>DJD</td>
</tr>
<tr>
<td>4</td>
<td>Lumbar disk</td>
<td>Fracture</td>
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#1 Cause of Debilitating Back Pain in Adults (Family Practice)

- Job dissatisfaction
- NEVER attribute back pain in a child to malingering, school avoidance, depression (don’t blow it off)
- Children & teens ALWAYS have a mechanical reason for their back pain
- The younger the child with back pain, the more likely it is something serious
Summary

- Take a good history
- Do a thorough neurological exam
- Select imaging carefully according to your ddx
- Most young people with back pain are able to return to their sport
- Children & teens always have a reason to have back pain
- The younger the child, the higher likelihood of serious pathology