

## **NONTRAUMATIC DISORDERS OF THE HAND**

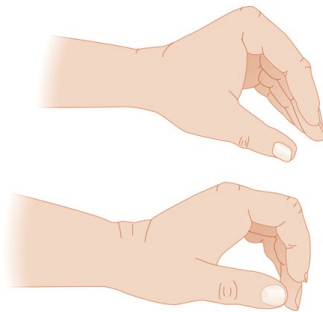
### **HAND INFECTIONS:**

#### **PATHOPHYSIOLOGY:**

- Bacterial aetiology depends on the source of the offending inoculum
  - Staph and strep from skin portal
  - Polymicrobial infections if mouth flora contaminates the wound
- IVDU present with abscesses or deep space infections due to staph aureus and gram negatives
- Paronychia and felons commonly caused by minor trauma → e.g. chewing fingernails
- Human bites are polymicrobial (median of 4 organisms) → common organisms include Fusobacterium, Prevotella, Staph aureus, Staph anginosus → AUGMENTIN OR MOXIFLOXACIN
- Cat and dog bites → harbour Pasteurella which produces an aggressive, rapidly spreading cellulitis that quickly becomes suppurative → penicillin sensitive
- HIV/AIDS/diabetics → candida or mycobacterium

#### **GENERAL PRINCIPLES OF EVALUATION AND MANAGEMENT:**

- MOST COMMONLY HAND INFECTIONS RESULT FROM INTRODUCTION BY INJURY TO THE DERMIS
  - The infection may remain superficial (paronychia, felon or cellulitis)
  - Left untreated → infections may ultimately spread along anatomic planes or to adjacent compartments
  - Deeper injuries may directly seed underlying structures
- Those SYSTEMICALLY UNWELL DUE TO A HAND INFECTION ARE SERIOUSLY ILL → parenteral antibiotics indicated
- Physical examination should be directed at defining the anatomic limits of the infection
  - If deep structures are involved → requires inpatient care
- With the exception of superficial cellulitis, hand infections are SURGICAL PROBLEMS:
  - If there is a collection of pus → DRAIN IT
  - IMMOBILISE THE EXTREMITY IN POSITION OF STABLE IMMOBILISATION AND ELEVATE THE EXTREMITY



- BROAD SPECTRUM ANTIBIOTICS AS OUTLINED BELOW

### **HAND CELLULITIS:**

- The most superficial of hand infections and may be treated with oral antibiotics if diagnosed early
- Document lack of involvement of any deeper structures → specifically ROM of the digits, hand or wrist should NOT BE PAINFUL and palpation of the deeper structures should not produce any tenderness
- Most common offending organisms are S aureus and Streptococcus pyogenes
- EMPIRIC ANTIBIOTICS vancomycin or if suitable for PO → cephalexin or bactrim
- For more extensive involvement → hand surgeons need to be involved
- Consider admission for the immunocompromised, clinically toxic patients, those with rapidly spreading infections
- SPECIAL MENTION:
  - Result of handling fish → Vibrio vulnificus, Klebsiella, Group A strep → cover with CEFTAZIDIME and DOXYCYCLINE
- Prior to immobilising, remove rings
- TETANUS PROPHYLAXIS

### **FLEXOR TENOSYNOVITIS:**

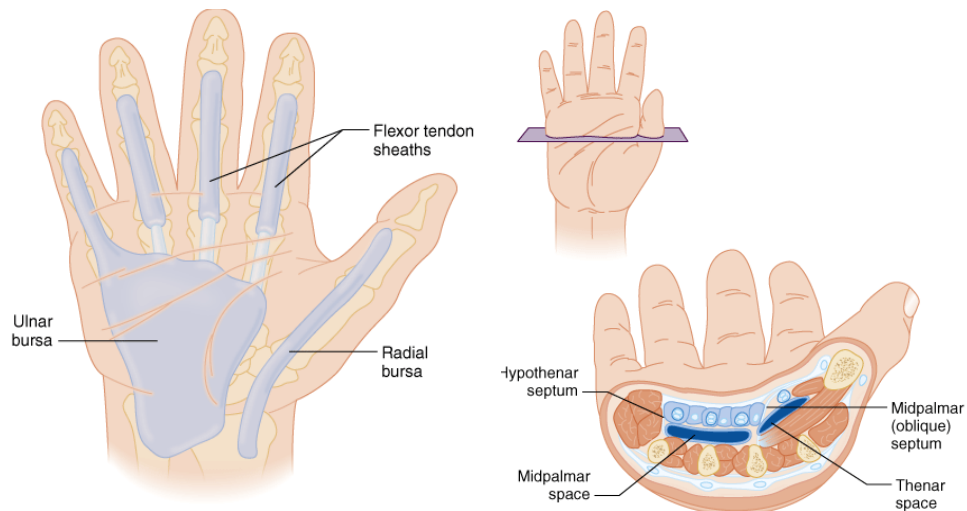
- A surgical emergency → failure to diagnose and manage flexor tenosynovitis will lead to loss of function of the digit and eventually loss of function of the hand
- DIAGNOSIS → RECOGNISE THE FOUR CLASSICAL FINDINGS DESCRIBED BY KANAVEL

<b>Table 280-2 Kanavel Four Cardinal Signs of Flexor Tenosynovitis</b>	
Percussion tenderness	Tenderness over the entire length of the flexor tendon sheath
Uniform swelling	Symmetric finger swelling along the length of the tendon sheath
Intense pain	Intense pain with passive extension
Flexion posture	Flexed posture of the involved digit at rest to minimize pain

- Infection usually associated with penetrating trauma
- Staphylococcus is the most common offending organism
- Initiate empiric antibiotics (TAZOCIN) immediately as the infection can spread through deep fascial spaces rapidly → add vancomycin to IVDU or those with high prevalence of MRSA
- Immobilise and elevate the hand → surgical involvement early
- Send any discharge for MCS

### **DEEP SPACE INFECTIONS:**

- Hand offers numerous compartments in which infections may propagate → thenar space, midpalmar space, radial bursa, ulna bursa (see below)



- Beware that the DORSUM OF THE HAND WILL ALWAYS SWELL WHENEVER THERE IS AN INFLAMMATORY PROCESS → MISDIAGNOSIS CAN OCCUR
  - Examination should include palpation of the volar surface of the hand to elicit tenderness, induration or fluctuance
- Give parenteral antibiotics (as for flexor tenosynovitis tazocin/vancomycin) for coverage of streptococcus and staphylococcus
  - Narcotic analgesia
  - IMMOBILISE AND ELEVATE THE HAND

### **INFECTIONS FROM CLOSED FIST INJURIES**

- **ALSO KNOWN AS “FIGHT BITES”**
- Most common human bite infection of the hand is the result of striking another individuals teeth with a clenched fist → usually occur over the dorsal aspects of the 3<sup>rd</sup>-5<sup>th</sup> MCPJ



- Appear innocuous at first but significant morbidity can result from late diagnosis or presentation
- Closed fist injuries tend to occur on multiple planes, and infection spreads rapidly to adjacent compartments
- Hand x-rays to exclude underlying fractures
- Typically these infections are POLYMICROBIAL → mouth organisms as outlined previously
- HAND SURGERY CONSULT FOR DEBRIDEMENT
- ADMIT FOR IV ANTIBIOTICS IF INFECTION ESTABLISHED

Use initially:

- 1 piperacillin+tazobactam 4+0.5 g (child: 100+12.5 mg/kg up to 4+0.5 g) IV, 8-hourly  
OR
- 1 ticarcillin+clavulanate 3+0.1 g (child: 50+1.7 mg/kg up to 3+0.1 g) IV, 6-hourly  
OR THE COMBINATION OF
- 2 metronidazole 400 mg (child: 10 mg/kg up to 400 mg) orally, 12-hourly  
PLUS EITHER
- 1 ceftriaxone 1 g (child: 25 mg/kg up to 1 g) IV, daily  
OR
- 2 cefotaxime 1 g (child: 25 mg/kg up to 1 g) IV, 8-hourly.

For patients with immediate hypersensitivity to penicillin (see [Table 2.2](#)), seek expert advice.

Change to oral therapy once patient is stable. If the infecting pathogen is uncertain, use:

amoxycillin+clavulanate 875+125 mg (child: 22.5+3.2 mg/kg up to 875+125 mg) orally, 12-hourly.

For patients with penicillin hypersensitivity (see [Table 2.2](#)), use:

- 1 moxifloxacin 400 mg (child: 10 mg/kg up to 400 mg) orally, daily  
OR THE COMBINATION OF
- 2 metronidazole 400 mg (child: 10 mg/kg up to 400 mg) orally, 12-hourly  
PLUS EITHER
- 1 doxycycline 200 mg (child more than 8 years: 5 mg/kg up to 200 mg) orally, for the first dose, then 100 mg (child more than 8 years: 2.5 mg/kg up to 100 mg) orally, daily  
OR
- 2 trimethoprim+sulfamethoxazole 160+800 mg (child more than 2 months: 4+20 mg/kg up to 160+800 mg) orally, 12-hourly.

- IF INFECTION NOT YET ESTABLISHED, TAKE NOTE OF BELOW AND HAVE LOW THRESHOLD FOR PROPHYLACTIC ANTIBIOTICS

## Infection not established

### Low risk

Antibiotics may not be necessary for mild wounds not involving tendons or joints that can be adequately debrided and irrigated and that are seen within 8 hours.

### High risk

Wounds having a high risk of infection include:

- wounds with delayed presentation (8 hours or more)
- puncture wounds unable to be debrided adequately
- wounds on hands, feet or face
- wounds with underlying structures involved (eg bones, joints, tendons)
- wounds in the immunocompromised patient.

Presumptive therapy is necessary; use:

**amoxycillin+clavulanate 875+125 mg (child: 22.5+3.2 mg/kg up to 875+125 mg) orally, 12-hourly for 5 days.**



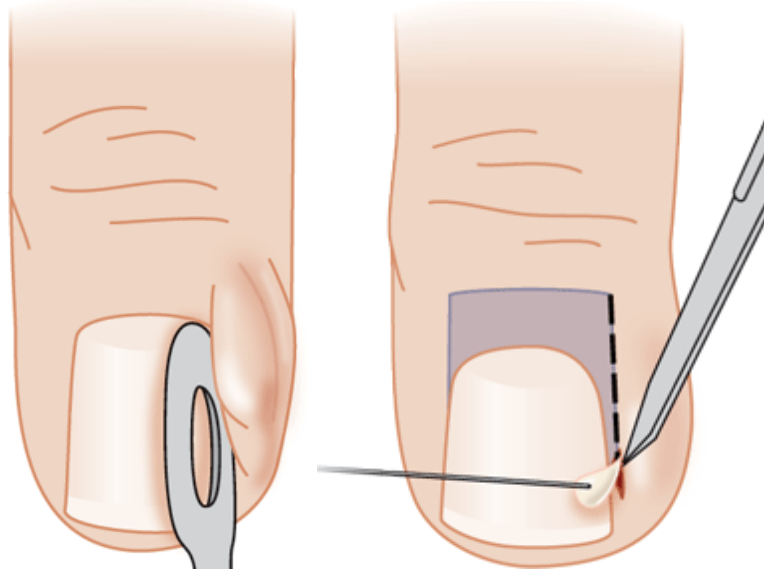
If commencement of oral therapy will be delayed, give:

**procaine penicillin 1.5 g (child: 50 mg/kg up to 1.5 g) IM, as a single dose, followed by amoxycillin+clavulanate as above.**



### PARONYCHIA:

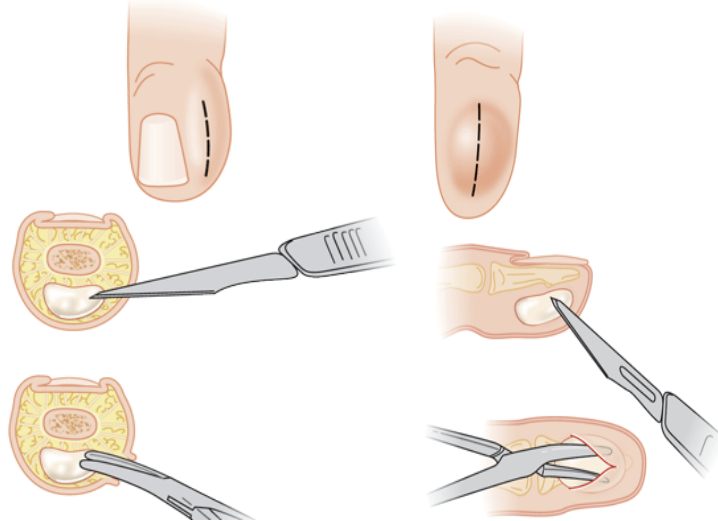
- An infection of the lateral nail fold or PERIONYCHIUM, occasionally extending to the cuticle or the EPONYCHIUM.
- Usually result of minor trauma → usually acute but may be chronic in immunocompromised
- If no fluctuance is identified, treat with warm soaks, elevation and antibiotics (bactrim or cephalexin)
- If a larger than expected area of blanching is present to suggest an underlying collection → DRAINAGE IS INDICATED (as shown below):



- Following incision and drainage, keep the hand elevated and immobilised
- Re-evaluate in 24-48 hours

### **FELON:**

- A subcutaneous pyogenic infection of the PULP SPACE of the distal finger or thumb → septa create multiple compartments of infection → red, tense and markedly painful distal pulp space
- Left untreated, the infection may spread to the flexor tendon sheath and the interphalangeal joints or to the periosteum, resulting in osteomyelitis
- If the finger pad is swollen and tense or if there is any palpable fluctuance, drainage is necessary (under digital nerve block) as shown below:



- Most felons have associated cellulitis and require PO antibiotics in addition to drainage

### **HERPETIC WHITLOW:**

- A viral infection of the distal finger caused by HSV → patient develops a burning, pruritic sensation with VESICULAR BULLAE → do not mistake herpetic whitlow for a felon, because I&D may result in secondary bacterial infection and prolonged failure to heal → diagnosis confirmed with TSANCK SMEAR



- Usually self-limited, but course may be shortened with use of antiviral agents

### **NONINFECTIOUS INFLAMMATORY STATES OF THE HAND:**



**CAN BE MARKEDLY PAINFUL AND DIFFICULT TO DISTINGUISH FROM ACUTE SEPTIC ARTHRITIS AND SUPPURATIVE TENOSYNOVITIS**

**TENDINITIS AND TENOSYNOVITIS:**

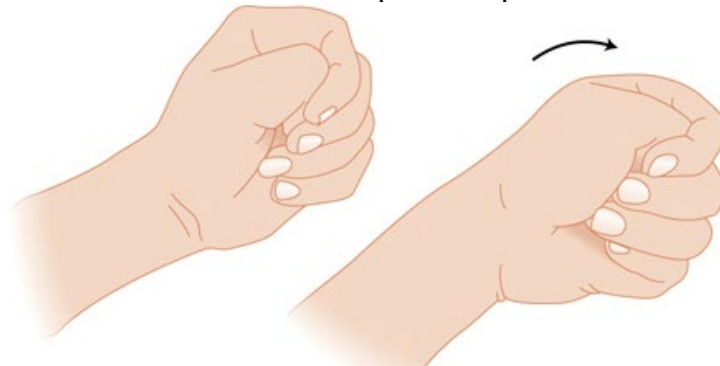
- History of repetitive motion directly affecting the inflamed tendon with tenderness over the tendon producing tenderness
- Treatment is splinting in the position of comfort and NSAIDS
- Directed to return if worsening pain, increased swelling or any signs of infection

**TRIGGER FINGER:**

- Tenosynovitis can develop in the flexor sheaths of the fingers and thumb as a result of repetitive use
  - Scarring or inflammation may cause the tendon to catch on its sheath → STENOSING TENOSYNOVITIS (trigger finger) → painful snap as finger extends or the finger may lock in flexion
  - Conservative treatment includes rest and NSAIDS
  - Surgical division of the pulley is usually curative

**DE QUERVAIN TENOSYNOVITIS:**

- Occurs in those who have experience excessive use of the thumb or wrist → tenosynovitis of the extensor pollicis brevis and abductor pollicis tendons → pain along the radial aspect of the wrist and painful ROM of the thumb
- FINKELSTEIN TEST → patient grasps the thumb in the palm of the hand and the examiner ulnar deviates the thumb → produces pain



- Treatment is immobilisation of the thumb and wrist with a splint and NSAIDS

**CARPAL TUNNEL SYNDROME:**

- A peripheral mononeuropathy that involves entrapment of the median nerve in the carpal tunnel
  - Whenever a condition causes swelling in the carpal tunnel (overuse, CHF, pregnancy), the median nerve is compressed → paraesthesiae that extend into the index and long fingers, the radial aspect of the ring finger and along the palmar aspect of the thumb
  - Patient complains of waking at night with burning pain

- Diagnosis is suggested by pain or paresthesiae in median nerve distribution → TINEL sign is tapping over median nerve at tunnel with paraesthesia resulting
  - PHALEN SIGN → flexing the wrist maximally and holding it for one minute → neither are great tests and the diagnosis remains clinical
- Presence of median nerve motor dysfunction requires emergency hand surgeon involvement
- Initial treatment is volar splint and NSAIDs → consider referral for steroid injection

### **DUPUYTREN CONTRACTURE:**

- A relatively common yet poorly understood disorder → fibroplastic changes of the subcutaneous tissues of the palm and volar aspect of the fingers
- Associated with tobacco use, alcohol abuse, DM and repetitive use
- Progressive fibrosis eventually may lead to tethering and joint contracture → surgery at this point may be required
- Initial diagnosis made with identification of nodule in the palm, usually at the distal palmar crease at the ring or little finger

### **GANGLION CYSTS:**

- A ganglion or synovial cyst is a cystic collection of synovial fluid within a joint or tendon sheath resulting from herniation of synovial tissue
- Presents with tender cystic swelling over or near a tendon sheath



- Common locations are dorsal and volar aspects of the wrist
- Treatment is pain control and NSAIDs
- About one third resolve spontaneously → refer to hand surgeon if persistent or recurrent pain, cosmetic deformity
- MAY RE-OCCUR