Common Pediatric MSK Complaints – when to keep, when to refer

Michael J Conklin, MD

I have no disclosures

Content

- Low risk wrist fx's
- Finger fractures
- Limping child
- Ankle sprains/fractures
- Back Pain

Low risk wrist injuries

- Boutis randomized 96 kids 5-12 yoa into cast or splint group
- Transverse or greenstick fx's of distal radius with <15 deg angulation
- Splint or cast 4 weeks and activity modification for 2 more weeks
- No difference in outcomes

CMAJ·JAMC
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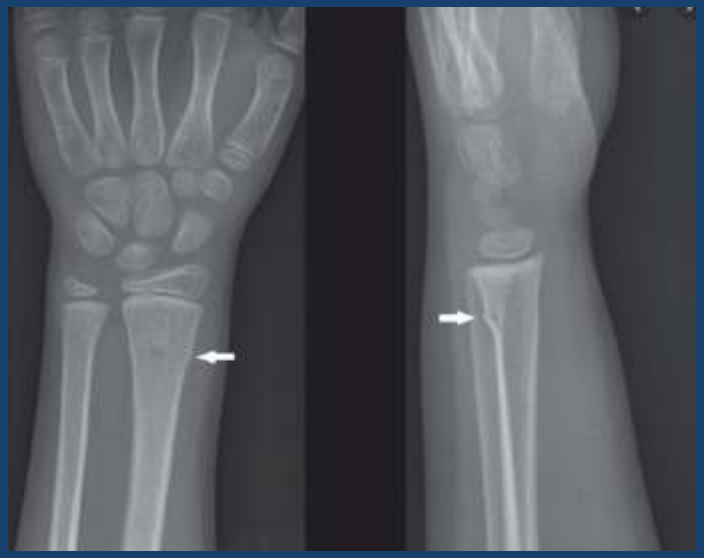
Information for Authors
Medical knowledge that matters — Des connaissances médicales d'envergure

CMAJ. 2010 Oct 5; 182(14): 1507–1512.
doi: 10.1503/cmaj.100119
PMCID: PMC2950182
PMID: 20823169

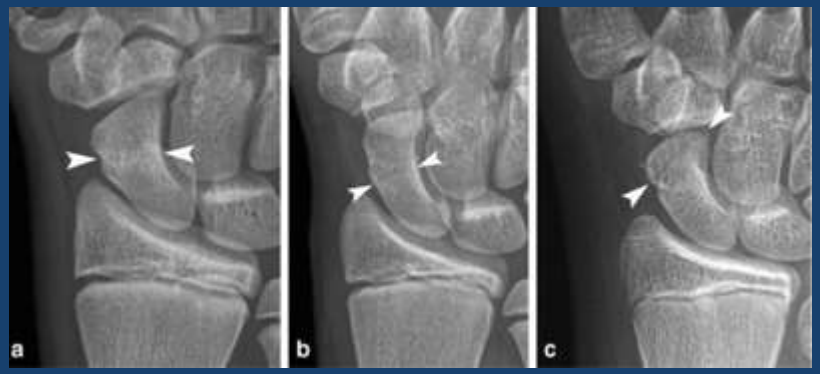
Cast versus splint in children with minimally angulated fractures of the distal radius: a randomized controlled trial

Kathy Boutis, MD, Andrew Willan, PhD, Paul Babyn, MD, Ron Goeree, MA, and Andrew Howard, MD



Scaphoid fx

- Before 15 yoa, 0.4% of pediatric fractures
- 0.45% of peds upper extremity fx's
- 0.6/10,000 per year
- Snuff Box tenderness
- Initial films may be negative
- Most tx'd non-op with thumb spica cast



Scaphoid – what to do

- If Snuff-box tender, place thumb spica splint and **refer**

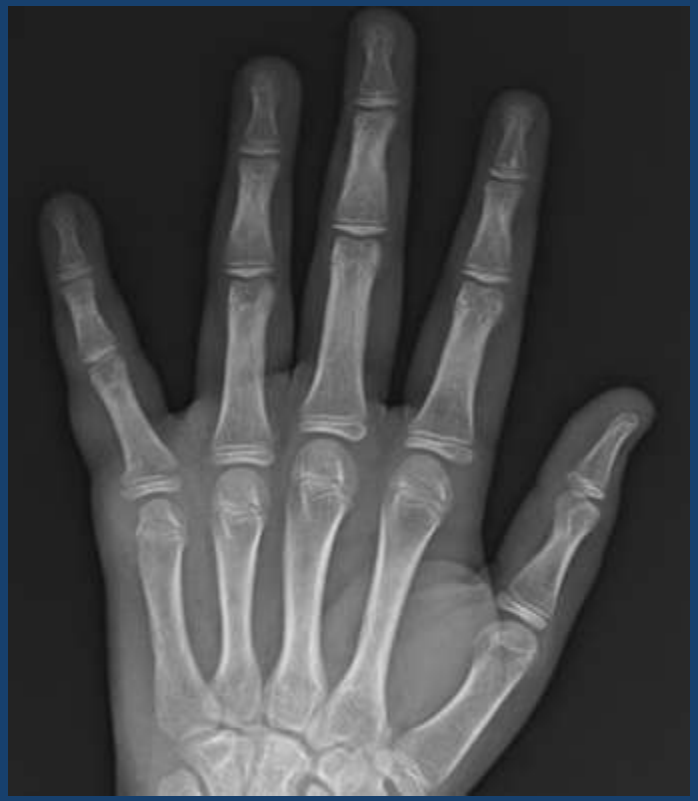
Finger fractures - Evaluation

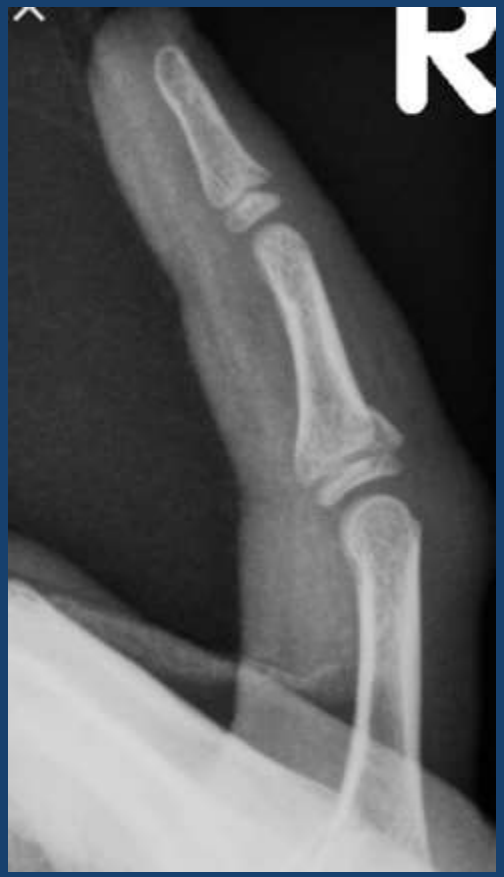
- Tenderness/ swelling
- Deformity – coronal or rotational
- Resting cascade of digits
- Flexor and extensor tendon function
- Order **xray of finger** not hand

Cornwall R1. Pediatric finger fractures: which ones turn ugly? J Pediatr Orthop. 2012 Jun;32 Suppl 1:S25-31. PMID: 22588100. [PubMed] [Read by QxMD]

Salter II phalanx fxs

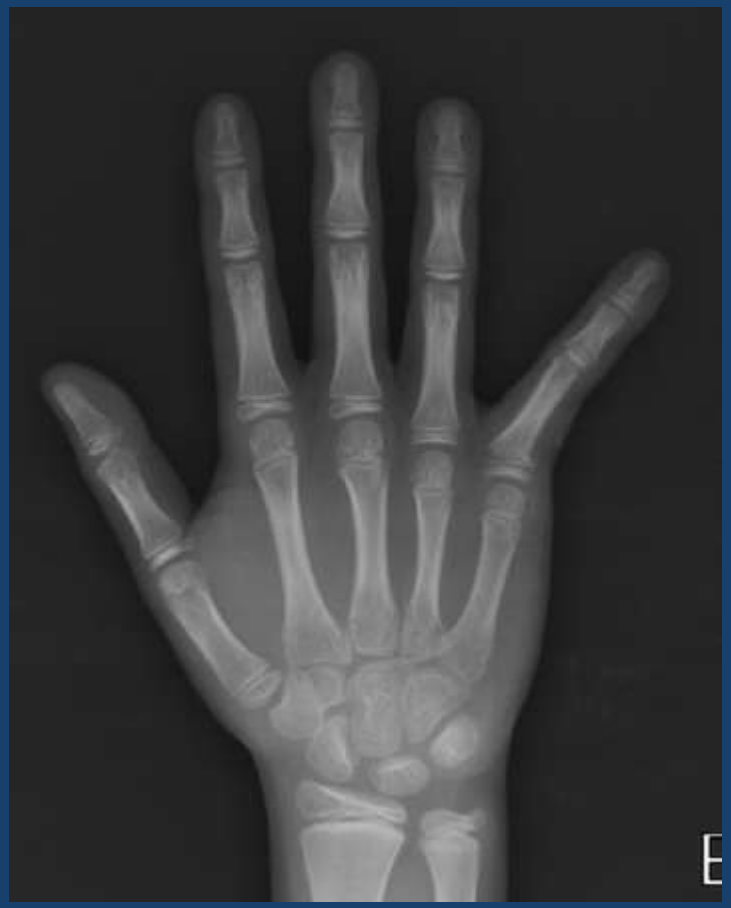
- Minimally displaced Salter II of Phalanx – buddy tape or splint
- **No need to refer**





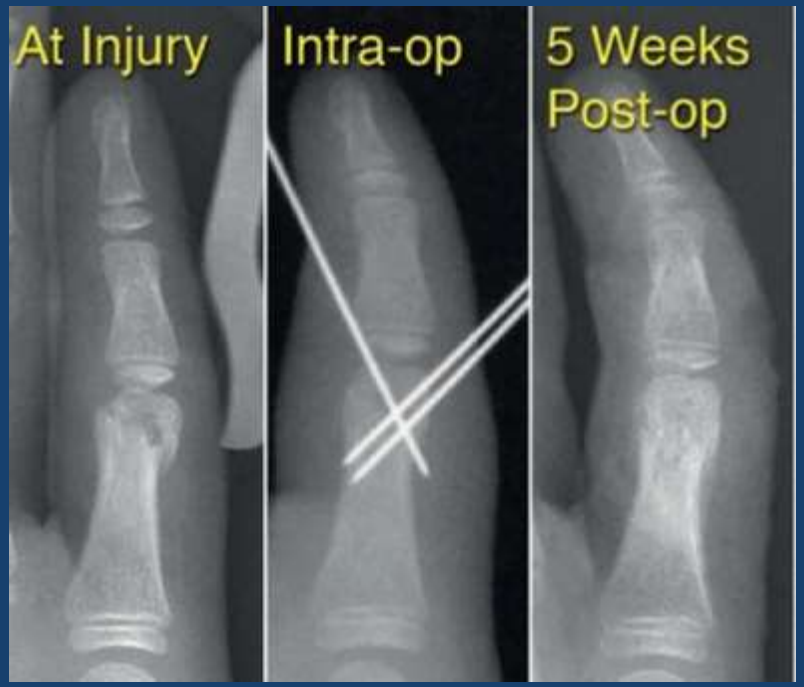
Salter II phalanx fxs

- When more displaced, reduction is necessary. Then buddy tape

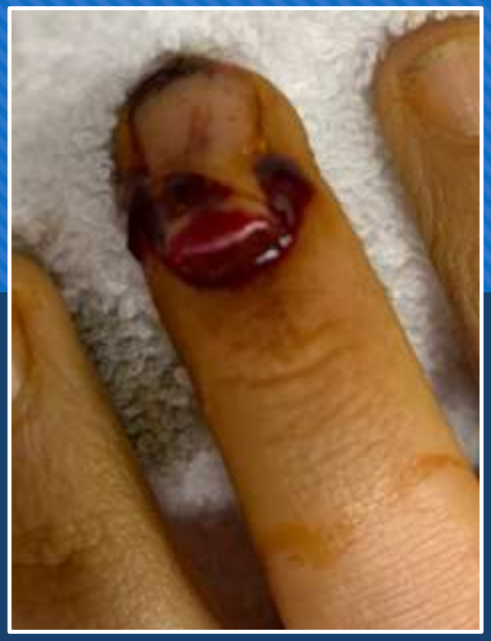


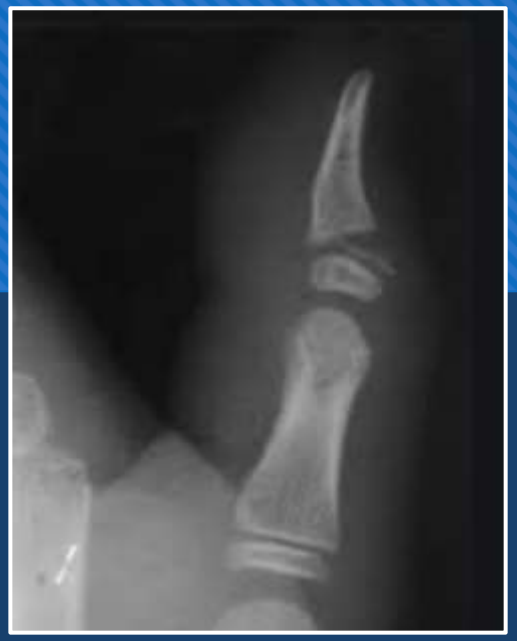
Phalangeal neck fx

- Phalangeal neck fracture – can be unstable - Refer



Seymour fx

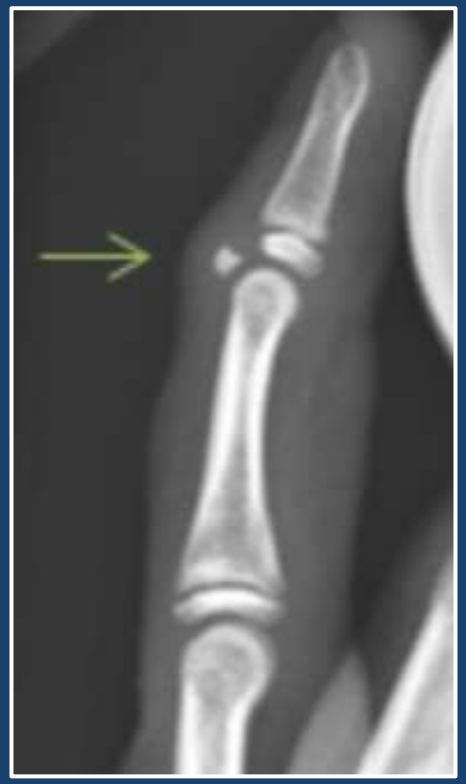




- Seymour fx – Occult open fx – blood under nail plate or cuticle
- Needs local washout, nailbed repair and abx (Keflex)
- **Refer**

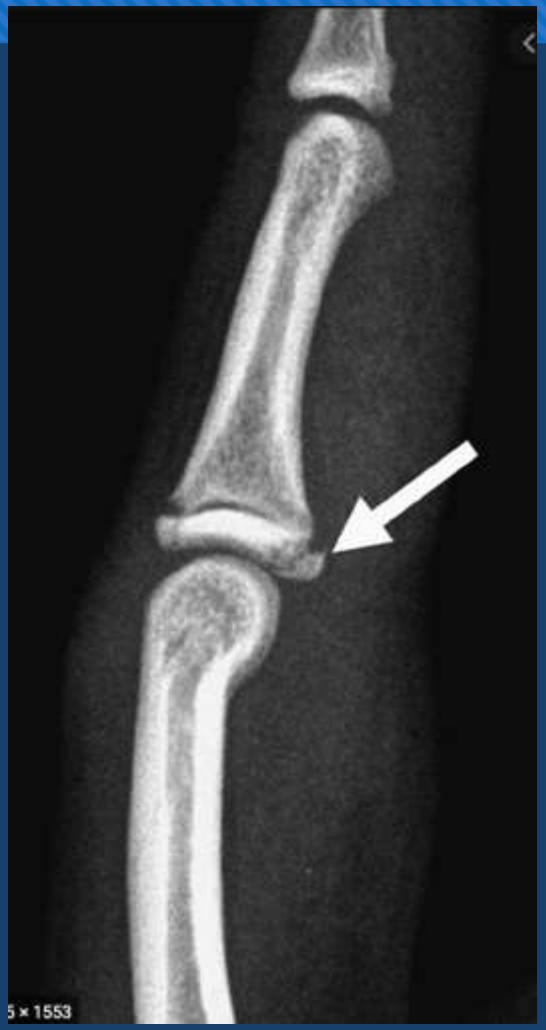
Mallet finger

- Avulsion of extensor tendon from distal phalanx
- **Refer**



Volar plate avulsion fx

- "Jammed finger"
- Hyperextension
- Dorsal extension block splint for 1 week then buddy tape
- **No need to refer**



Snuff box tenderness is indicative of:

- a. Phalangeal neck fracture.
- b. Distal radius fracture
- c. Scaphoid fracture

A physeal fracture of the distal phalanx with avulsion of the nail plate requires:

- a. irrigation
- b. antibiotics
- c. both

Limping

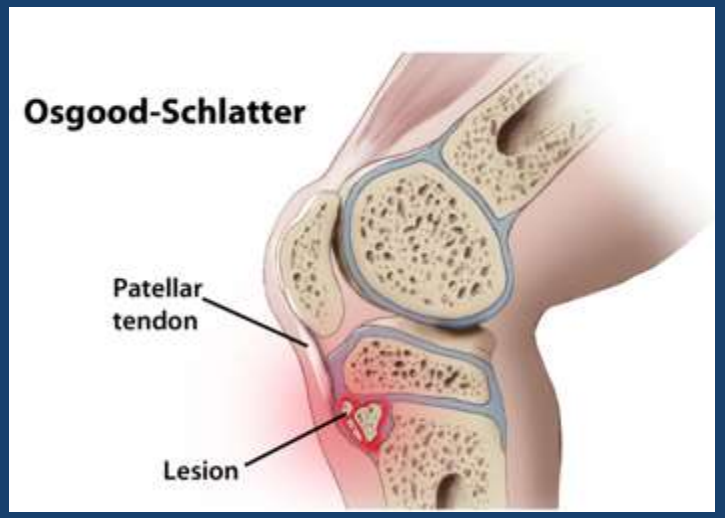
- Osteochondroses – Sever's, Osgood-Schlatters
- Fractures that may be difficult to see on xray: Toddler's fracture (tibia), Calcaneal tuberosity, Ist Metatarsal, Cuboid
- SCFE
- Transient synovitis
- Osteomyelitis/septic arthritis

Evaluation

- History – Where is the pain? Duration? Fevers? Injury?
- Exam – gait evaluation, Trendelenberg gait vs. Antalgic gait
- Exam – TTP, pain to ROM
- Imaging – Xray first

Osteochondroses

- Inflammation of growing bones at tendon insertions
- Sever's disease – Achilles insertion
- Osgood-Schlatters – Patellar tendon insertion
- Sindig-Larsen – Patellar tendon at inferior pole of patella



Osteochondroses

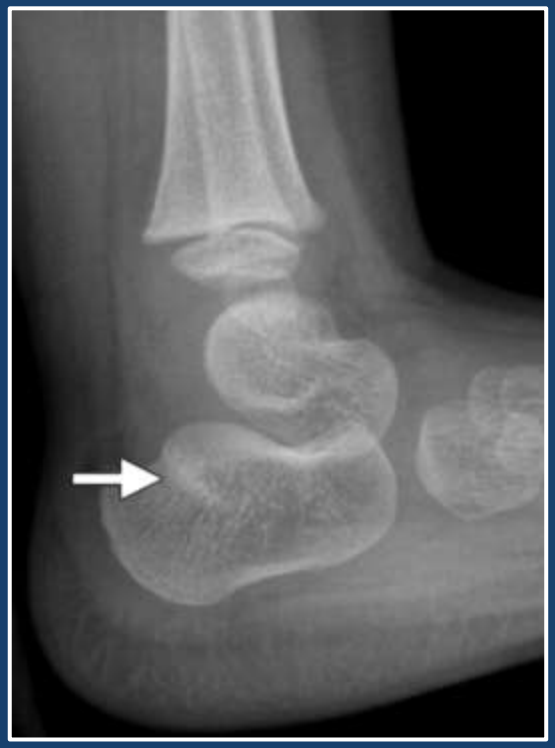
- Not emergent
- Little or no sequalae
- NSAIDS, activity modification
- Bracing/othotics
- PT
- Referral not necessary

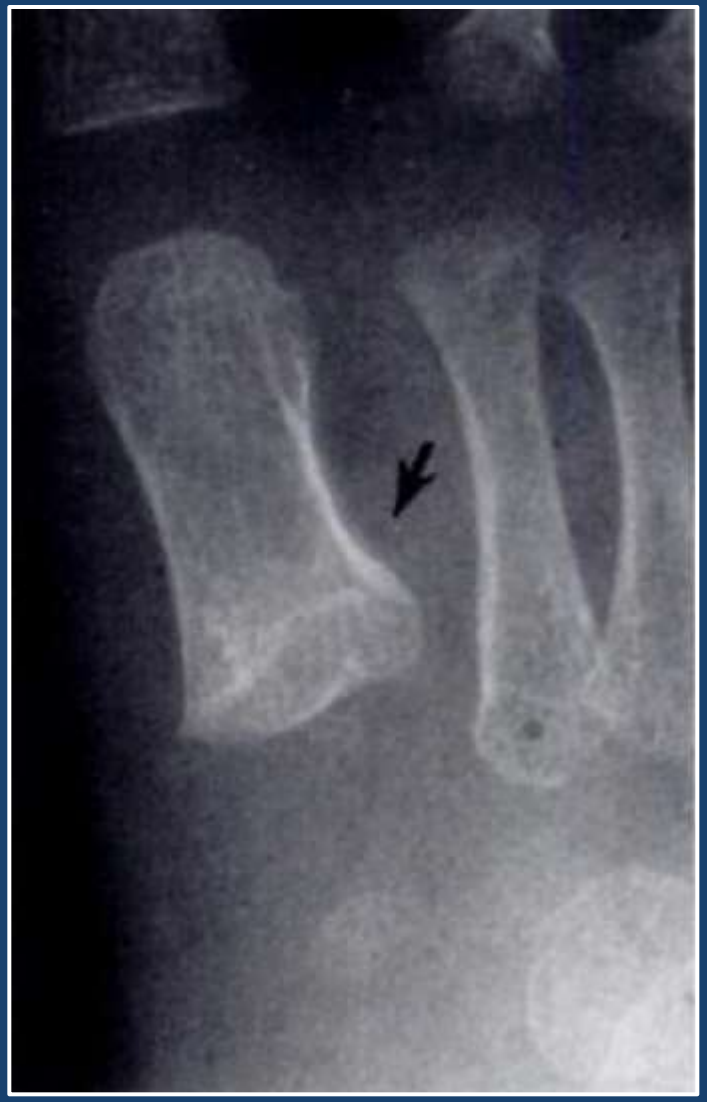
Fractures

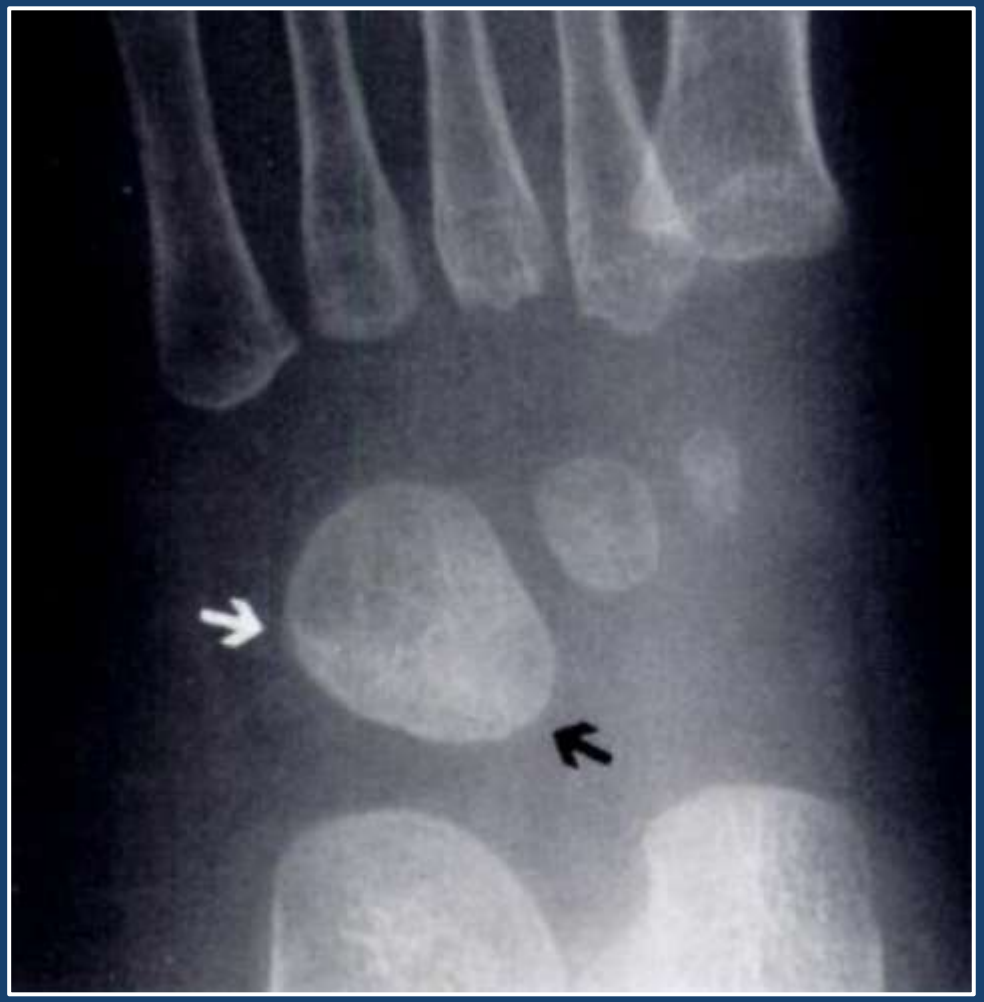
Expanding the Concept of the Toddler's Fracture[1]

Susan D. John, MD
Chetan S. Moorthy, MD
Leonard E. Swischuk, MD

- Difficult to see on xray
- Toddler's fx – Non-displaced spiral fx of tibia
- !st Metatarsal fx
- Calcaneal fx
- Cuboid fx

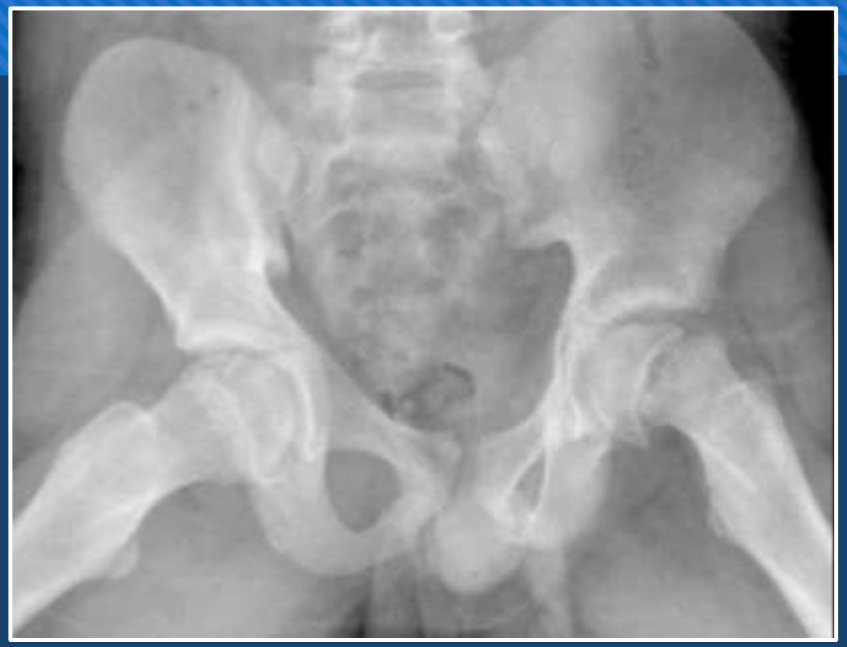






Slipped Capital Femoral Epiphysis

SCFE



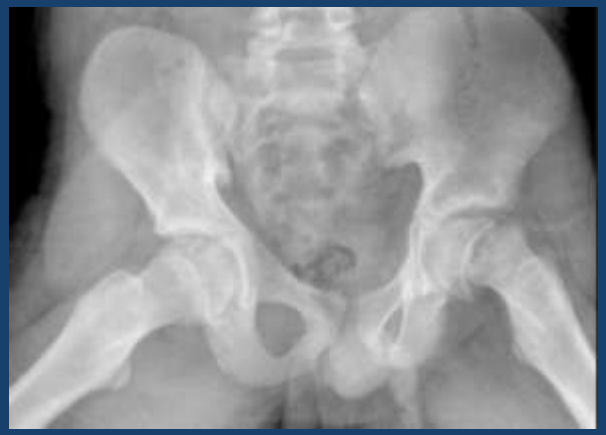
- 2-10 per 100,000
- Most common hip disorder in adolescents
- Boys 9-16 and girls 8-15
- Male:Female 3:1
- More common in African Americans
- Obese: > 50% above 95th % for weight
- Hip or knee pain

SCFE - Exam

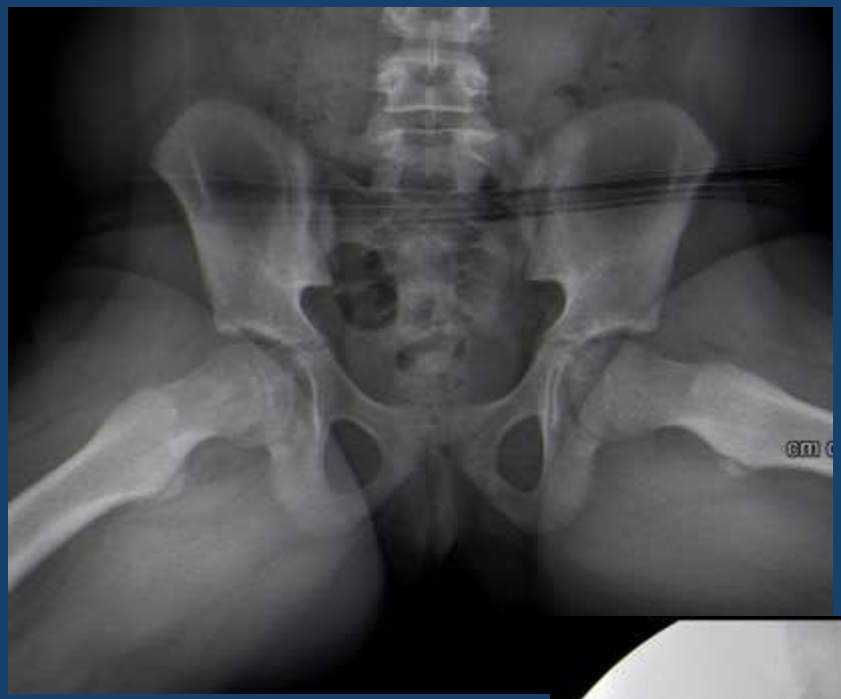
- External Rotation with hip flexion
- Trendelenberg gait

SCFE – Stable vs. Unstable

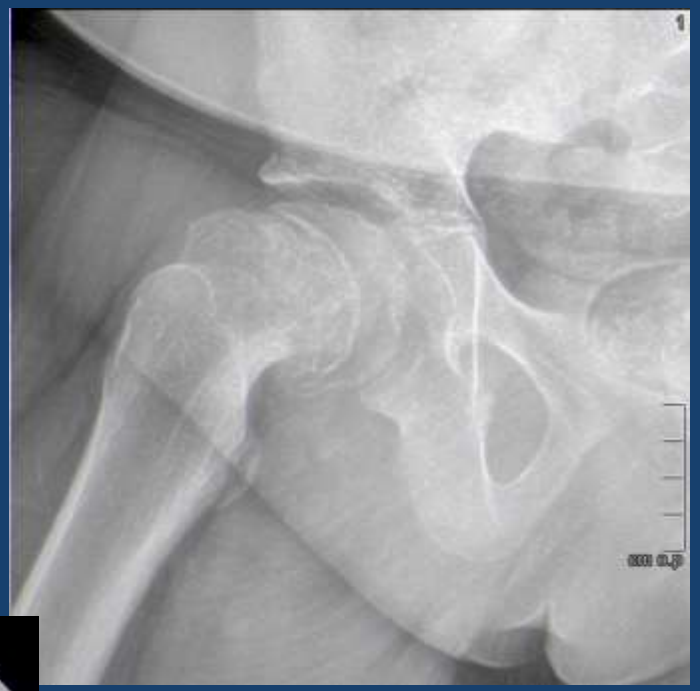
- Stable – able to bear wt – **Refer soon**
- Unstable – unable to bear wt – **emergent** – high risk of AVN

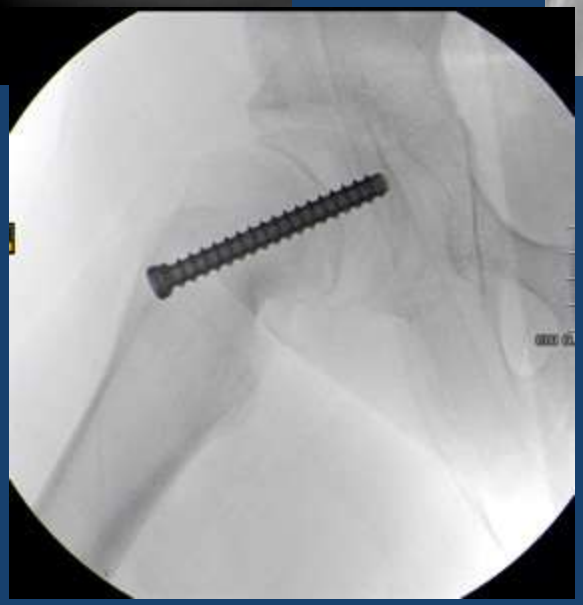


9 yoa – refused tx



10 yoa – slip progressed

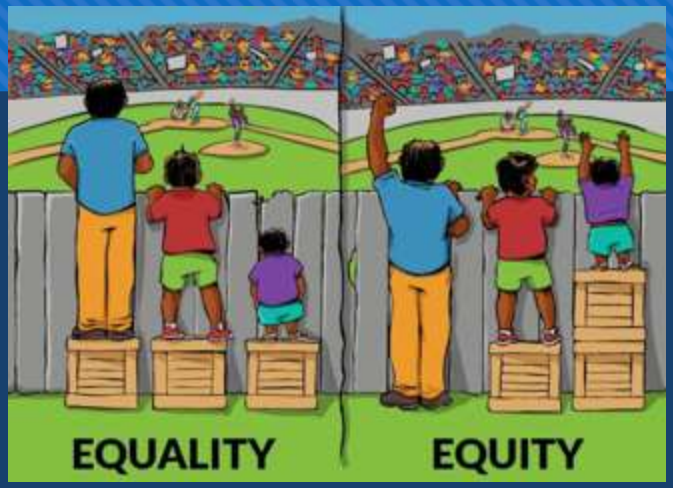




Percutaneous screw fixation

SCFE treatment –Health Care Disparity?

- Studies show a higher incidence of complications such as chondrolysis and AVN in Blacks vs. Whites.
- Physiologic or d/t lack of resident supervision?



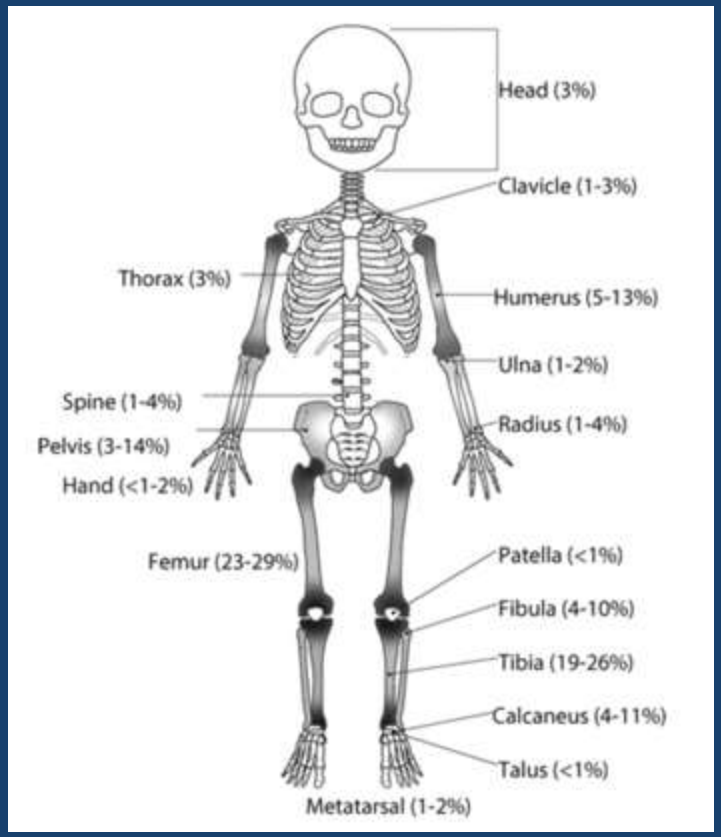
An obese adolescent with hip, thigh or knee pain should be evaluated with:

- CBC, Sed Rate, CRP
- MRI of the knee
- AP pelvis, lateral of hips

Infection

A child with bone pain and fever should be assumed to have osteomyelitis proven otherwise

Joint pain + Fever = Septic Arthritis until proven otherwise

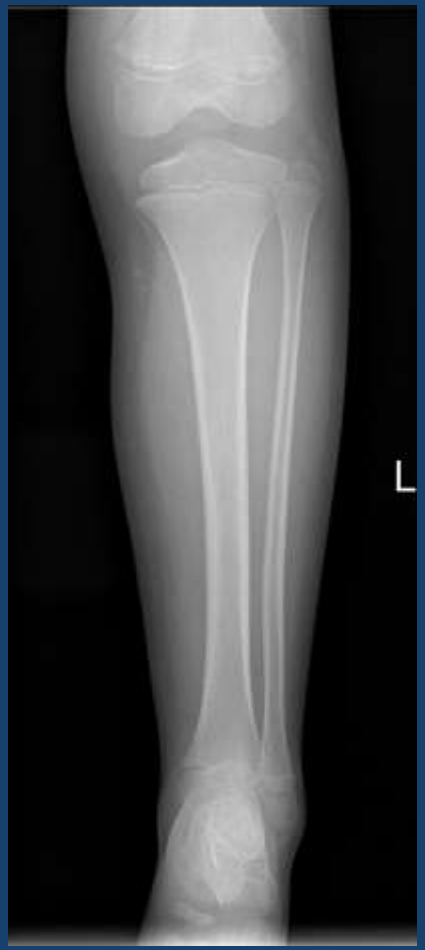


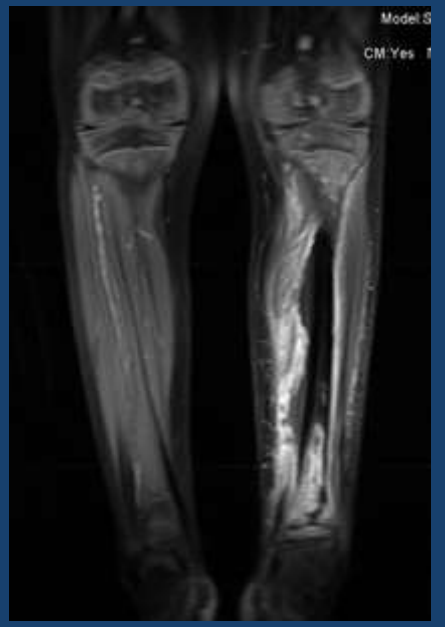
Ddx Septic Hip & Transient Synovitis – THE KOCHER CRITERIA

- Inability to bear wt
- oral temp > 38.5C
- ESR >40
- WBC > 12K
- .2%, 3%, 40%, 93%, 99.6% likelihood of septic hip for 0 thru 4 criteria

Osteomyelitis

- Hematogenous
- Common in long bones of the leg
- Bone pain + fever = workup
- May bear weight until more advanced disease
- CBC, ESR, CRP
- Xrays normal first 1-2 weeks
- MRI diagnostic
- Staph most common



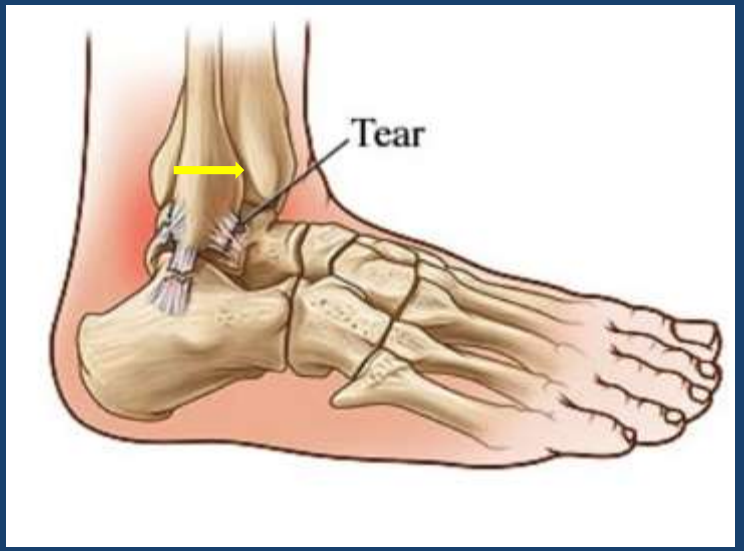


Which is not a Kocher criteria:

- ESR (sed rate) > 40
- Respiratory rate > 40 breaths/minute
- WBC > 12
- Inability to bear weight

Ankle Injuries

- Children different than adults d/t growth plates
- Sprains in children can be physeal fractures
- Palpate for tenderness
- Xray to r/o operative fracture
- When non-displaced – can be considered ankle sprain equivalent and treated in boot



Low risk pediatric ankle fractures

- Boutis K, Willan A, Babyn P, Narayanan U, Alman B, Schuh S. A randomized, controlled trial of a removable brace versus casting in children with low-risk ankle fractures. *Pediatrics*. 2007;119(6):e1256-63.

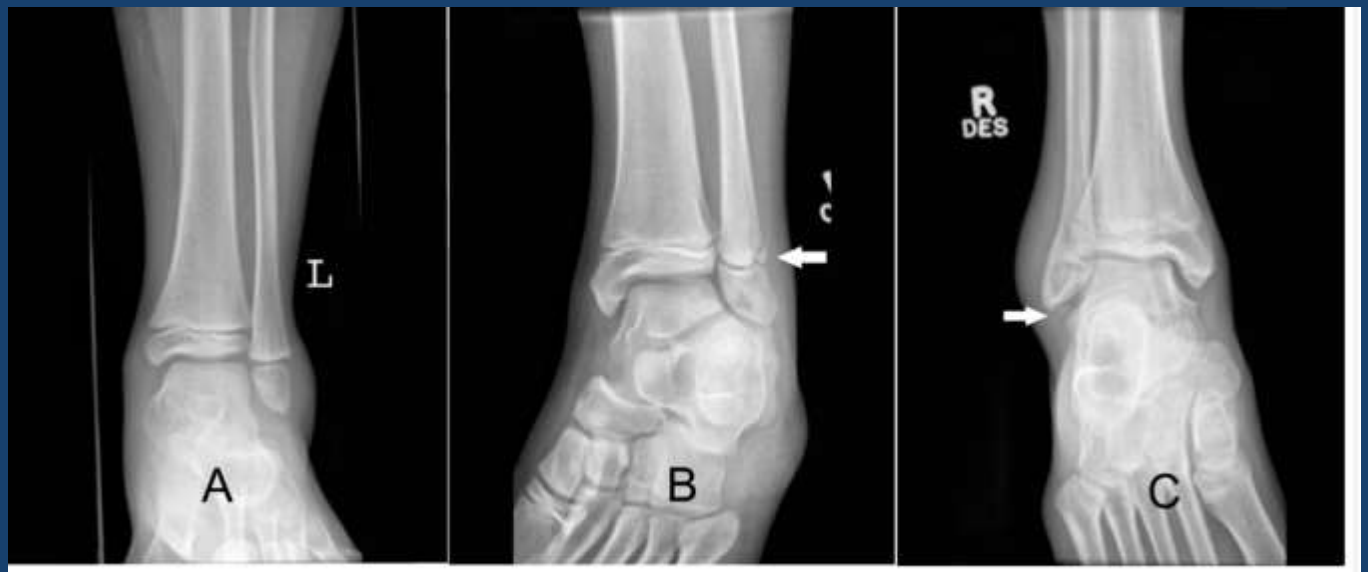


FIGURE 1: LOW RISK ANKLE FRACTURES (A) PRESUMED DISTAL FIBULAR SALTER-HARRIS I PHYSEAL FRACTURE (B) DISTAL FIBULAR SALTER-HARRIS II PHYSEAL FRACTURE (C) DISTAL FIBULAR AVULSION FRACTURE

Low risk ankle fractures and sprains

- Can be tx'd by primary care
- Removable ankle brace
- Self-regulated return to activities
- **Refer if fail to improve**

Back Pain

> Spine (Phila Pa 1976). 2020 Aug 15;45(16):1135-1142. doi: 10.1097/BRS.0000000000003461.

The Epidemiology of Back Pain in American Children and Adolescents

Peter D Fabricant [1], Madison R Heath [1], Jonathan M Schachne [1 2], Shevaun M Doyle [1], Daniel W Green [1], Roger F Widmann [1]

- Common
- Cross sectional survey of 10 and 18 yr olds: 33.7% back pain within last year, 8.9% severe
- Incidence increased with age
- Females > Males (P<0.001)
- 41% sought treatment- PT most common
- Only 1.6% had invasive tx – injections or surgery

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Article

Back Pain in Children and Adolescents

Micah Lamb and Joel S. Brenner

Pediatrics in Review November 2020, 41 (11) 557-569; DOI: https://doi.org/10.1542/pir.2019-0051

Article | Figures & Data | Supplemental | Info & Metrics | Comments | Quiz

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Micah Lamb, DO[*] Joel S. Brenner, MD, MPH[†,‡,§]

[*]*Children's Hospital of Philadelphia, Philadelphia, PA*

[†]*Children's Specialty Group PLLC, Norfolk, VA*

[‡]*Children's Hospital of The King's Daughters, Norfolk, VA*

[§]*Eastern Virginia Medical School, Norfolk, VA*

History, Physical, Labs

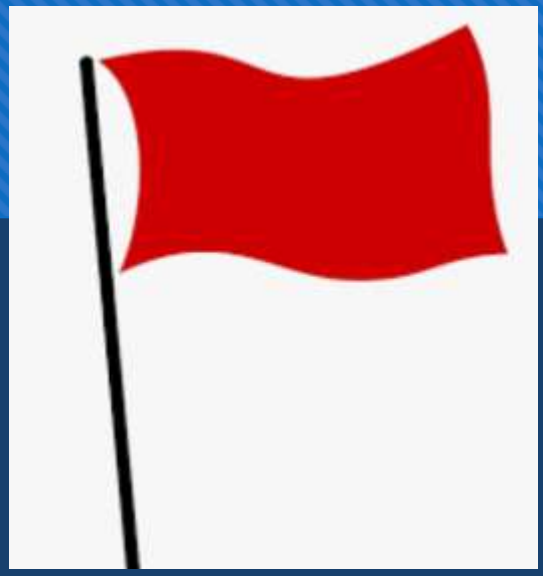
- Numbness/Weakness
- **Loss of Bowel/Bladder - Cauda Equina = EMERGENCY**
- Weight loss, Fever, Night sweats
- Neuro exam
- CBC, ESR, CRP for constitutional symptoms

When to image?

Review > J Am Coll Radiol. 2017 May;14(5S):S13-S24. doi: 10.1016/j.jacr.2017.01.039.

ACR Appropriateness Criteria ® Back Pain-Child

Expert Panel on Pediatric Imaging:; Timothy N Booth [1], Ramesh S Iyer [2], Richard A Falcone Jr [3], Laura L Hayes [4], Jeremy Y Jones [5], Nadja Kadom [6], Abhaya V Kulkarni [7], John S Myseros [8], Sonia Partap [9], Charles Reitman [10], Richard L Robertson [11], Maura E Ryan [12], Gaurav Saigal [13], Bruno P Soares [14], Aylin Tekes-Brady [15], Andrew T Trout [16], Nicholas A Zumberge [17], Brian D Coley [18], Susan Palasis [19]



- Red Flags
- Constant pain, Night pain, Radicular pain lasting 4 weeks
- Abnormal neuro exam
- Clinical or Lab findings c/w infection or neoplasm
- Xray area of interest
- MRI if further eval indicated

When Should You Worry About Your Child's Back Pain?

They are also experiencing leg pain, numbness, or weakness

Your child is very young

The pain is keeping them up at night

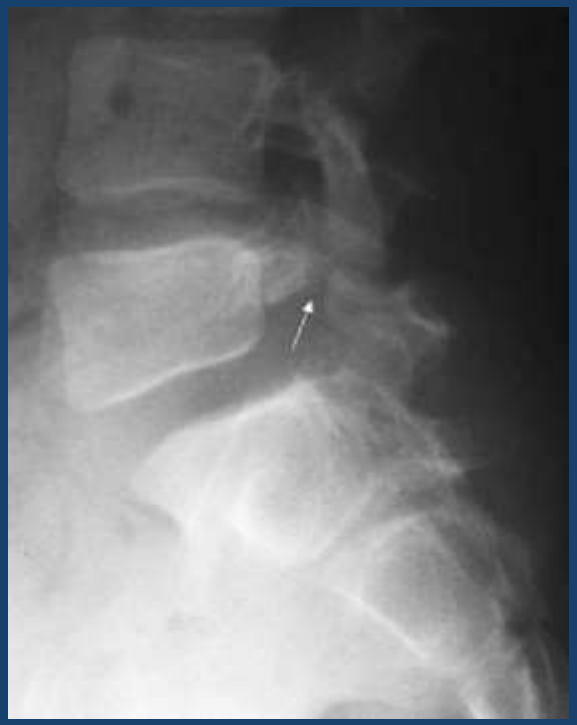
Their symptoms are persisting beyond several weeks

They are also experiencing symptoms of generalized illness

The pain is constant

Back Pain - Causes

- Muscular or Non-specific – most common
- Spondylolysis or Spondylolisthesis
- Infection – Discitis/Osteomyelitis, Epidural abscess
- Neoplasm
- Rheumatologic



Unspecified (Mechanical) Back Pain

- Other causes ruled out
- Common cause
- Hamstring tightness, weak core, central obesity, ligamentous strain
- Initiate PT or Core exercises
- **Refer** if fail to improve

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§Eastern Virginia Medical School, Norfolk, VA

Core exercises can be initiated as described at HealthyChildren.org (https://www.healthychildren.org/English/healthy-living/fitness/ Pages/Core-Exercises-Guidelines-and-Examples.aspx).

In the setting of back pain, the following is an absolute emergency:

- Numbness of the foot
- Pain radiating down the lower extremity
- Tenderness to palpation over the lumbar spine
- Loss of Bowel or Bladder control – Cauda equina syndrome

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