Surgery of the wrist and hand

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Rheumatoid arthritis of the wrist and hand

- Prevalence in the UK: 116/10,000 women ; 44/10,000 men
- 90% of individuals suffer from involvement of the hands
- MCP, PIP and wrist joints are involved earlier, and more frequently
- **The goal: minimising and delaying the personal, economic and social impairment.**
- Surgery is <u>one</u> of the treatment options.

Rheumatoid arthritis of the wrist and hand

- Assessment
- Surgical hierarchy
- Nerves
- Tendons
- Joints
  - Wrist
  - Hand
    - MCP, PIP/DIP, Thumb

Rheumatoid arthritis of the wrist and hand

- **Assessment:**
  - *Each patient is different – avoid a "cook book" approach*
  - Functional assessment
  - Anatomical assessment:
    - Skin, nerves, tendon-muscle units, joints
  - Medical assessment
  - Psychological assessment
  - Financial assessment
  - Surgical assessment

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - Nerves
  - Flexor tendons
  - The wrist
  - The thumb
  - The metacarpophalangeal joints (MCP)
  - Extensor tendons
  - Proximal interphalangeal joints (PIP)
  - Distal interphalangeal joints (DIP)

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Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **Nerves:**
    - Increased risk of compressive neuropathy
    - Prolonged compression can give rise to peri-neural fibrosis, and poor recovery – hence, a priority!
    - Median nerve
    - Ulnar nerve
    - Posterior interosseous nerve

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **Flexor tendons**

    Flexor tendons are at risk from chronic compression from bony spurs for example FPL over scaphotrapezial joint; or from chronic flexor tenosynovitis

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **Flexor tendons**

    Ruptures are difficult to deal with and multiple ruptures almost impossible to deal with

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The wrist**
    - **A painful, unstable wrist joint reduces efficiency of power generated in forearm, transmitted through the tendons to the hand**

      pathoanatomy : synovitis and capsular distension leads to supination, radial rotation, and ulnar and volar translocation of the carpus on the radius

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The wrist**
    - **Options:**
      - Synovectomy (early disease)
        - +/- limited arthrodesis (intermediate disease)
      - total wrist arthrodesis
      - +/- distal ulnar excision
      - wrist arthroplasty

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - The wrist

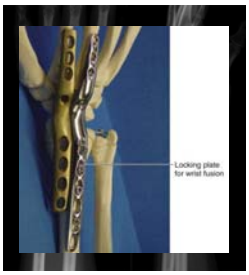
Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The wrist**

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The wrist: total arthrodesis**

Mannerfelt technique: Nail



Plating technique

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The thumb**

Thumb forms 50% of hand function

Tendon repairs, tendon transfers, thumb joint fusions

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The metacarpophalangeal joints (MCP)**

Progressive ulnar drift due to dislocation of extensor tendons
Ulna deviation of > 10 to 15 degrees will worsen over time

Synovitis of the MCP joint leads to destruction of the collateral ligaments; and anterior subluxation due to pull of the flexors and intrinsics

More difficult to treat at later stage

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The metacarpophalangeal joints (MCP)**

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - **The metacarpophalangeal joints (MCP)**
  - Correction of ulnar drift: soft tissue releases and realignment - effective when done early
  - If joint erosion with fixed deformity:
  - Joint arthroplasty + soft tissue correction
  - **Swanson silastic replacement**

Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - Extensor tendons
  - Synovitis
    - Tenosynovectomy (with wrist)
  - Ruptures
    - Attrition over the ulnar head (caput ulnae syndrome)
    - Early recognition is important


Extensor tendon ruptures of ring and small fingers

Rheumatoid arthritis of the wrist and hand

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  - Extensor tendons
  - Synovitis
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Rheumatoid arthritis of the wrist and hand

- **Surgical hierarchy**
  - Proximal interphalangeal joints (PIP)
  - Distal interphalangeal joints (DIP)
  - Swan neck
  - Boutonniere

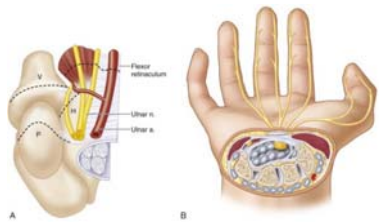
Soft tissue reconstruction for rheumatoid swan-neck and boutonniere deformities: long-term results. Kiefhaber TR, Strickland JW. Indiana Hand Center, Indianapolis.

Ninety-two fingers with rheumatoid swan-neck deformity were treated with dorsal capsulotomy and lateral band mobilization. An initial increase of 55 degrees of motion into flexion was noted, but this proximal interphalangeal motion deteriorated over time. Of 15 fingers followed at 3 and 12 months, there was a mean loss of 17 degrees of the early postoperative flexion.

Nineteen fingers with rheumatoid boutonniere deformity were treated with central slip reconstruction. The results were unpredictable, with only modest improvement in the proximal interphalangeal extension, which deteriorated over time. The authors now recommend arthrodesis for most severe rheumatoid boutonniere deformities.

J Hand Surg Am. 1993 Nov;18(6):984-9.

Carpal tunnel syndrome



Carpal tunnel syndrome

- Nonoperative
  - **night splints, activity modifications**
    - indications
      - first line of treatment; mainly nocturnal symptoms
  - **steroid injections**
    - second line of treatment
    - outcomes
      - 80% have transient improvement of symptoms (of these 22% remain symptoms free at one year)
      - failure to improve after injection is poor prognostic factor surgery is less effective in these patients
      - ineffective in pts with symptoms > 12 months

Carpal tunnel syndrome

- Nonoperative
  - Steroid injections and wrist splinting are effective for relief of carpal tunnel syndrome symptoms but have a long-term effect in only 10 percent of patients.
  - Symptom duration of less than 3 months and absence of sensory impairment at presentation were predictive of a lasting response to conservative treatment.
  - It is suggested that selected patients (i.e., with no thenar wasting or obvious underlying cause) presenting with mild to moderate carpal tunnel syndrome receive either a single steroid injection or wear a wrist splint for 3 weeks. This will allow identification of the 10 percent of patients who respond well to conservative therapy and may not need surgery.

A prospective study to assess the outcome of steroid injections and wrist splinting for the treatment of carpal tunnel syndrome.
Plast Reconstr Surg. 2004 Feb;113(2):550-6

Carpal tunnel syndrome

- Operative
  - **carpal tunnel release**
    - indications
      - failure of nonoperative treatment
        - temporary improvement with steroid injections is a good prognostic factor that the patient will have a good result with surgery
      - acute CTS eg. following ORIF of a distal radius fx
    - outcomes
      - pinch strength return in 6 week
      - grip strength is expected to return to 100% preoperative levels by 12 weeks postop

Carpal tunnel syndrome

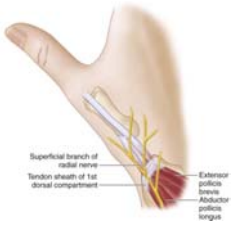
- Operative
  - Severe disease
    - With prolonged or severe symptoms (two-point discrimination changes, thenar weakness), relief of symptoms may occur over many months, and the patient may not experience complete improvement.

Carpal tunnel syndrome

- Complications:
  - Infection
  - Neurovascular injury (palmar cutaneous branch or motor branch)
  - Pillar pain
  - Scar tenderness
  - CRPS
  - Failure to improve is related to incomplete decompression

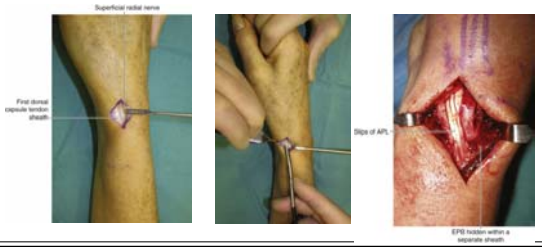
De Quervains tenosynovitis

- Surgery is recommended after failure of conservative treatment measures, including the following:
  - One to two injections of steroids, which should work in up to 60% of patients
  - Wrist splinting for 4 to 6 weeks
  - Avoidance of all inciting activities



De Quervains tenosynovitis

- **Surgical release of 1st dorsal compartment**
  - release on dorsal side of 1st compartment to prevent volar subluxation of the tendon
    - has variable anatomy with APL usually having at least 2 tendon slips and its own fibro-osseous compartment
    - a distinct EPB sheath is often encountered dorsally



De Quervains tenosynovitis

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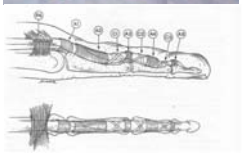
  - release on dorsal side of 1st compartment to prevent volar subluxation of the tendon
    - has variable anatomy with APL usually having at least 2 tendon slips and its own fibro-osseous compartment
    - a distinct EPB sheath is often encountered dorsally
- **Complications**
  - Sensory branch of radial nerve injury
  - Neuroma formation
  - Failure to decompress with recurrence
    - may be caused by failure to recognize and decompress EPB or APL lying in separate subsheath/compartment
  - Complex regional pain syndrome

Trigger finger

- Indications for surgery:
- Failure of tendon sheath steroid injections:
  - Recurrence of triggering after one injection in diabetic patients
  - in patients with long-standing trigger (>6 months), a flexible flexion contracture,
  - trigger of the little finger
- A fixed flexion contracture of the proximal interphalangeal (PIP) joint owing to the triggering
- Trigger digits in patients with rheumatoid arthritis
- **Imaging** is routinely not necessary. USS can be useful when diagnosis requires confirmation. A radiograph may be useful in a patient with a long-standing flexion contracture to determine the condition of the PIP joint.



Trigger finger

- The most frequently involved digit is the ring finger, followed by the thumb.
- Patients who present with primary index finger trigger must be evaluated for associated conditions like diabetes and rheumatoid arthritis.

Trigger finger

- **Corticosteroid Injection in Diabetic Patients with Trigger Finger. A Prospective, Randomized, Controlled Double-Blinded Study**
  J Bone Joint Surg Am. 2007;89:2604-2611
- Conclusions: Corticosteroid injections were significantly more effective in the digits of nondiabetic patients than in those of diabetic patients. In patients with diabetes, corticosteroid injections did not decrease the surgery rate or improve symptom relief compared with the placebo. The use of corticosteroid injections for the treatment of trigger finger may be less effective in patients with systemic manifestations of diabetes mellitus.

Trigger finger

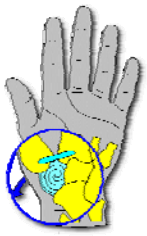
- Patients with rheumatoid arthritis and trigger fingers need flexor tenosynovectomy. A1 pulley release may be done only after tenosynovectomy has failed to relieve the trigger.
- The release of the A1 pulley may contribute to the MCP joint ulnar drift deformity, especially for the index and middle fingers, because of the oblique line of pull of the long flexors for these digits.

Basal joint of thumb arthritis

- Trapezial metacarpal joint is a biconcave saddle joint
- Trapezium has a palmar groove for flexor carpi radialis (FCR) tendon
- CMC joint reactive force is 13X applied pinch force

Basal joint of thumb arthritis

- Operative treatment:
- **Indications:**
  - Failure of conservative management (NSAIDs, splinting, steroid, hyaluronidase injections)
- **Procedures:**
  - **trapezial resection** with LRTI (ligament reconstruction and tendon interposition)
  - Trapezial excision appears to be the important step; FCR tendon most commonly used to interpose
  - **Outcomes:**
  - Good pain relief
  - Subsidence, nearly 25% but no effect on outcome
  - Improved pinch and grip strength



Basal joint of thumb arthritis

- Operative treatment:
- **Indications:**
  - Failure of conservative management (NSAIDs, splinting, steroid, hyaluronidase injections)
- **Procedures:**
  - **Arthrodesis** of trapeziometacarpal joint: in young, manual workers
  - outcomes
    - good pain relief, stability, and no subsidence
    - decreased ROM
    - nonunion rate of 12%