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
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
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
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

web: sportsinjuries.gazette.no
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 – Analogous 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

From Clinical Guide to Sports Injuries by Roald Behr and Sverre Mæhlum (Eds.), 2003, Champaign, IL: Human Kinetics. ©Tommy Bulic/Gazette bok/NMF 2002; web: sportsinjuries.gazette.no
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 heated – 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 (>3mm 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
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