HAND INJURIES

CONTENTS

NERVE INJURIES

Digital nerve injuries

- Digital nerves lie against the bone (but lateral to digital vessels) two-thirds of the way down from the dorsal to the palmar aspect of the fingers. Beyond the DIP joint they are too small to repair if damaged.
- Remember that the nerves are more 'volar' in the thumb, the radial border of the index finger and the ulnar border of the little finger.
- Supply sensation AND SWEATING to appropriate side of finger.
- Consider the possibility of digital nerve injury in any wound over the radial or ulnar border of a digit. Arterial bleeding from the finger suggests that the nerve has been damaged, as the nerve lies on the skin side of the artery.

1. **Test for:**
   - Sensation
     - Complete nerve division results in loss of sweating, but in the acute situation when there is blood about and you have been cleaning the finger, this may not be obvious.
     - Ask the patient about any abnormal sensation and then test for it - check light touch and then pinprick sensation (blunted green needle). Document this carefully.
   - Sweating
     - A smooth dry feel to the finger denotes the absence of sweating and a divided digital nerve. Try the 'biro test'.

2. **Warn the patient** - "Jump Phenomenon" - even though sensation appears normal at the time of examination, the nerve may be damaged and if any change occurs in the next 48 hours, to return the following morning.

3. **Refer to Plastic Surgeon** - if any numbness, paraesthesia or absence of sweating distal to a wound overlying the digital nerve. i.e. Plastics referral for anyone with altered sensation, not just those with complete numbness. Note that beyond the DIP joint, the nerves are said to be too small to repair. With the thumb, refer anyone with lacerations up to and including the IP joint.

Median Nerve

Large structure (comparable to the size of the little finger) in the mid-line of the wrist directly below the palmaris longus tendon (if present) or skin. Very easily damaged.

1. **Supplies** - sensation to thumb and radial 2.5 fingers
   Lateral two lumbricals)
   Opponens pollicis) **"LOAF"** muscles
   Abductor pollicis brevis)
   Flexor pollicis brevis)

2. **Test for** - sensation in O, A, F muscles. Thumb abduction is the best.

Ulnar Nerve

Lies on the skin side of the ulnar artery at the wrist

1. **Supplies** sensation to ulnar 1, 1/2 fingers
   hypothenar muscles
   adductor pollicis
   interossei muscles
   medial two lumbricals

2. **Test for** sensation, interossei,
   adductor pollicis (*Froment's test*)
   finger abduction against resistance

Radial Nerve

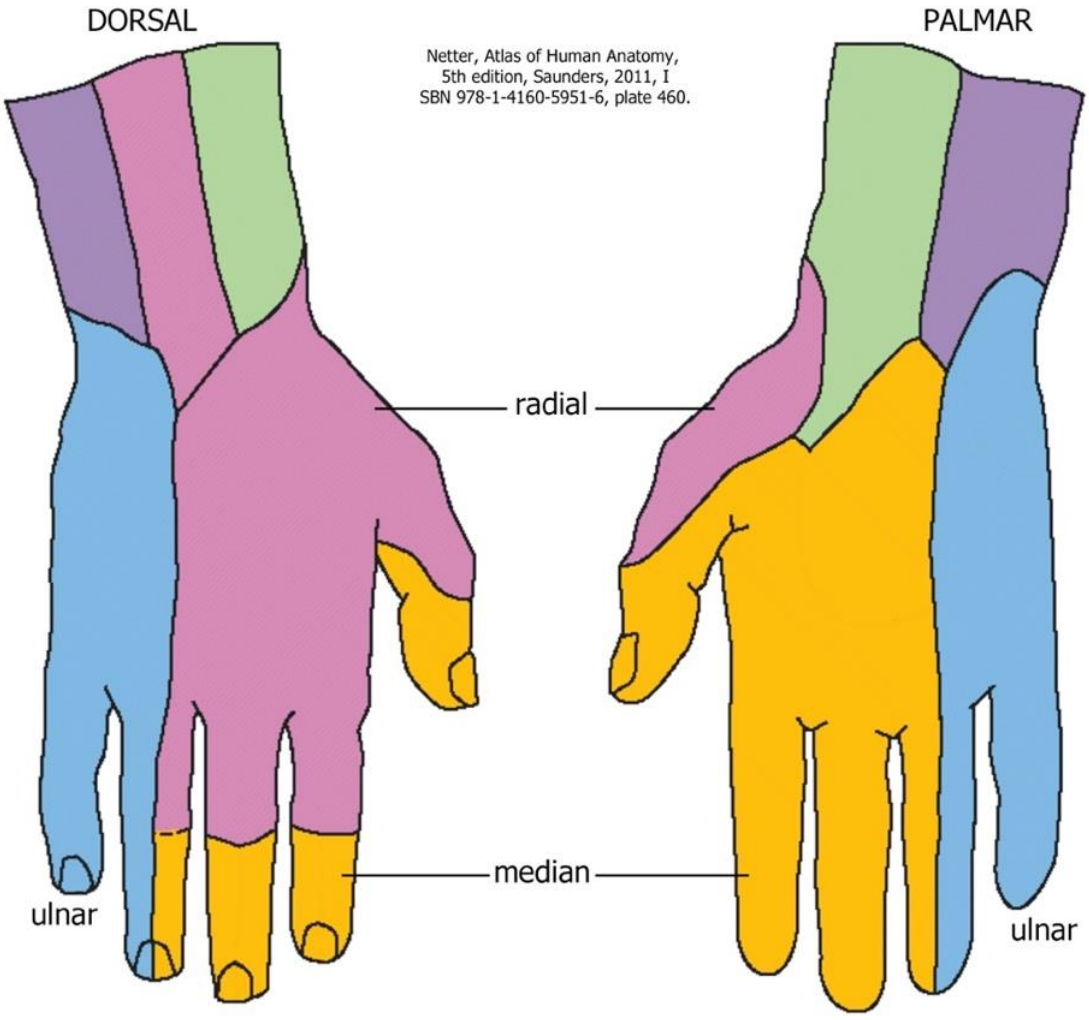
Lies on the skin side of radial artery and runs along the floor of the anatomical snuffbox.

1. **Supplies** - sensation at base of thumb on dorsum of hand

2. **Test for** sensation first dorsal web space, wrist and finger extension

Peripheral Nerve Testing at a glance

"Peace sign" against resistance	Ulnar nerve	
"Hitchhiker" / Thumbs up	Radial nerve	
"Power to the people"	Median nerve	
OK sign	Median nerve (anterior interosseous)	



BLOOD VESSELS

It is difficult to significantly impair the circulation to the hand unless the radial and ulnar arteries are both damaged; to impair the circulation to the finger both digital arteries would need to be damaged.

Test - capillary refill of the nail should be < 2 seconds

Major arterial bleed – ABCD, direct pressure if ongoing bleeding, imaging (Xray/CT angio). Refer to plastics. Consider antibiotics +/- tetanus.

DOCUMENTATION

It is important that in all wounds of the hand or wrist that injury to the nerves, tendons and blood vessels is carefully examined for and documented. In medico-legal terms if it is not documented, **it has not been performed!**

TENDON INJURIES

'Closed' tendon ruptures may occur - more commonly, tendons are damaged as a result of a penetrating injury.

- Take a careful **history**, including position of hand or finger at time of injury.
- **Examine** carefully: first look at the position in which the hand or individual finger is sitting at rest.
- then test individual tendons.
- A partially divided tendon will still be functioning, but pain is usually experienced when it is stretched or used, particularly against resistance.
- When checking wounds, examine the floor of the wound with the finger or hand in different positions.
- - e.g. if a wound over a knuckle occurred when the MCP joint was flexed, the extensor tendon will have been taut and is very likely to have been damaged. However, if you only examine the wound with the MCP joint extended, the damaged section of tendon may not be apparent.

- **Referral** (useful rule of thumb).
    - Extensor injuries - refer to Ortho.
    - Flexor Injuries - refer to Plastics.

Bedford splints can be used in place of Buddy Strapping when available.

EXTENSOR TENDON

Division over the proximal phalanx	- Dropped finger.
Division of middle slip over PIP joint	- Boutonniere deformity.
Division distal to PIP joint	- Mallet deformity.

There are interconnections between the extensor tendons around the MCP joints, so that even if the tendon to a particular finger has been completely divided proximal to these interconnections, there may still be some active extension present. Extension will be weaker than the same finger on the opposite hand.

Mallet and Boutonniere deformities from blunt injury can be treated in splints *(see section on joint injuries).*

A cut extensor tendon should be repaired and requires splintage for 4 weeks.

FLEXOR TENDON

Flexor digitorum profundus

- All tendons arise from a single muscle belly and insert into base of distal phalanges.
- All contract together or not at all.
- To test, flex DIP joint with PIP joint immobilised in extension.

Flexor digitorum superficialis

- Tendons arise from individual muscle bellies and insert into base of middle phalanges
- To test, flex PIP joint of affected finger while holding DIP joints of other fingers immobilised in extension; check that DIPJ is 'floppy'.

Flexor pollicis longus - flexes IP joint of thumb.

Flexor pollicis brevis - thenar muscle which flexes MCP joint of thumb.

Divided flexor tendons must be repaired by a Plastic Surgeon and require expert post-surgery rehabilitation.

DIGITAL NERVE BLOCK

- The finger must have been fully examined before it is anaesthetised.
- Never use lignocaine with adrenaline as digital arteries are end arteries.
- You will need to be shown how to do this.

Digital Nerve Block

- Place hand palm down.
- On one side of the finger, insert needle perpendicularly into the dorsal web space adjacent to the medial aspect of the metacarpal head. Slowly inject about 1ml to block the dorsal digital nerve. Continue to advance needle downward into palmar space and slowly inject about 1.5ml to block the palmar digital nerve. To complete the block, do the same on the other side of the finger.
- Wait at least 5 minutes for it to work.

NHS Lothian

PROBLEMS AROUND JOINTS IN THE HAND

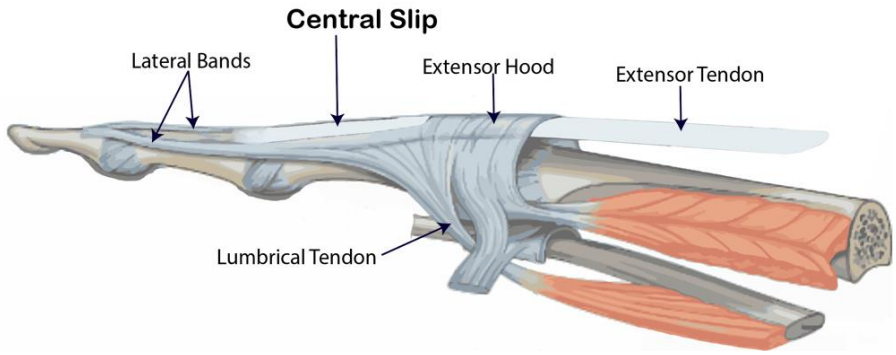
Finger Dislocations

- These are usually obvious, but should be confirmed on X-ray before manipulation.
- Reduction is usually easy: offer the patient the choice of local anaesthetic / no anaesthetic / Entonox. Apply longitudinal traction to distract the overlapping bones and then apply pressure in the appropriate direction.
- Once reduction has been achieved, examine the joint (*should have a good range of movement on passive testing*) and assess for any instability.
- Always do a check X-ray - minor fracture may now be visible.
- Warn the patient that these injuries take some weeks to settle, give advice sheet.
- DIPJ dislocations with no fracture – reduce, Mallet splint for 3 weeks.
- PIPJ dislocations with no fracture – reduce, buddy strap and TTC (PIPJ).
- DIPJ/PIPJ dislocations with fracture – reduce, mallet or buddy strap, repeat XR, TTC (78).

Mallet Finger

- Caused by a forced flexion of the extended DIP joint. The extensor tendon insertion on to the base of the DP is avulsed or a small fragment of bone which holds the tendon insertion is avulsed.
- Flexion deformity of the DIP joint. The patient cannot actively extend the joint and if you extend it for them, they cannot keep it extended.
- X-ray – look for avulsion fracture (you need a proper AP and lateral view of the individual finger)
- Soft tissue Mallet Finger – mallet splint, discharge, no TTC
- Bony Mallet Finger – mallet splint, repeat XR in splint, TTC (70E)
- Check Mallet splint is a firm enough fit to maintain the joint in slight hyper-extension. The PIP joint should not be restricted by the splint. Stress the importance of keeping the DIP joint straight at all times, even when removing the splint for washing the finger.

Central Slip injury - Boutonniere deformity



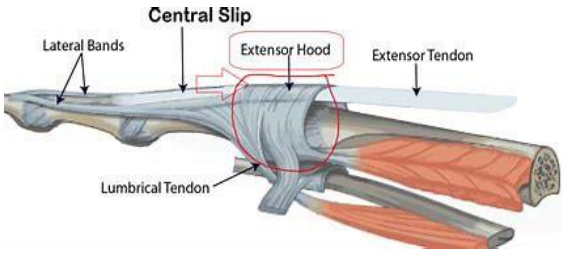
- There are several tendons that balance their work to straighten the finger. These tendons run along the side and the dorsum of the finger. The extensor tendon attaches to the dorsal aspect of the middle phalanx and is known as the ***central slip***. If this ruptures, no deformity may be apparent initially, but over a period of time, without the central slip working the finger may develop a deformity called ***boutonniere*** (button-hole), hyperextension of the DIPJ and flexion of the PIPJ.

- Unable to straighten PIPJ and pain over dorsum of PIPJ with associated swelling.
- Transverse wounds over dorsal aspect of PIP joint particularly when they occur when

the joint is flexed and the extensor tendon slips are stretched may cause this. The middle slip of the tendon is especially susceptible to damage in this situation - the wound needs to be explored to exclude division of the middle slip or a Boutonniere deformity will develop later.

- Consider possibility of this middle slip injury in anyone with a painful, swollen PIP joint and dorsal tenderness.
- X-ray ****You need a proper AP and lateral view of the individual finger ****
- Look for an avulsion fracture at the base of the middle phalanx. But can also occur from tears in the fibres of the central slip itself without avulsion (tendinous).
- Apply a splint to keep the PIPJ straight – this allows the tendon/fracture to heal in a good position. If central slip injury is missed, the affected PIPJ will be deformed and the patient will not be able to straighten the finger without help, stiffening into a boutonniere position. It will not heal on its own. Zimmer splint if available (otherwise trimmed and taped tongue depressors).
- If acute, Boutonniere deformity is not usual visible.
- Any bony injury present – refer to Ortho.
- Boutonniere deformity present – refer to Plastics.

Extensor Hood



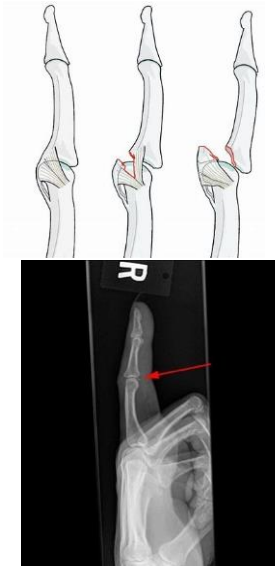
- Extensor hood is a triangular aponeurosis (flattened tenson) by which the extensor tendons insert onto the phalanges. The extensor hood surrounds the MVPJ laterally, medially and dorsally, and receives tendinous fibres from the lumbricals and interossei.
- Extensor hood rupture is rare and associated with trauma, eg boxing. It also occurs secondary to arthritis and steroid injection.
- Swelling, tenderness and pain over dorsum of MCPJ/proximal phalanx. Limited ROM and MCPJ +/- overlying wound and subluxation of the extensor digitorum communis of the affected finger at MCPJ level.
- Extensor wounds with tendon injury/central slip – refer to Ortho.
- Zimmer splint, or usually a large finger dressing will keep it straight if there is a wound.

Sagittal Band

The sagittal bands are part of a closed cylindrical tube that surrounds the metacarpal head and MCP along with the volar plate. They are primary stabilisers of the extensor tendons at MCPJ level, i.e. keep tendons at the middle of the MCPJ during flexion and extension.

- Sagittal band ruptures lead to dislocation of the extensor tendons and a sensation of snapping when extending the MCPJ, Pain and swelling over the MCPJ +/- laceration.
- Inability to initiate MCP extension from flexion, but able to hold MCP in extension once passively extended.
- Acute injury – Zimmer splint and refer to Ortho.
- Chronic injury usually requires surgery. Untreated causes weakness in extension, pain and reduced ROM.

Volar Plate Injuries



- The volar plate is a thickening of the volar aspect of the PIP joint capsule. It acts as a hinge that allows you to flex the joint but prevents it being hyperextended. It is damaged in hyper-extension injuries, e.g. when a basketball hits the tip of the finger and hyperextends it. It is also common after PIPJ dislocation.
- Take a good history to establish the mechanism of injury.
- Look for a swollen PIP joint with some restriction of movement. Passive movement into the fully extended position will cause pain over the PIP joint. Check for any collateral ligament laxity. Often bruising on volar aspect at PIPJ.
- X-ray: **** You need an AP and lateral X-ray of the finger ****
- Look for small avulsion fractures from the volar aspect of the base of the middle phalanx. They may not be seen on a hand X-ray but will be on a finger x-ray.
- (Note: absence of a fracture does not exclude a significant volar plate injury - these patients also need careful follow-up).
- Buddy strap, refer to TTC.
- NB this can take several weeks (months if severe) for the joint to recover. Emphasise the importance of attending for follow-up - stiffness can be a major problem and is best avoided by early physiotherapy if things are not progressing.

Collateral Ligament Injury

- Examine with MCPJ in flexion and extension applying varus and valgus challenges.
- Buddy strap to adjacent digit to support injured side for 10-14 days.
- Refer to TTC.

FINGER FRACTURES

Large fractures around joints are under joint injuries.

Bedford splints if available can be used in place of Buddy strapping

Small Avulsion Fractures

- Buddy strap and TTC neighbour strap.
- Stress the importance of follow-up so Physiotherapy can be arranged if joint stiffness is a problem.

Distal Phalanx fracture (Tuft)

- Treat associated soft tissue injuries and prescribe antibiotics (5 days) and check tetanus status if open fracture.
- Trephine subungual haematoma if throbbing and add antibiotics as now open fracture.
- Consider need for washout and repair eg of nailbed lacerations.
- Mallet splint and TTC (78).

Distal Phalanx fracture

- Undisplaced and intact nail bed – mallet splint, TTC (78).
- Other distal phalanx fracture (eg displaced/intra-articular involving >25% articular surface/ associated nail bed injury – ED Senior, mallet splint, TTC (78).

Compound fracture distal phalanx/wounds

- Check no mallet deformity.
- Treat nail bed injury as appropriate.
- 5 days antibiotic prophylaxis.
- Check tetanus status + treat as indicated.
- Jelonet finger dressing.

Proximal and Middle Phalanx Fractures

- Examine carefully to make sure that there is no axial rotation at the fracture site. This applies especially in spiral fractures which are potentially unstable. Compare both hands, and look to see if the nail of the affected digit is not in the same plane as the rest.
- If rotation has occurred, it must be corrected and strapping/splinting applied so that it counteracts any tendency for the deformity to recur.
- Reduce displaced fractures (under ring block).
- Zimmer splint (then re-Xray).
- TTC (78).

Features of Instability

- Displaced intra-articular fracture.
- Comminuted fractures.
- >10 degrees angulation or >2mm shortening.
- Spiral and long oblique fractures.
- Irreducible fracture.
- Multiple digital fractures.
- Floating joint (fractures proximal and distal to join.

METACARPAL FRACTURES

Little Finger Metacarpal neck or shaft fractures

Most of the metacarpal fractures that you see will be involving the neck or shaft of the little finger metacarpal. They will usually have been caused by punching something or someone.

- There is usually a degree of palmar angulation at the fracture site. Unless the person is a concert pianist or similar, we accept the palmar angulation (up to 50 degrees little MC, 35 degrees ring, 15 degrees middle or index) at the fracture site. Warn the patient that their knuckle will not be as prominent as it was, but reassure them that their hand function will be normal.
- Check for and document **axial rotation** that will make the finger tend to cross over its neighbour when the patient tries to start to make a fist. Axial rotation is most likely to occur with oblique/spiral fractures of metacarpal shafts.
- Buddy Strap, TTC (77)

Metacarpal fracture midshaft + Distal Transverse fractures of metacarpal shafts

- These are usually stable and undisplaced apart from some palmar angulation, which we accept.
- Only reduce if significant displacement (Ring MC >20 degrees, Little >30degrees
- Buddy strap, TTC (77).

Metacarpal Base fracture

- Check for CMCJ Dislocation.
- Wrist splint, TTC (77).
- Refer metacarpal base fracture with dislocation to ORTHO.

Carpo – metacarpal dislocation

- There may be dorsal dislocation of the base of the metacarpal.
- This is uncommon but will be missed on the two standard AP and oblique views of the hand. You need a true lateral view to prove-disprove this. Some Radiographers will have provided this if there is trauma to the base of a metacarpal but you may need to ask specifically or send the patient back for another x-ray.
- If dislocation is present, it needs reduced – refer ORTHO.

MCPJ Dislocation

- Xray.
- Attempt reduction under Metacarpal block/Entonox.
- Joint subluxation.
    - Flex wrist to relax flexor tendons, apply distal & volar directed pressure to base of proximal phalanx. Should slide the proximal phalanx and volar plate over metacarpal head into reduced position. Splint to allow active flexion, but restricted extension of MCP joint beyond neutral.
- Complex dislocation.
    - Flexion of MCP joint not possible Palpate prominence of MC head in palm Volar plate becomes trapped in MCPJ Attempt reduction with technique described above. Do not merely apply longitudinal traction as this will tighten the volar plate and prevent reduction. If irreducible will need surgical open reduction.
- Buddy strap/wrist splint, or zimmer splint/cast if unstable.
- TTC.

INJURIES OF THE THUMB

Fractured thumb metacarpal (not MC base, see below) or interphalangeal joint

Thumb Proximal Phalanx Fracture

- Thumb splint/Bennett's cast, TTC (78).
- Displaced fractures – require manipulation, POP and check Xray.
- Undisplaced fractures – splint for minor fracture, otherwise POP (Xray after POP).

Thumb Distal Phalanx Fracture

- ED Senior, mallet splint (78).

Thumb Ulnar Collateral Ligament Injury

'Skier's Thumb' 'Hillend Thumb' 'Gamekeeper's Thumb'.

- Caused by abducting/extending force on the thumb. Untreated, rupture of the ligament results in an unstable MCP joint and problems when trying to grip things.
- Try to get an idea of what force was applied to the joint, eg. fell on dry ski slope and whole body weight dragged on thumb.
- In all patients with an injured 1st MCP joint, feel over the ulnar collateral ligament (UCL) for tenderness.
- On examination the patient will have a painful, swollen thumb. The whole MCP joint may be sore, with maximal tenderness over the ulnar side of the joint.
- Try to assess stability of joint: Apply a valgus strain to the MCP joint, with counter pressure on the radial side of the joint. Compare it with the opposite thumb.
- X-ray may show no fracture. A fracture of the base of the proximal phalanx may be present - this may be displaced or undisplaced.
- If suspect UCL injury - apply thumb splint and refer TTC (78).
- If not, advise patient to return if they feel it is unstable after pain has settled.

Fracture/subluxation base of the thumb metacarpal

Base of thumb metacarpal fractures can be extra-articular, Bennet fractures (partial intra-articular, fracture dislocation) or Rolando fractures (complete intra-articular, comminuted).

'Bennett's Fracture'

Fracture of base of thumb (medial side).

- Partial Intra-articular two part fracture (involves articular surface of trapezo-metacarpal joint).
- First metacarpal shaft subluxes proximally, dorsally and radially (due to pull of tendons. which remain attached to fracture fragment).
- Unstable injury.
- Results from forced abduction.
- Pain + weakness of pinch with bruising and swelling over CMCJ of thumb.
- Undisplaced
  - Bennett's POP.
  - Check x-ray in POP.
  - TTC (78)
- Displaced
  - Refer to ORTHO.
  - These will require reduction that may be difficult to hold so they often require internal fixation.

Rolando Fracture

- Multi-fragmentary intra- articular fracture of thumb MC base.
- Often requires reduction and fixation (closed with K-wires or ORIF).
- Refer ORTHO.

Extra-articular Fracture

- Does not involve the joint.
- Frequently angulated due to pull of inserting tendons.
- Does not require surgical fixation unless an open injury.
- Reduce in abduction and apply cast with moulding.
- Check XR.
- TTC.

Thumb MCPJ Dislocation

- Xray.
- Thumb MC block to facilitate reduction.
  - Distally directed pressure applied to base of proximal phalanx with metacarpal flexed and adducted. Volar plate can get stuck in MCPJ and block reduction.
  - If irreducible – open reduction in theatre.
- Post reduction, assess UCL,MCL, volar plate for stability.
- Splint
- TTC

HAND SOFT TISSUE WOUNDS & SKIN LOSS

- Take a good history.
- Check tetanus status.
- Examine any wound thoroughly and consider need for X-ray.
- Clean +/- irrigate thoroughly, after local anaesthetic if necessary.
- Clean wounds can be sutured up to 12 hours old (not dog bites).
- Antibiotics are only needed for specific injuries below and are not an alternative to adequate wound cleaning.
- Most wounds need no follow-up or at most an appointment with the GP nurse/CTAC.

Hand Skin Loss

- May be partial or full thickness, or a combination of both, with the central area being deeper than the edges.
- If there is full thickness loss, the underlying fatty tissue is exposed. Once bleeding has been stopped, it is usually easy to tell whether it is a full or partial thickness injury.
- Areas less than 1 square centimetre in size can be left to granulate up themselves.
- Dress with Mepitel (not Jelonet unless using Kaltostat or going for immediate review as this dries and sticks).
- If bleeding is very troublesome, try Kaltostat.
- Refer to CTAC for review in 5-7 days if FU needed.
- For large areas of tissue loss, or where bone is exposed, refer to Plastics.

Hand Injuries from Glass

If the wound is caused by glass:

- you need a soft tissue X-ray to exclude a retained foreign body.
- Assume damage to all deeper structures between skin and bone until your examination has shown that they are all intact – glass is very sharp and often cuts to the bone.

Hand Crush Injuries

- X-ray to check for bony damage.
- Remember that these injuries are associated with a lot of swelling and wound edges may be badly contused.
- If very dirty, the area may need to be anaesthetised before adequate cleaning can be done.
- It may be better to leave these wounds open.

Hand High Pressure Injuries

- May have only a small wound.
- The problem is that paint/grease will have been forced into the tissues at high pressure and there may be widespread contamination along tissue planes.
- These need referral to Plastics immediately.

Hand Bites - human or animal

- Also see Human bites in the hand.
- Never suture a human bite.
- Avoid suturing dog bites if possible – if bite is so large it needs closed, refer to Plastics.
- After thorough cleaning and wound irrigation apply a dressing.
- Prescribe antibiotics – 3 days Co-amoxiclav (see human and animal bite sections in antibiotic guidelines).

- Tetanus
- For human bites see Exposure to blood borne virus section.
- Refer to plastics if already infected.

Hand Wounds over Joints

- These need to be explored carefully to exclude damage to deeper structures or penetration into the joint.
- They may be caused by punching an assailant in the mouth – if so treat as for Hand bites also – always check mechanism in confidence and explain potential severity of 'fight bite'.

Transverse wounds over dorsal aspect of PIP joint

- Usually occur when the joint is flexed and the extensor tendon slips are stretched. The middle slip of the tendon is especially susceptible to damage in this situation
- The wound needs to be explored to exclude division of the middle slip or a Boutonniere deformity (see section) will develop later.

Hand Degloving Injuries

- Small areas, where the skin appears viable and there is no injury to deeper structures, can be steristripped and followed up at the GP surgery.
- Larger areas need careful assessment to decide whether the skin flap is viable – Senior review (+/- Plastics).
- Damage may have been done to underlying structures, including bone and there may be a great deal of swelling - they may need admission for observation, even if no operation is planned.

Closed degloving injuries

- Get the history.
- If caused by rollers, ask how far apart the rollers were, whether they were hard, or had a softer foam covering and what usually went between them. Also find out how far in the digit/hand went and how long it was compressed for.
- Damage may have been done to the skin and/or the underlying structures and a large degree of swelling may occur.
- Senior Review (+/- Plastics).

Finger Injuries from Rings

- Beware of these, as the ring may have compressed the blood vessels quite badly and problems may arise with the circulation later.
- Tendons and nerves may also have been crushed.
- Anyone whose finger is very painful, with limited movement or altered sensation after the ring is removed, should be reviewed by an experienced EM doctor (+/- Plastics).

NAIL & FINGERTIP INJURIES

Splinter under the nail

If the splinter can be easily grasped:

- Remove it.
- Apply a light dressing.
- Warn of signs of infection.
- No formal follow-up required.

If the splinter is hard to grasp:

- A segment of nail will need to be removed.
- Anaesthetise with a ring or metacarpal block.
- Cut away as much nail as necessary, remove the splinter and dress the finger.
- Prescribe antibiotics only if any pus was present.

F.B. e.g. sewing machine needle **through the nail**

- ****** If there is a piece of thread still attached to the needle, do not pull on it yet!***
- X-ray the finger - looking for size of foreign body and whether or not it is in one piece. Also, is there damage to the bone?

If the object is embedded in the bone:

- Refer to Plastics.

If the object is intact and appears to be at or just below the surface:

- Removal can be attempted.
- Anaesthetise the finger.
- If the object is partly visible on the nail surface, grasp it firmly and remove it.
- If the object cannot be grasped, a segment of nail needs to be removed - leave any attached thread in place until ready to look for the object - if it is lodged below the surface, the thread will lead you to it.
- After removal, antibiotics are not necessary unless it looks infected.

Subungual Haematoma

- X-ray to check for a fracture.
- If more than a small haematoma, it is worth trephining the nail.
- Consider antibiotics if fracture present – not needed if tuft fracture and sustained in clean environment/absence of tissue devitalization.
- TTC if fracture, otherwise, no formal follow-up.

Avulsed / Partially Avulsed nails

Try to preserve nails wherever possible:

- They act as splints in the presence of fractures;
- Protect the extremely sensitive nail bed; and
- Provide a channel for the new nail to grow along.

These injuries are usually due to the digit being shut in a door.

- X-ray for underlying fractures.

Nailbed injury

- Usually refer to Plastics for repair
- If doing in ED, ringblock, washout, repair with 5.0/6.0 absorbable sutures then replace nail. Use steristrips over the nail to attach nail to the nail bed. May need to trim the nail

to allow smoother re-insertion under the nail fold. CTAC FU.

- If associated fracture present, refer to Plastics if nailbed needs repaired.
- If fracture present and nailbed does not need repaired, replace nail base under nail fold, steristrips to support nail, dress finger, prescribe antibiotics, TTC.

Amputation

- Xray to assess degree of bone involvement.
- If superficial, clean in saline bath and dress with non-adherent dressing.
- Deeper fingertip wounds require ring block and thorough irrigation.
- Consider antibiotics if underlying fracture or heavily contaminated, repair nail in associated nail bed injury.
- Check tetanus status.
- Refer all amputations (even distal phalanx) to Plastics.
- If patient brings amputated part with them to ED and you think it could be re-planted, wrap in gauze, wet with saline, place in plastic bag with patient details and place sealed bag in a container with ice and water. Keep in fridge for plastics review. (Do not place directly on ice or in freezer).

HAND INFECTIONS

Appropriate treatment and follow-up is important to ensure resolution of infection and to minimise long- term problems, especially stiffness.
As for all soft tissue infections check tetanus status and glucostix.

Paronychia

Early

- No treatment is necessary – most will get better without treatment.

Later

- Red, very swollen around edge of nail. Painful +++ but no pus has formed yet.
- Treat with antibiotics.
- Worsening advice.

Late with collection of pus

- Drain.
  - Ring/metacarpal block.
  - Elevate lateral nail fold at affected side with a blunt needle to release pus.
  - Once drained, antibiotics not required unless spreading erythema.
- Xray? osteomyelitis if long history.

Fingertip Pulp Space Infections (Felon)

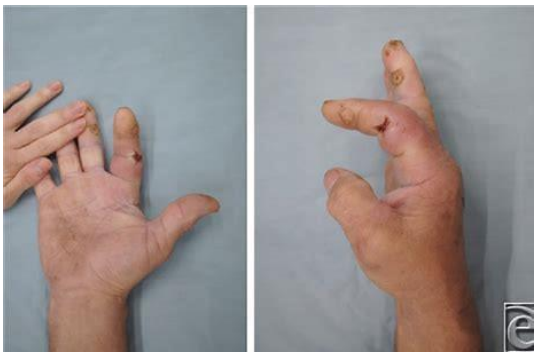
- May be due to a penetrating injury, e.g. thorn/glass.
- Painful, red, swollen fingertip.
- Pulp feels more tense than other fingers.
- Take a soft tissue X-ray to exclude foreign body (or osteomyelitis if long history)
- Failure to drain these infections can result in local tissue destruction, proximal spread or deep spread to involve the phalanx.
- Refer to Plastics for drainage.

Cellulitis of the hand

- May result after a penetrating injury.
- swollen, red, painful.
- Should still have a good range of movement.
- If movement is decreased, consider possibility of tendon sheath or joint infection (*see below*).
- X-ray to exclude presence of a foreign body.
- Mark Erythema.
- Oral antibiotics if systemically well, no proximal spread and started within 24 hours.
- If not, discuss with senior, IV access, bloods, IV antibiotics, elevate, refer Plastics.

Bacterial Tenosynovitis of the hand/ Flexor Sheath Infection

- Usually secondary to a penetrating injury but also from pulp space infection.
- Xray digit.
- Kanaval's signs:
  - Finger is held in a degree of flexion.
  - Pain on passive extension.
  - Tender along flexor sheath in finger.
  - Fusiform swelling of digit +/- erythema.
- Refer to Plastics.
- IV antibiotics, elevation +/- surgical washout.



Septic Arthritis in the hand

- The affected joint is red, hot, swollen and tender.
- Both active and passive movements are markedly restricted and painful.
- If in doubt, 'telescoping' the finger (pressing on the fingertip) will squash the joint and cause much pain – if it is cellulitis it will not hurt.
- Xray to look for FB or signs of osteomyelitis or loss of joint space (due to articular cartilage from infection).
- Elevate, analgesia.
- Bloods, Antibiotics +/- tetanus.
- Refer to Plastics.

Osteomyelitis in the hand

- Xray
- Refer to Plastics – for ? bone biopsies and follow up.
- OPAT if systemically well.

Web Space Infections

- Swelling may be mainly dorsal.
- Web space will be tender and adjacent fingers will be spreading apart.
- Xray if suspect FB in skin.
- Refer to Plastics for drainage and antibiotics +/- tetanus.

Palmar Space Infections

- Mid-palmar (beneath flexor tendons).
- Thenar.
- Hypothenar.
- Xray if suspect FB or underlying fracture.
- Infection could spread to volar aspect of wrist deep to flexor tendons.
- Senior review, early antibiotics, tetanus booster if indicated.
- Refer to Plastics.

Human Bites on the hand

- Always ask yourself whether wounds over knuckles could have been caused by punching human teeth – is there an underlying fracture? Is there extensor tendon injury? The damaged extensor tendon will move proximal to the MCPJ with the joint in extension, rather than clenched in a fist when the injury was sustained.
- X-ray to exclude fracture, or presence of a tooth fragment.
- If a fresh wound and there is no underlying structural damage, clean wound, give antibiotics.
- As for any wound check tetanus status. See section on blood born viruses for Hepatitis B and HIV prophylaxis.
- If concern for intra-articular inoculation refer to Plastics (risk septic arthritis).
- If delayed presentation already looking infected, take bloods, elevate, IV antibiotics and refer to Plastics.

Pyogenic Granuloma

- Benign lesion, not an infection.
- Frequently affects fingertips after minor injury.
- Raised, red friable lesion that bleeds easily.
- Can be treated with silver nitrate if small, but if larger may need surgical excision.