

# Orthopedic Pearls & Pitfalls

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## Introduction

- Why are you here?
- General Tips
- Pearls and Pitfalls
- Summary of really important stuff

## Who Cares?

- MISSED INJURIES = bad for patients
- MISSED INJURIES = \$\$\$\$\$
- Gwynne, Barber and Tavener:  
Journal of Accident Emerg Med 1997
  - 105 consecutive negligence claims in the United Kingdom
  - 54 claims involved missed fractures



## Who Cares?

- Karcz et al: Am J Emerg Med 1996
  - 549 Malpractice claims against EPs in Massachusetts
  - 17% involved fractures
  - 35% payed out



## General Tips



## Tip #1

- Do good sensory and motor exam BEFORE using anesthetic.
- 2 point discrimination is the gold standard
  - 4-5 mm in fingers

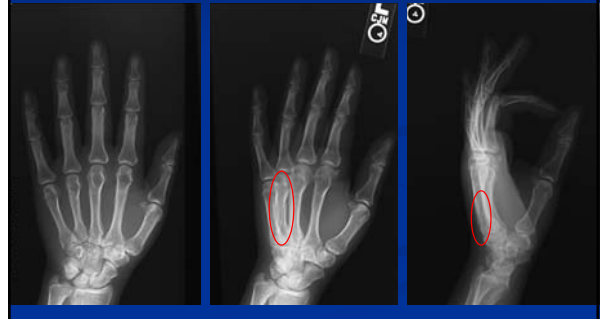


## Tip #2

- Get at least 2 views – and often 3



- Get at least 2 views – and often 3



## Tip #3

- If you would think ligamentous injury in an adult, think growth plate injury in a kid.



## Tip #4

- Splinting is good

Be liberal with plaster.

- Relieve pain
- Prevent fracture displacement
- Satisfy patients/parents
- Assure follow-up.



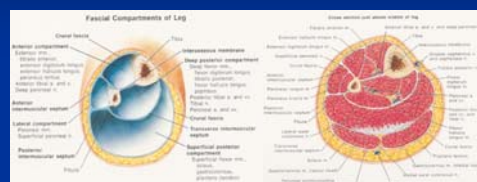
## Tip #5

- Remove cast for any symptoms under it.



## Tip #6

Think of compartment syndrome



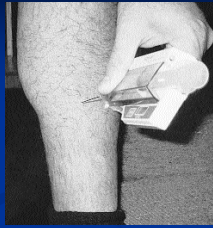
- External compression
  - Cast, burn
- Internal compression
  - Edema, hematoma

■ 5 P's

- Pain (earliest)
- Paresthesia (most reliable)
- Paresis
- Pallor
- Pulselessness (too late)

■ Pressures

- 0-10 mm Hg normal
- >20 compromised cap flow
- >30 ischemic necrosis of muscles/nerves



■ Now the meat!



■ 45 yo male c/o finger pain



■ Flexor Tenosynovitis

Kanavel's signs

- 1) held in flexion
- 2) pain with passive extension
- 3) fusiform swelling
- 4) tenderness along tendon sheath

Tx is surgical & abx



■ 14 yo male was in a fight at school. C/o hand pain.



■ Boxer's Fracture

- Flexion deformity up to 45 deg is acceptable
- NO ROTATIONAL DEFORMITY
- Treat with buddy-tape (to maintain rotational reduction)
- Ulnar gutter splint



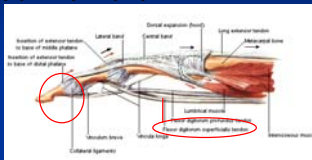


- 25 yo rugby player c/o finger pain after a tackle.



## FDP rupture

- "Rugby jersey" injury



- All should be considered surgical candidates
- Splint and f/u <7d



## FDS/FDP exam



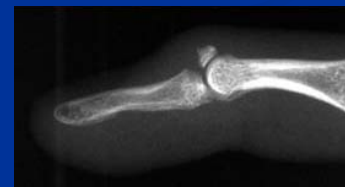
- FDS
  - Hold all other fingers in extension
  - Flex PIPJ of finger to be tested
- FDP
  - Hold PIPJ in extension
  - Flex DIPJ



- This gentleman c/o jamming his finger.



## Mallet finger



long extensor tendon

distal phalanx

Immobilize in extension for 8 weeks  
If untreated can develop a.....  
Refer to hand

A prisoner presents stating he fell and cut his hand:

■ **Fight Bite**

- Patients may lie
- Depth of penetration is often greater than appreciated, (skin, tendon, capsule).
- Infection is a frequent sequela.

■ ALL should receive antibiotics

- 23 yo male crane operator was working on the crane when a hydraulic line sprang a leak.
- c/o minimal pain

**Prognostic Factors**

- material injected
  - grease (fibrosis)
  - paint (necrosis)
- site of injection:
  - digits: tendon sheath - poor prognosis
  - palm: not governed by fascial planes, better prognosis

**All go to the OR**

22 yo female c/o right wrist pain s/p FOOSH



- Examine snuff box- if tender, then assume scaphoid fx and do thumb spica with f/u

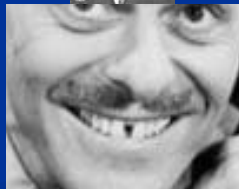


- 56 yo male s/p FOOSH.

X-ray shows this



- Terry Thomas sign.
- Normal scapho-lunate distance is <3mm
- Tx: volar splint in neutral position and f/u



- 36 yo female s/p FOOSH





Tx: early reduction and then surgery  
Check for acute carpal tunnel syndrome

- Another FOOSH



- Colles'- don't miss acute carpal tunnel
- 0 to 15 degrees of dorsal angulation OK. Otherwise reduce
- Beware volar abrasions as being open fxs
- Sugar tong splint



What's this?



- Monteggia:

- Up to 50% miss rate (1940)
- Usually FOOSH with pronation but can be direct blow to ulna
- posterior interosseus N (deep branch of radial N) –b/c near radial head
- get weakness in extension of fingers or thumb

So what's this then?



MUGR



## Galeazzi



### ■ Galeazzi:

- 3 x more common than Monteggia
- Up to 50% miss rate (1940)
- Surgery is usually needed for good outcome
- Injury at the distal radioulnar joint may be just ligamentous

*So how to diagnose?*

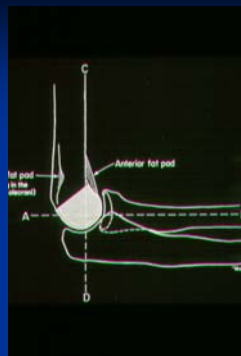
- Pt. resists pronation and supination.
- Neurovascular injury uncommon

- If a child has swelling at the elbow – something is wrong

- Nursemaids don't usually swell
- Supracondylar fx
- Lateral condyle fx (need surgery)

- Get a good lateral

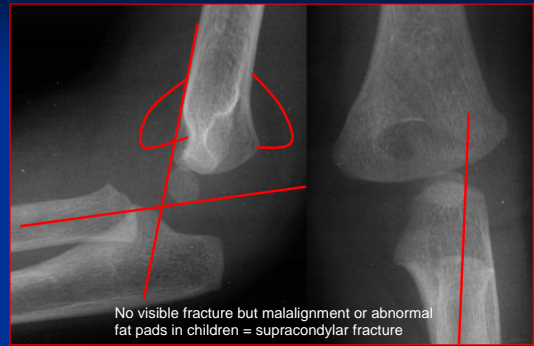
- Look at lines and fat pads



- 8 y/o fell off skateboard

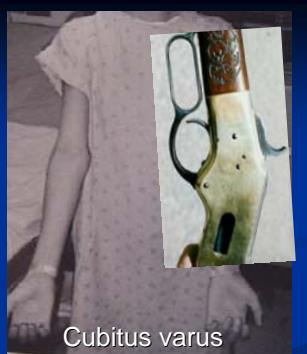


## Supracondylar fracture



### Supracondylar Fracture Outpt. Referral Criteria

Looks like an elbow  
Active finger motion  
Anterior humeral line  
hits capitellum  
Orthopedic evaluation  
within 5 days



## FOOSH?

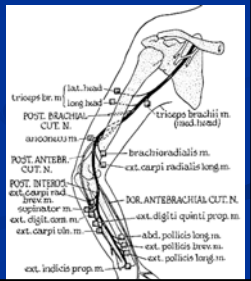
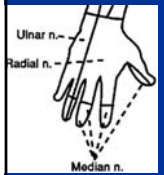


### ■ Radial Head Fracture

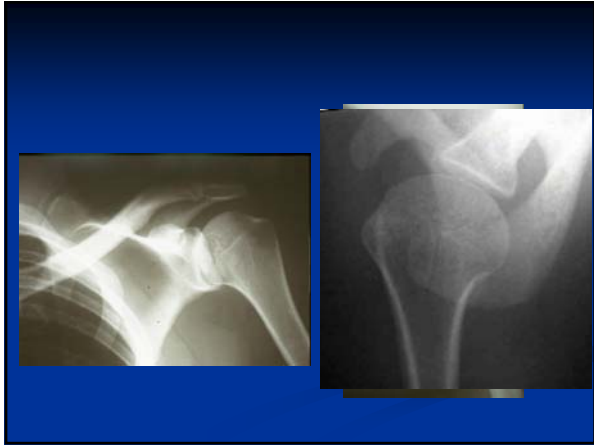
- Elbow pain after fall on outstretched arm.
- Injection of anesthetic can facilitate assessment of motion to assure no mechanical block.
- Treat non-displaced fractures with a sling and **early mobilization**.

■ **Humerus**

- Very forgiving
- Just don't miss Radial N injury
- Get wrist drop and sensory loss over radial n distribution



- 43 y/o sustains burn to L arm and c/o L upper extremity pain.



- Posterior dislocation may be relatively asymptomatic can do minor ADLs
- Inability to rotate palm up
- Don't immobilize shoulder more than 14 days



- 52 yo diabetic c/o foot pain after stepping in a hole



- Lisfranc fracture/dislocation –
  - Get weight bearing view if subtle
  - Plantar ecchymosis bad sign even if x-rays neg
  - Look for alignment of 2nd metatarsal on AP and 4th metatarsal on oblique x-rays

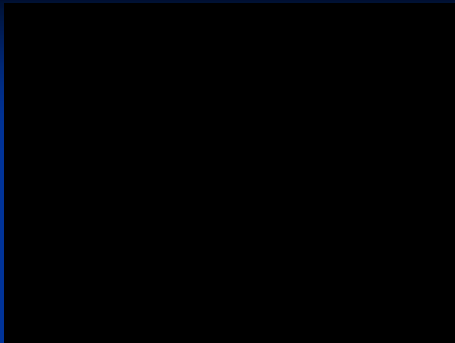
- Frequently missed.
- Needs surgery.



- Medial borders of 2<sup>nd</sup> MT and middle cuneiform on AP



- Medial borders of 4<sup>th</sup> MT and cuboid on oblique



- This Darwin award competitor c/o heel pain.



### ■ Calcaneus Fracture

- Frequently mistaken for ankle sprain because of "negative" x-rays.
- Look for heel tenderness and subtle X-ray findings.




### ■ Bohler's angle

- 20-40 deg is normal



This nuclear physicist presents with ankle pain.



- Maisonneuve 
- examine prox fib for all ankle injuries


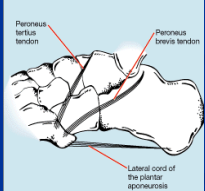





- 23 yo Lindy Hopper c/o ankle sprain




- Always examine base of 5th metatarsal

Jones Dancer's

- 35 yo c/o "pop" in ankle during 1<sup>st</sup> game of beer league






- Thompson test



Tx: splint in gravity equinus and f/u ortho

- If in doubt.....

Pretty much all ankle injuries can be splinted, made non-weight bearing and f/u ortho in a week.

### The exception.....



### Ankle fracture-dislocation

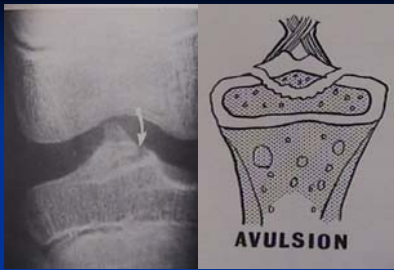


- 32 yo male got tackled playing football. Now has a little pain in the knee.



- 50-60% anterior
- 10-40% vascular injury
  - 1/2 will need amputation





Beware mechanism plus an unstable knee.

### Don't miss popliteal artery injury:

- If ischemia, or pulse deficit → OR (angio)
- If normal → ABI
  - ABI > 0.9 → observe
  - ABI < 0.9 → angio



### Dislocation Summary

- High incidence of injury to popliteal artery.
- Watch for peroneal N. inj
- May spontaneously reduce
  - High suspicion for dislocation if gross instability of knee
- All patients need imaging of vascular supply vs. admission



- 27 yo rugby player c/o severe pain with walking after a tackle

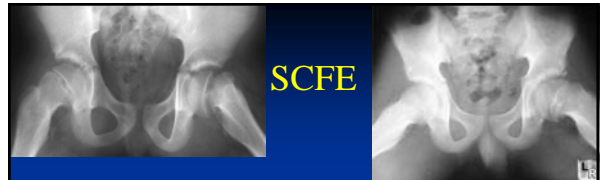
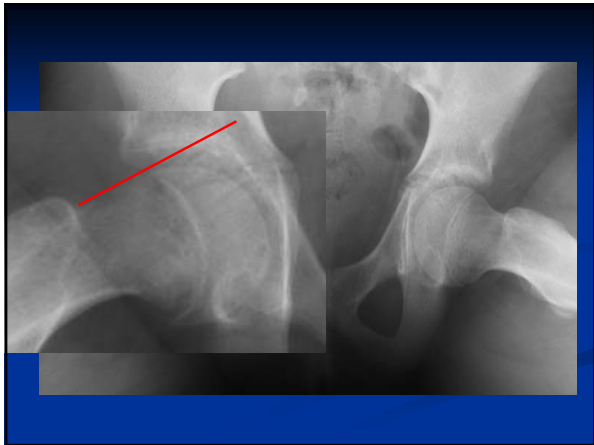


- Tibial plateau fx's
  - make sure joint space is even all the way across





■ This 13 yo presents c/o R knee pain while roller blading



- male, obese, active, 12-13 yo.
- 15% have pain in the distal thigh or knee.
- 30% are not diagnosed at first presentation
- A lateral x-ray is the most sensitive test
- **Strict non-weight bearing on the affected side should be enforced from the moment of diagnosis**

■ Be wary of hip injuries in people c/o back pain in a wheel chair



- 27 yo female s/p MVC.
- c/o L hip pain



## Posterior Hip Dislocation



## Anterior Hip Dislocation



## Hip dislocation: emergency

- Need to be reduced ASAP (avascular necrosis)
- Anterior: 10-25 % - abducted, externally rotated, flexed
  - Reduced by longitudinal traction
- Posterior: 75-90% - adducted, internally rotated, shortened
  - Reduced by anterior traction while hip is flexed to 90 deg

- 2 yo female brought in because not walking.



## ■ TRANSIENT SYNOVITIS VS SEPTIC HIP

- Four independent clinical predictors:
  - History of fever (>38.4)
  - Non weight bearing
  - ESR > 40
  - WBC > 12
- 0 predictors..... 0.2% septic
- 1 predictor..... 3% septic
- 2 predictors..... 40% septic
- 3 predictors..... 93% septic
- 4 predictors..... 99% septic

Kocher, Zurakowski and Kasser; J Bone Joint Surg 1999

## SUMMARY

- Orthopedic Emergencies
  - Hip dislocation (ASAP)
  - Ankle dislocation with tenting (1 hour)
- Orthopedic Urgencies
  - Open fractures (to OR in 6 hours)
  - Compartment syndrome
  - High pressure injection injuries

## SUMMARY

- Other Important Things
  - Fat pads and lines on all elbow films
  - Look at joint space in tibial plateau injuries
  - Beware posterior shoulder dislocation
    - Always get a lateral view
  - Beware arterial injury in knee dislocations
  - Splint kids with joint tenderness

## SUMMARY

- If in doubt:
  - Splint
  - Non-weight bearing
  - Follow-up with ortho
- **Don't be afraid – it's not rocket science!**

Questions?

