



British Orthopaedic
Association

INSTRUCTIONAL COURSE

Saturday 11th January 2020

Your first night on call.....

Hip septic arthritis

Slipped epiphysis

Open fractures



What you will hear

Evidence

Personal take

Top tips

Traps for the unlucky

9 /12 girl

Left hip pain

CRP

13

Grumpy

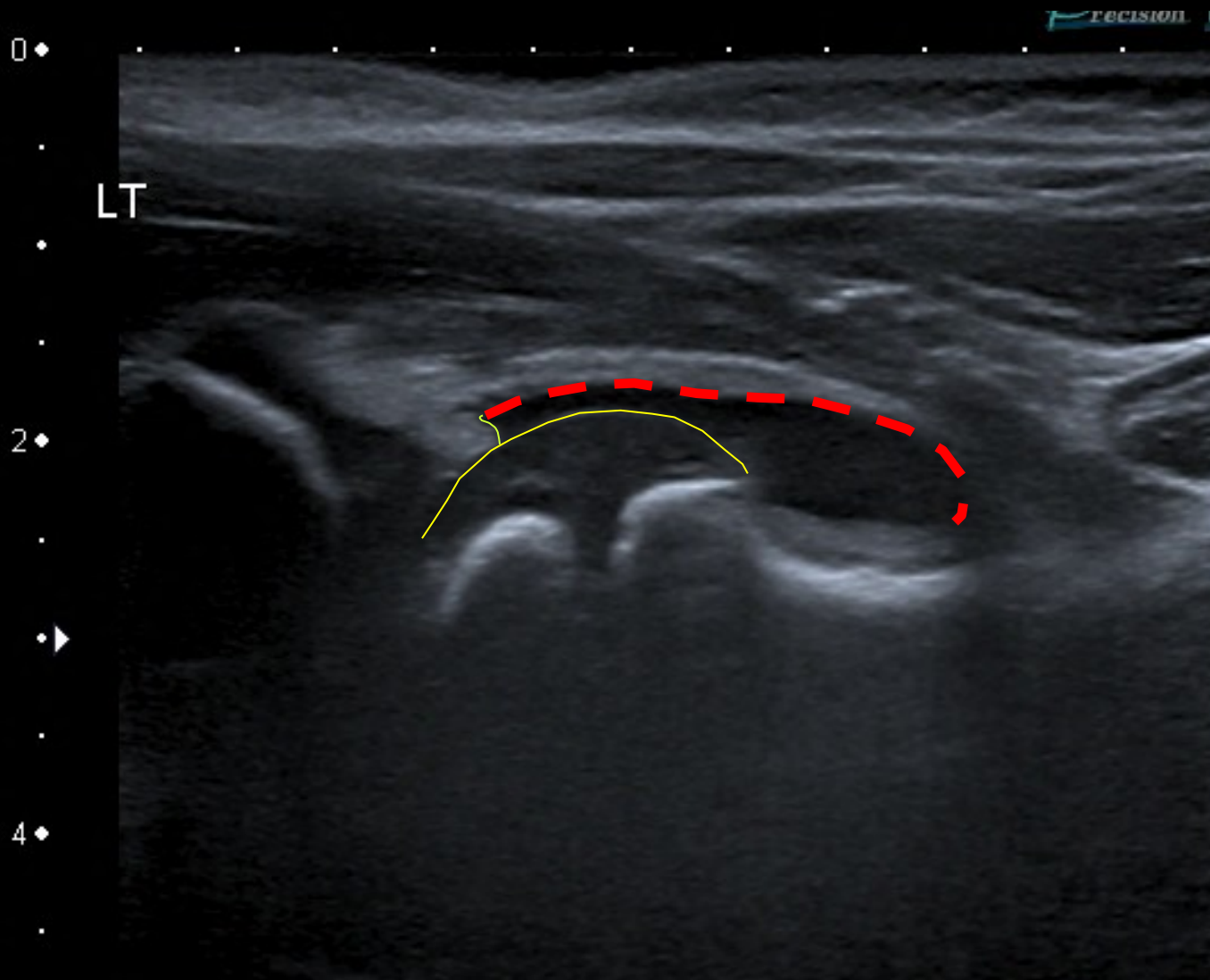
WCC

14

T 38⁵

Plain film

normal

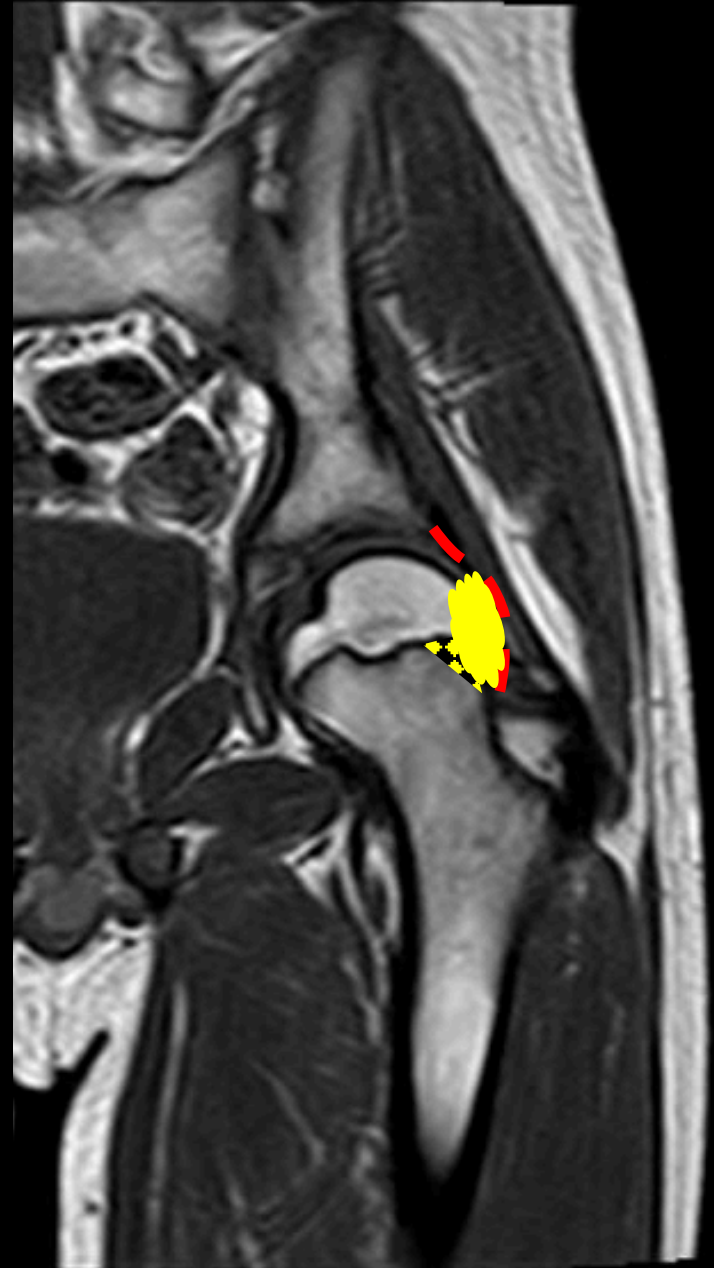


Bacterial seeding

Large lower limb joints

Metaphyseal osteomyelitis

Proximal femur



Bacterial seeding

Large lower limb joints

Metaphyseal osteomyelitis

Proximal femur

Distal fibula

Proximal humerus

Proximal radius

Multiple joints 5 - 10%

Rapid joint destruction

Synovitis

Fibrinous exudate

Intra-articular pus

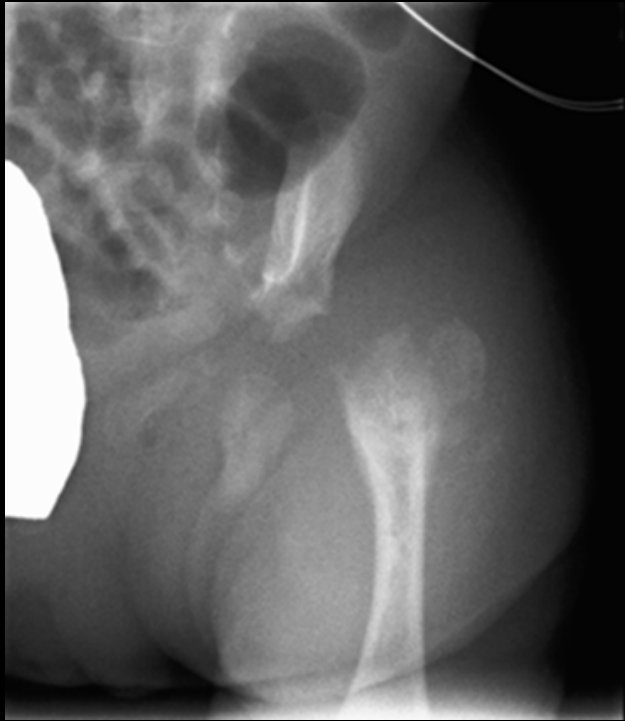
↑↑ Intra-articular pressure

Avascular necrosis

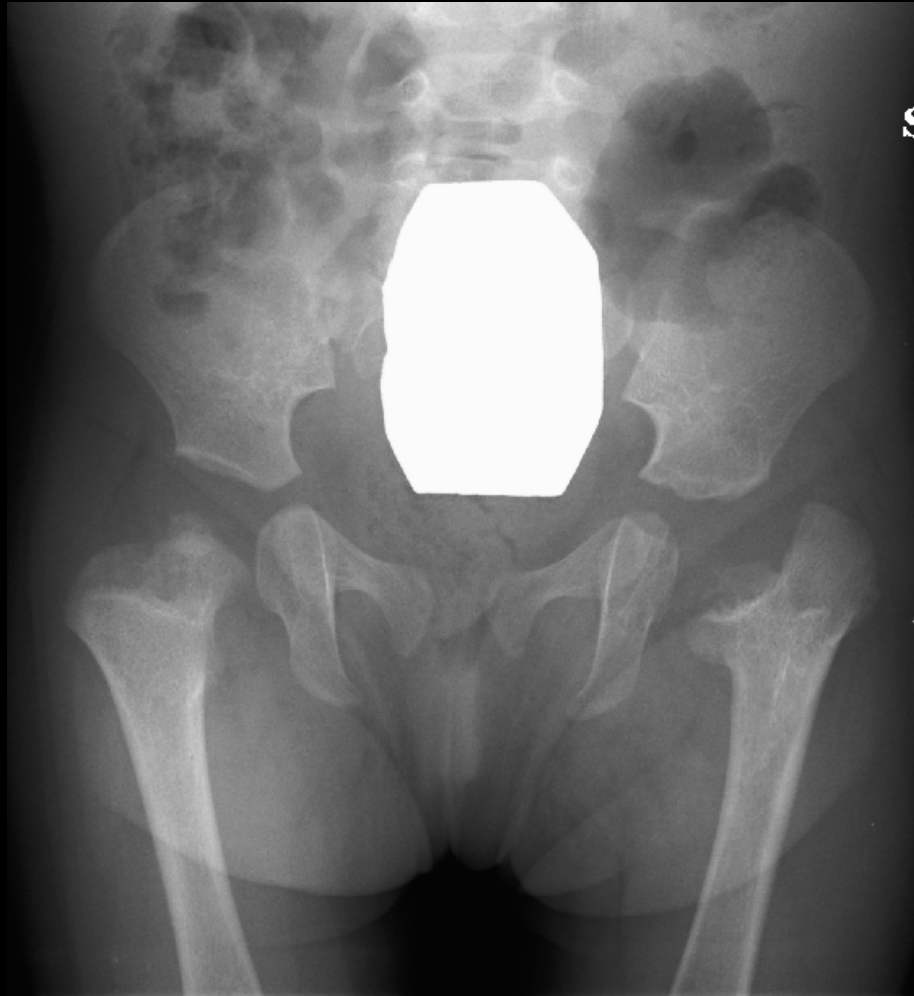
2 week old



+ 2 weeks



+ 6 weeks



All ages

infant - early childhood

Fever

Systemic illness

Intense joint pain

Absent range of movement

Differential diagnosis

Reactive Arthritis vs. Septic Arthritis

Joint movement less restricted

Haematological parameters overlap

Kocher et al JBJS Am 1999, 2004

Fever $>38.5^{\circ}\text{C}$

Inability to weight bear even with support

WCC $> 12 \times 10^9$ cells/L

ESR >40 mm/Hg

1 3%

2 40%

3 93 %

4 99% positive predictive value

Caird et al JBJS Am 2006

CRP $\geq 20\text{mg/L}$

98% positive predictive value

Easy wins

0	Home and review
1	Admit and observe
4	Drain

Hard yards

2-3	Clinical suspicion
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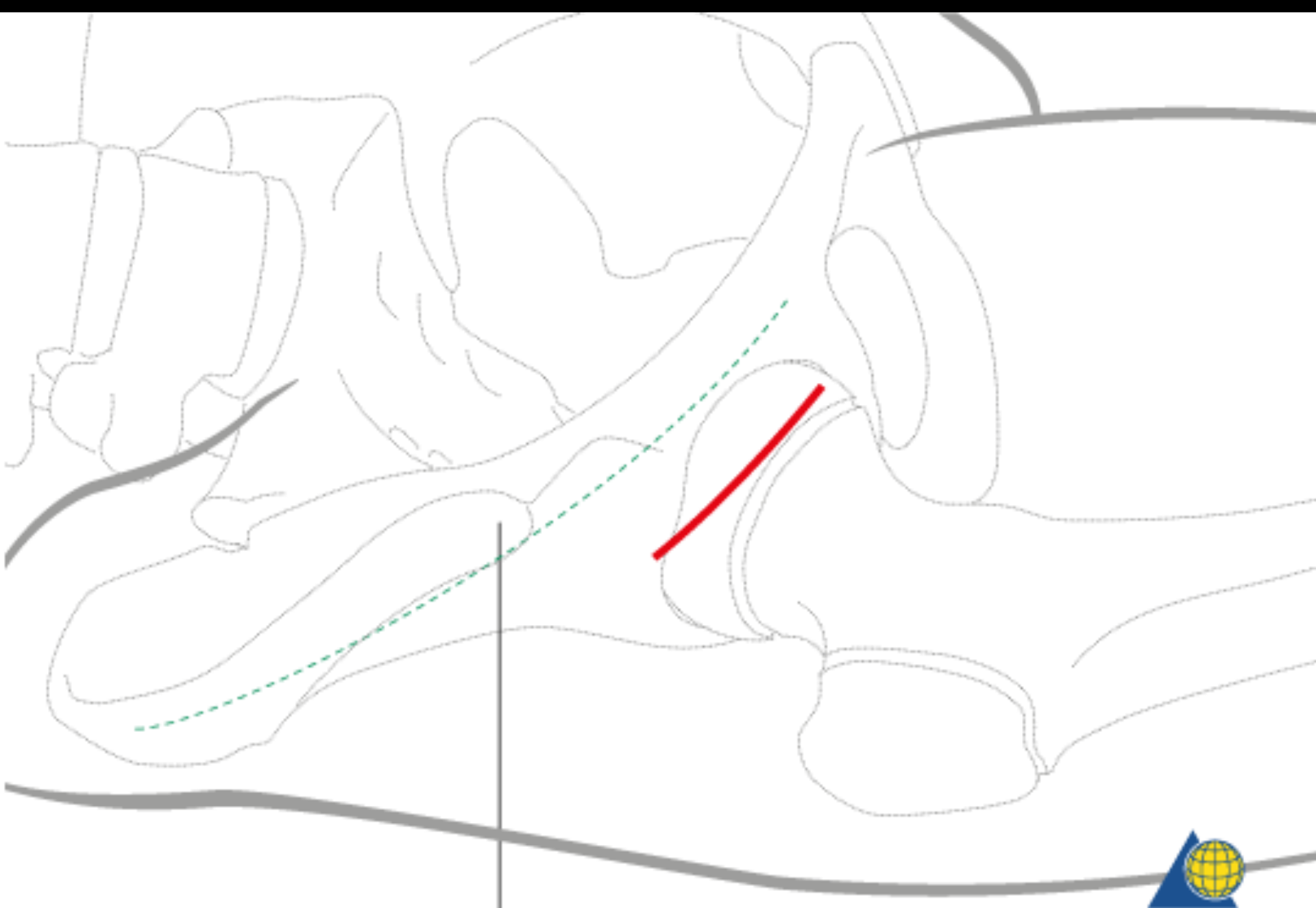
Hip Drainage

Bikini incision

Identify TFL- sartorius interval

Retract rectus femoris (Straight head)

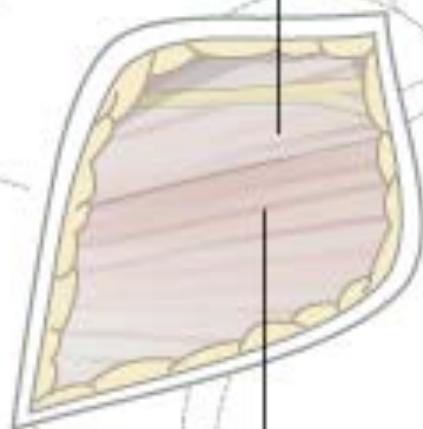
Incise capsule



Anterior superior illiac spine



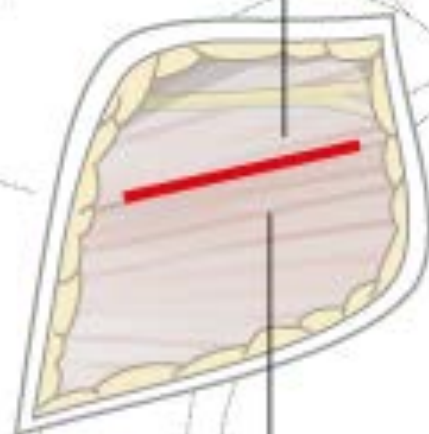
Sartorius muscle



Tensor fascia lata muscle



Sartorius muscle



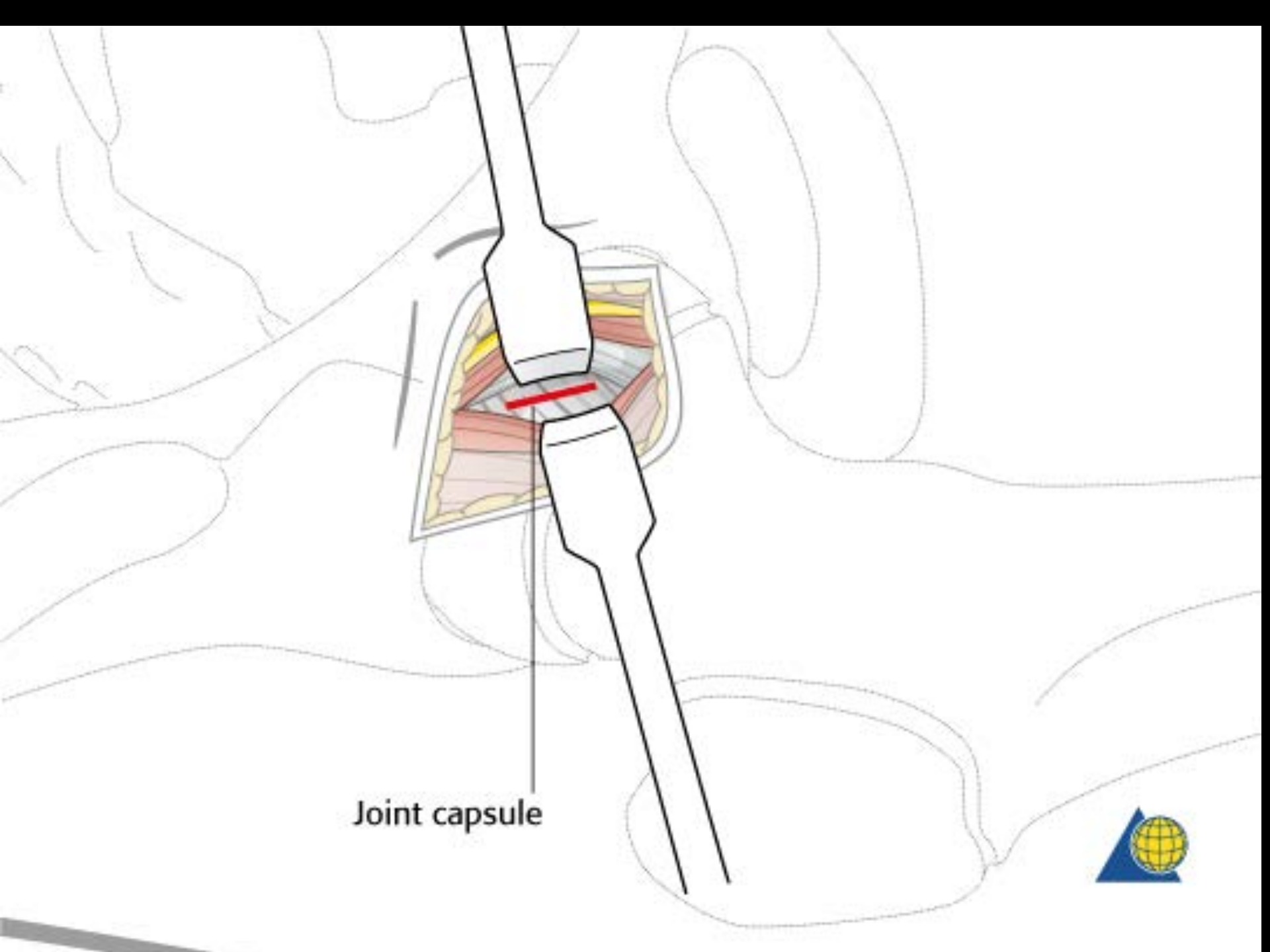
Tensor fascia lata muscle



Lateral femoral cutaneous nerve

Rectus femoris tendon





Joint capsule



Hip Drainage

Visualise and assess articular cartilage

? Drill metaphysis

Copious irrigation

Close wound without drainage

+/- Plaster spica

+/- Long line

High dose intravenous antibiotics

Cef du jour

Armageddocillin

Rapid clinical response

- Resolution of fever

- Resolution of pain

- Improvement of serum markers

Oral antibiotics

(Adjusted for sensitivities)

Take home message

Septic arthritis is a surgical emergency

14year old boy
6/52 limp



BOSS

BRITISH ORTHOPAEDIC SURGERY SURVEILLANCE

STUDY

	At-risk Population ^(a) (Mid-year estimate 2016 ^(b))	First presentation of SCFE		
		n	Incidence	95% CI
All^(a)	9,499,724	429	3.61	(3.27,3.95)
By Country & Region:				
England	8,301,394	379	3.65	(3.28,4.02)
London & Surrounding Boroughs	1,851,204	89	3.85	(3.09,4.73)
South	1,696,467	75	3.54	(2.78,4.43)
Northern	2,280,272	102	3.58	(2.88,4.27)
Central	2,473,451	113	3.65	(2.98,4.33)
Wales	454,551	12	2.11	(1.09,3.69)
Scotland	743,779	38	4.09	(2.89,5.61)
By age-group:				
6-10 years	3,850,071	82	1.70	(1.36,2.11)
11-18 years	5,649,653	347	4.91	(4.4,5.43)
By sex:				
Male	4,867,679	243	3.99	(3.49,4.50)
Female	4,632,045	186	3.21	(2.75,3.67)

^(a)6-18 year-olds, England, Scotland & Wales; ^(b) Source: ONS

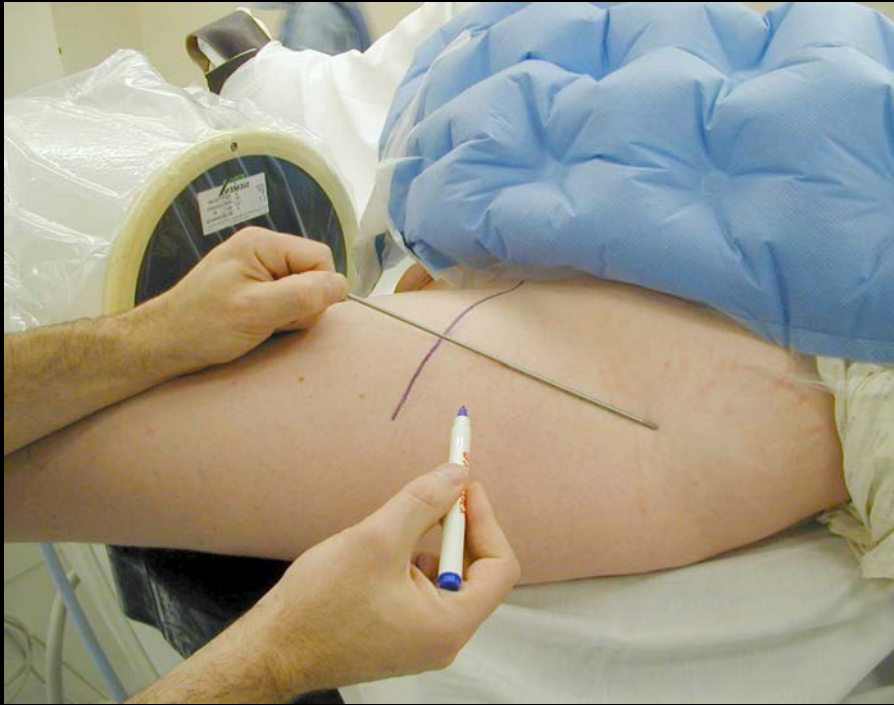
BMI	
n	140
Mean (SD)	26.4 (6)
Min, Max	14.2, 48.9
Missing	346

	Clinical stability: patient able to walk (with crutches) at admission?		
	Stable (hips=402)	Unstable (hips=109)	Unknown (n=3)
Radiographic severity (n=514 hips)			
Mild	213 (53.3%)	15 (13.9%)	1
Moderate	110 (27.5%)	24 (22.2%)	0
Severe	77 (19.3%)	69 (63.9%)	1
Missing	2	1	1



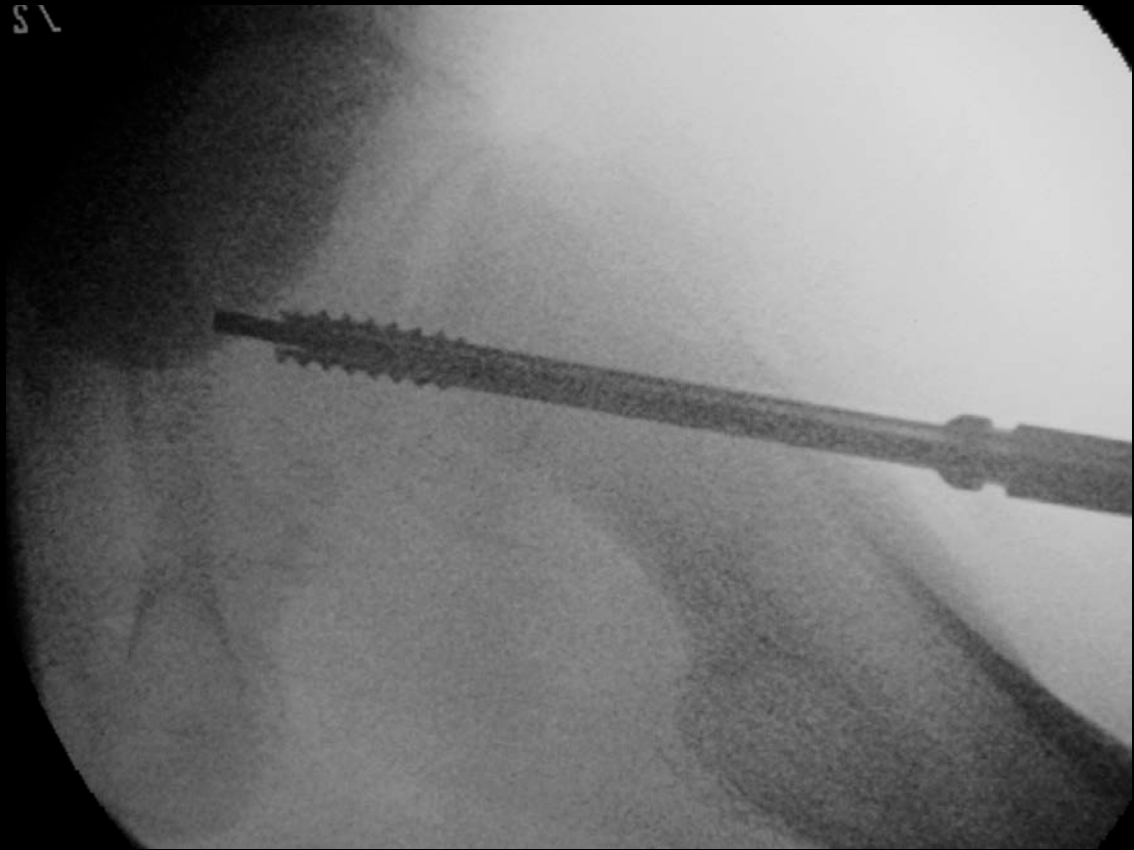
41.4%







15



12 year old boy
Acute Left hip pain



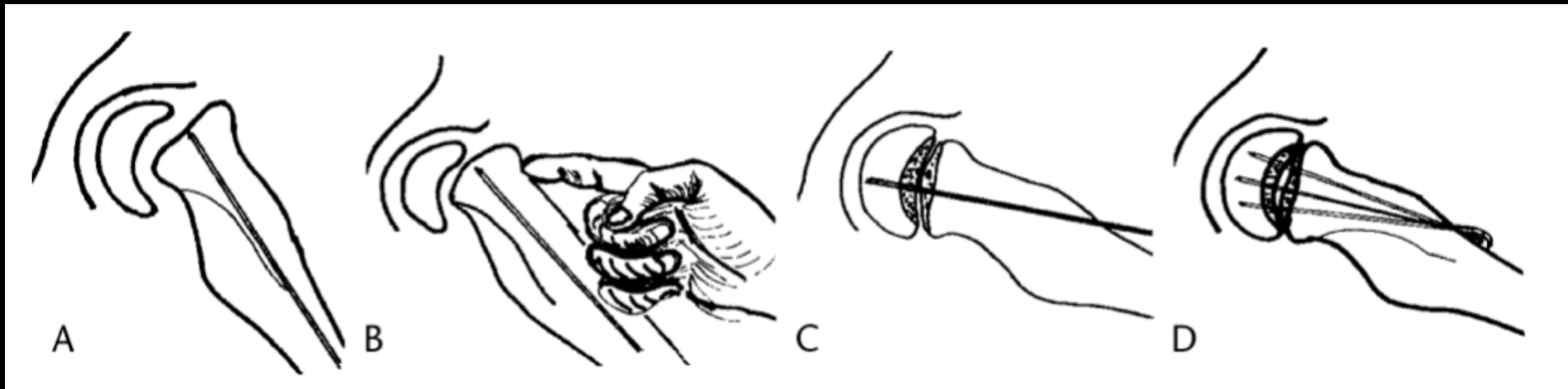
13.4%

Serendipitous reduction?



Parsch mini-open

Parsch et al J Pediatr Orthop. 2009;29:1-8



Parsch mini-open

Parsch et al J Pediatr Orthop. 2009;29:1-8

Within 24 hours
AVN 4.7%





28/12/2017
21:32:32.062000
88 kVp



Im: 1 Ser:2
Bristol Royal Childrens Hospital
ARCADIS

28/12/2017
22:30:46.796000
86 kVp



Im: 1 Ser:8
Bristol Royal Childrens Hospital
ARCADIS



The other side

20% within 18 months

60 – 100% with endocrinopathy

Top tip

Prophylactic pinning

Acute severe

Known cause

Young patient

Extreme obesity

Take home message

Adolescents with a limp have a slip until proven otherwise

10¹⁰ female

Fall 3 m



0.5 cm laceration

Current Practice in the Management of Type I Open Fractures in Children: A Survey of POSNA Membership

Robert J. Wetzel, MD, Shobhit V. Minhas, BS,† Brittany C. Patrick, MPH,†
and Joseph A. Janicki, MD†*

J Pediatr Orthop • Volume 35, Number 7, October/November 2015

No consensus

What

Amount or type of irrigation

Use of antibiotics in the irrigation

Bone end delivery

Where

Treated in the Emergency Room

Soft-tissue infections 13%

Delayed union 8%

Treated in the Operating Room

Soft-tissue infections 16%

Delayed union 30%

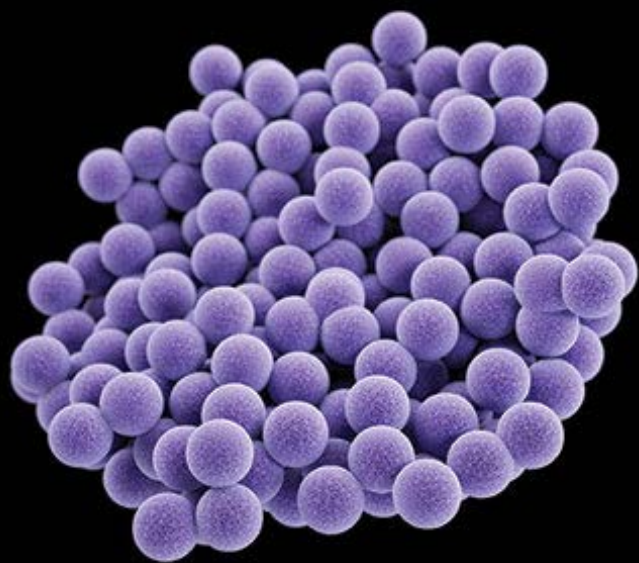
“There are three kinds of lies:
lies,
damned lies
and statistics”

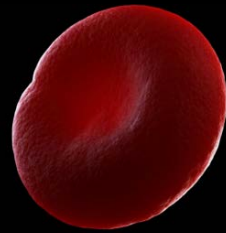


Benjamin Disraeli
1804-1881

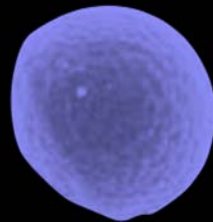
Just a fracture with an incidental soft tissue injury ?







6-8 μ



0.2 - 10 μ



If blood has got out, germs have got in

Unevidenced Algorithm

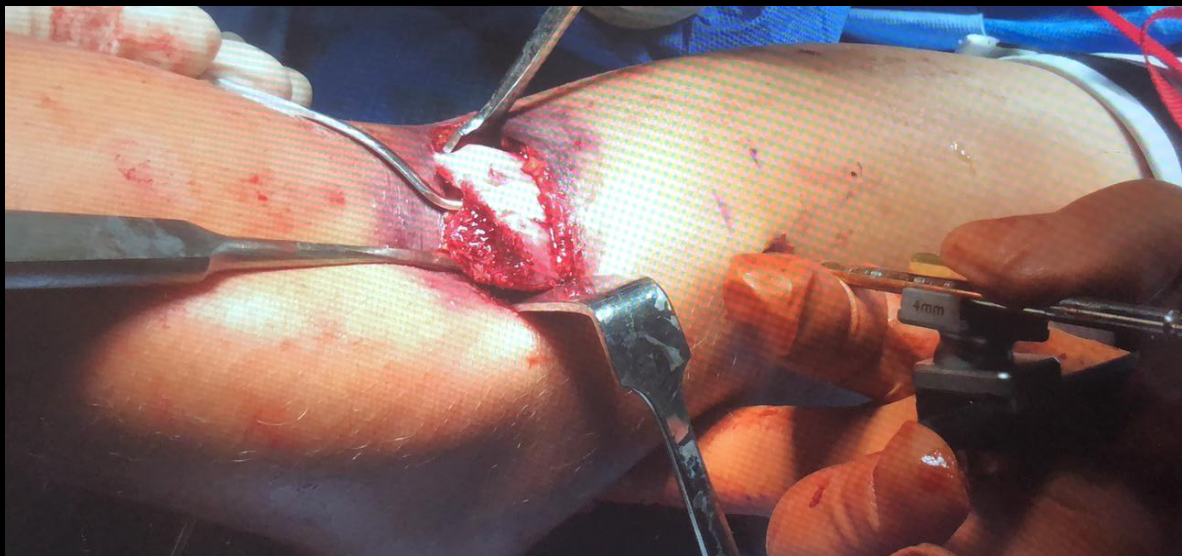
Panoramic view of bone ends

Remove all the dead stuff

Irrigate with *fluid du jour*

Until your feet are wet

Armageddocillin for a bit

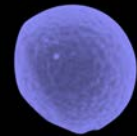


10¹⁰ female

Fall 3 m

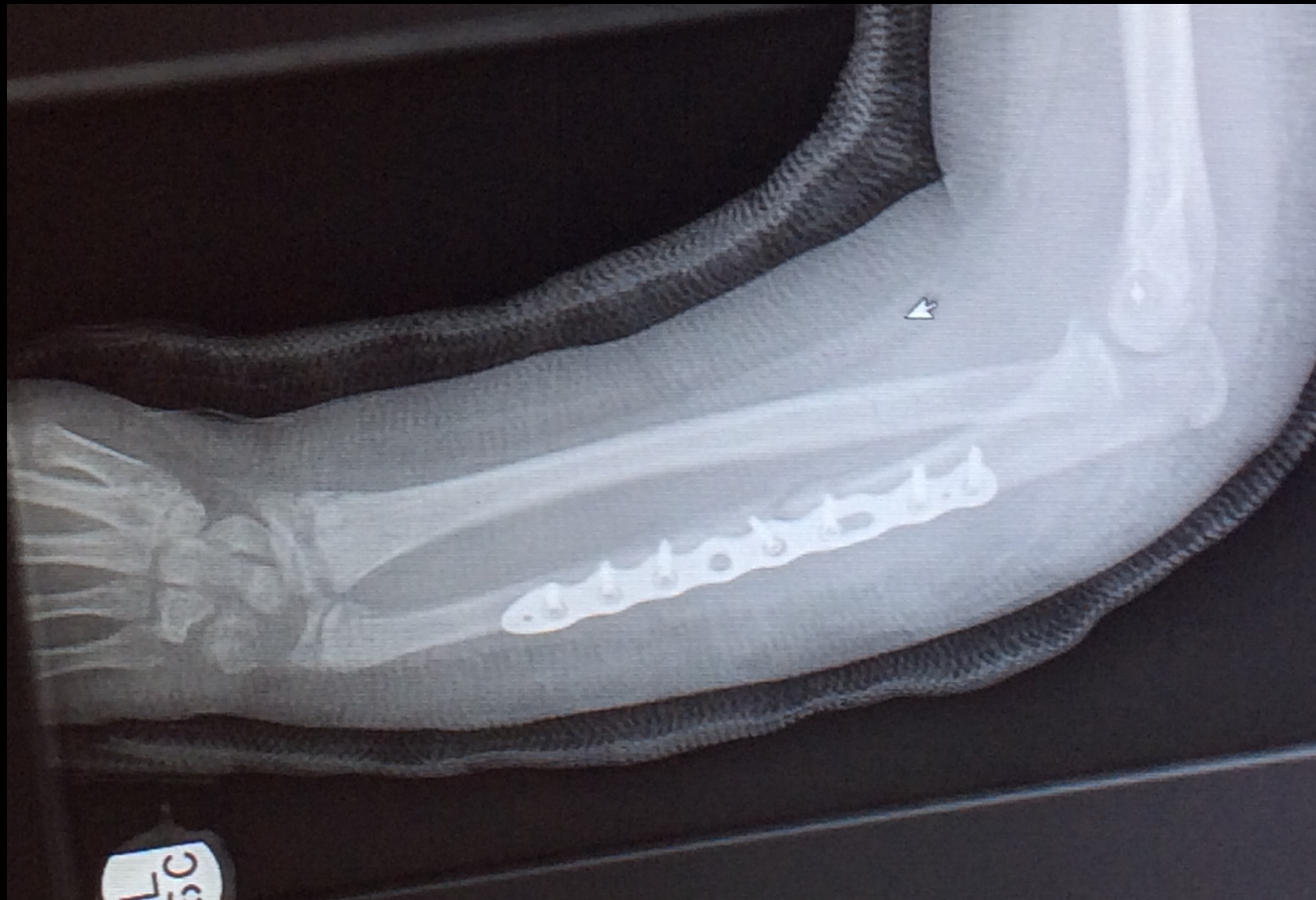


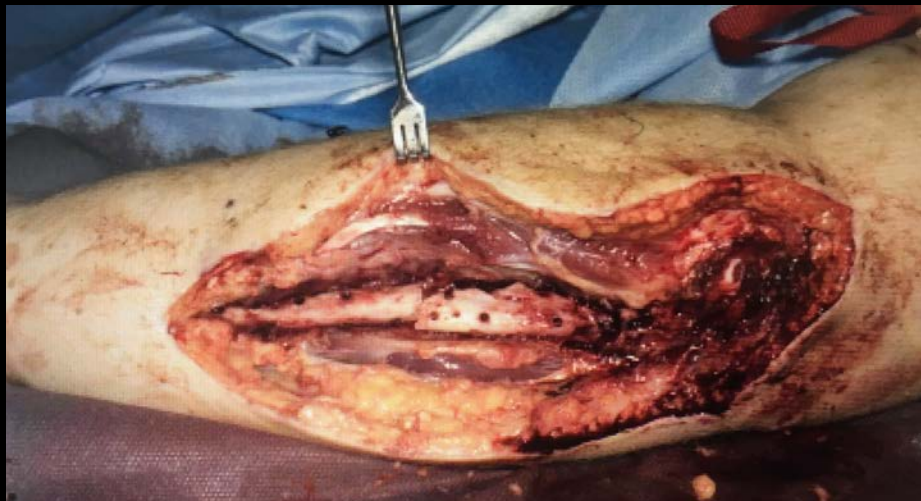
0.5 cm laceration



0.2 - 10 μ

6 weeks





Top tip

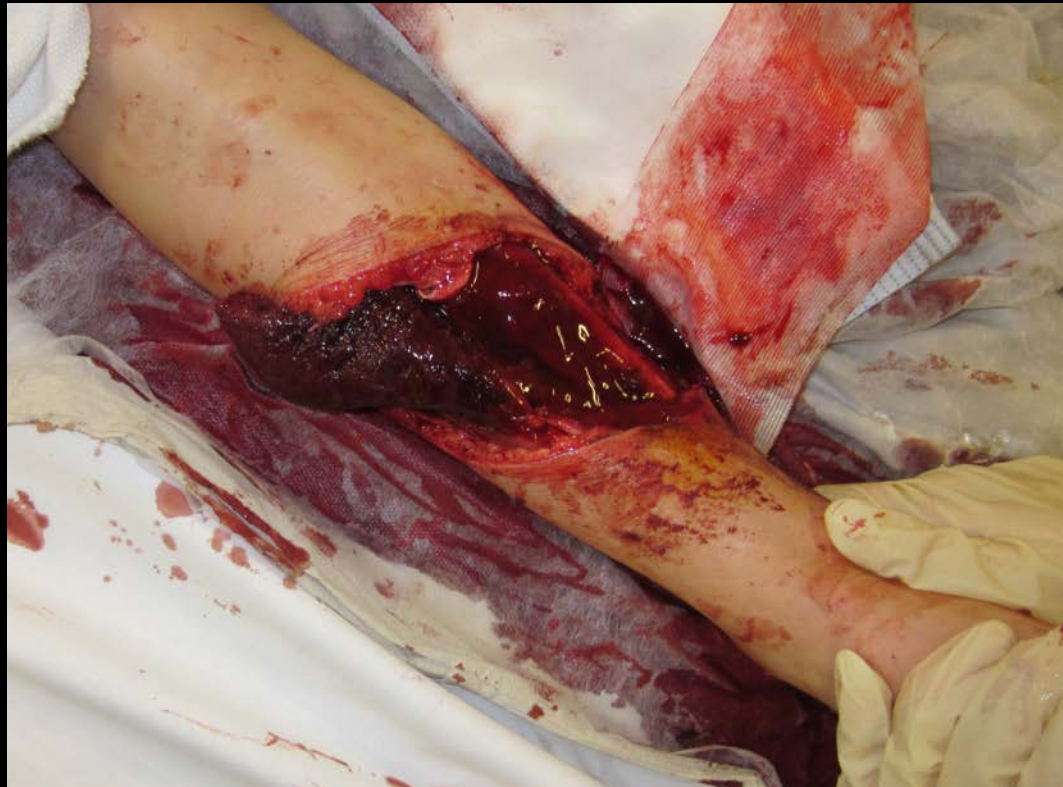
Do not underestimate Gustillo I

Ever

Top tip

Children with open forearm fractures are just small adults
with open forearm fractures

9 y boy
Pedestrian vs Car



Villains

Dead bone

Dead soft tissue

Germs



BOAST 4: THE MANAGEMENT OF SEVERE OPEN LOWER LIMB FRACTURES

Background and Justification:

The British Orthopaedic Association and the British Association of Plastic, Reconstructive and Aesthetic Surgeons have reviewed their 1997 guidance and now publish a review of all aspects of the acute management of these injuries using an evidence-based approach, leading to the "Standards for the Management of Open Lower Limb Fractures," which are free to download from www.boa.ac.uk and www.bapras.org.uk. This BOAST is derived from these standards. Contrary to traditional teaching, best outcomes are achieved by timely, specialist surgery rather than emergency surgery by less experienced teams.

Included Patients:

All patients with high energy open fractures as manifest by the following injury patterns:

- Fracture Pattern:
- Multifragmentary (comminuted) tibial fracture with fibular fracture at same level
 - Segmental fractures
 - Fractures with bone loss, either from extrusion or after debridement
- Soft tissue injury:
- Swelling or skin loss, such that direct, tension-free wound closure is not possible
 - Degloving
 - Muscle injury that requires excision of devitalised muscle via wound extensions
 - Injury to one or more major arteries of the leg
 - Wound contamination with marine, agricultural or sewage material

Standards for Practice Audit:

1. Intravenous antibiotics are administered as soon as possible, ideally within 3 hours of injury: Co-amoxiclav (1.2g) or Cefuroxime (1.5g) 8 hourly and are continued until wound debridement. Clindamycin 600mg, 6 hourly if penicillin allergy
2. The vascular and neurological status of the limb is assessed systematically and repeated at intervals, particularly after reduction of fractures or the application of splints
3. Vascular impairment requires immediate surgery and restoration of the circulation using shunts, ideally within 3-4 hours, with a maximum acceptable delay of 6 hours of warm ischaemia
4. Compartment syndrome also requires immediate surgery, with 4 compartment decompression via 2 incisions (see overleaf)
5. Urgent surgery is also needed in some multiply injured patients with open fractures or if the wound is heavily contaminated by marine, agricultural or sewage matter.
6. A combined plan for the management of both the soft tissues and bone is formulated by the plastic and orthopaedic surgical teams and clearly documented
7. The wound is handled only to remove gross contamination and to allow photography, then covered in saline-soaked gauze and an impermeable film to prevent desiccation
8. The limb, including the knee and ankle, is splinted
9. Centres that cannot provide combined plastic and orthopaedic surgical care for severe open tibial fractures have protocols in place for the early transfer of the patient to an appropriate specialist centre
10. The primary surgical treatment (wound excision and fracture stabilisation) of severe open tibial fractures only takes place in a non-specialist centre if the patient cannot be transferred safely
11. The wound, soft tissue and bone excision (debridement) is performed by senior plastic and orthopaedic surgeons working together on scheduled trauma operating lists within normal working hours and within 24 hours of the injury unless there is marine, agricultural or sewage contamination. The 6 hour rule does not apply for solitary open fractures. Co-amoxiclav (1.2g) and Gentamicin (1.5mg/kg) are administered at wound excision and continued for 72 hours or definitive wound closure, whichever is sooner
12. If definitive skeletal and soft tissue reconstruction is not to be undertaken in a single stage, then vacuum foam dressing or an antibiotic bead pouch is applied until definitive surgery.
13. Definitive skeletal stabilisation and wound cover are achieved within 72 hours and should not exceed 7 days.
14. Vacuum foam dressings are not used for definitive wound management in open fractures.
15. The wound in open tibial fractures in children is treated in the same way as adults

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Top tip

Get into bed with your plastic surgeons



OPB

Andy, Andy, Anna, James, Mark, Roger, Steve, Thomas, Tom, Umr...



7 M

20mph car vs pedestrian

4-6 hours ago

isolated injury

Normally fit and well

Martin Gargan on for ortho

Plans to take for initial debridement tomorrow am (after shunt revision but can go first at 0830)

Who is on for plastics

Pics to follow

19:50 ✓

Forwarded



19:51 ✓

Top tip

Get rid of all the bad stuff

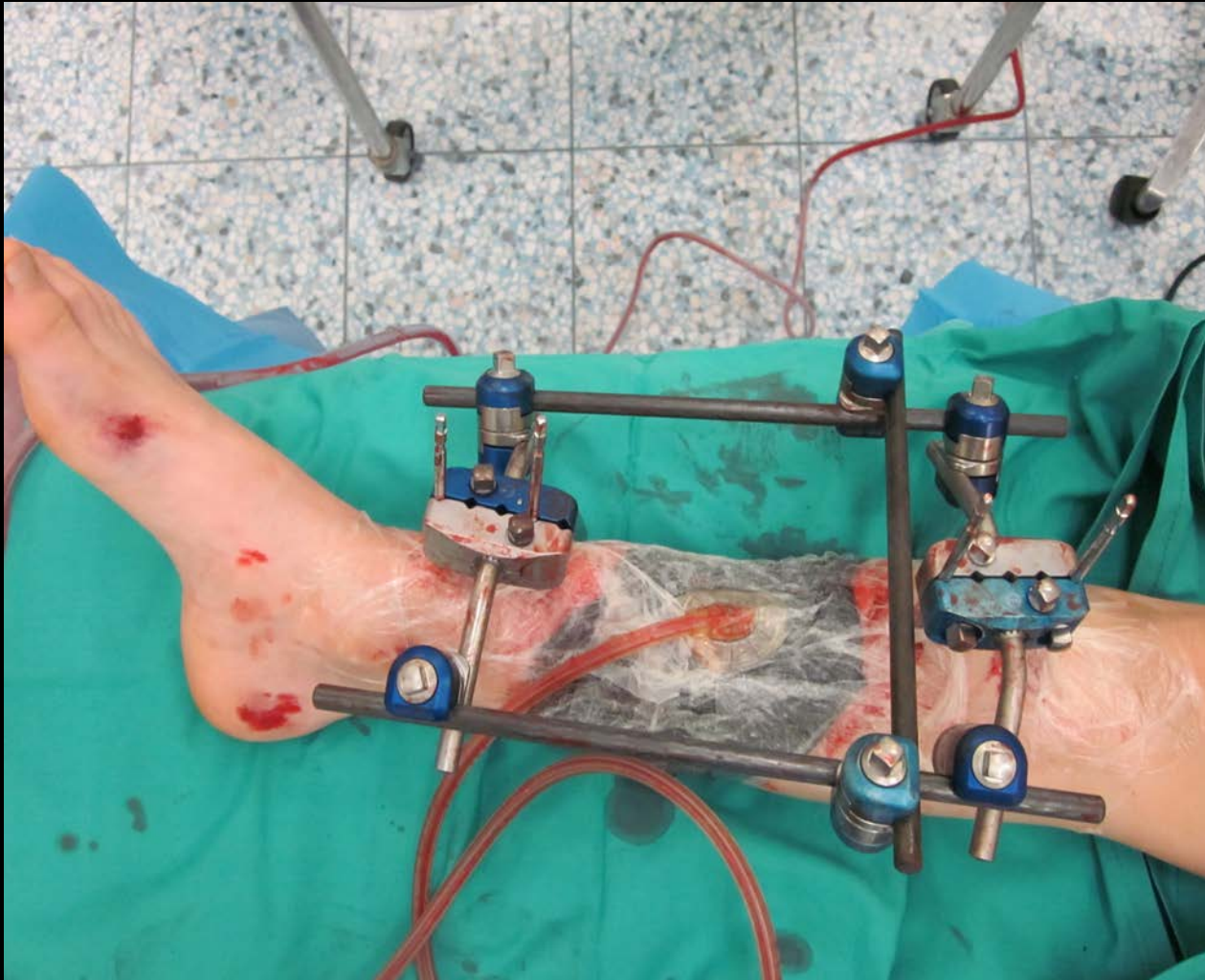
Wound Assessment In Theatre

Systematic

Bone Assessment & Resection

Wound "Excision" (not debridement)

Wound Extension



+ 3 hours

Courtesy of Mr S Mitchell

Bristol Children's Hospital
Aquilion ONE
CTA\Coronal.29

0 cm



R

31 cm

Im: 30 Ser: 10

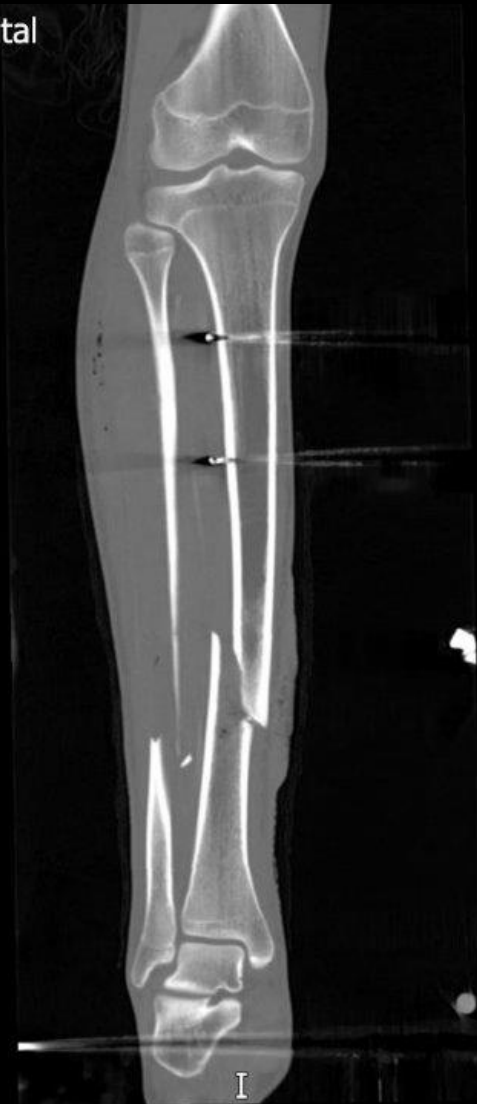
100kV

90mA

Thk:2mm

Loc:46.495mm

FC08-H



+ 24 hours



+ 48 hours

2014



+ 18 months





Take home message

Children with open fractures are just small adults
with open fractures

What you have heard

Hip septic arthritis

Slipped epiphysis

Open fractures