



University of California  
San Francisco

## 2024 International San Francisco Orthopaedic Trauma Course

Septic Hip and Osteomyelitis

or

*Pediatric Musculoskeletal Infections and Mimickers*

Donald Kephart, MD

4/6/2024



UCSF Benioff Children's Hospitals

## Disclosure

I have no relevant financial relationships with any companies related to the content of this course.

# Goals

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- Recognize infection
- Work it up
- Manage it



# Septic Arthritis

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- 8 cases/ 100K/ yr
- Mostly in young children <3
- Hip, knee each ~35%



# Mechanism

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- Hematogenous spread
- Direct Inoculation
- Adjacent Osteomyelitis



# Mechanism

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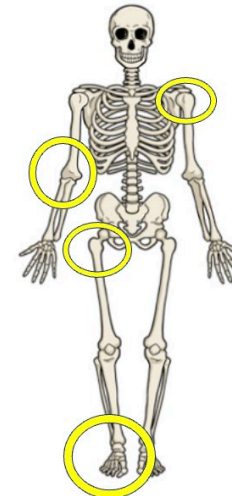
- Hematogenous spread
- **Direct Inoculation**
- Adjacent Osteomyelitis



# Mechanism

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- Hematogenous spread
- Direct Inoculation
- **Adjacent Osteomyelitis**



# Consequences

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- MMPs
- AVN
- Sepsis





# Microbiology

Septic Arthritis Antibiotic Treatment		
Age	Organism	Antibiotics
< 3 months	group B streptococci, s. aureus, and gram-negative bacilli	1st generation cephalosporin
3 months to 5 years	S. aureus, <i>Kingella</i> , S. pneumoniae, group A streptococci, H. influenzae	2nd or 3rd generation cephalosporin <i>Kingella</i> shown to be resistant to vancomycin and clindamycin
5-12 yrs	S. aureus ?	1st generation cephalosporin
12-18 yrs	N. gonorrhoeae, S. aureus	2nd or 3rd generation cephalosporin



Credit to OrthoBullets

# Special Populations

- Non-Immunized – Haemophilus influenzae type b
- Sickle Cell Anemia – at higher risk of Salmonella
- Immune compromised – Less virulent microbes or fungi
- Neonate: Group B Strep and Gram Negative
- Adolescent: Gonorrhea

# Differential Diagnosis

Trauma	Hemarthrosis	Reactive effusion	Juvenile Inflammatory arthritis	Acute rheumatic fever
Osteomyelitis	Pyomyositis	Tumor	Leukemia	Lyme
Sickle Cell	Transient Synovitis	SCFE	Lumbar Discitis	Testicular Torsion



# History

- Ask about trauma, duration of symptoms, recent illness
- Vaccination history
- Travel history, sick contacts
- Any recent or current antibiotics

# Physical Exam

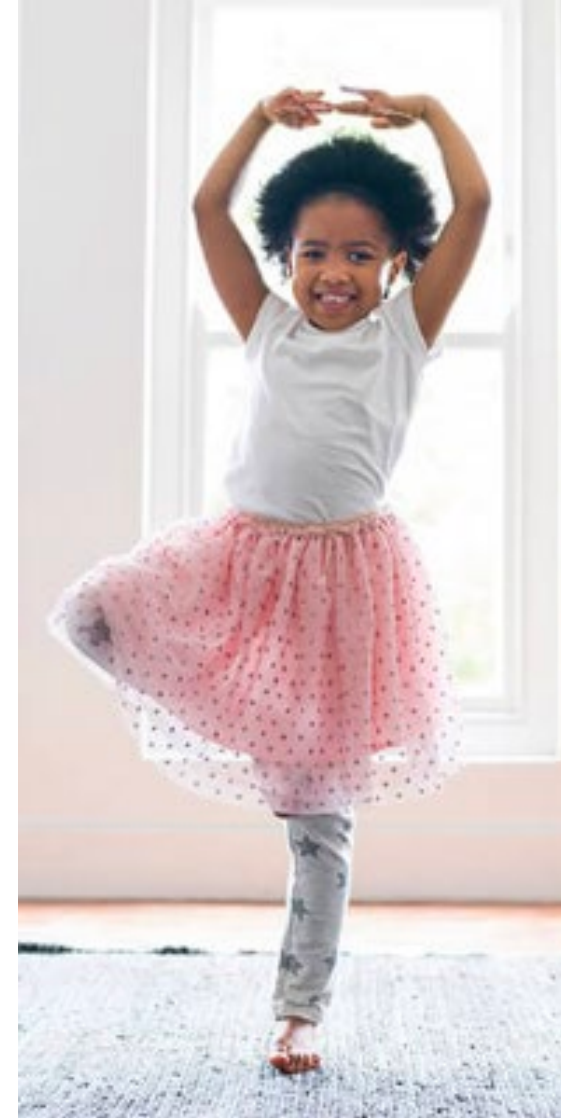
- Does the patient appear ill?
- Febrile (38-40°C)
- Reduction of spontaneous motion
- Refusal to bear weight
- Pain with passive ROM
- Flexed, externally rotated, abducted
- Often no erythema or swelling



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# Distinguishing Septic Arthritis from transient synovitis

- Most common cause of acute atraumatic hip pain ages 3-8
- Due to transient inflammation of synovium
- 5% Bilateral
- Often follows viral illness
- Diagnosis of exclusion

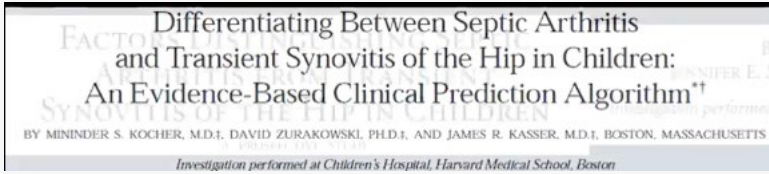


# Distinguishing Septic Arthritis from Transient Synovitis

Septic Arthritis	Transient synovitis
Looks ill	Looks OK
T>38.6	Low grade fever
Resists all motion	Resists end ROM
Refuses to bear weight (Check yourself)	+/-
	Preceding Viral Illness

# Workup

Labs
CBC w/ diff
CRP
ESR
Blood Cultures
+/- Lyme



Kocher Criteria	Modified
WBC >12K	WBC >12K
ESR >40	ESR >40
T > 38.5	T > 38.5
Unable to bear weight	Unable to bear weight
	CRP > 2

Risk Factors	1999 Kocher	Modified (Caird)
1	3%	36
2	40%	62
3	93%	82
4	99%	93
5 (modified)		97

# Imaging

- Order simultaneously to labs to avoid delay
- AP and frog lateral pelvis
- Ultrasound
- Bone scan not particularly helpful
- MRI

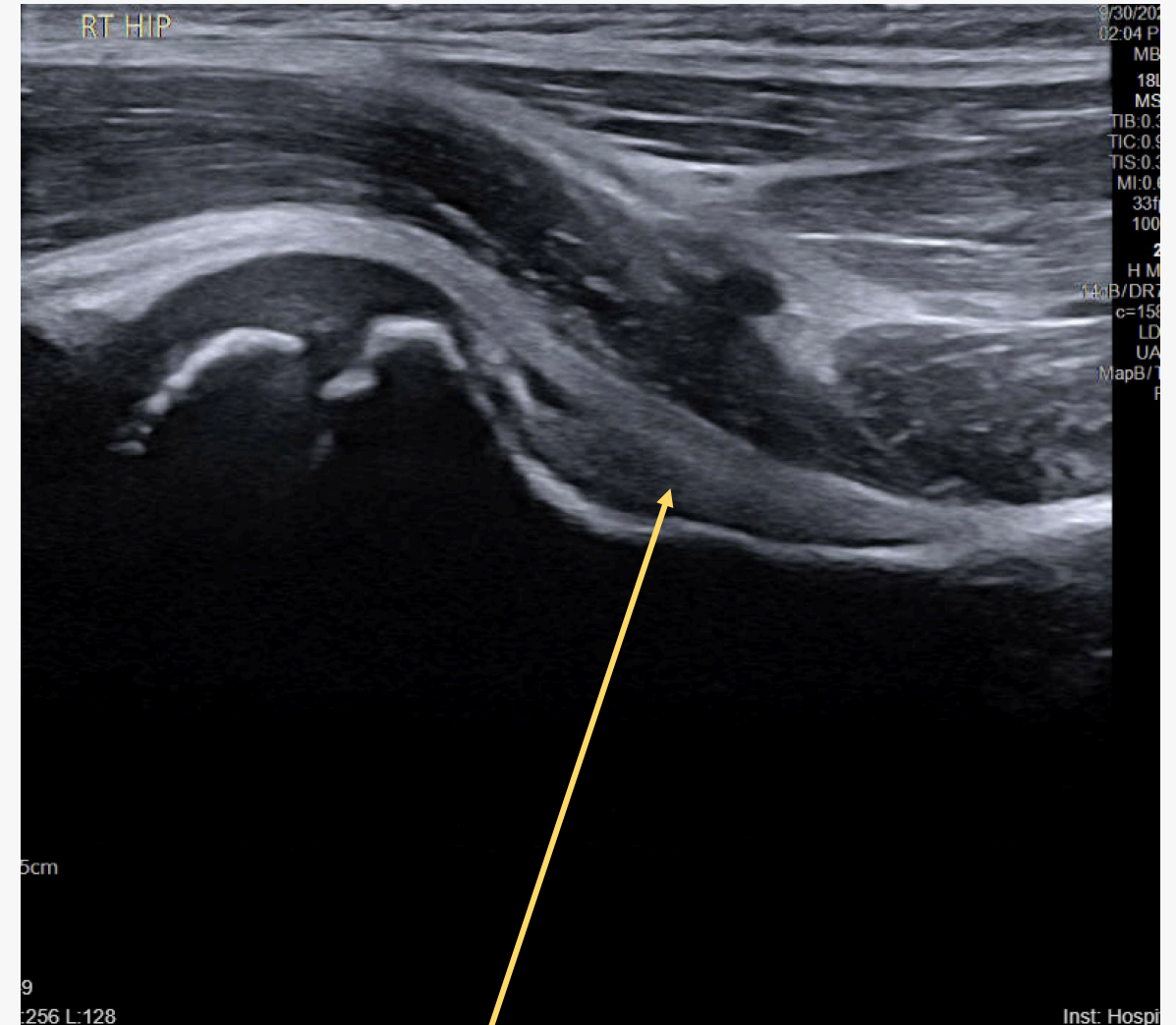
# AP and Frog Hip

- Rule out fracture or SCFE or Tumor
- Look for joint space narrowing
- Bony involvement-osteomyelitis



# Ultrasound

- Get both for comparison
- Look for joint space narrowing
- Bony involvement-osteomyelitis



**The role of ultrasound in differentiating septic arthritis from transient synovitis of the hip in children**

Mohamed Medhat Zamzam

Journal of Pediatric Orthopaedics B 2006, 15:418-422

# MRI

- Especially helpful to help determine if there is adjacent osteomyelitis
- Order w/ and w/out Gad
- Do not delay treatment

ORIGINAL ARTICLE

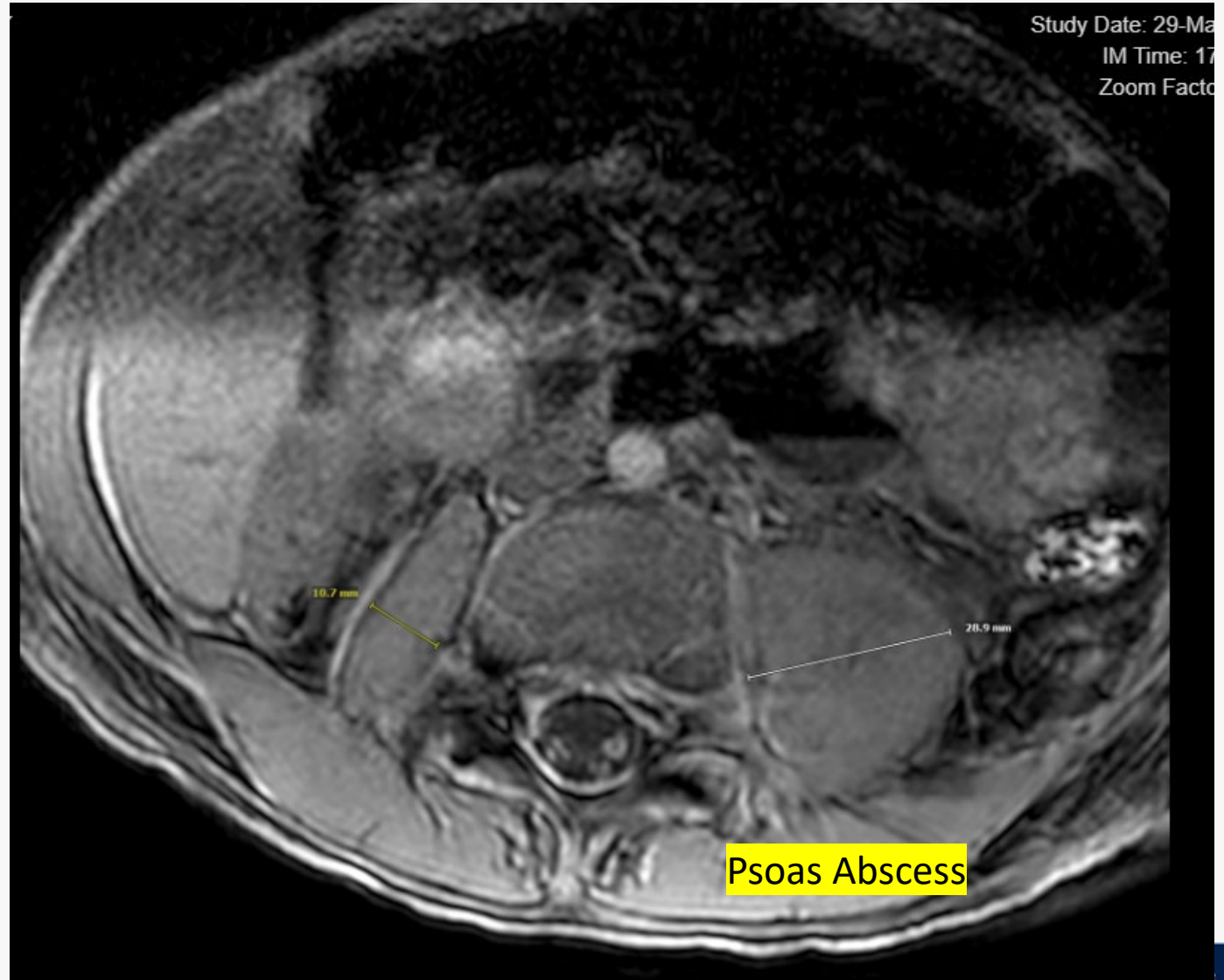
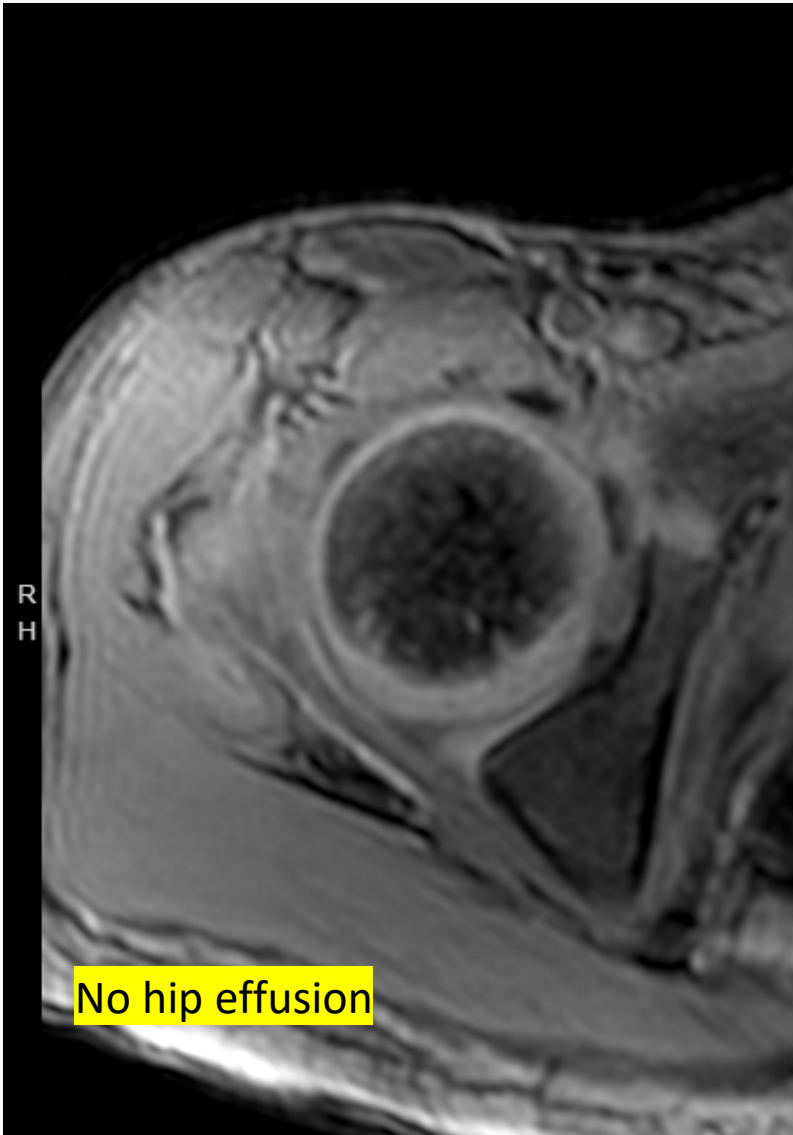
## Pain for Greater Than 4 Days Is Highly Predictive of Concomitant Osteomyelitis in Children With Septic Arthritis

*Ali A. Siddiqui, MD,\*†‡ Lindsay M. Andras, MD,\*† Kenneth D. Illingworth, MD,\*† and David L. Skaggs, MD, MMM\*†*





# Recent Case: 3/5 Modified Kocher, but excellent PROM hip



# Aspiration

- WBC +Diff
- Gram stain, culture sensitivity
- IR or Ortho

- Chloroprep on radiolucent OR table
- Drape out with blue towels
- Spinal needle just under palpable adductor tendon with hip extended aiming at the ipsilateral nipple at 45\* from the table and confirming with fluoro

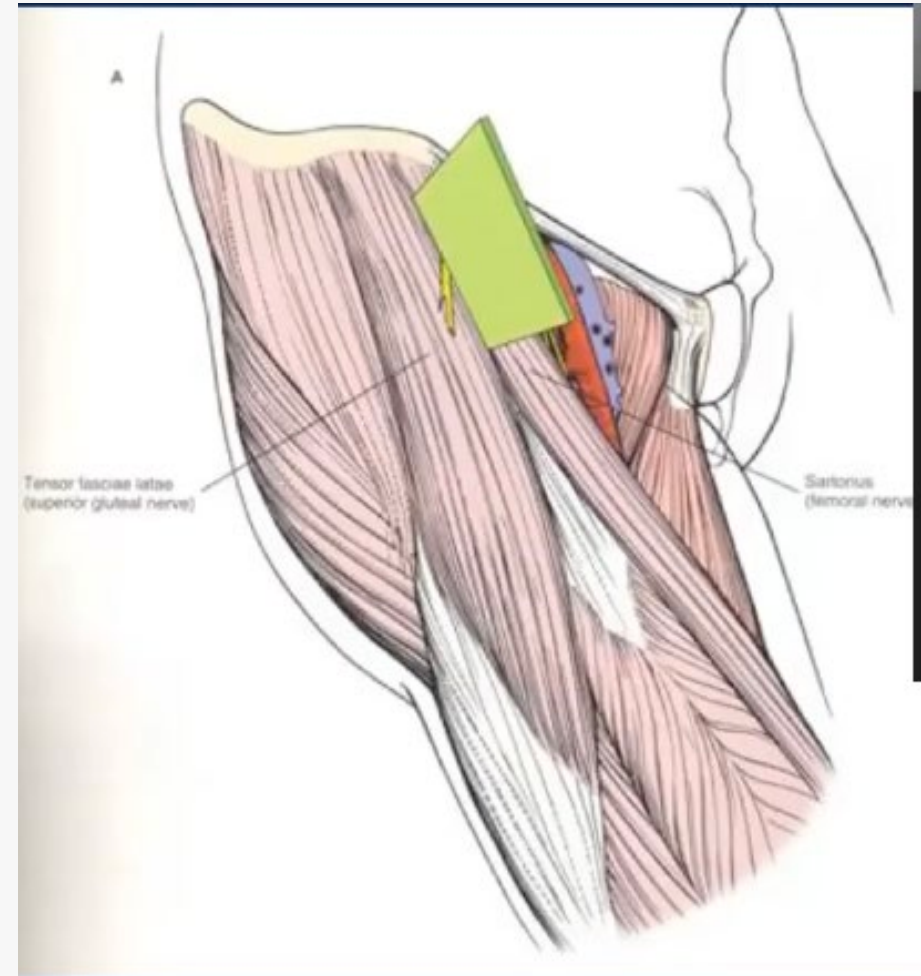
Disease	Leukocytes (cells/mL)	Polymorphonucleocytes
Normal	<200	<25%
Traumatic Effusion	<5,000 with many RBCs	<25%
Toxic Synovitis	5,000-15,000	<25%
Acute Rheumatic Fever	10,000-15,000	50%
JR(I)A	15,000-80,000	75
Septic Arthritis	>50,000	>75

# Treatment: Transient synovitis

- Rest/ activity restrictions
- NSAIDs
- Should improve within 72 hours  
(often sooner)
- Average course 10d

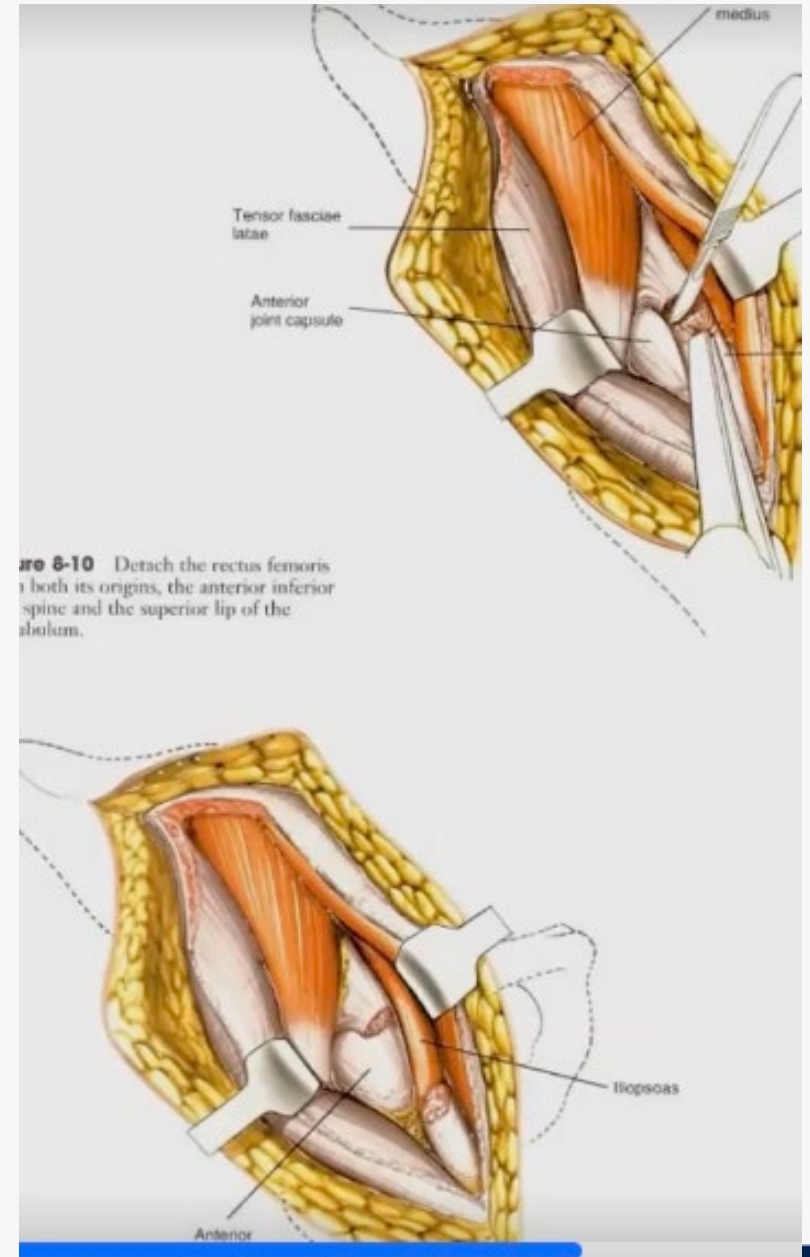
# Operative I&D

- Bikini or short oblique 2cm distal to ASIS
- Interval between tensor fascia lata and Sartorius
- \*Watch for LFCN
- Deep interval between rectus femoris and gluteus medius
- Clear off anterior capsule
- 1cmx1cm capsulotomy
- Drain



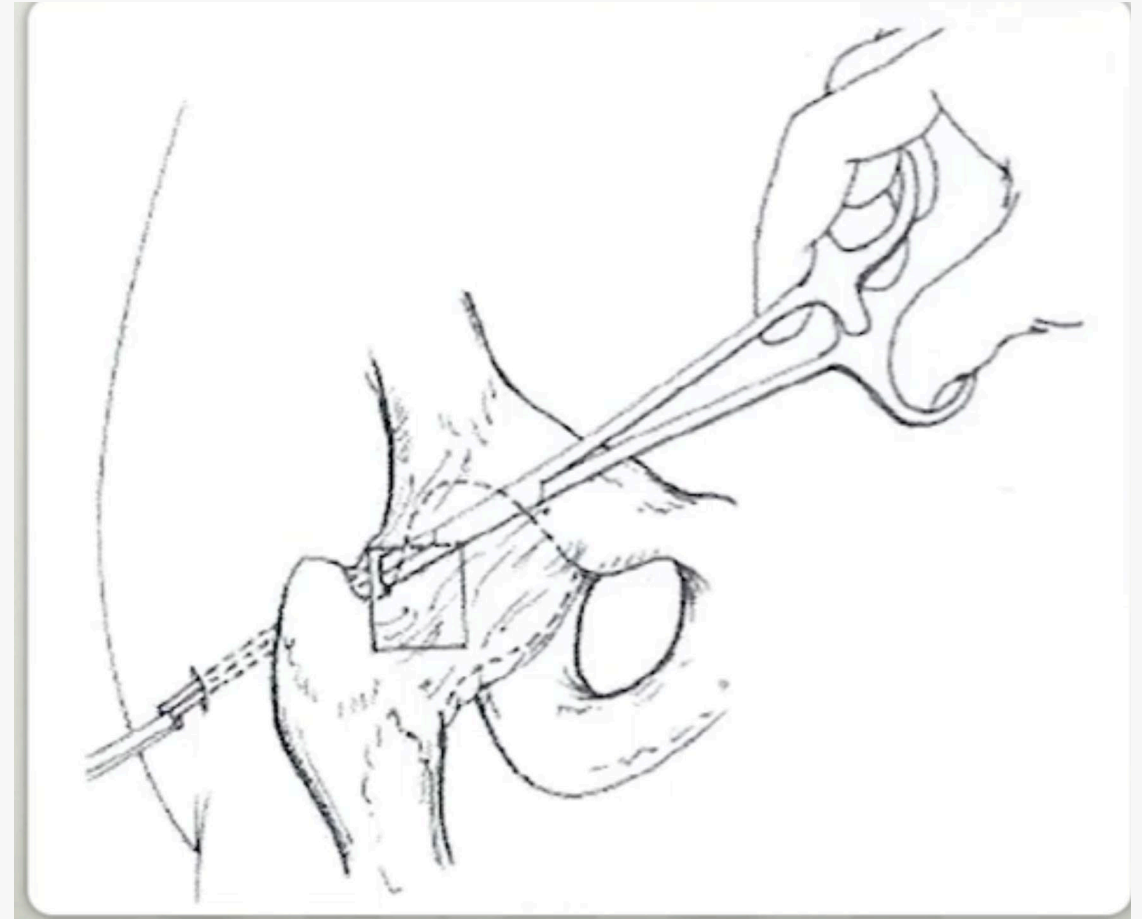
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# Operative I&D

- Drain
- Skin closure
- Consider femoral neck drilling if osteomyelitis
- Typically protected WBAT if SA alone



# Antibiotics

- Obtain fluid before starting antibiotics
- Base empiric treatment on epidemiology of the region
- Tailor when culture data returns
- IV until clinical picture improves
  - Pain control
  - CRP <50% max

# Antibiotics

- Neonates, Immunocompromised, MRSA, Salmonella may require longer treatment
- If insignificant improvement:
  - MRI
  - Repeat I&D



Complications: : Avoid these

- Sepsis
- Chronic Osteo
- Path fracture
- Growth disturbance
- Femoral head destruction
- Contracture

