

BACK PAIN

RESIDENT
PEM CONFERENCE

BRAD SOBOLEWSKI, MD

The case

- A previously healthy 4 y/o male presents to the ED with a complaint of abdominal pain
 - PMHx of seasonal allergies
- Upon further questioning has also been complaining of lower back pain for 3 weeks
 - No trauma or prior history
- Intermittent fevers for 3 ½ weeks
 - Most recently 101.2
 - Tmax 103, occur q2-3 days
- Seen by PMD 2 weeks ago, Dx w/ constipation and started on Miralax
 - Stools have since been regular in frequency and consistency



The case

- Parents concerned because he came out of the bathroom in daycare crying with abdominal and back pain
- He has been drinking and eating less for 2 days
- Difficulty walking up stairs and picking things up off of the ground
- Denies fatigue or weight loss
- No respiratory, urinary, or GI Sx
- No allergies
- Tylenol has helped the pain somewhat
- On Miralax and Claritin
- Daycare attendee, family history of thyroid disease, arthritis, and diabetes



The case

- They also state that he has been walking like an old man



Physical exam

- **General:** alert, NAD, well appearing
- **Head and Face:** head atraumatic, normal cephalic
- **Eyes:** conjunctivae and lid normal
- **Pharynx:** oral mucosa moist
- **Ears:** tympanic membranes normal
- **Throat:** normal
- **Respiratory:** breath sounds equal bilaterally, no rales, rhonchi, or wheezes, normal respiratory effort/excursion
- **Cardiovascular:** distal pulses present, strong, cap refill <2 seconds, NL S1/S2



Physical exam

- **Gastrointestinal:** abdomen soft, nontender, nondistended, positive bowel sounds, normal rectal tone
- **Lymph:** Bilateral shotty inguinal lymphadenopathy
- **Genitourinary:** normal external genitalia
- **Skin:** skin pink, warm, and dry
- **Neuro:** sensation normal, normal reflexes, mildly antalgic gait, GCS=15, normal muscle strength
- **Spine:** normal curvature, no point tenderness over spine; he points to posterior hips as site of pain



In summary

- 4 year old male with 3 weeks of intermittent fever and low back pain
- ‘Walks like an old man’
- No neurologic abnormalities
- What would you like to do?



Back pain in children

- How many of you have seen a child with back pain?
- What comes to mind when you hear 'back pain' as the chief complaint?

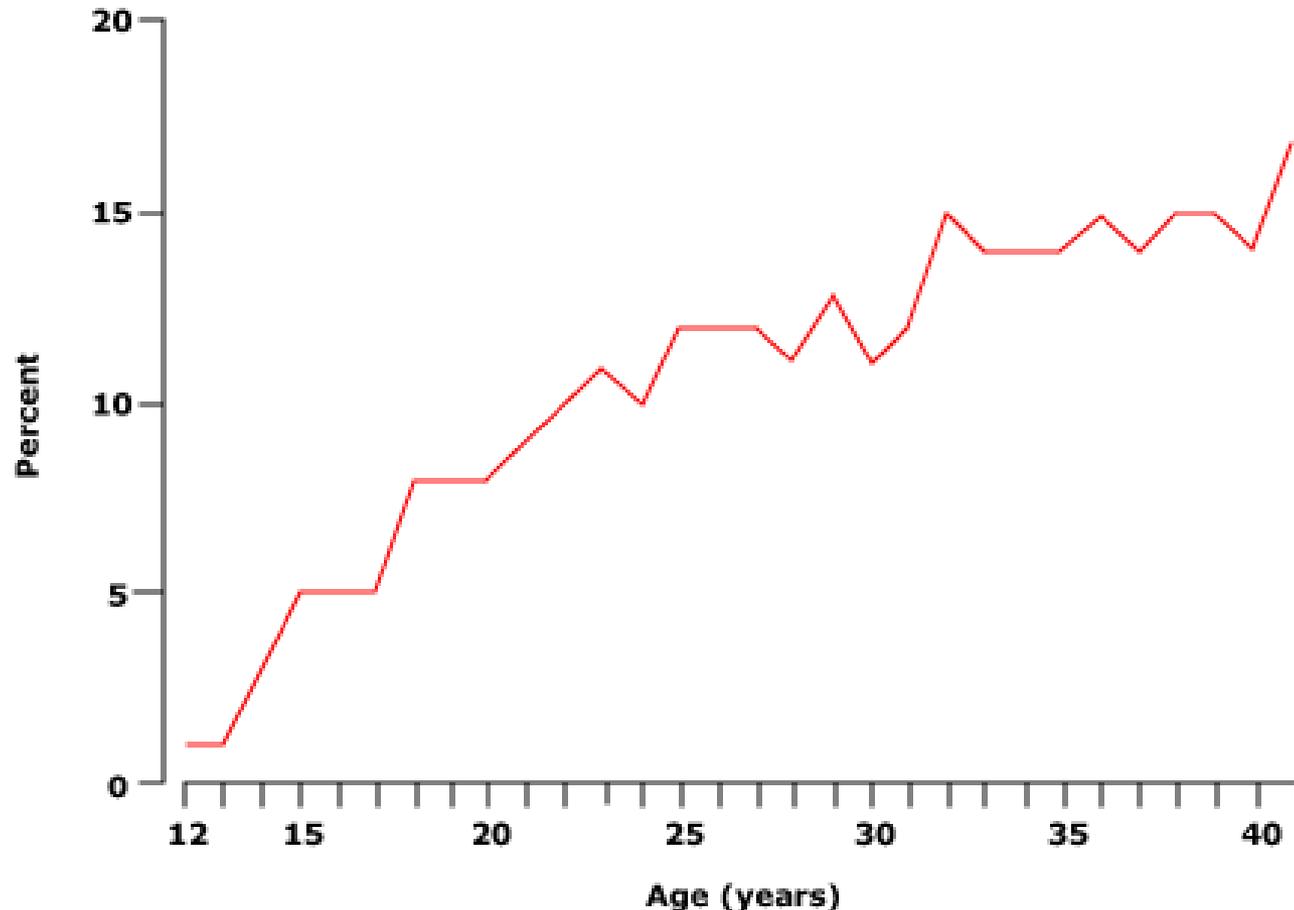


Back pain in children

- According to a Scandinavian study of over 29,000 children
 - 7% of 12 year olds experienced low back pain
 - Cumulative incidence at 50%
 - By age 18 in females, 20 in males
- Associations
 - Female gender, increased TV time, negative affect scores, family Hx



Back pain: point prevalence



Point prevalence of low back pain, individuals aged 12 to 41 years.
Data from Leboeuf-Yde, DC, Kyvik, KO. Spine 1998; 23:228.



- Back pain is the presenting complaint in 0.4% of ED visits
 - 90% present for <4 weeks

50% musculoskeletal

9% infection (UTI or viral)

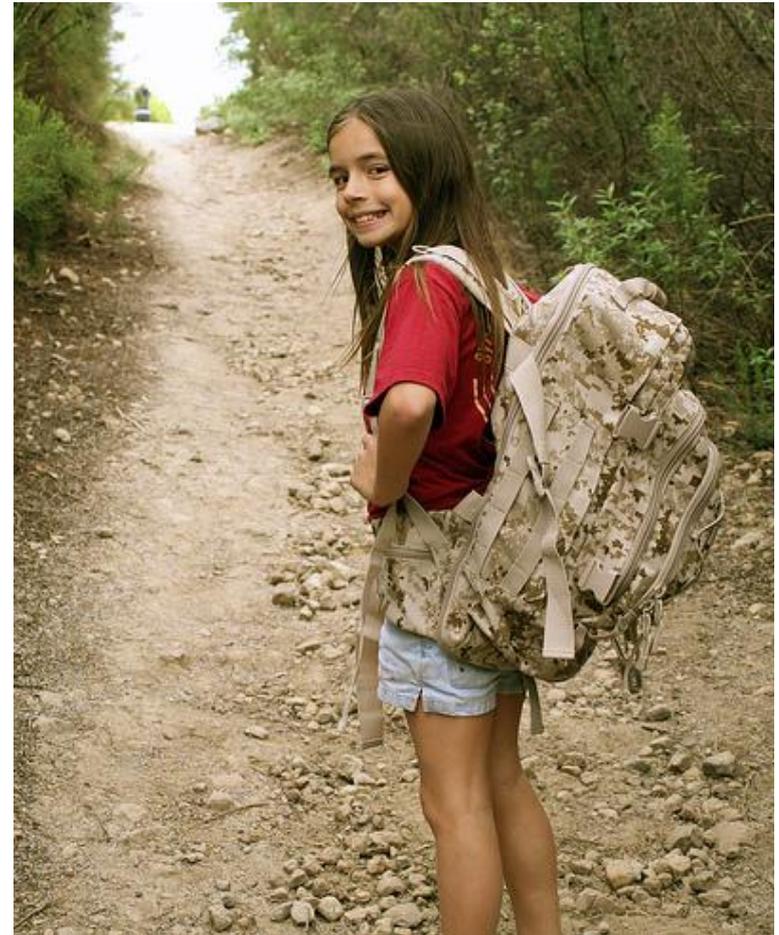
13% idiopathic

13% sickle cell pain crises

6% miscellaneous



- Overloaded school backpacks are a potential cause of back pain in children, particularly if the weight of the backpack is >15 percent of the child's
- The AAP says that backpacks should weigh no more than 10-20% of child's weight



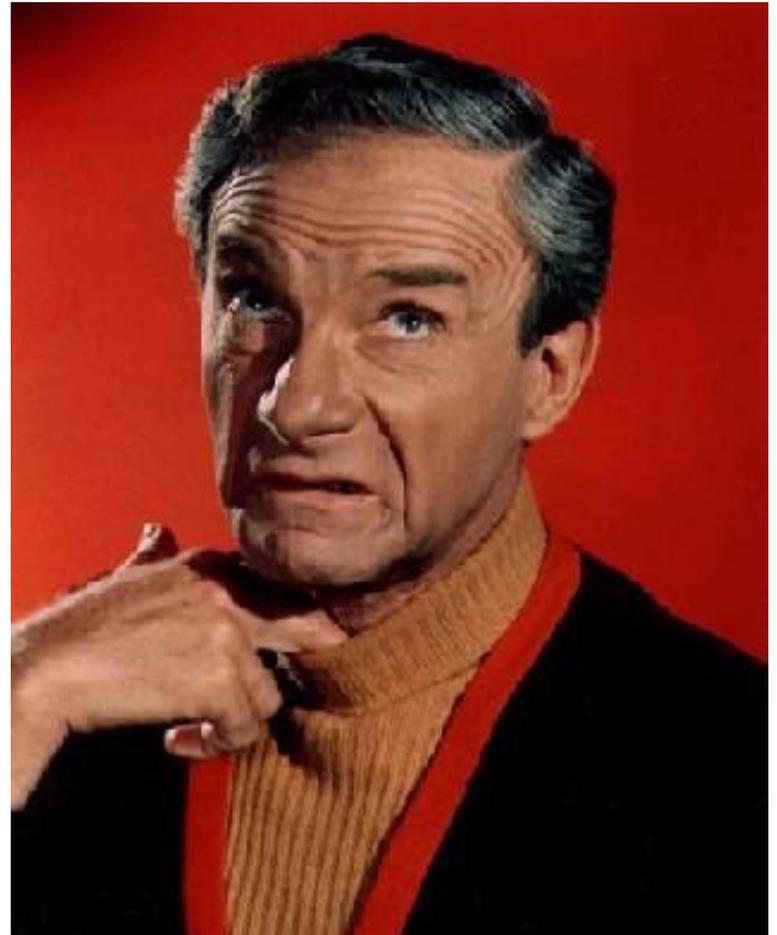
Red flags

- Young age
 - prepubescent, especially before school-age
- Fever
- Acute trauma
- Weight loss
- Constant pain
- Night pain
- Progression of symptoms over time
- Significant pain or disability
- Sciatica
- Repetitive microtrauma, especially lumbar hyperextension
- History of malignancy
- History of TB exposure
- Bowel or bladder symptoms
- Abnormal neurological examination
 - asymmetric reflexes, Babinski, low rectal tone



Oh the pain, the pain of it all!

- Location?
 - Sprains and strains lead to nonspecific pain that can radiate to the buttocks



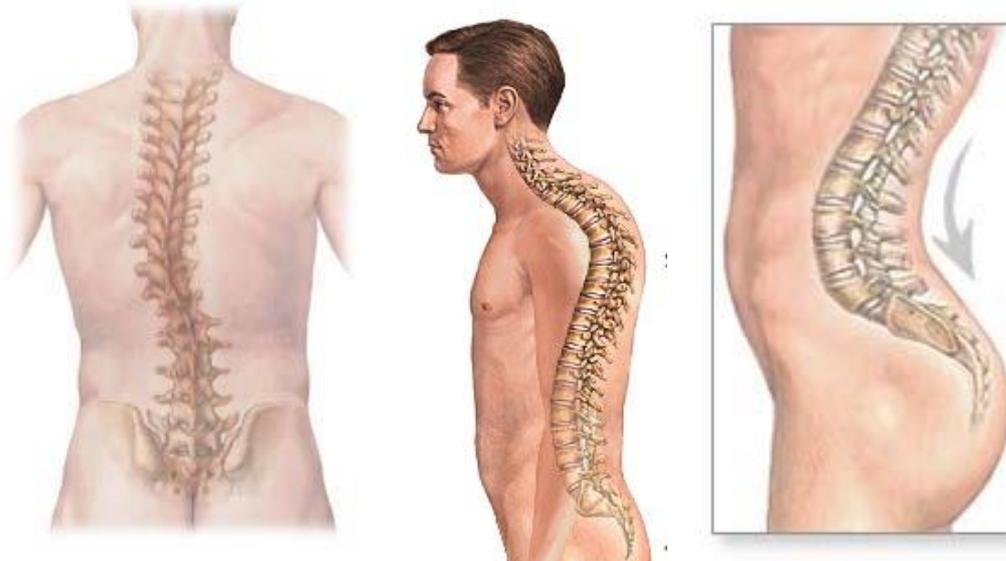
Location of pain

- Nerve root - brief; sharp and shooting, increased by straining, better supine
- Severe, constant back pain, persisting at night, suggests neoplasm, infection, or nerve root compression
- Sciatica suggests herniated disc – usually stops at the knee
- Pain radiating below the knee – true radiculopathy



Physical exam

- Signs of spinal pathology
 - postural shift of the trunk
 - neurologic abnormality
 - limitation of motion



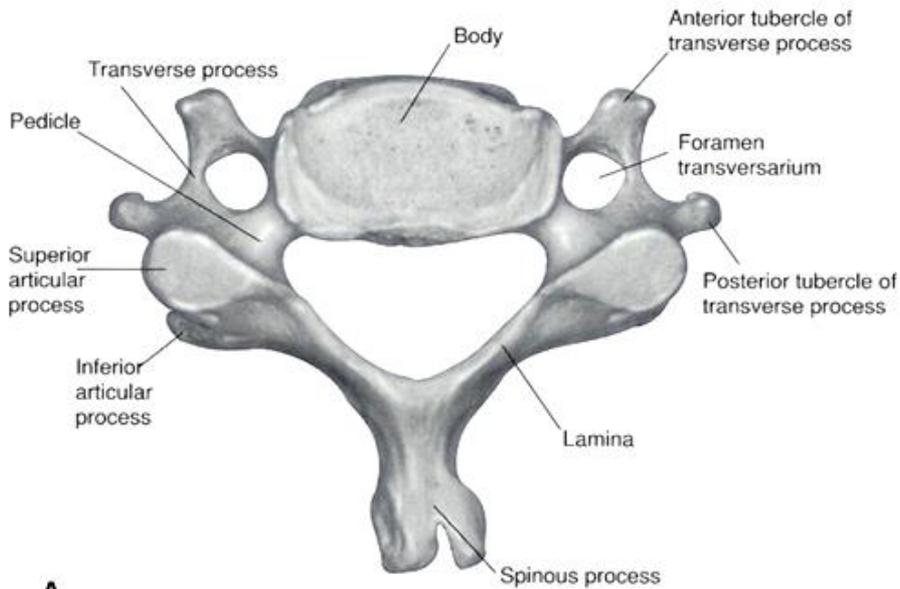
Physical exam

- Range of motion

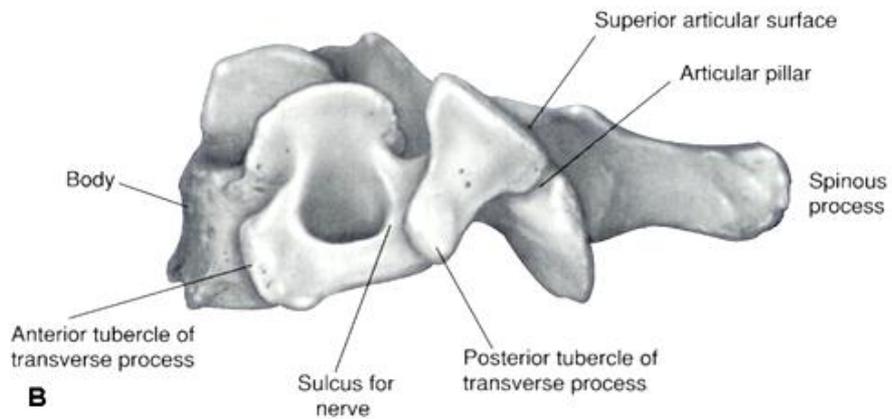
- Hold on a second, spondylowhatzit? Listhesis? I'm among those of us confused by lots of letters

defect)

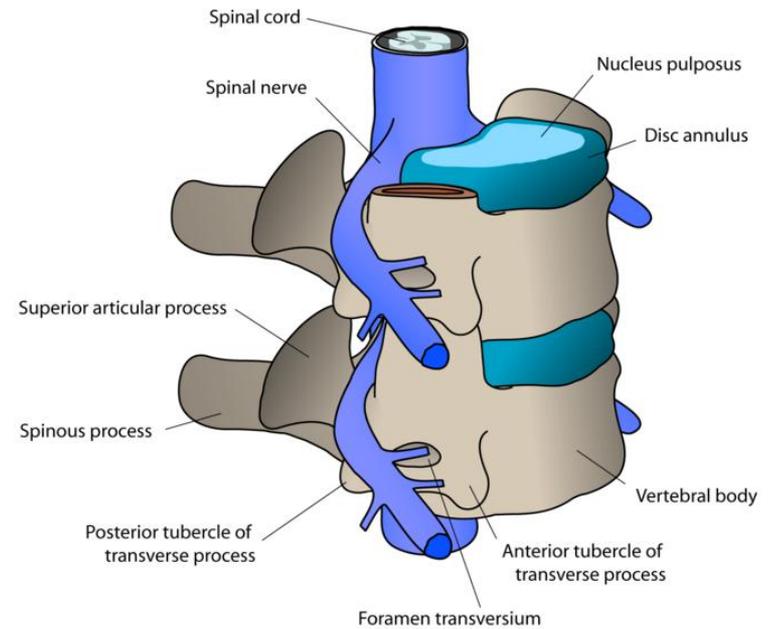




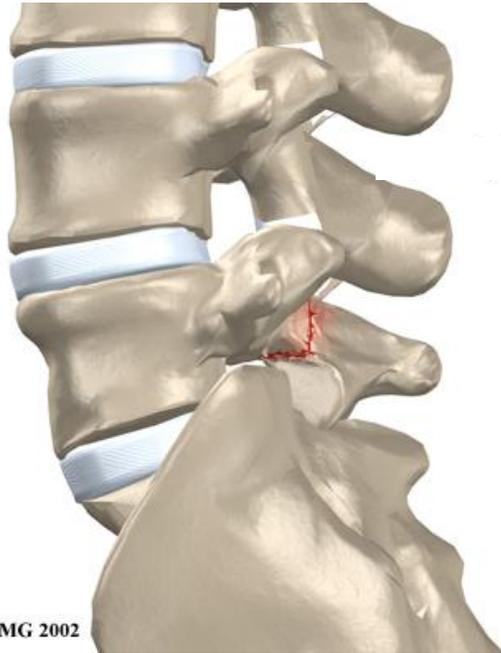
A



B



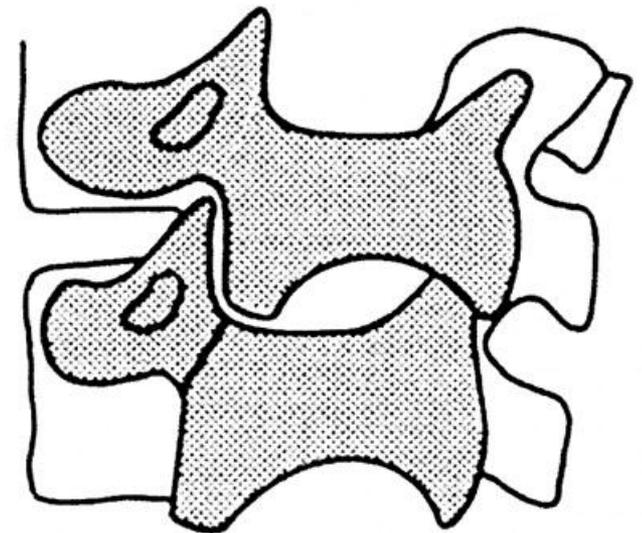
Spondylolysis



©MMG 2002

- Defect in the pars interarticularis
- Most common in L5
- Stress fractures
- 6% of population
- Most common cause of spondylolisthesis in pediatric patients

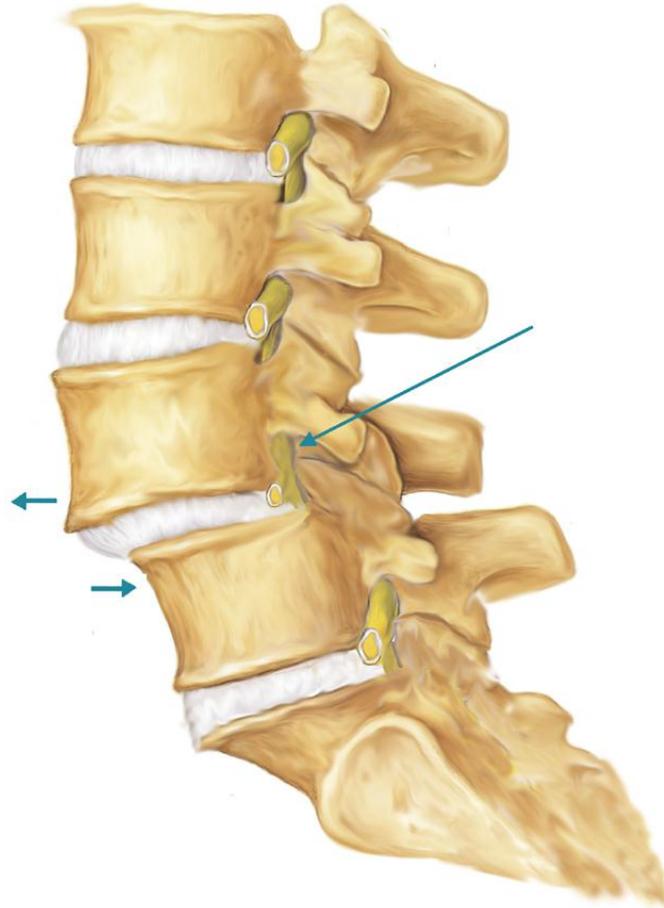
The **pars interarticularis** is the part of vertebra located between the inferior and superior articular processes of the facet joint. In the transverse plane, it lies between the lamina and pedicle.



Oblique 'scottie dog' view



Spondylolisthesis



- Anterior displacement of a vertebra in relation to the vertebrae below
- Due to a pedicle fracture



Back to physical exam

- Neuro exam
 - Reflexes – KNEE L3-4, POST TIBIAL L5, ANKLE S1
 - Can't rise from squatting? Proximal muscles
 - Gastrocnemius strength (S1) rising up on the toes.
 - Ankle dorsiflexion weakness L4 or L5 nerve root
 - Sciatic pain may be increased by testing foot dorsiflexion with the knee extended - stretches the S1 or L5 root
 - Great toe extensor weakness is indicative of L5 nerve root involvement
 - Gluteus maximus weakness (S1) may cause one buttock to sag
 - Gluteus medius weakness (L5) may cause a lurching or waddling (Trendelenburg) gait



Back to physical exam

- Straight leg raise
 - Detects nerve root impingement by herniated discs
 - Supine, uninvolved foot on table w/ knee at 45 degrees
 - Raise effected side w/ ankle at 90 degrees
 - In adults sens 80% spec 40% (LOTS OF FALSE POSITIVES!)
 - Likely due to hamstring tightness



Causes of back pain

- Musculoskeletal
 - Fractures
 - Nonspecific sprains/strains
 - Backpacks, overly soft mattress, large breasts
 - Spondylolysis
 - Inherited or repetitive microtrauma (lumbar hyperextension in gymnasts, dancers, divers, weight lifters, and football linemen)
 - Aching low back pain exaggerated by extension
 - Spondylolisthesis
 - From bilateral spondylolysis



Causes of back pain

- Musculoskeletal
 - Scoliosis
 - Musculoskeletal pain is more common in patients with scoliosis
 - One cohort of 2000 patients had 23% with pain at presentation
 - Scheuermann kyphosis (juvenile kyphosis)
 - anterior wedging of 5 degrees or greater in at least three adjacent vertebral bodies, as measured on lateral spine radiographs
 - Onset in adolescence (hunchback)
 - Inherited and common
 - Disc disease
 - Degenerative most common in L4-5, L5-S1
 - Very rare less than age 10



Scheuermann's Kyphosis



Causes of back pain

- Infections
 - Discitis
 - Vertebral osteomyelitis
 - Epidural abscess
 - Paraspinal abscess
 - Pyelonephritis
 - Pneumonia
 - PID
 - Endocarditis
 - Viral illness induced myalgias

Feet not happy, just cold.



Causes of back pain

- Inflammatory arthritis
 - Ankylosing spondylitis, psoriatic arthritis, the arthritis of IBD, and reactive arthritis
 - Characterized by
 - Morning stiffness
 - SI joint pain
 - HLAB-27 is common – but most back pain in HLAB-27 + patients is not from sacroiliitis



Causes of back pain

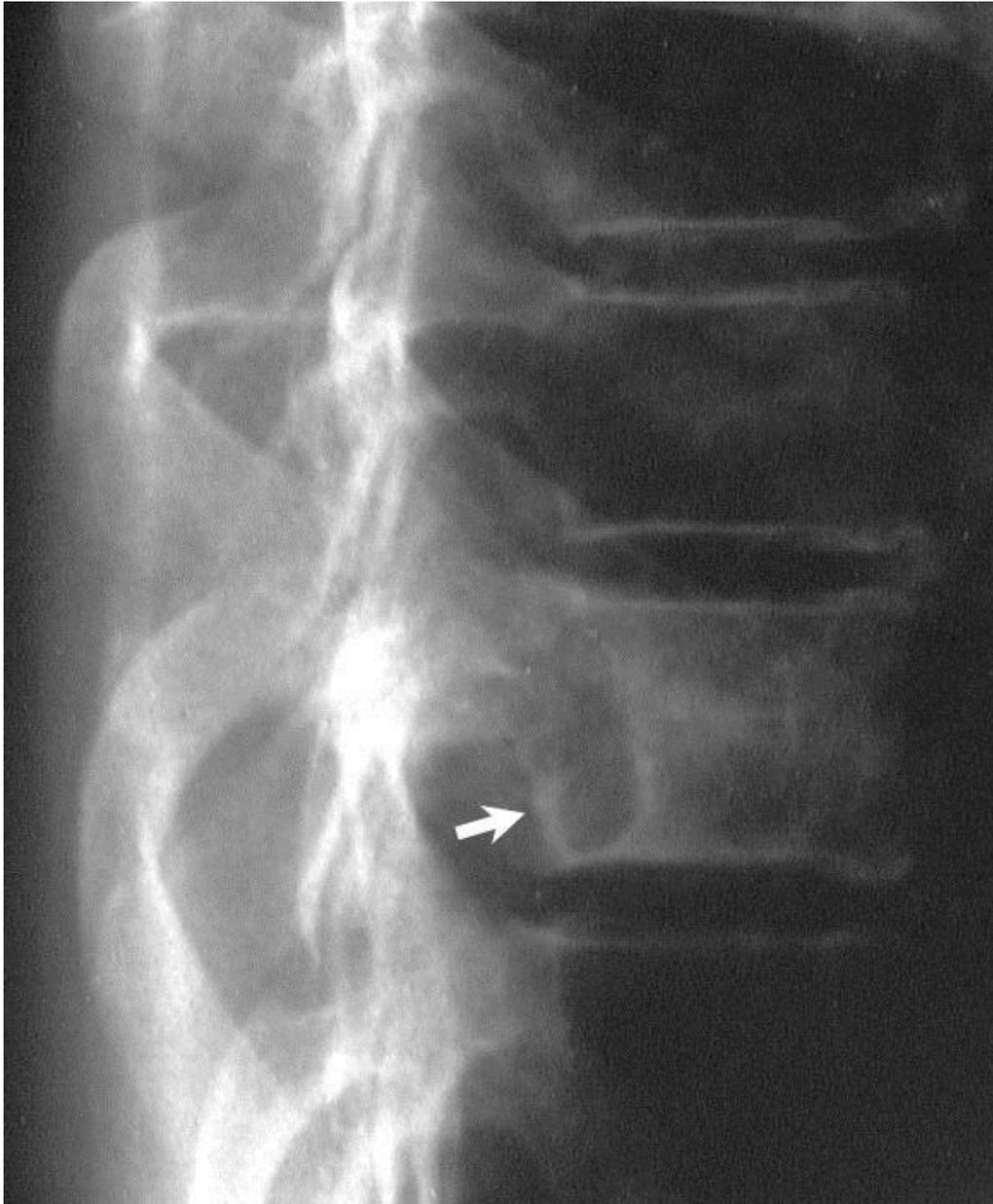
- Neoplastic
 - #1 is osteoid osteoma – benign, nocturnal pain relieved by NSAIDs
 - Can lead to scoliosis
 - Leukemia, Lymphoma, Ewing sarcoma, neuroblastoma, osteoblastoma, osteosarcoma, neurofibroma, and Langerhans cell histiocytosis
 - constant pain, nocturnal pain, and duration of pain less than three months were associated with tumors
- Miscellaneous
 - Sickle cell pain crisis, syringomyelia, cholecystitis, pancreatitis
 - Chronic pain syndromes – 10-15% of Rheumatology referrals
 - Most are adolescents, isolated back pain uncommon



Work up

- Labs
 - Inflammatory or infection? CBC, ESR, CRP, B/C, urine studies
- Radiology
 - Plain films – congenital or acquired pathology
 - Usually include AP and lateral only
 - Add oblique view for pars (spondylolysis)
 - MRI
 - Test of choice for evolving neurologic changes or known malignancy
 - nonbony spinal tumors, discitis, and sacroiliac (SI) joint inflammation
 - CT
 - Paraspinous or intrabdominal pathology
 - Bone scan
 - osteomyelitis, discitis, and early stress reactions in the pars





Osteoid osteoma



Work up – a pearl of wisdom

- Children with...
 - A short duration of symptoms
 - A clear musculoskeletal precipitant
 - A normal neurologic examination
 - A benign appearance
- Can be managed conservatively without labs or radiographs



Back to the case

- In the ED we obtained CBC, B/C, U/A, U/C, ESR, and CRP

8.2	13	524	S	34
	38		L	55
			M	8
			E	3

ESR 66

CRP 0.7

Electrolytes, Cal, Mag, Phos normal

- Abdominal and Spine XRays both normal



Back to the case

- We consulted Ortho and Radiology and obtained an MRI of the spine
- It showed L5-S1 discitis and S1 vertebral osteomyelitis



Back to the case

- Admitted to General Pediatrics with Ortho and ID consults with Dx of **Osteomyelitis/discitis**
- ID consulted and recommended treating with Clindamycin for 6 weeks via PICC
- Pain: Ibuprofen, with Tylenol #3 for breakthrough pain
- After D/C weekly CBC with diff, CRP
- Doing well



The big 5

- Take home points about back pain
 - Half of all kids will have had back pain at some point before adulthood
 - **Spondylolysis** is a stress fracture in the pars whereas **Spondylolisthesis** is anterior displacement of a vertebra in relation to the vertebrae below
 - Red flags - Young age, fever, neurologic symptoms
 - Children with a short duration of symptoms, a normal neuro examination and a suspected musculoskeletal cause can be managed conservatively without labs or radiologic testing
 - Workup starts with labs if you are considering inflammatory or infectious diagnoses while the best imaging test varies based on the clinical scenario

