Back Pain in Children and Adolescents: Clinically and Cost Effective Treatment

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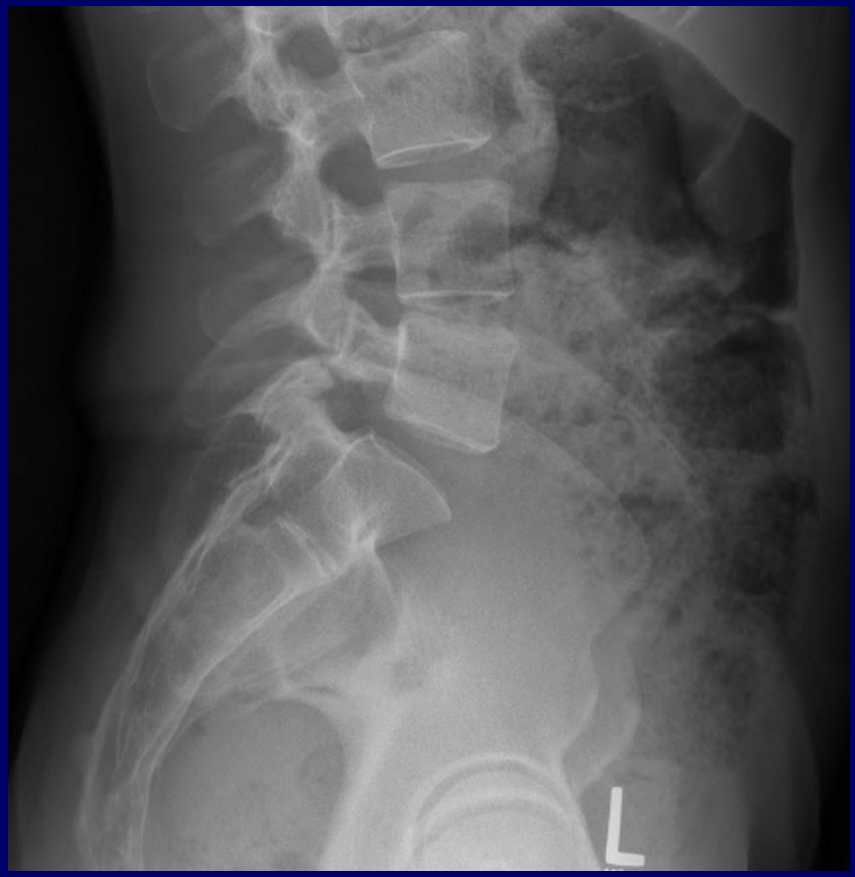

Children's National Health Network

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Back Pain

- **Kids have LBP**
  - 50% experience some back pain by 15 yo
  - Up to 36% experience episodic LBP by school age
  - Disabling condition in up to 13% of kids

Back Pain - Diagnosis

- **Back pain and underlying condition**
  - 1984: specific dx in 84% of kids presenting with LBP
  - 1995: number down to only 22%. Risks – male, constant, brief
  - 2000: 22% with use of bone scan. Risks – constant, night, male

- **In children, back pain of lasting duration is distinctly abnormal. Such complaints are significant and require thorough evaluation**

Back Pain – Diagnostic Algorithm

Diagnostic Modalities for the Evaluation of Pediatric Back Pain

A Prospective Study

(*J Pediatr Orthop* 2008;28:230–233)

Nitin N. Bhatia, MD, Gregory Chow, MD,† Stephen J. Timon, MD,‡ and Hugh G. Watts, MD†*

- **Evaluation of a diagnostic Protocol**
  - 73 patients presenting with LBP (ages 5-17)
    - H+P and plain spine radiographs at presentation
    - Negative xray → bone scan with SPECT + labs (ESR and CBC)
    - + Bone scan → CT scan
    - + Neurologic findings → MRI
    - + ESR → HLA-B27
    - End Point: Definitive diagnosis or no worse symptoms after 2 yrs

Back Pain – Diagnostic Algorithm

- 78% of patients had NO diagnosis
- Of the patients with diagnosis (13): 69% spondy
- 10/13 had diagnosis on initial plain film
- 2 others had +CT scan (spondy) and 1 with neuro findings had HNP on MRI

- Bone scans, labs, MRI are not needed in early evaluation of children with LBP

Who Gets Back Pain?

- **Many assessments for risk factors for pediatric back pain**
  - 2008 Questionarie 546 Danish kids age 15-16 (Skoffer, Eur Spine J)
    - Back pain correlated with inactivity → time in front of TV or homework
    - Only soccer and swimming were protective sports
  - 2002 Questionarie 1500 British kids age 11-14 (Watson, Arch Dis Child)
    - No correlation of BP and BMO or weight in backpacks
    - Strong association of BP and emotional problems, conduct problems And other somatic complains (headache, abd pain, daytime tiredness)

Activity level and general psychosocial health likely play a role in pediatric back pain

Back pain and Backpacks

Backpacks

- **Multiple studies on the connection of BP and LBP**
- **Relationship is unclear**
  - Mackenzie 2003
    - Increased back pain with pack weighting > 15-20% child's weight
  - Wall 2003
    - Only 1/346 kids attributed back pain with backpack
  - Jones 2004
    - No relationship found

Utility of education programs have been shown: 2 straps, use lockers, lighten loads to minimum

History

- Toddlers and young kids play and do not complain of pain
- Adolescents may have secondary gain issues

- Type (repetitious pain after activity? night pain?)
- Location (localized or radiating)
- What aggravates or relieves pain (anti-inflammatories)
- Neurological changes (gait, incontinence)
- Fever, weight loss

Physical Exam

Check for:

- Skin (café-au-lait spots, dimples, hairy patches)
- Posture (Kyphosis – roundback)
- Scoliosis (usually not painful and may be secondary to underlying pathology)
- Pelvic obliquity
- Stiff movements (a child may not bend over)
  - Cookie test: cookie on the floor and child with go get it
    - Do they bend at the knees or the back?

Physical Exam

- Direct pain to palpation over lower back (usually not significant for anything bad)
- Loss of normal back contours (flat back in lumbar region may suggest spondylolisthesis)
- Pain with flexion (herniated disc? – uncommon)
- Pain with hyperextension (spondylolysis – common cause of childhood back pain)
- Neurological exam (reflexes, strength, size, etc.)

Aids in Diagnosis – Ask why are you ordering test!

- AP and Lateral x-rays of region of enitre spine
- Oblique x-rays – little utility
  - Recent paper in JBJS showed no increased sen/spec with inclusion of oblique radiographs for detection of spondy
- Bone scan (stress fractures, diskitis)
- MRI (cord abnormalities, tumors)
- CT scan
- Labs
  - CBC, ESR, UA, occasional rheumatological studies

The more common causes of childhood back pain ....

Muscle Strain

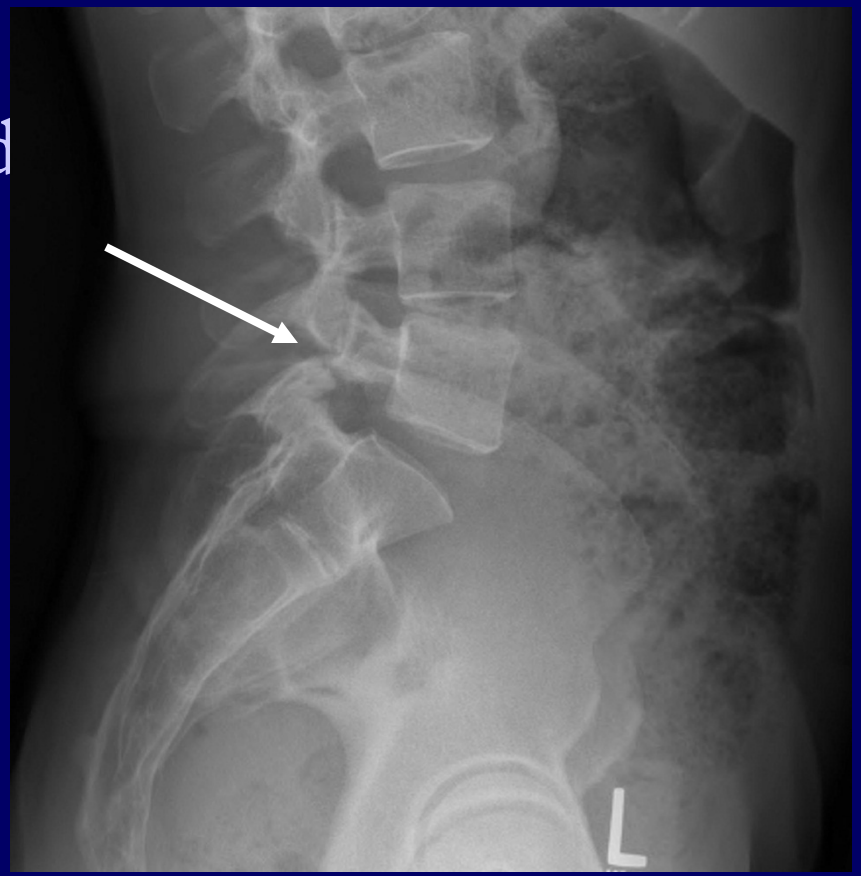
- **Common cause of pain in active adolescents**
  - Axial low back pain
  - Non-radiating
  - Activity related, improved with rest
  - NSAIDs “sort of” helpful
  - Normal neurologic exam
  - Tx
    - Activity modification until improved
    - Short course of RTC NSAIDs until improved, then taper
    - Short course of PT for core strengthening, quad/hamstring stretching
    - Put the responsibility on the adolescent patient

Scoliosis

- Not supposed to be painful
- Study of 2442 patients with scoliosis
  - 32% had back pain
  - Underlying pathologic condition in 9%
  - Beware of painful left thoracic curves
- Normal exam and radiographs – furthe imaging rarely helpful
- Pain often reported with prolonged Sitting → pain over rib prominence.

Spondylolysis

- Defect in posterior aspect (pars interarticularis) of a lower lumbar vertebra
- Frequent cause of childhood back pain
- Present in 5% of the North American population
- Gymnasts, dancers, football players, weight lifters



Spondylolysis

- Acquired during growth (not congenital) usually between age 5-10.
- May not be symptomatic but if it is, the pain is chronic - worsening with activity and improving with rest.
- Pain increases with hyperextension of the lumbosacral spine.

Spondylolysis

- X-ray
  - May begin as a stress (fatigue) fracture
  - Bone scan may demonstrate stress fracture if not apparent on plain x-rays

- RX
  - If not symptomatic, observe only
  - If symptoms are mild, limit the offending activities
  - If symptoms are moderate: PT, may brace temporarily
  - If symptoms are severe and resistant to conservative treatment, surgery is beneficial

Spondylolisthesis

- Forward slippage of the 5th lumbar on the sacrum.
- Spondylolysis (above) is always present.
- Physical exam demonstrates flat back and tight hamstrings.
- May be symptomatic.

Spondylolisthesis

- RX
  - If “slip” is mild and asymptomatic, only observe.
  - If “slip” is progressive or severe, surgical fusion is necessary.

Scheuerman's Kyphosis - Roundback

- Occurs most commonly in adolescent males.
- May cause midthoracic or low thoracic back pain of aching nature.
- Lateral x-ray demonstrates kyphosis exceeding 45 degrees and wedging of the involved vertebral bodies.

Scheuerman's Kyphosis - Roundback

- RX
  - In a growing child, bracing may arrest progression and relieve symptoms.
  - Rarely is surgery needed
  - Pain usually typically at skeletal maturity

Disc Space Infections

- More common in children than adolescents.
- Isolated disc infection usually caused by staph aureus.
- Occurs at one level.
- Irritable child refuses to walk or stand, but does not appear acutely ill.
- Back pain, spasm, tenderness (usually lumbar) loss of lordosis, limited spine motion.

Disc Space Infections

Labs

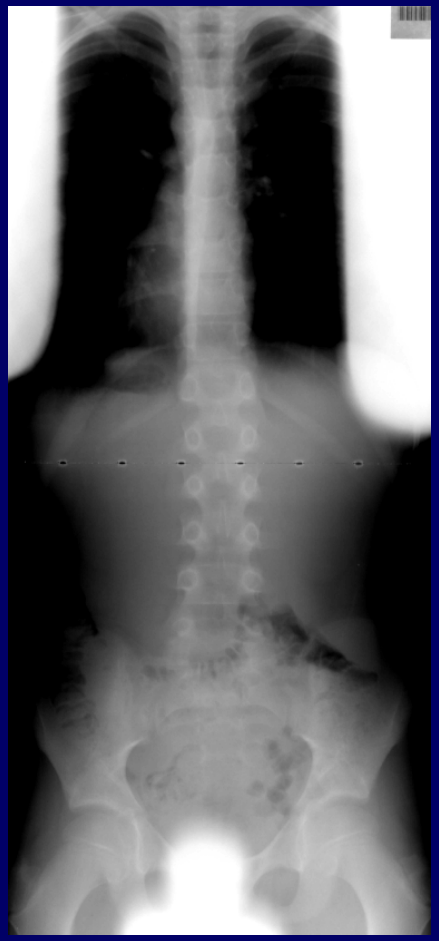
- Elevated ESR, normal WBC, +/- positive blood cultures
- X-rays usually negative early but progress, narrowed disc space and vertebral end plate irregularity.
- Bone scan is positive early (before x-ray changes)
- Needle aspiration is not necessary.

- **Rx**
  - Acitvity modification with/without cast or corset.
  - Antibiotics – penicillinase resistant anti-staph.

Less Common Causes of Childhood Back Pain…

Neoplasms – (usually benign)

- Osteoid osteoma
- Eosinophiliac granuloma
- Osteoblastoma
- Leukemia, Lymphoma
- Metastasis



Other Causes

- Trauma
- Visceral
  - Abdominal neoplasms
  - Pyelonephritis
  - Retrocecal appendicitis
  - Retroperitoneal abscess
- Infection
  - Vertebral osteomyelitis
  - Sacroiliac joint sepsis
  - Epidural abscess

What do we know about back pain in kids?

- Common
- Usually no identifiable cause
- There are secondary factors which contribute to back pain: psychosocial issues, backpacks
- There are red flags: persistent pain, pain at night, fever, neurologic changes
- The most common “cause” of back pain is spondylolysis

How can we treat back pain in kids?

- NSAIDS
- Narcotics
- Physical Therapy
- TENS, Electrical stimulations, chiropractic care
- Brace
- Surgery

Algorithm of diagnosis and treatment

- **Careful history and physical**
  - Night pain, fever, radicular symptoms, constant/prolonged pain, limp, stiffness, avoiding usual play
  - Look for radicular symptoms, weakness, stiffness, other neurologic signs, location of pain

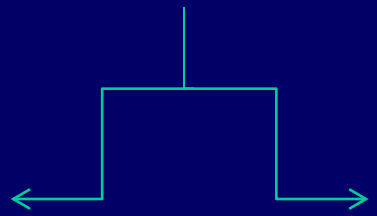
1. PA and Lateral xray of the spine
   - Will pick up the majority of abnormalities
   - Easy to quickly obtain and interpret

Normal xray, + red flags
MRI

Normal xray, no red flags
PT, NSAIDS for 8 weeks

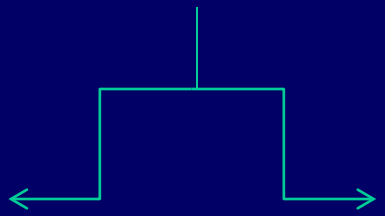
Algorithm of diagnosis and treatment

2. Patient returns at 8-12 weeks



Asymptomatic
Continue exercises, wean NSAIDS

Symptomatic (despite PT)
MRI



Normal – Continue PT
- Consider labs
  - Vit D, inflammatory labs
- Psychology – multimodal pain clinic

Abnormal
- Surgery
- Directed injections

What if we miss something?

- **Most abnormalities in kids are spondylolysis and are seen on xray**
  - Missed spondy or very mild spondy with pain STILL are treated with PT
- **What about a tumor**
  - Exceedingly rare without radiographic or neurologic abnormality
  - Good H+P → utilities of the red flags!

Conclusions

- Increasing incidence of pediatric low back pain necessitates a practical and cost effective treatment algorithm
- Most diagnoses are found on plain radiographs
- Assess for *Red Flags* during the H+P
- Physical therapy and NSAIDS are first line
- Alternative imaging should be symptom directed.