

Common wrist injuries in sport

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Overview / Classification

Acute injuries

- Simple - wrist sprain
- Not so simple
- 1 - Fracture of distal radius/ulna
- 2 - Scaphoid fracture
- 3 - Fracture of hook of Hamate
- 4 - Scapho-lunate ligament rupture
- 5 - Lunate dislocation
- 6 – Triangular fibrocartilage (TFCC) tear

Chronic/overuse injuries

- 1 - Missed scaphoid fracture
- 2 - Missed scapho-lunate ligament rupture
- 3 - Instability of distal radio-ulnar joint
- 4 - TFCC tear
- 5 - Ulnar impaction
- 6 - Dorsal impingement
- 7 – Tenosynovitis
- De Quervain's
- Intersection syndrome



Key points

- 1 – Mechanism of injury is important
- 2 – Specific injuries are often associated with specific sports and age groups
- 3 – A missed scaphoid fracture is the most common missed fracture leading to litigation



History

1 – Mechanism of injury - FOOSH

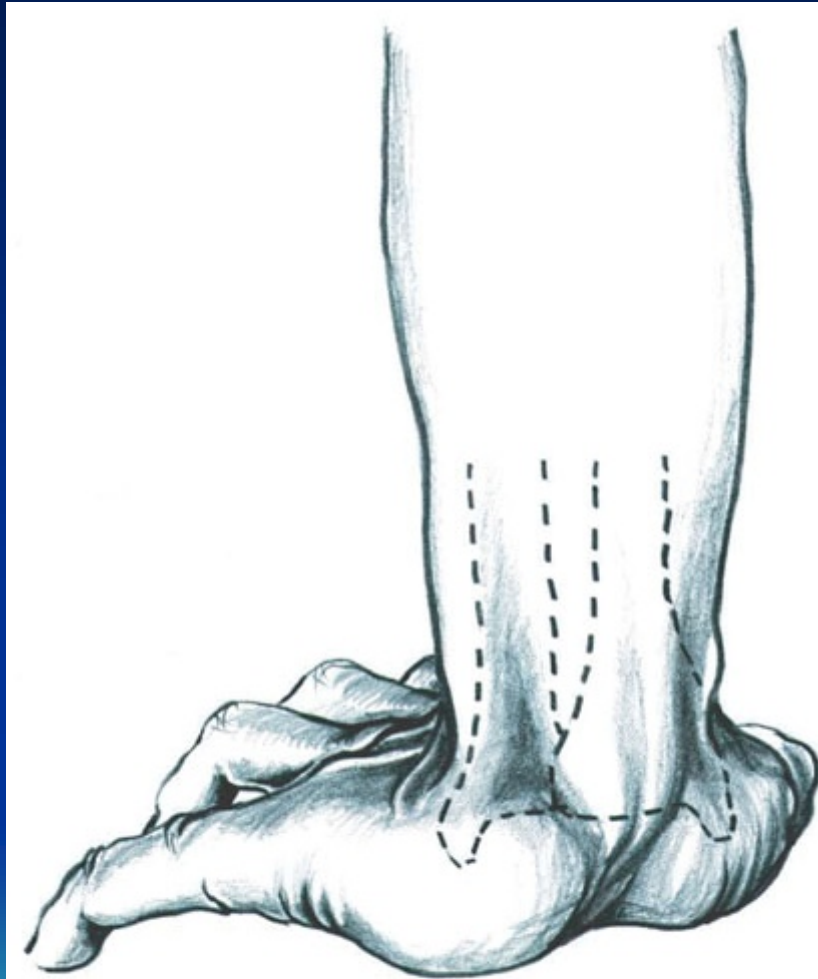
- forced flexion
- forced extension

2 – High or low energy

High energy injuries – cycling,
mountain-biking, skateboarding,
rollerblading, snowboarding



Mechanism of injury



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History Continued:

- 3 – Location of pain – ulnar, radial sided
- 4 – Associated clicking, snapping
- 5 – Occupation – heavy / light work
- 6 – Other recreational activities
- 7 – Previous injuries + treatment



Examination

Look – Deformity e.g – dinner fork

Swelling e.g – ganglion

Feel – Tender sites – start with where they are most symptomatic

Always check – anatomical snuffbox
- scaphoid tubercle

Move – Flexion (80 deg) Extension (70 deg)

Radial deviation (20 deg) Ulnar deviation (30 deg)

Pronation (80 deg) Supination (80 deg)

Special tests

1 – Watson's test

2 – TFCC stress tests – grind, sitting hands

3 – Distal radio – ulnar joint mobility

4 – Impingement tests



Investigations

X-rays – Routine – PA, Lateral

Scaphoid views

Clenched fist view – If suspect rupture of scapho-lunate ligament (gap of over 3mm is significant)

Ulnar /radial deviation

Ultrasound scans

- 1- Show tendon pathology eg tenosynovitis, or instability of ulnar tendons
- 2- Useful for guidance of injection eg for De Quervains or intersection syndrome



Investigations contd.

Bone Scans

- 1- Show active bone injury e.g scaphoid fracture (normal bone scan helpful in excluding scaphoid fracture)
- 2- May help in gymnasts with wrist pain, if activity in distal radial youth plates is significantly asymmetrical (? Super- imposed growth plate fracture)

CT Scans

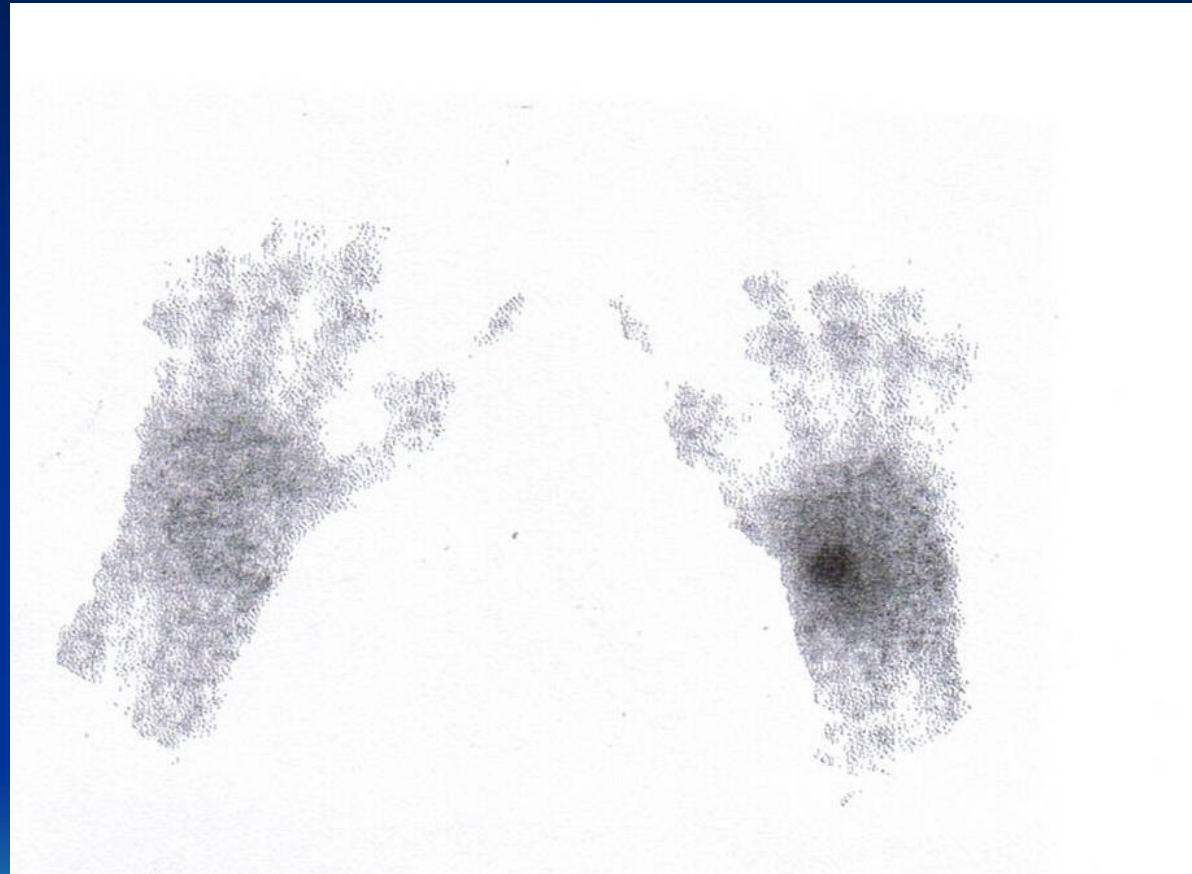
Thin slice in scaphoid fracture can show anatomical disruption

MRI Scans

- 1- Scaphoid fracture
- 2- Scapho-lunate ligament tear / disruption
- 3- TFCC tear
- 4- Ulnar impaction



Bone scan scaphoid fracture



Typical case – Wrist sprain NOS

History –Low energy injury

Pain, no clicking

Mechanism

- Forced extension – Traction of flexor tendons, Compression of dorsal capsule
- Forced flexion – Traction to extensor tendons

Examination - Mild tenderness

- Minimal restriction of movement
- Not tender over snuffbox or scaphoid tubercle
- Watson's test negative
- TFCC stress tests negative
- No pain on mobilising distal radio-ulnar joint



Typical case continued

Investigations - No Ottawa rules for wrists
- X-ray those with clinical risk factors for fracture, eg high energy injury

Treatment - Pain relief
- Splintage – Off the shelf devices, thermoplastic devices from hand therapist
- Hand exercises – physio, home based ,review if not significantly improved in three weeks



Extensor muscle exercise



Fracture of Radius / Ulna

- Young people – High energy required for fracture suspect significant associated soft-tissue injury
- Old People – Osteoporosis – less energy required
- Treatment:
 - 1- If intra- articular involvement - step of 1mm acceptable otherwise anatomical reduction required
 - 2- 6 weeks in cast – distal half of forearm + hand, leaving MCP joints free
 - 3- ORIF if unstable or reduction inadequate



Colles fracture



Fracture of scaphoid

-a minefield

- History – fall, radial sided pain
- Examination – Tender in snuffbox or scaphoid tubercle, pain with axial loading of thumb
- Investigations – X-rays including scaphoid views. If need to know yes/no rapidly. Bone scan / limited MRI positive 24 – 48 hrs post injury (cheaper than 2 weeks off work)
- Treatment – Scaphoid cast 2 weeks then re X-ray. If positive, further 4 weeks in cast .If no fracture – Velcro wrist splint and exercises

If ongoing wrist pain – refer to orthopaedic surgeon with hand surgery interest and expertise

- Likely ORIF



Scaphoid fracture



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Fracture hook of Hamate

- History – Playing golf, hit a ground shot - grip is forced against top hand. Ulnar sided wrist pain.
- Examination – Tender flexor aspect of wrist, over hamate
- Investigations – X-rays including carpal tunnel view CT or MRI scan helpful
- Treatment – Excision of hook, then 3 weeks immobilisation, or - ORIF



Fracture hook of Hamate

Mechanism of injury

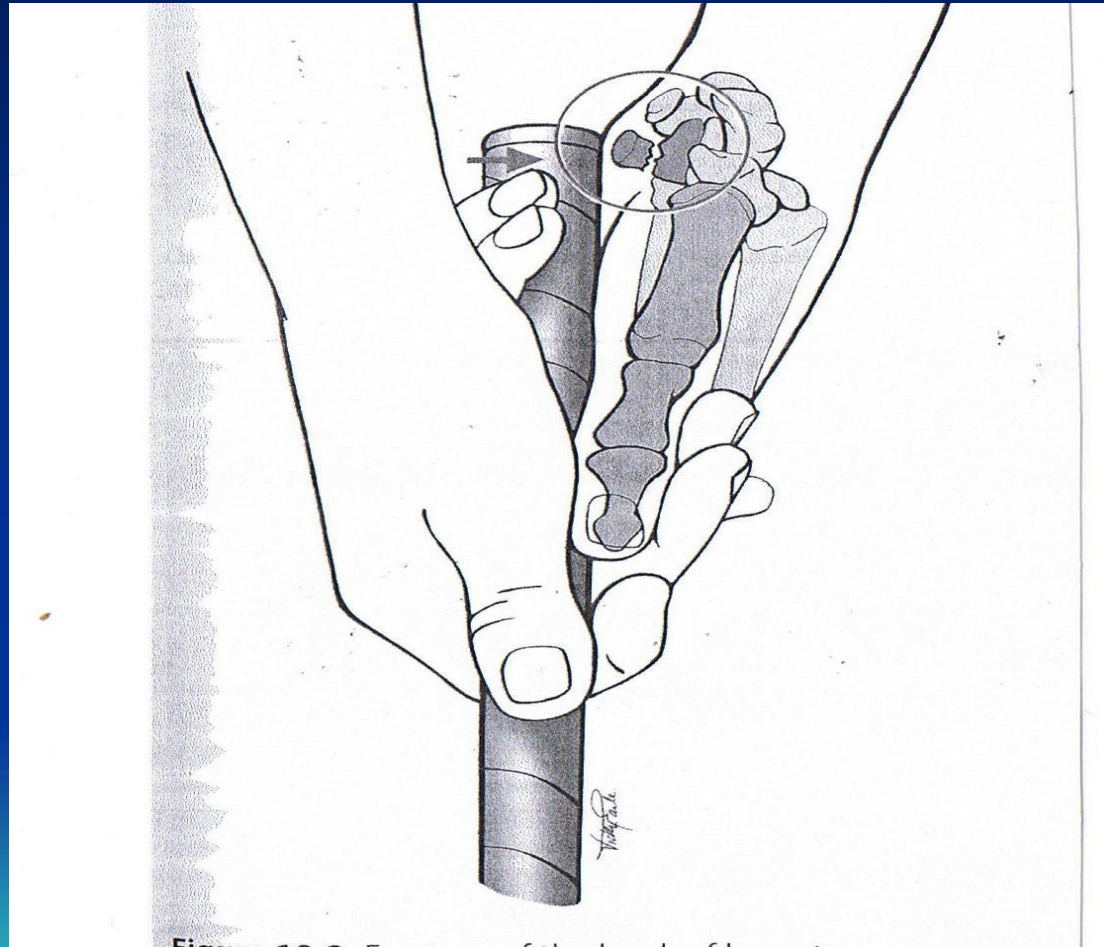
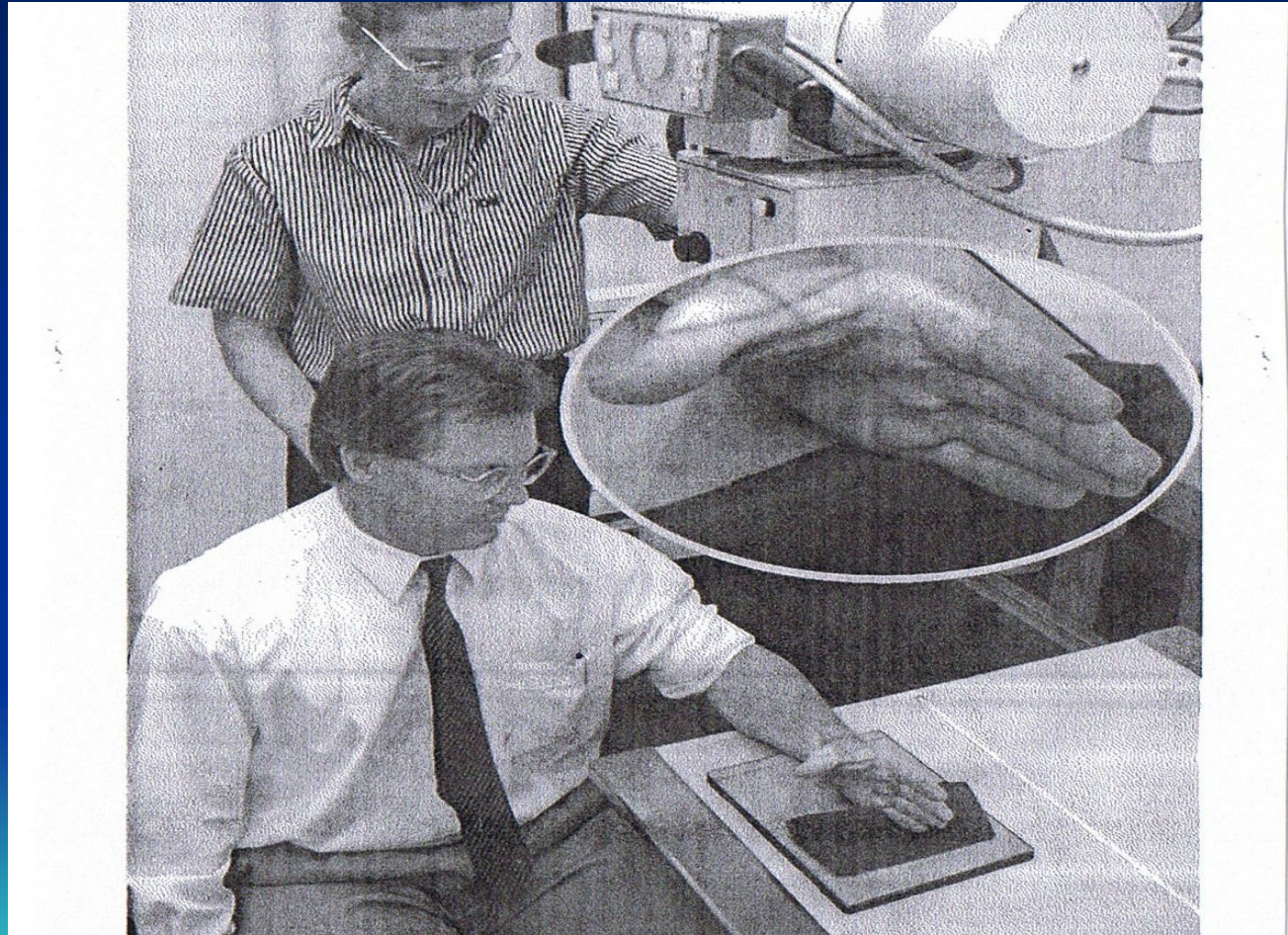


Figure 12-25 Fracture of the hook of hamate

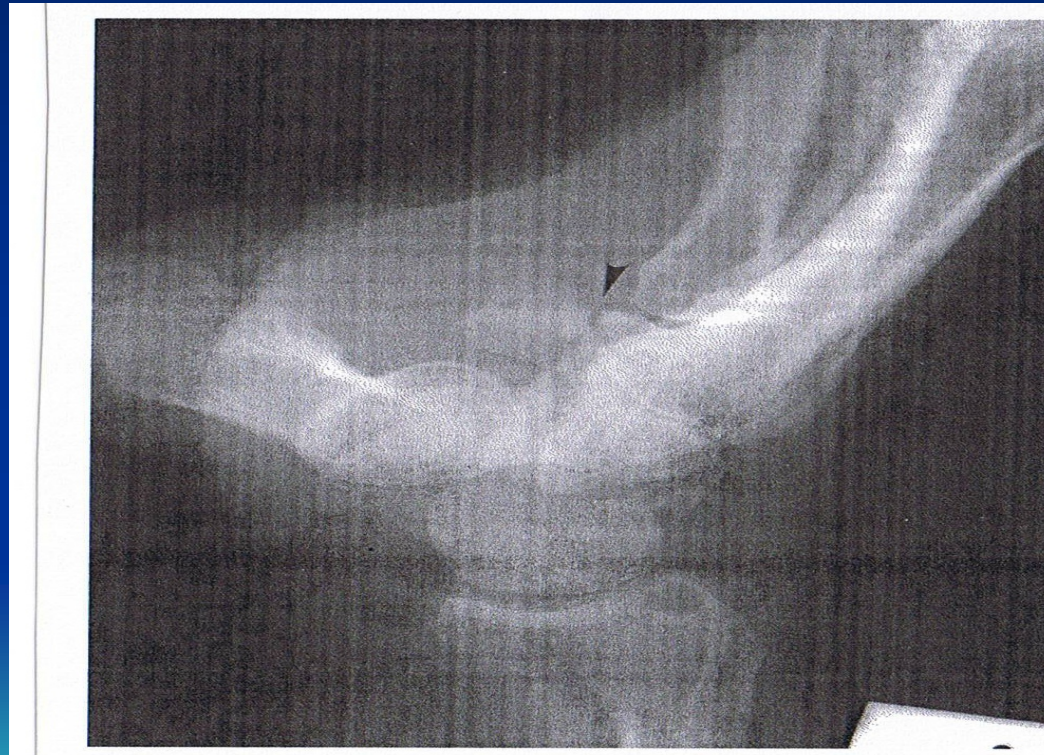
Fracture hook of Hamate

Hook view



Fracture hook of Hamate

Hook view



Scapho-lunate ligament rupture

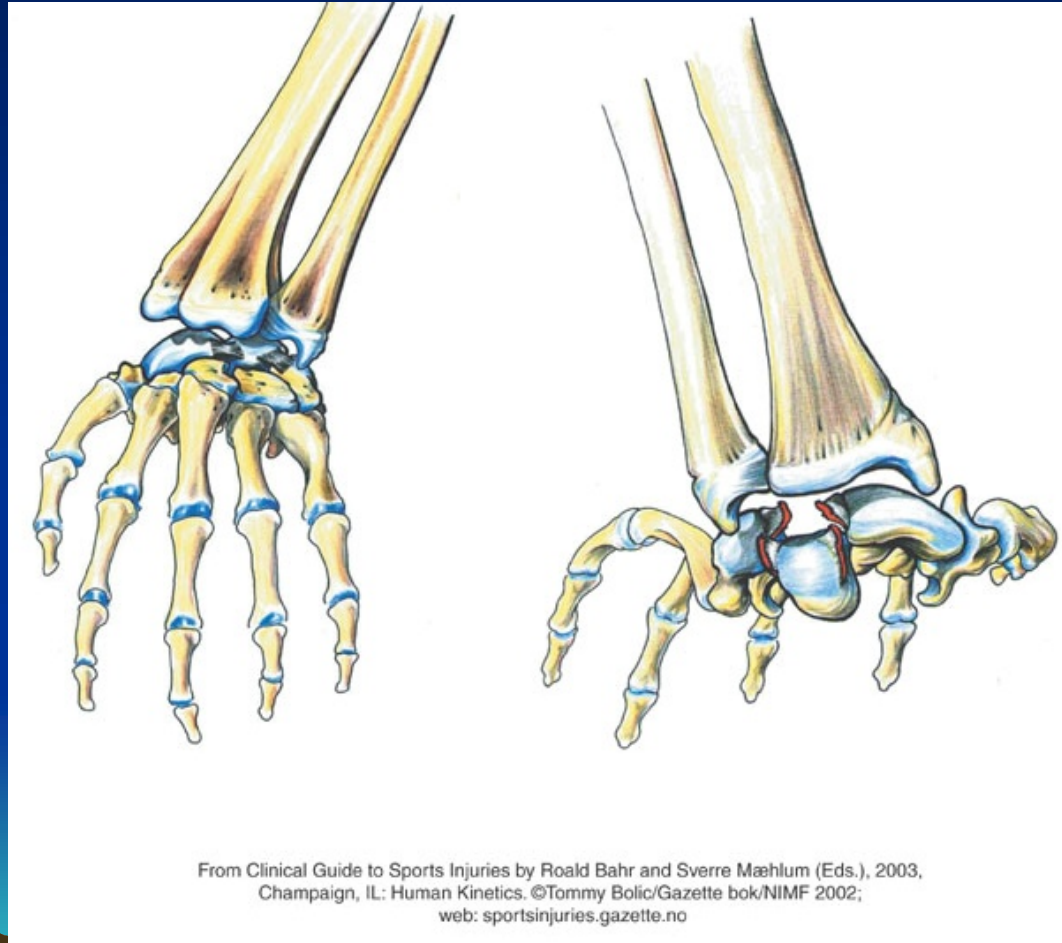
- History – Fall on outstretched hand, pain/clicking
- Examination – Tender 2cm distal to Lister's tubercle, in line of middle ray. Pain, dorsal movement of scaphoid on performing Watson's test
- Investigations – X-Rays including clenched fist view (>3mm separation) MRI scan
- Treatment – Ligament repair (at cost of some mobility of wrist)



Scapho-lunate ligament rupture



Scapho-lunate ligament rupture

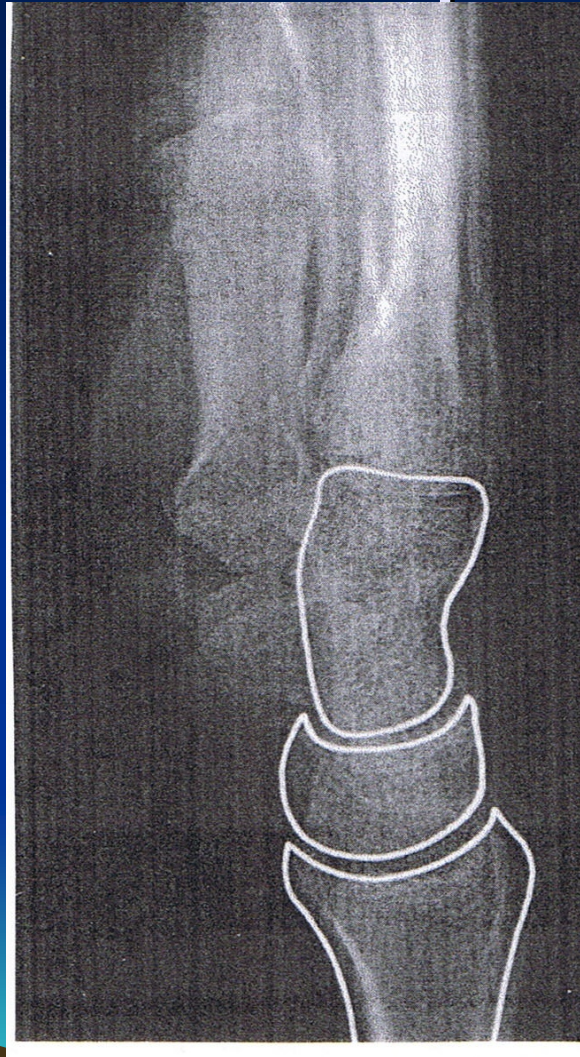


Anterior dislocation of lunate

- Mechanism – FOOSH, forced extension injury
- History – Severe pain, swelling in palm, sometimes carpal tunnel syndrome
- Examination – Tender swelling in palm
- Investigations – X-Ray – lateral view shows lunate tilted into palm, not articulating with capitate
- Treatment – Reduction – open or closed cast immobilisation 8 weeks
- NB – Needs to be recognised and treated within a few days to avoid complications



Alignment of carpal bones



Anterior dislocation of lunate



Perilunate dislocation

- Mechanism – In association with scaphoid fracture - lunate remains with the radius, and capitate dislocates dorsally
- History – Fall severe pain, concavity in palm
- Examination – Tender swelling over dorsum of hand
- Investigations – X-Ray – Lateral view shows dorsal displacement of capitate and other distal structures
- Treatment – Reduce by traction. POP with wrist in flexion for 2 weeks, then replace with POP in neutral for a further 2 weeks

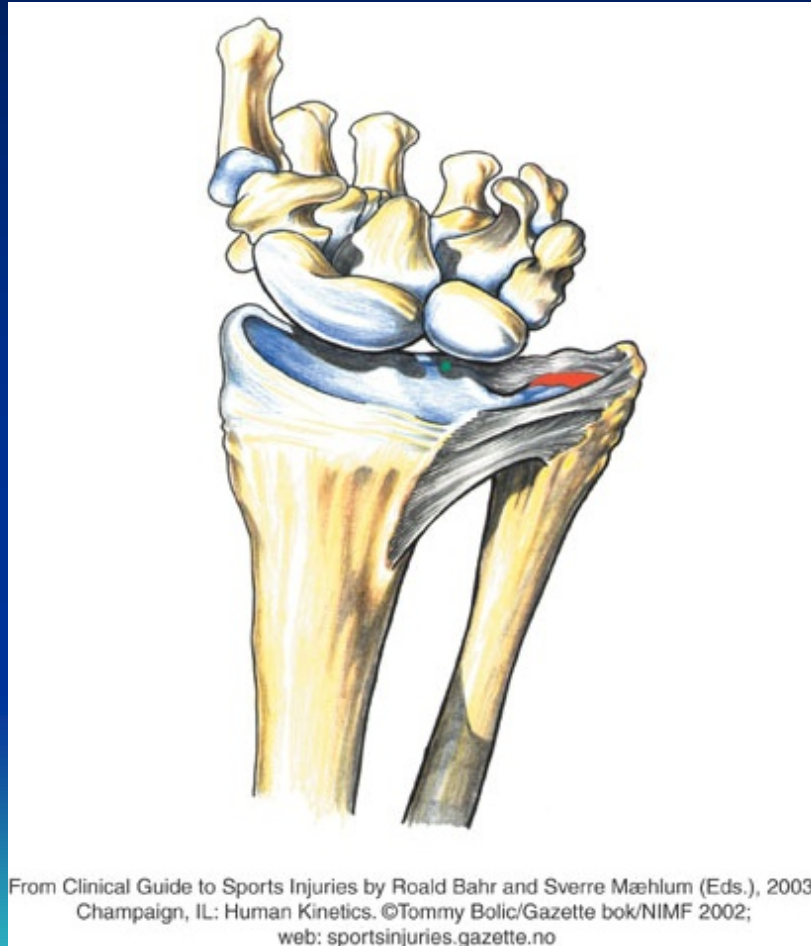


Triangular Fibrocartilage Complex (TFCC) Tears

- TFCC – Analagous to the meniscus of the knee
- Components – Triangular fibrocartilage, Ulnar meniscus homologue, Ulnar collateral ligament , Carpal ligaments , ECU tendon sheath
- Acute presentation – in association with fracture of distal radius / ulna
- Subacute presentation – Compressive loads to wrist – gymnastics, racquet sports, golf



TFCC Tears



TFCC tears, continued

- History – Ulnar sided wrist pain +/- clicking
- Examination – Tenderness, swelling ulnar aspect of wrist, TFCC grind test, sitting hands test reproduce pain
- Investigations – X-Rays – if positive ulnar variance, increased risk of TFCC damage
MRI – 60% sensitive, 90% specific
- Treatment – Brace, strengthening exercises, surgery – excision of torn fragment, shortening of ulna (if too long)



Complications of acute injury

- Scaphoid fracture – avascular necrosis (AVN) of proximal pole, post traumatic arthritis
- Scapho-lunate ligament disruption :
 - instability of proximal carpal row
 - SLAC wrist
- Any significant wrist injury :
 - 1- Carpal tunnel syndrome
 - 2- Complex regional pain syndrome (CRPS)
 - 3- Post traumatic arthritis



Chronic / Subacute presentation

- 1- Review history – ask specifically about pain in snuffbox, clicking
- 2- Examination – look specifically for :
 - a- Tenderness in snuffbox, scaphoid tubercle
 - b- Watson's test
 - c- TFCC provocation tests
 - d- Pain on mobilising distal radio-ulnar joint



Missed Scaphoid fracture

- History – Radial sided pain. Injury may be forgotten
- Examination – Tender in snuffbox , progressive joint stiffness
- Investigations – X-Rays – Sclerosis of proximal pole, associated degenerative change
- Treatment – ORIF and bone graft
If partially healed – CT scan through long axis of scaphoid, fine cuts can show anatomic integrity



Missed scapho-lunate ligament disruption

- History – Pain + / - clicking
- Examination – Tender 2cm distal to Lister's tubercle, pain, dorsal movement of scaphoid on performing Watson's test
- Investigations – X-Rays incl. clenched fist view ($>3\text{mm}$ gap), MRI scan
- Treatment – Open reduction and repair of ligament

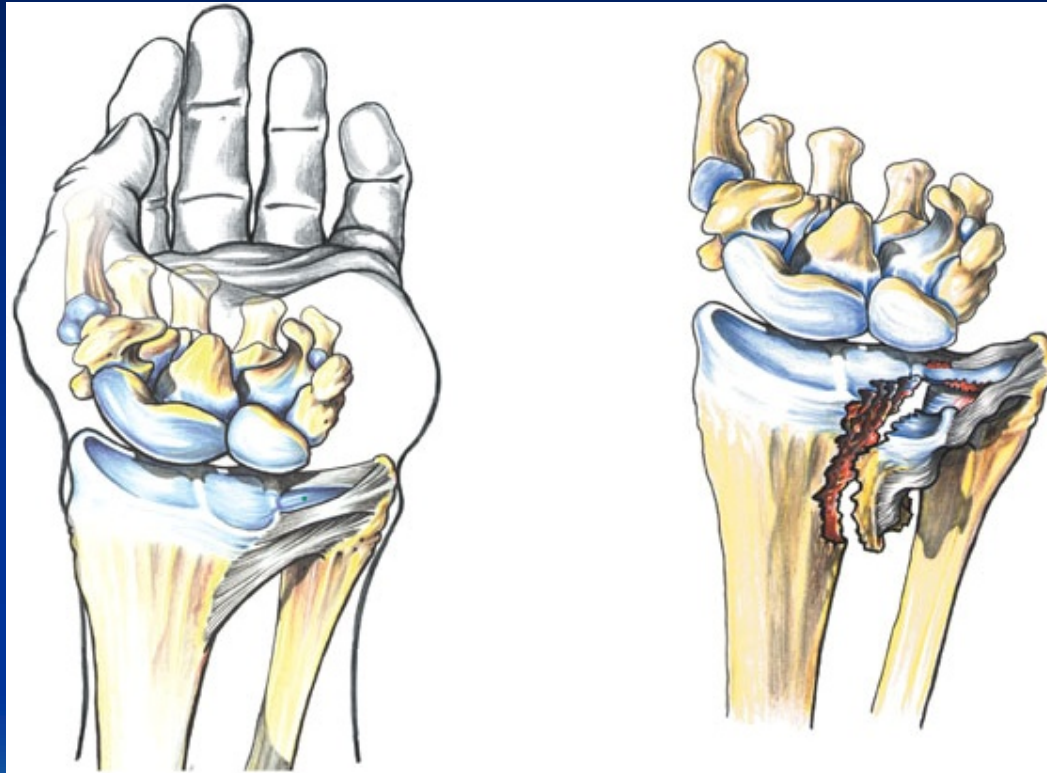


Instability of distal radio-ulnar joint

- History – Pain, clicking of wrist
- Examination – Tender over distal radio-ulnar joint, pain, excessive motion of opposite side
- Investigations – True lateral in pronation may show dorsal displacement of ulnar styloid process
- Treatment – Repair of TFCC



Distal Radio-ulnar joint instability



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Triangular Fibrocartilage (TFCC) Tear

- History – Ulnar sided pain +/- clicking
- Examination – Tenderness, swelling ulnar aspect of wrist TFCC grind test, sitting hands test, reproduce pain
- Investigations – X-Rays – look for positive ulnar variance. MRI scan-60% sensitive,90% specific
- Treatment – Brace, strengthening exercises
Surgery – excision of torn fragments, repair of attachments, shortening of ulna useful



Ulnar Impaction

- Pathomechanics – Repeated impaction damages lunate and triquetrum
- History – Ulnar sided pain
- Examination – Tender ulnar border of wrist
- Investigations – X-Rays show: positive ulnar variance, sclerosis of lunate
- Treatment – Shortening of ulna



Dorsal impingement

History – Repeated extension loading, esp. in skeletally immature gymnasts

Examination – Tender dorsum of wrist, restricted extension, pain at end range

Investigations – X-Rays may show changes in distal radial epiphysis

1- Widening of growth plate

2- Cystic changes- usually affect metaphyseal aspect of epiphyseal plate

3- Haziness of normal radiolucent area of epiphyseal plate (cf asymptomatic side)

Treatment – Load reduction – modify training regime
strengthening of forearm flexors



Gymnast's wrist



DE Quervains syndrome (tenosynovitis of APL + EPB)

History – Radial sided wrist pain, esp. with ulnar deviation e.g –
L thumb of R handed golfers, racquet sports, 10 pin bowlers,
rowers, canoeists

Examination – Tenderness of APL / EPB tendons as they cross the
radial styloid , positive Finkelstein's sign

Investigations – X Ray usually normal , Ultrasound scan shows
fluid in tendon sheath

Treatment – Splint (14% success)

Stretches, strengthening exercises

Injection – under ultrasound guidance (83% success)

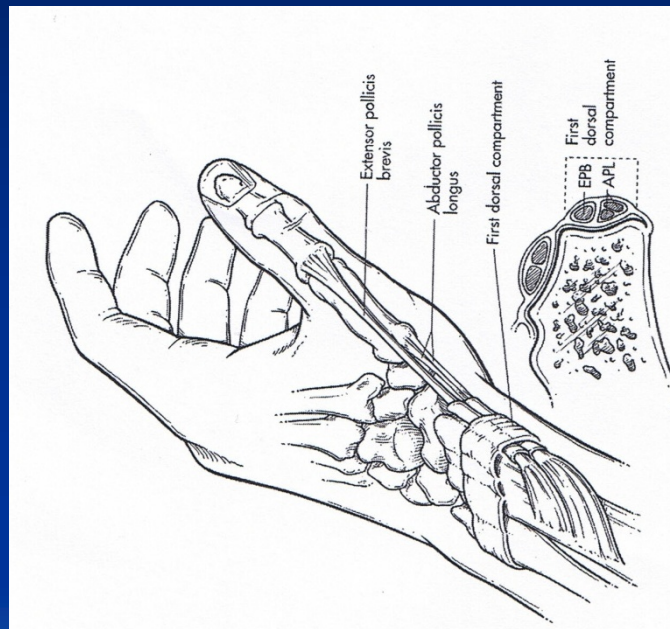
Injection + splintage (61% success)

Rarely surgery

Activity modification – after training



De Quervain's syndrome



Intersection Syndrome (crossover tenosynovitis)

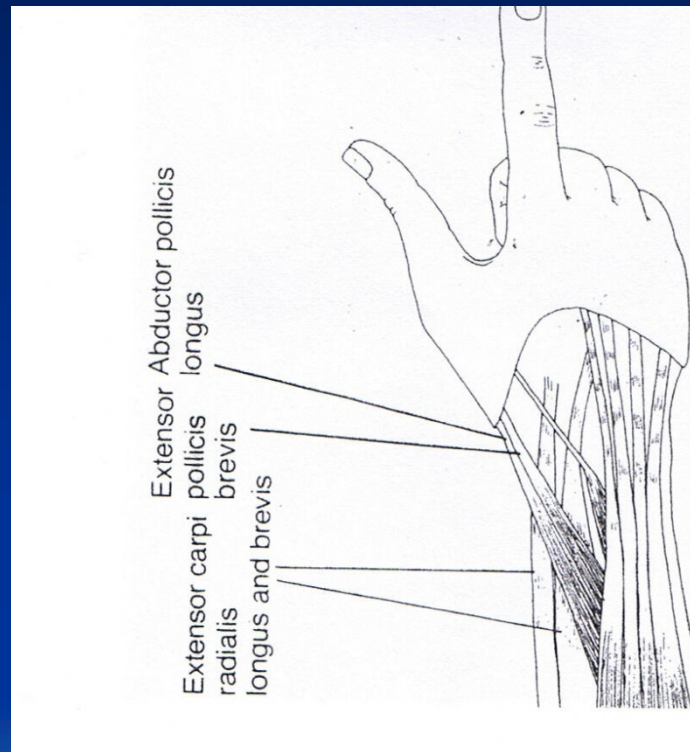
- History – Radial sided distal forearm pain + crepitus in rowers or canoeists(oarsman's wrist)
- Examination – Tender in crossover region (where APL / EPB cross wrist extensors) ,Crepitus on flexion / extension of wrist
- Investigations – Ultrasound scan shows fluid in tendon sheath
- Treatment – Load reduction: off water 1-2 weeks, Injection (under ultrasound guidance), If recurrent symptoms – surgery
-

Technique modification:

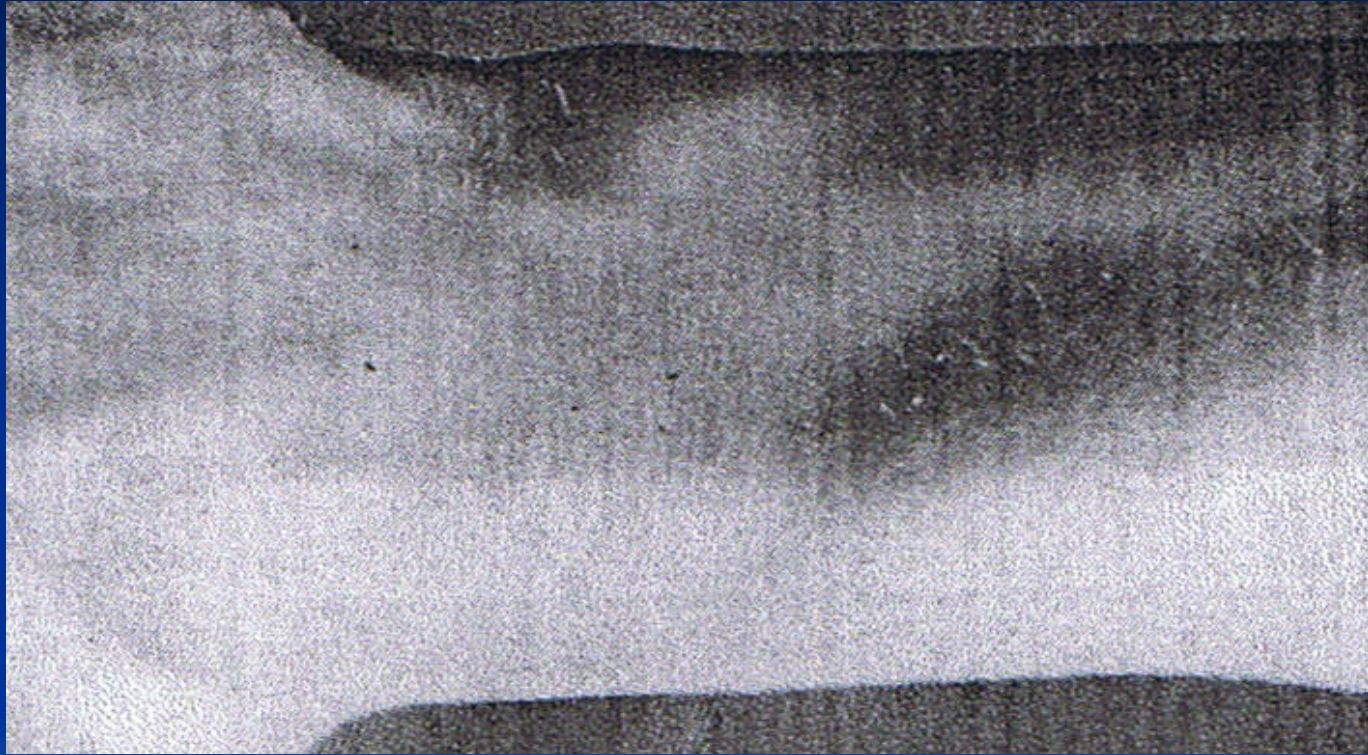
- 1- Row with oar square all the time
- 2- Rotate oar by rolling fingers not twisting the wrist
- 3- Check adequate travel on seat



Intersection syndrome



Intersection syndrome



Summary

- 1- Be careful before you diagnose a simple wrist sprain
- 2- Scaphoid fractures and scapho-lunate ligament rupture can have long term complications
 - have a high index of suspicion for these injuries
- 3- TFCC injuries are analogous to meniscal tears in knees. A trial of bracing and exercises is worthwhile
- 4- Tendon problems respond well to local steroid injection under ultrasound guidance

