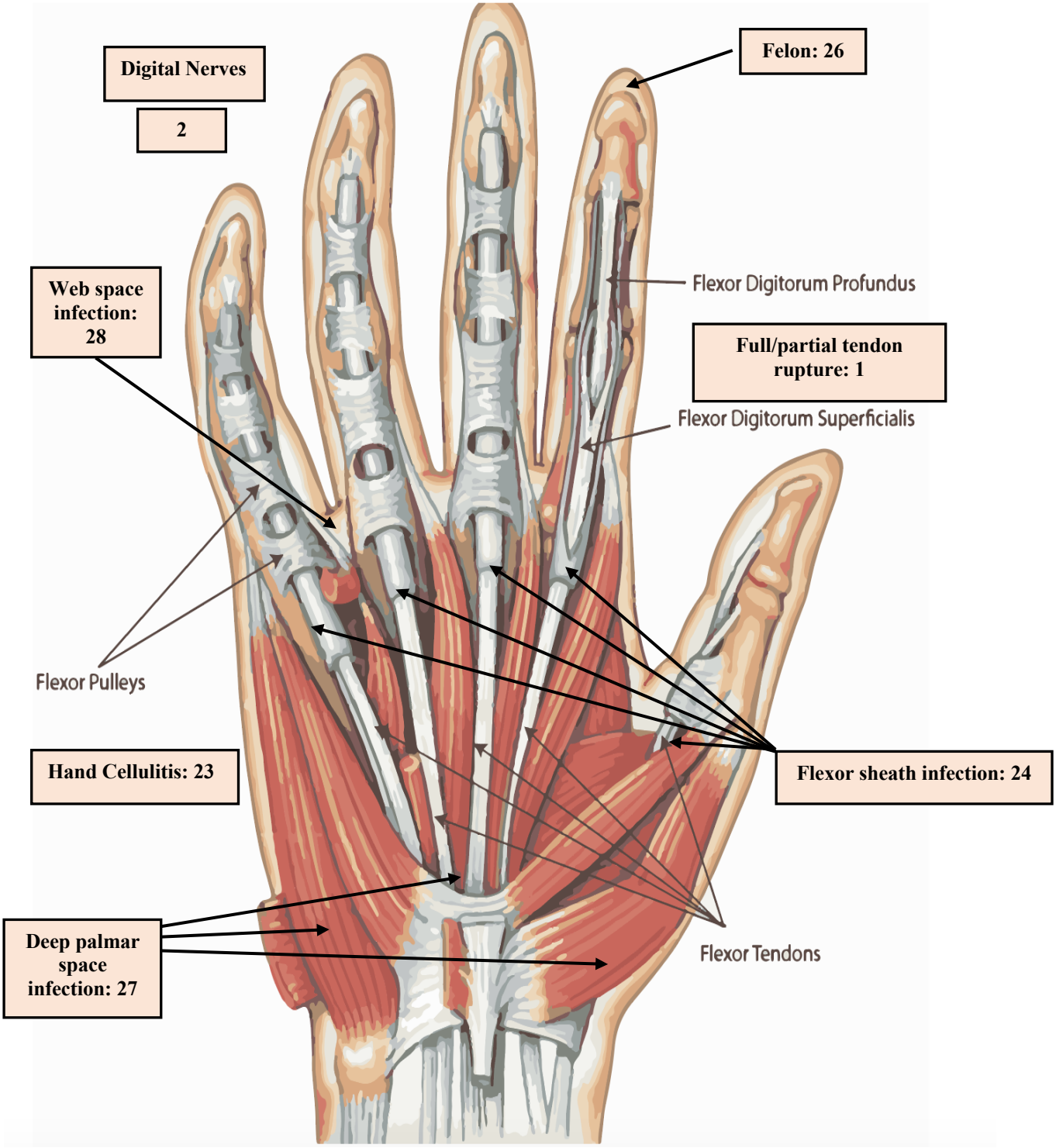
Hand Injuries Guidance

Flexor/Palm



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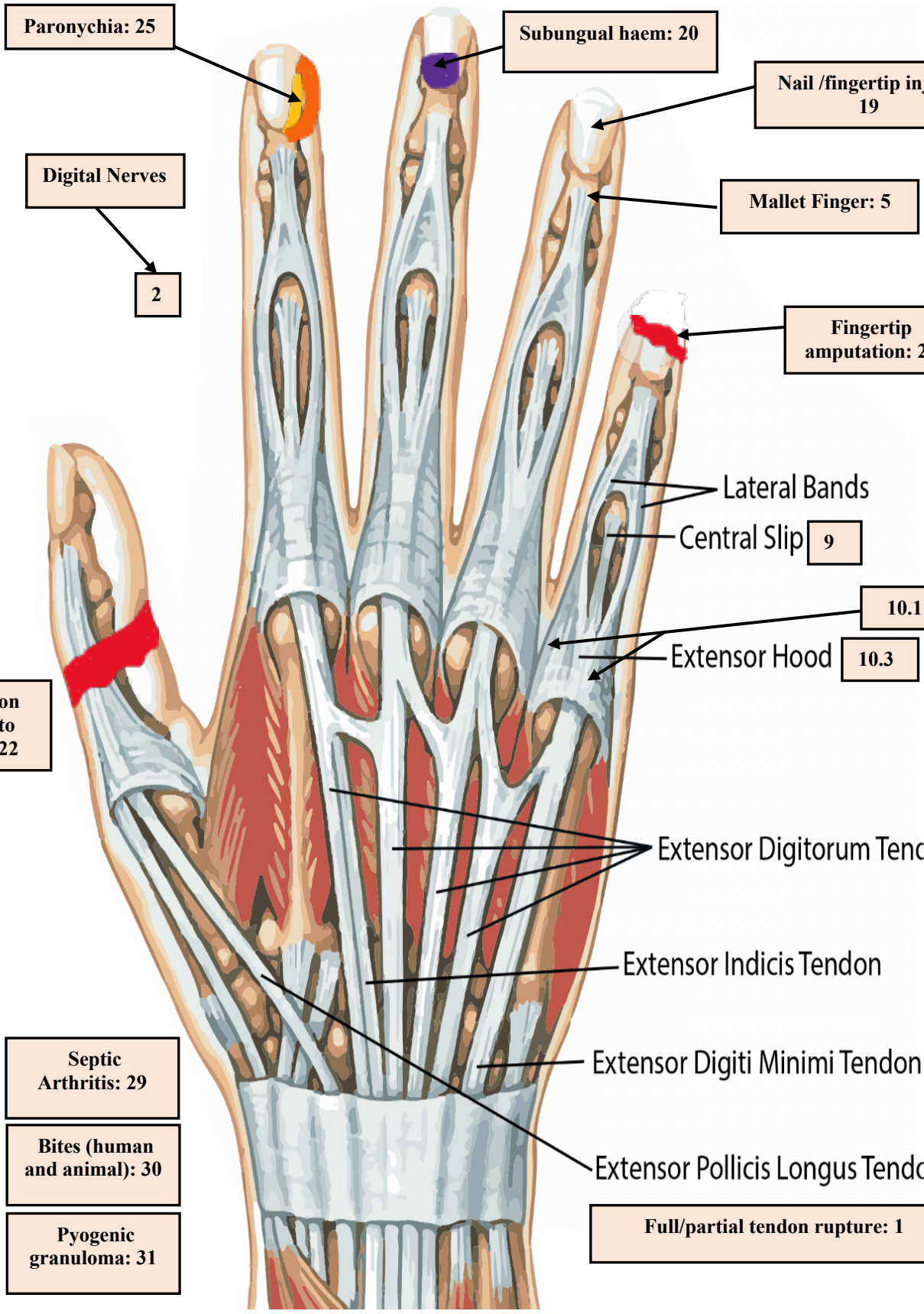
Extensor/Dorsum



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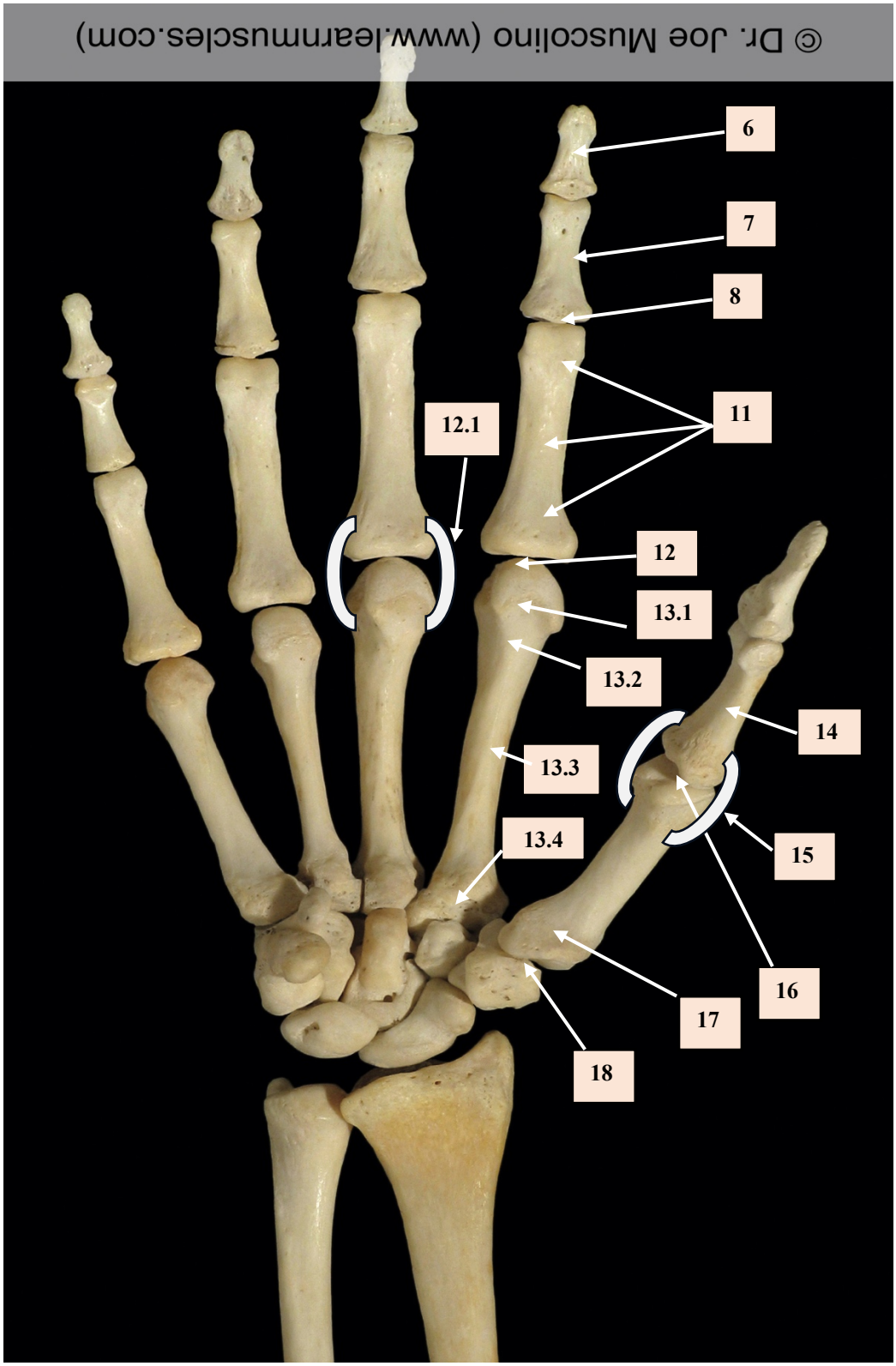
Bones and Joints



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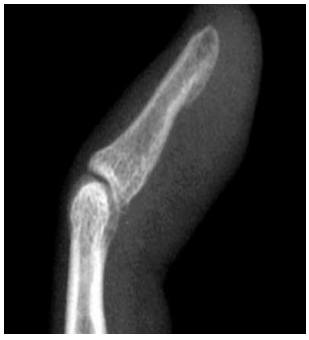
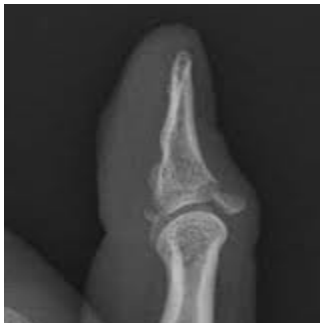
ED Management – When to Refer – How to Refer

Injury	ED Management	Plastic Surgery Follow-up
1. Suspected full/partial tendon rupture (fingers, hand, wrist or forearm)	AAD* Washout – Dressing X-ray for FB or Fracture Antibiotics +/- tetanus booster	In-hours: refer via bleep After 16:00: refer via email for urgent review
2. Digital nerve injury	AAD* Washout – Dressing X-ray for FB or Fracture Antibiotics +/- tetanus booster *If numbness is only limited to area distal to DIPJ: not for surgical repair*	In-hours: refer via bleep After 16:00 refer via email for urgent review
3. Major nerve injury (median, ulnar and/or radial)	ABCD and call ED senior AAD* Inform Plastics +/- Anaesthetist Washout – Dressing Imaging (X-ray/CT) Antibiotics +/- tetanus booster	In-hours: refer via bleep After 21:00: refer via HAN
4. Major arterial bleed	AAD* - ABCD and call ED senior Inform Plastics +/- Anaesthetist Washout – Dressing Direct pressure to wound if ongoing bleeding Imaging (X-ray/CT angio) Antibiotics +/- tetanus booster	In-hours: refer via bleep After 21:00: refer via HAN
5.1 Mallet Finger – Tendinous 	AAD* Mallet splint: ensure appropriate size, for 6-8 weeks day and night, followed by only during night and sports for further 2 weeks. Patient advice leaflet: ensure patient understands how to care for splint and what to expect at end of treatment (See Appendices 4 and 5)	Hand Trauma Clinic: within 2 weeks. If the splint is not fitting or loose, please refer earlier than 2 weeks. (ED Reception can organise)
5.2 Mallet Finger – bony, <30% of articular surface area 	AAD* Mallet splint: ensure appropriate size, for 4-6 weeks day and night, followed by only during night and sports for further 2 weeks. Patient advice leaflet: ensure patient understands how to care for splint and what to expect at end of treatment (See Appendices 4 and 5)	Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise)

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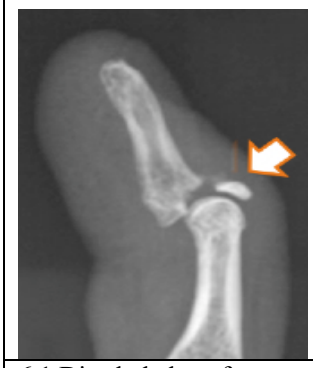
5.3 Mallet Finger – bony, >30% of articular surface area or subluxation 	AAD* Mallet splint: ensure appropriate size. Re-Xray digit in splint to confirm position of DIP joint Plastic review for consideration of surgical repair (See Appendices 4 and 5)	In-hours: refer via bleep After 16:00: refer via email for urgent review
6.1 Distal phalanx fracture: Tuft	AAD* X-ray The fracture itself does not usually need specific treatment. Treat the associated soft tissue injuries *(usually a crush injury)* and prescribe antibiotics if it is an open fracture. **Closed:** Mallet splint for comfort (2 weeks), elevation and analgesia. Ensure PIPJ is not covered by splint and is free to move **Open:** washout and repair, including nail bed lacerations. Oral Abx for 5/7 if open fracture Check tetanus status Trephine subungal haematoma if throbbing and add Abx as now open fracture Patient information leaflet (TBC)	Closed: Discharge to GP with worsening advice Open, but nail bed intact: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) If open and needs nail bed repair: In-hours: refer via bleep After 16.00 refer via email for urgent review If you feel you require training on nailbed management please contact Dr Reem Al Soufi on reem.alsoufi@nhslothian.scot.nhs.uk to book your place on a practical session for nailbed repair.
6.2 Distal phalanx – shaft	AAD* X-ray Ring block to facilitate ED treatment Longitudinal: splint for comfort Transverse - minimally displaced: splint for comfort Transverse – displaced: associated with significant nailbed injury, refer to plastics for debridement, repair +/- K wire fixation	For longitudinal/minimally displaced transverse: no follow up is required For open wounds with displaced fracture: In-hours: refer via bleep After 16:00: refer via email for urgent review
6.3 Distal phalanx: base	AAD* X-ray If closed injury: • Mallet splint is enough if intrarticular fracture is	Closed and < 25% articular surface area involvement: In-hours: refer via bleep After 16:00: refer via email for urgent review

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	undisplaced and involves <25% of articular surface Often this is an open injury: washout and dressing, Abx and tetanus booster if indicated Nail plate frequently dislocated with underlying laceration in nail matrix Needs debridement, repair of soft tissues +/- k wire stabilisation in theatre via plastics	Open fracture or > 25% of articular surface is involved: In-hours: refer via bleep After 21:00: refer via HAN
7. Middle phalanx fracture	AAD* and X-ray Undisplaced and stable: buddy strapping, elevation and analgesia for 10-14 days Undisplaced but at risk of displacement: zimmer splint and refer to Plastics (email) Displaced: attempt reduction under ring block and zimmer splint then re-xray. If unable to reduce or appears unstable: splint for comfort and refer to plastics on the same day Open injury: washout and dressing, Abx and tetanus booster if indicated. Refer to plastics on the same day Re-X-ray after splinting **Unstable Fractures include:** • Displaced intra-articular fracture (unicondylar or comminuted) • >10 degrees angulation or > 2mm shortening • Spiral and long oblique fractures • Comminuted Fractures • Irreducible fractures • Multiple digital fractures • Floating joint – fractures proximal and distal to joint	Undisplaced and stable: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) Undisplaced fracture, intra-articular extension or successfully reduced in ED but at risk of displacement (unstable): In-hours: refer via bleep After 16:00: refer via email for urgent review Unreducible or open fracture: In-hours: refer via bleep After 21:00: refer via HAN

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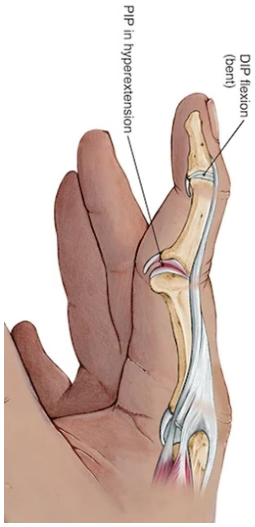
8.1 PIPJ – Volar plate injury *******PIPJ injuries can result is significant loss of function and pain, please discuss with senior if in doubt******* **See Appendix 3 for more details**	AAD* - is there a ***swan neck deformity*** or collateral ligaments injury? X-Ray If stable joint: buddy strapping 10-14 days. If acute swan neck deformity: dorsal zimmer splint with PIP in 20 degrees of flexion Encourage active ROM of PIP joint – full flexion and extension if no ***swan neck deformity*** ***Swan neck deformity:*** Hyperextension of PIPJ and flexion of DIPJ  Patient advice leaflet for volar plate injury (TBC)	Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise)
8.2 PIPJ – Collateral ligament injury	AAD* X-ray Buddy strap to adjacent digit to support the injured side for 10-14 days	Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise)
8.3 PIPJ Dislocation (simple volar) Closed central slip injury	AAD* Reduce under ring block/Entonox X-ray Assess PIPJ for stability after reduction and document findings Splint PIPJ in <u>full extension</u> with initial dorsal zimmer splint which will be converted to circumferential PIPJ splint Can leave DIP to mobilise Patient advice leaflet (TBC)	In-hours: refer via bleep After 16:00: refer via email for urgent review

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8.4 PIPJ fracture/dislocation – dorsal	AAD* X-ray Attempt reduction under LA/Entonox Apply dorsal zimmer splint to keep PIPJ in 20^{o} Flexion if unstable, if stable apply buddy strapping. Re-Xray Can leave DIP to mobilise Patient advice leaflet (TBC)	**Closed or stable injury:** Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) **Open or unstable injury:** In-hours: refer via bleep After 16:00: refer via email for urgent review
8.5 PIPJ fracture/dislocation – volar	AAD* X-ray Attempt reduction under LA/Entonox Volar zimmer splint to splint PIPJ in extension Re-Xray Can leave DIP to mobilise Patient advice leaflet (TBC)	In-hours: refer via bleep After 16:00: refer via email for urgent review
9. Central slip injury – PIPJ	AAD* X-ray Splint PIPJ while keeping DIPJ free to mobilise using zimmer splint with PIPJ in extension Re-Xray Can leave DIP to mobilise Patient advice leaflet (TBC)	**Closed/tendinous only injury:** Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) **Open injury or associated fracture:** In-hours: refer via bleep After 16:00: refer via email for urgent review
10.1 Sagittal Band injury – open	AAD* X-ray for FB or fracture Washout and dressing Antibiotics +/- tetanus booster Splint?	In-hours: refer via bleep After 16:00: refer via email for urgent review
10.2 Sagittal Band injury – closed	AAD* X-ray for FB or fracture Specialised splint (hand clinic or physio) to hold MCPJ in minimal flexion for 6 weeks – Relative motion splint. Check with Plaster technician to apply a dorsal slab keeping the MCPJ straight in minimal flexion while awaiting for hand pysio/clinic appointment.	Hand Trauma Clinic: next available appointment within 2 weeks if specialised splint was provided via ED NB if hand physio cannot organise to review patient will need urgent review for assessment and provision of splint
10.3 Extensor Hood injury See Appendix 7 for more details	AAD* X-ray for FB or fracture Washout and dressing if open injury Antibiotics +/- tetanus booster if open Volar slab in the Edinburgh position and elevation	In-hours: refer via bleep After 16:00: refer via email for urgent review
11.1 Proximal Phalanx (P1) condylar fracture	AAD* X-ray (PA and true lateral) Unicondylar and undisplaced: Refer for early fixation. These are unstable injuries and displace late Displaced unicondylar: reduction and fixation in theatre	Undisplaced Unicondylar: In-hours: refer via bleep After 16:00: refer via email for urgent review Displaced unicondylar or bicondylar: In-hours: refer via bleep After 16:00: refer via email for urgent review

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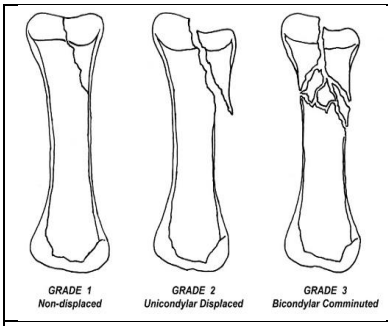	Bicondylar fracture are unstable => surgical fixation in theatre Apply a volar slab for comfort and elevate hand in a sling	
11.2 Proximal Phalanx (P1) neck, shaft, base fracture and growth plate – with no angulation	AAD* X-ray (PA and true lateral) **Undisplaced**: buddy strap or Zimmer splint, elevation and hand injury advice sheet (TBC) **Displaced**: attempt reduction under ring block or Entonox Zimmer splint in position of safety **Unstable**: zimmer splint in position of safety and refer to plastics (volar slab for comfort) Re-Xray after splint application **Unstable Fractures include:** • Displaced intra-articular fracture (unicondylar or comminuted) • >10 degrees angulation or > 2mm shortening • Spiral and long oblique fractures • Comminuted Fractures • Irreducible fractures • Multiple digital fractures • Floating joint – fractures proximal and distal to joint	**Undisplaced:** Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) **Displaced or unstable:** In-hours: refer via bleep After 16:00: refer via email for urgent review
11.3 Fracture of base of proximal phalanx with angulation	AAD* and X-ray (PA and true lateral) Degree of angulation can be overlooked, obtain true lateral x-rays Missed opportunity for treatment can lead to malunion, pseudoclawing and reduced ROM at MCPJ Attempt reduction in ED and splint (volar slab with flexion of MCPJs and extension of PIPJs) Lower threshold for MUA +/- K-wire to maintain position so refer to plastics	Undisplaced or successfully reduced: In-hours: refer via bleep After 16:00: refer via email for urgent review Unreducible or open fracture: In-hours: refer via bleep After 21:00: refer via HAN
12.1 MCPJ collateral ligament injury (+/- avulsion)	AAD* Examine with MCPJ in flexion (20 degrees) and in full extension, applying varus and valgus challenges to the MCPJ, always compare with the other hand	Grade I and II: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise)

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• Brewerton view for metacarpal head fractures  	X-ray: Brewerton view radiographs to determine presence of an associated MC head fracture Management depends on degree of instability: **Grade I** – pain, no instability = splinting/buddy strapping **Grade II** - pain, some instability but end point present = splintage/strapping **Grade III** – pain and instability, no end point = consider surgical repair	Grade III: In-hours: refer via bleep After 16:00: refer via email for urgent review
12.2 MCPJ dislocation	AAD* X-ray Attempt reduction under MC 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	If irreducible: In-hours: refer via bleep After 21:00: refer via HAN If reducible but unstable: In-hours: refer via bleep After 16:00: refer via email for urgent review If reducible and stable: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise)
12.3. MCPJ joint/extensor tendon injury due to human bite (Fight Bite - Zone 5)	AAD* Swab any discharge, FBC/BC/CRP Washout – Dressing X-ray for FB (teeth) and/or Fracture Antibiotics +/- tetanus booster Blood-borne viruses risk assessment +/- prophylaxis Elevate hand in a sling	In-hours: refer via bleep After 21:00: refer via HAN
13.1 Metacarpal fractures – Head	AAD* and X-ray Index MCPJ is commonest If closed fracture and undisplaced treat in volar slab with flexion of MCPJs and extension of PIPJs	Undisplaced: In-hours: refer via bleep After 16:00: refer via email for urgent review Intra-articular extension, displaced or open fracture: In-hours: refer via bleep

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	If open fracture or intra-articular extension discuss with plastics	After 21:00: refer via HAN
13.2 Metacarpal fractures – Neck Boxer's fracture	AAD* and X-ray Treatment depends on joint involved. **Examine for rotational deformity and document findings*** Most commonly ring and little metacarpals, can tolerate a large degree of angulation so buddy strapping and elevation suffice. Patient advice leaflet (TBC): Keep joints mobilising, painful for 6 weeks so avoid heavy lifting, extensor lag and knuckle deformity to be expected For Index and middle Metacarpals, angulation is not tolerated and therefore require fixation, refer to plastics.	Ring /little metacarpals: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) Middle/index metacarpals or open fractures: In-hours: refer via bleep After 21:00: refer via HAN
13.3 Metacarpal fractures – Shaft	AAD* PA, oblique and true lateral hand X-rays are required Undisplaced and stable fracture: volar slab and elevation. Leave MCP joints free to move Refer to Plastics for fixation if: • Significant angulation (see below) • Rotational deformity (even if subtle) • Unstable: long oblique, spiral or comminuted • Multiple MC fractures • Open fracture **Note:** single metacarpal spiral/long oblique fractures rarely need surgical intervention if no rotational deformity. Volar slab and allow and encourage MCPJ range of movement Elevation and analgesia for comfort while waiting for Plastic review. May attempt closed reduction for transverse fractures with angulation under MC block in ED. **Volar angulation:** *Index and middle MC: minimal angulation is tolerated* *Ring MC: tolerate up to 20 degrees* *Little MC: tolerate up to 30 degrees*	Undisplaced and stable fracture: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) If Fixation is required: In-hours: refer via bleep After 21:00: refer via HAN

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13.4 Metacarpal fractures – Base Including fracture/dislocation of CMCJ	AAD* X-ray: AP and true lateral to assess angulation adequately Most common at ring and little MC bases Extra-articular fractures could be treated conservatively if undisplaced and minimally angulated. ED management: volar slab and elevation Fracture/dislocation at CMCJ is inherently unstable and requires reduction and K-wire fixation. ED management: analgesia and elevation while waiting for plastics review.	Undisplaced extra-articular fractures: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) Displaced, angulated, intra-articular or open fracture or Fracture dislocation at CMCJ: In-hours: refer via bleep After 21:00: refer via HAN
14. Thumb Proximal Phalanx	AAD* X-ray (PA and true lateral) Undisplaced: thumb spica velco splint or POP Displaced: attempt reduction under ring block or Entonox POP thumb spica Re-Xray	Undisplaced: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) Displaced: In-hours: refer via bleep After 16:00: refer via email for urgent review
15. Thumb MCPJ collateral ligaments injury	AAD* Rotational deformity? X-ray: is there an avulsion fracture? L.A infiltration to allow assessment of stability of the MCPJ: Examine stability with MCPJ in extension and flexion, and compare with the normal side. **Ulnar collateral ligament:** Grade I: pain over UCL on thumb abduction, no instability. Treat with futuro splint with thumb extension Grade II: pain over UCL on thumb abduction, some instability, end point felt. Treat in thumb spica cast for 4-6 weeks, hand clinic follow up Grade III: as grade 2 but no end point felt on MCPJ abduction. Refer to plastics to discuss with hand surgeons, options between exploration and repair in theatre, vs USS to determine if Stener lesion is present. However, USS does have false negative rate. **Radial collateral ligament:**	Grade I&II UCL and partial RCL tear: Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) Grade III UCL or complete RCL tear: In-hours: refer via bleep After 16:00: refer via email for urgent review

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	• Partial injuries: thumb spica cast • Complete injuries: refer to plastics for consideration of early repair	
16. Thumb MCPJ Dislocation	AAD* X-ray 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 – will need open reduction in theatre Post reduction: assess UCL/MCL/volar plate for stability Splint in thumb spica till seen in hand clinic Hand injury advice sheet (TBC)	Hand Trauma Clinic: next available appointment within 2 weeks (ED Reception can organise) If irreducible: In-hours: refer via bleep After 21:00: refer via HAN
17. Thumb Metacarpal base	AAD* X-ray: AP and true lateral to assess angulation adequately Fracture at base of thumb MC has 3 injury patterns: 1. **Extra –articular fracture** 2. **Bennett fracture (fracture dislocation)** 3. **Rolando fracture (comminuted)** ***Extra- articular fracture*:** • Does not involve the joint • Frequently angulated due to the pull of the inserting tendons • Does not require surgical fixation unless an open injury • Reduce in abduction and apply a cast (not futura splint) with moulding • Check XR once in cast • Review in hand clinic within a week ***Bennett Fracture*** • Fracture dislocation of thumb CMC Joint • Do not accept non-diagnostic radiographs – need to be able to see if there is subluxation of the joint with a step in the articular surface	Undisplaced extra-articular and stable fracture: Hand Trauma Clinic: next available appointment within a week (ED Reception can organise) If Fixation is required (Bennett or Rolando): In-hours: refer via bleep After 16:00: refer via email for urgent review Open Fracture: In-hours: refer via bleep After 21:00: refer via HAN

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	• If undisplaced (unusual) – can be treated non-operatively in cast with close supervision in hand OPD • If displaced – requires operative fixation – refer to plastics Often treated with closed reduction and k-wire fixation ***<u>Rolando Fracture</u>*** • Multifragmentary intra-articular fracture of thumb MC base • Often requires reduction and fixation (closed with k-wires or ORIF) • Place in cast for comfort and refer to plastics for definitive treatment on the same day or via email if after 21:00. Remember all open fractures require review by plastics on the same day.	
18. Thumb CMC joint dislocation	AAD* X-ray Reduction under Bier's block/Entonox Hold in thumb spica cast with moulding Check X-ray Elevation Hand injuries advice sheet (TBC) Unstable injuries will need open reduction, ligament repair and k-wire fixation	In-hours: refer via bleep After 21:00: refer via HAN
19. Nail and Fingertip injuries	<u>Avulsed / Partially Avulsed nail:</u> AAD* and X-ray to check for underlying fracture • Try to preserve the nail wherever possible; it acts as a splint in the presence of fracture and protects the extremely sensitive nail bed • Apply ring block to facilitate examination, washout and repair • Irrigate the wound with saline and take care not to further injure the nail bed, if laceration edges are well opposed and there is no step you could replace the nail back with base underneath the nail fold. The nail acts as a splint to hold the laceration/fracture in place. Use a combination of glue and steristrpis over the nail to attach the nail to the nail bed. Sometimes you will need to trim the nail to allow smoother re-insertion under the nail fold.	Practice Nurse follow up for most. If unable to repair the nail bed/laceration in ED due to the complexity of laceration or patient not tolerating the procedure, please refer to Plastic Surgery: In-hours: refer via bleep After 21:00: refer via HAN

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	• If laceration edges are not well opposed use absorbable sutures size 5/0 or 6/0 Vicryl rapide to repair the nail bed then place the nail over as explained above. Can use running stitch instead of interrupted sutures • Dressing, elevation and analgesia. Please use non-adherent dressing such as Urgotul Silver •Antibiotics if underlying fracture or if wound was heavily contaminated •Practice Nurse follow up •Patient Information leaflet (TBC)	
20. Subungual Haematoma	Small hematomas need no treatment If larger and painful – trephine the nail plate and x-ray If >50% of nail plate area has underlying haematoma – significant nail bed injury may be present – if nail is still well attached use as a splint to maintain alignment. Elevation and analgesia are a must as very painful.	No follow up is required for most cases, to return to ED if signs of infection develop.
21. Fingertip amputation	AAD* X-ray to assess the degree of bone involvement. If superficial clean in saline bath and dress with non-adherent dressing Deeper wounds require ring block and thorough irrigation Consider antibiotics if underlying fracture or heavily contaminated, repair nail in associated nail bed laceration. Check tetanus status	Hand Trauma Clinic: next available appointment within 2 week (ED Reception can organise) Practice Nurse follow up for superficial skin loss and no bone exposure/fracture. If bone evident distal to amputation site will likely need terminalisation. In-hours: refer via bleep After 16:00: refer via email for urgent review
22. Thumb and digital amputation proximal to the fingertip	AAD* X-ray to assess the degree of bone involvement.	In-hours: refer via bleep After 21:00: refer via HAN

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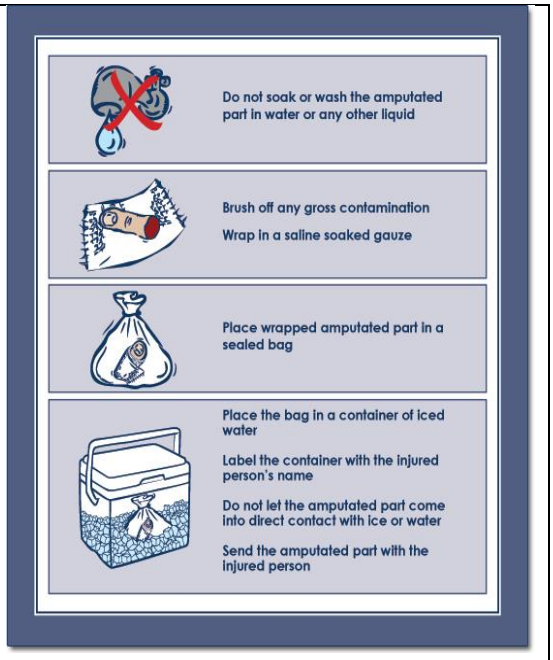
	• Young children <5y with amputated part – consider replant as a composite graft. Refer plastics ASAP • All thumb amputations need assessment by plastics team as matter of urgency for consideration of replantation • Adults – likely to need terminalisation of digit (+/- local skin flap for skin cover), refer to plastics ASAP • Dress with non-adherent dressing and apply direct pressure if still bleeding. • Elevate the affected hand in a sling • Antibiotics and check tetanus status • If the patient brought the amputated part with them to ED and you thought it could be re-planted, please wrap in gauze wet with saline, place in a plastic bag alongside a label with patient's details. Place the sealed bag in a container with ice & water. Keep in fridge for plastics to review. Label container with patient details, date and time of injury. **Do not place tissues directly on ice or place in freezer!**	
23. Hand cellulitis	AAD* Mark erythema with a marker pen Consider oral antibiotics if systemically well If there is FB in skin consider removal Discuss with senior if patient is diabetic or immune compromised Hand cellulitis is not a medical problem. If systemically unwell discuss with senior and ensure iv access, bloods and iv antibiotics and elevate in Bradford sling.	If systemically well: discharge to GP care with worsening statement If systemically unwell: In-hours: refer via bleep After 21:00: refer via HAN
24. Flexor sheath infection	AAD* X-Ray digit Kanaval's signs:	In-hours: refer via bleep After 21:00: refer via HAN

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	o Finger held in flexion o Pain on passive extension of digit o Tender along flexor sheath in finger o Fusiform swelling of digit +/- erythema Refer plastics for admission, IV antibiotics and elevation +/- surgical washout	
25. Paronychia	AAD* Ring block Early: Oral antibiotics Late with collection of pus: Drain the abscess by elevating the lateral nail fold at the affected side +/- remove the outer 1/4th of the nail plate Once drained there is no need for antibiotics unless there is a spreading erythema into the rest of the digit If long history obtain x-ray to look for evidence of osteomyelitis	Discharge with worsening statement If evidence of osteomyelitis IN hours: refer via Bleep After 21.00: refer via HAN
26. Felon Felon = Infection of pulp space	AAD* Ask about penetrating injury and possibility of FB X-Ray for FB or osteomyelitis (if longer history) Early Felon: if pulp is not tense and no proximal spread. Early felon may respond to oral antibiotics with early review in ED as "planned return" within a week If pulp is tense and very tender then surgical decompression of pus is required – under ring block. This is treated as an emergency as ongoing pressure from pus can cause necrosis of the digital pulp. Any signs of flexor sheath involvement (see Flexor sheath infection) refer to Plastics urgently	Felon: if early or responding to treatment: ED follow up as "planned return" within a week If suspecting flexor sheath infection: Refer to Plastics on the same day via bleep or H@N after 21:00
27. Deep palmar space infection	AAD* X-ray if suspecting FB or underlying fracture Pus can collect in one of the three deep spaces in the palm:	Refer to Plastics on the same day via bleep or H@N

*AAD: Analgesia, Assess, Document

	1. Thenar space 2. Hypothenar space 3. Midpalmar space Infection could spread to the volar aspect of the wrist deep to the flexor tendons. Escalate to senior doctor in ED, give early antibiotics, tetanus booster if indicated and refer to plastics for surgical drainage	
28. Web space infections (collar button abscess)	AAD* X-ray of suspecting FB in skin Abscess extends in the webspace both dorsally and volarly, causing fingers to spread apart by pressure in the abscess Requires drainage and antibiotics +/- tetanus booster Discuss with ED senior, if small it could be drained in ED If large abscess, suspecting flexor sheath infection or patient is septic escalate to ED senior and refer to plastic surgery urgently.	If ED senior can supervise you draining the abscess, then I&D in ED followed by antibiotics (Fluclox, if Pencillin allergy give doxycycline) If ED senior recommends referral to surgery: In-hours: refer via bleep, OOH via HAN If patient has signs of sepsis or flexor sheath infection: Refer to Plastics on the same day via bleep or H@N
29. Septic arthritis of hand joints	AAD* X-ray to look for FB or signs of osteomyelitis or loss of joint space (due to loss of articular cartilage from infection) Elevation and analgesia Take bloods (FBC/CRP/U&Es/BC if pyrexial) Antibiotics (antimicrobial companion) Tetanus booster if indicated Urgent referral to plastics	Refer to Plastics on the same day via bleep or H@N
30. Bites – human and animal	AAD* Clean wound thoroughly with saline, use local anaesthesia or LAT gel if washout is inconvenient for the patient. If suspecting teeth fragments in wound or a fracture obtain x-rays See Antimicrobial Companion for the most up to date advice of when to give antibiotics for different types of bites For human bites follow guidelines for BBV risk assessment, does the patient need Hep B vaccine or HIV PEP?	Discuss with ED senior if patient is septic (delayed presentation) or you suspect joint involvement Discuss with ED senior if the bite is involving face/neck and wound is deep with significant tissue loss For complex wounds with significant tissue loss, joint involvement or if tendon injury is suspected discuss with plastics on the same day: Refer to Plastics on the same day via bleep or H@N There are multiple guidelines available to aid ED management (antimicrobial companion, tetanus prophylaxis and BBV risk assessment). Please consult these guidelines before speaking to ED senior/plastics

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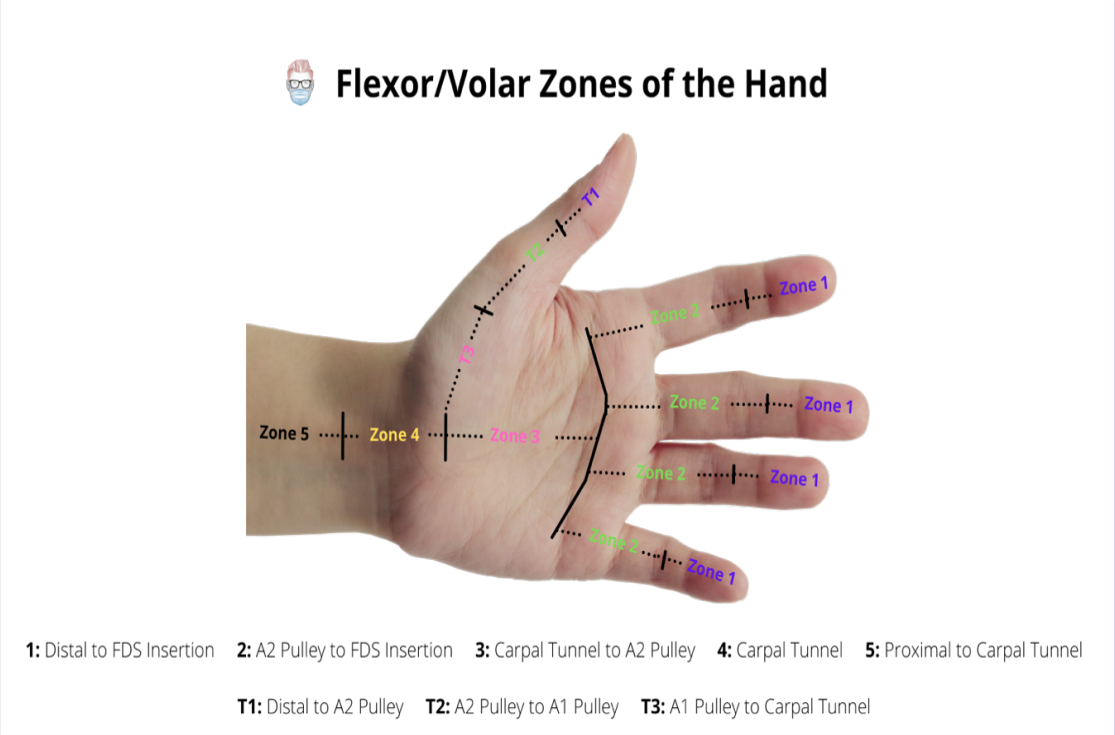
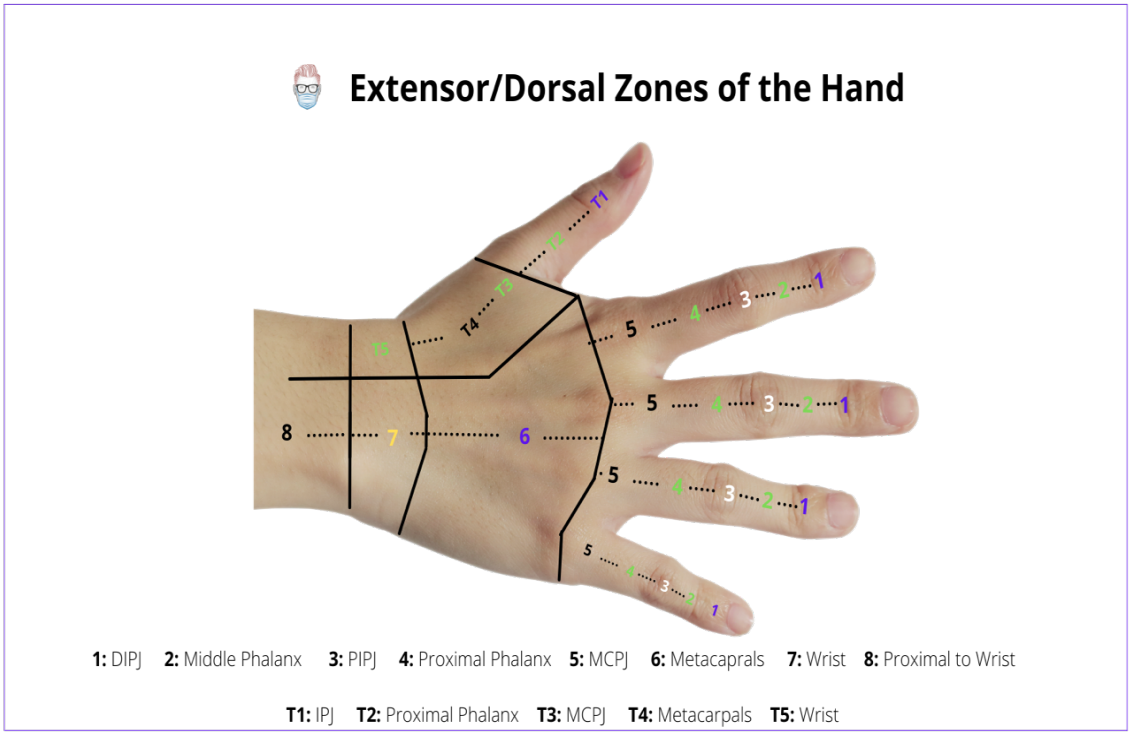
	Check tetanus status and provide booster vaccine +/- anti-tetanus immune globulin (see Tetanus prophylaxis guidelines) Be suspicious of wounds overlying MCPJ (Zone 5) with history of altercations, if bite is over a joint have a low threshold for seeking senior advice as intra-articular inoculation will lead to septic arthritis, refer urgently to plastics for joint washout if suspected. For delayed presentations with infection, obtain bloods, elevate the arm and give iv antibiotics as per Antimicrobial companion, refer to plastics urgently.	
31. Pyogenic granuloma	AAD* Benign lesion and not an infection. Frequently affects fingertips after minor injury. Presents as a raised, red friable lesion that bleeds easily, can be treated with silver nitrate if small, but if larger may need surgical excision	Most cases can be managed in ED, discuss with ED senior if you require support in using silver nitrate or if in doubt about diagnosis. If problem persists despite cauterisation: Hand Trauma Clinic: next available appointment within 2 week (ED Reception can organise)

*AAD: Analgesia, Assess, Document

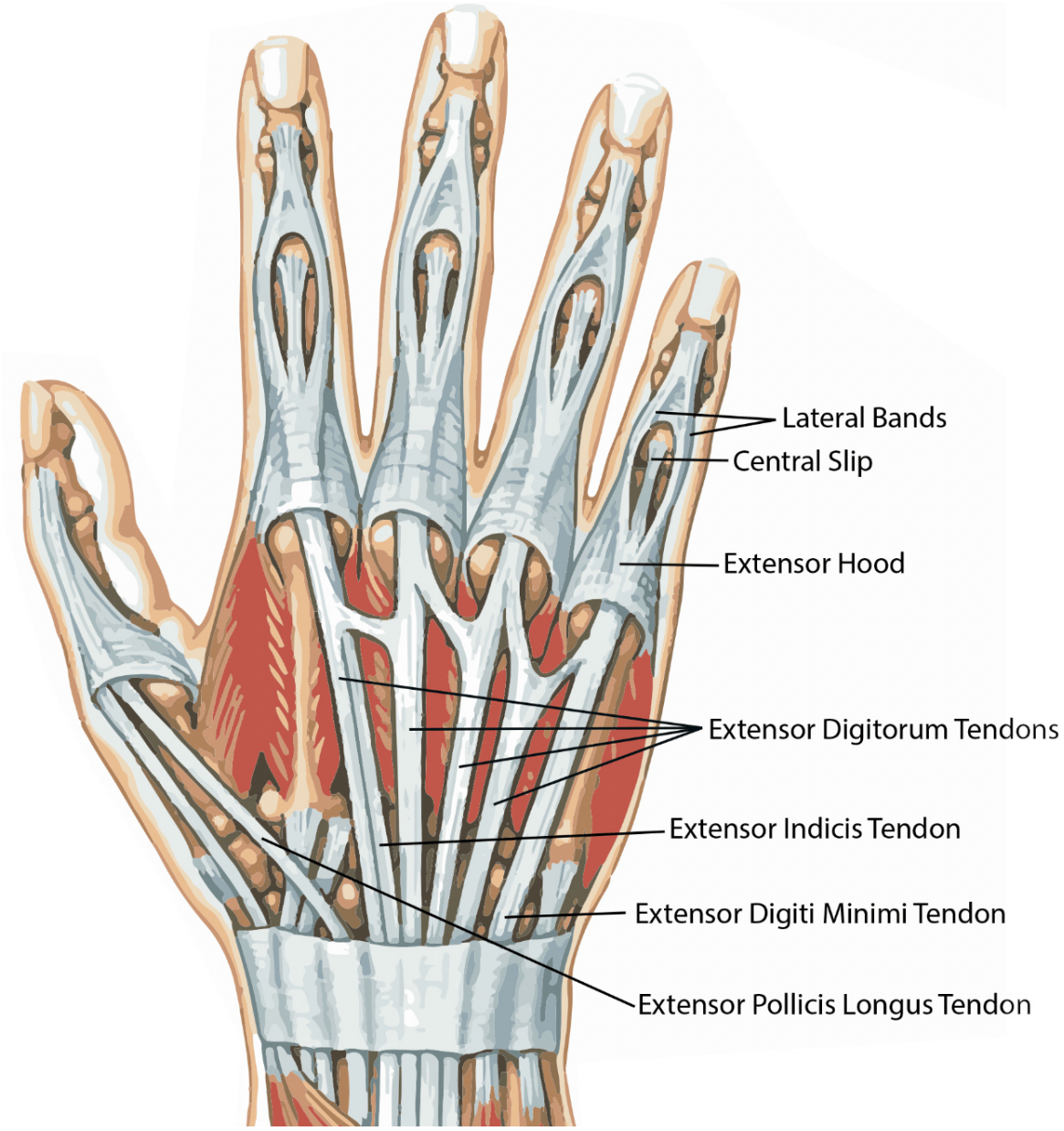
Appendix 1: Hand Zone
Where is the wound?

Flexor/Volar	
Extensor/Dorsal	

*AAD: Analgesia, Assess, Document

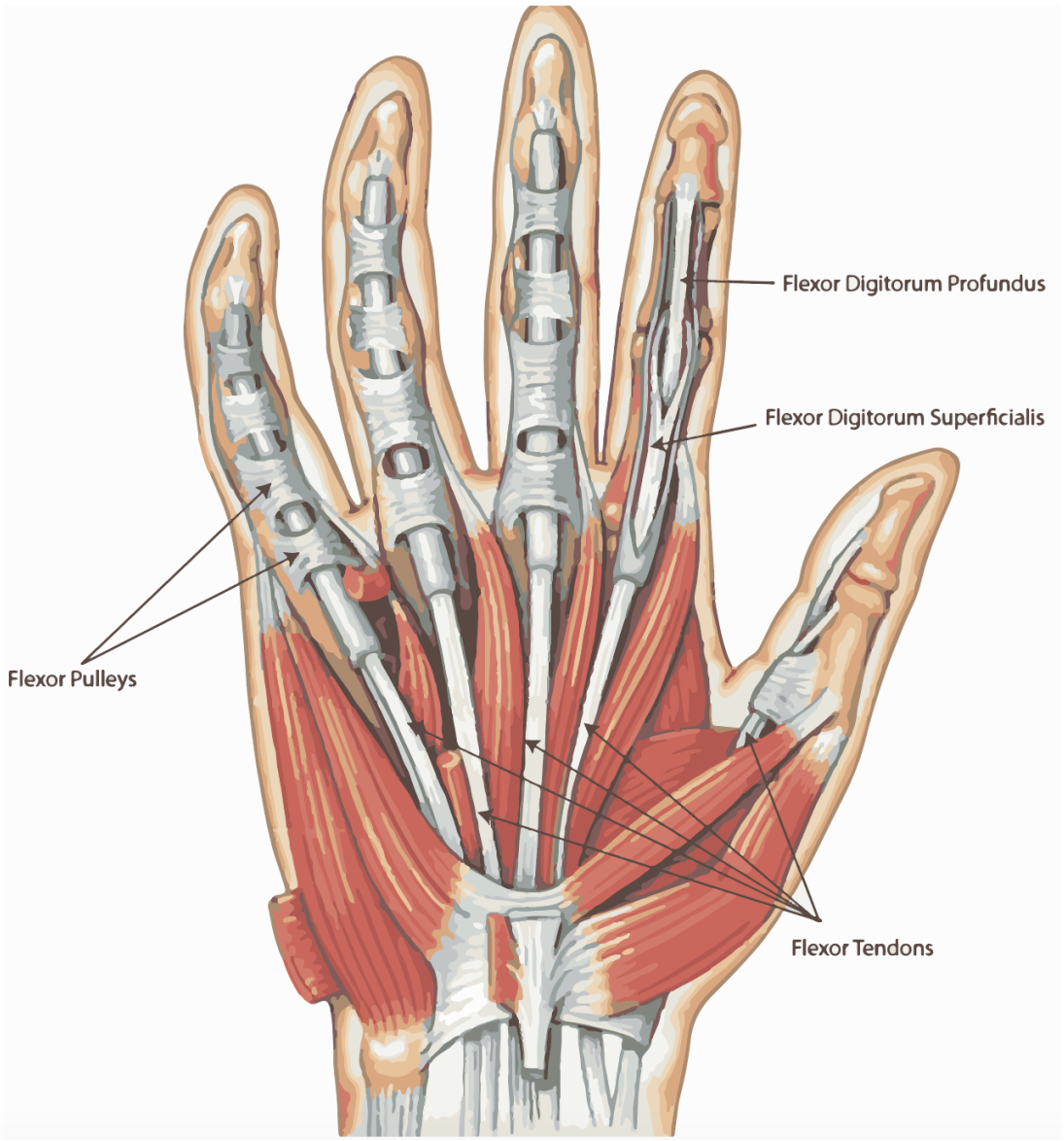
Appendix 2: Hand Anatomy Diagrams

1. ***Dorsum of hand***

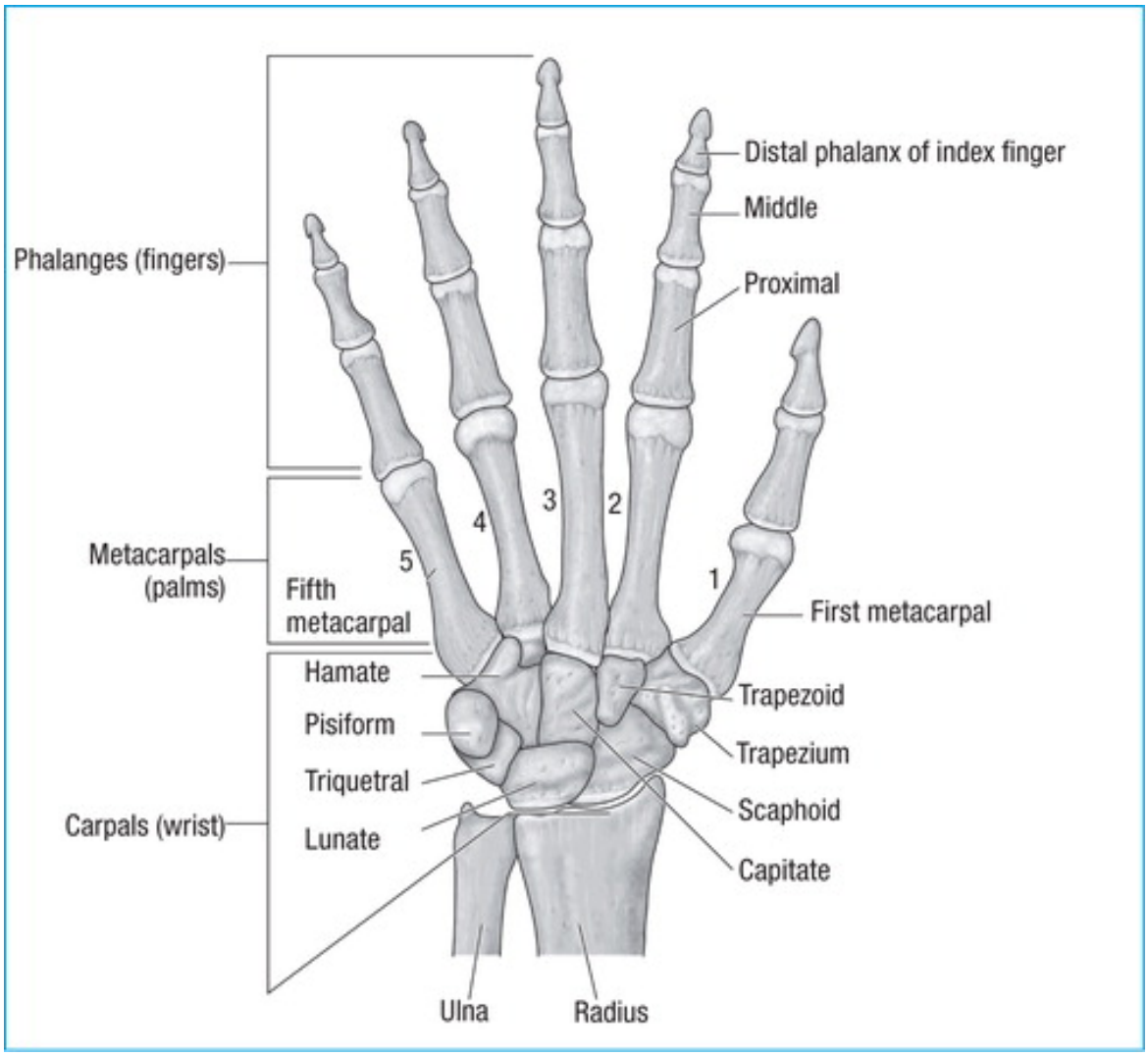


*AAD: Analgesia, Assess, Document

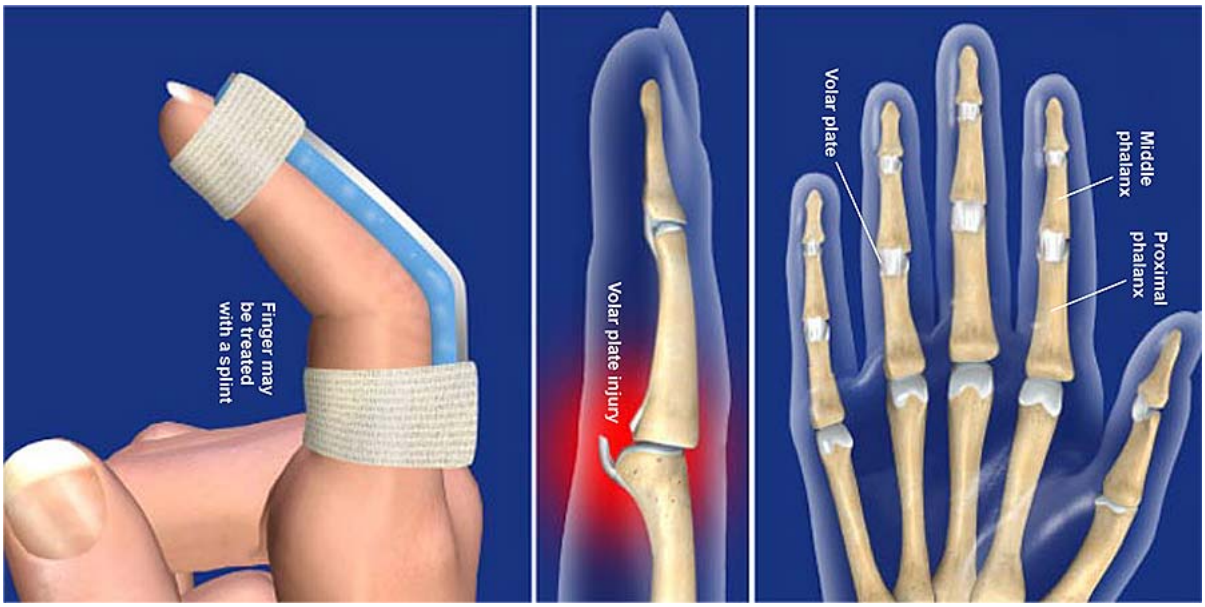
2. ***Palm of the Hand:***



3. ***Bones of the Hand (Palmar view)***



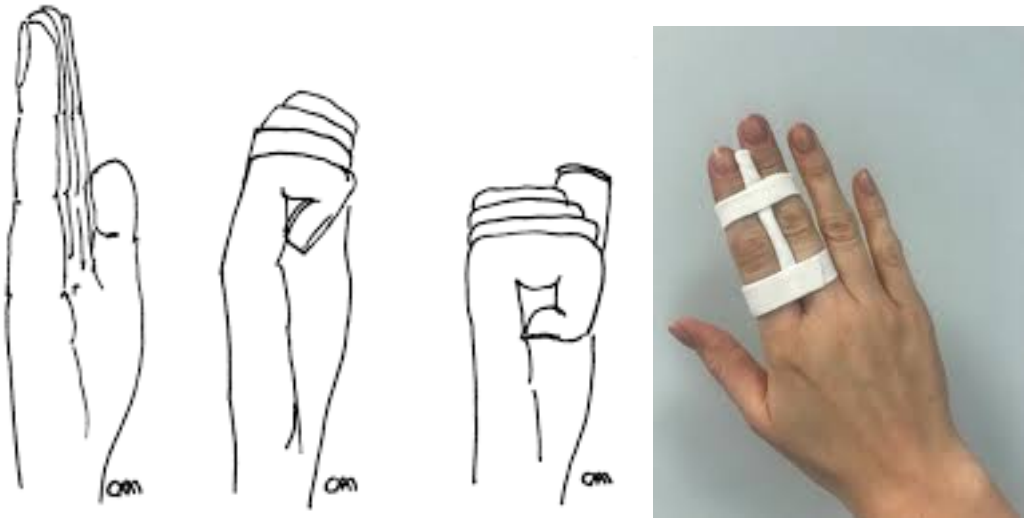
Appendix 3: Volar Plate Injury



The volar plate is a strong ligament, not visible on x-ray, at the palm side of the PIPJ. This structure supports the PIPJ and prevents it from being hyper-extended or dislocated. The volar plate can be partially or fully torn and may sometimes pull off a small piece of bone (avulsion) when it is damaged, usually following a sport hyper-extension injury e.g. ball games, also it is common after PIPJ dislocation.

The PIPJ is painful at the time of impact, although it is often possible to complete a game if it occurs during sport. The finger swells and there is often bruising on the palm side of the finger at the PIPJ.

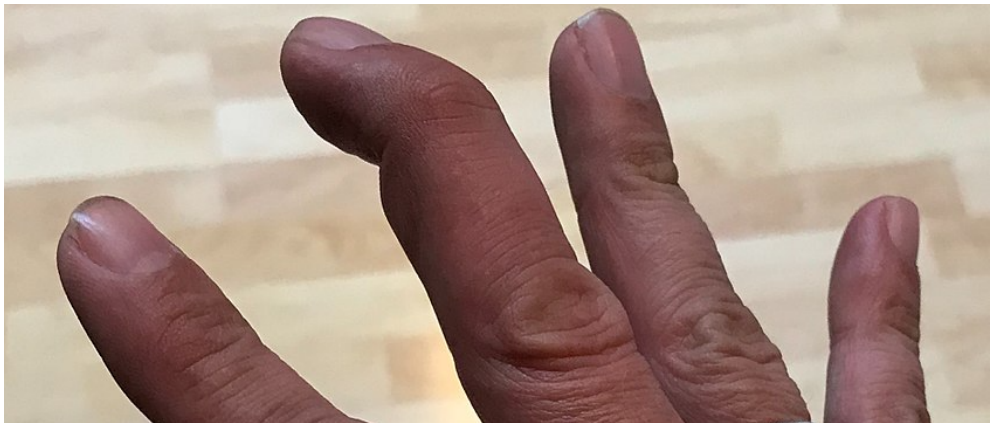
In the first couple of weeks, the aim is to reduce the swelling by keeping in the hand higher than the heart and moving the finger as pain allows. By the time the patient is reviewed at the hand clinic and the pain and swelling have reduced, buddy strapping could be removed and progress on to the exercises shown below:



*AAD: Analgesia, Assess, Document

Appendix 4: Mallet Finger Injuries

Presentation:
Flexion deformity at DIPJ – unable to extend fingertip.



Mechanism:
Forced flexion of an extended DIPJ +/- axial loading e.g., ball sports, finger caught in clothes or following a fall.

Examination:
Flexion deformity, +/-swelling, +/-tenderness at DIPJ, +/- wound or loss of skin, movements including limitation to extension at DIPJ.

X-Ray: see pictures on next page

A. No fracture: only tendon is avulsed = tendinous Mallet
B. Fracture of base of distal phalanx = bony Mallet
C. Fracture of base of DIPJ and volar subluxation of distal phalanx = fracture subluxation Mallet

Management:
In principle:

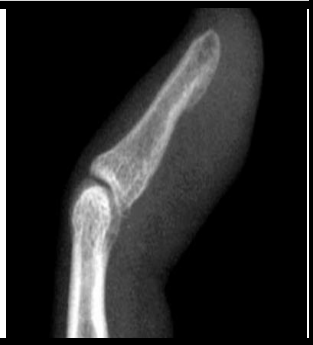
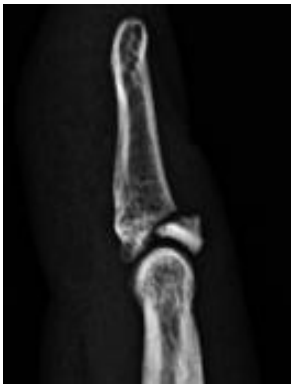
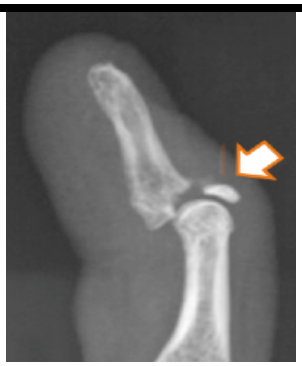
- Analgesia
- Adequate documentation (dexterity, career/hobbies, mechanism of injury, PMHx, DHx, tetanus status, examination and X-ray findings)
- Splinting
- Plastic Surgery follow-up

Useful Documents:

- Mallet Splint: How to apply (page 28)
- Mallet Finger Patient Leaflet (page 29)

*AAD: Analgesia, Assess, Document

Mallet Finger Types

Type of injury	X-ray/Appearance	ED Management	Follow-up
Tendinous Mallet		Mallet splint: ensure appropriate size, for 6-8 weeks day and night, followed by only during night and sports for further 2 weeks. Patient advice leaflet: ensure patient understands how to care for splint and what to expect at end of treatment	Hand Trauma Clinic (HTC) in 2 weeks Ask ED reception to make an appointment
Bony Mallet		Analgesia Adequate documentation <30% of articular surface area: Mallet splint: ensure appropriate size, for 4-6 weeks day and night, followed by only during night and sports for further 2 weeks. >30% of articular surface area: mallet splint, re-xray in splint and refer to plastics for internal fixation Mallet Finger Patient Leaflet Patient advice leaflet: ensure patient understands how to care for splint and what to expect at end of treatment	<30%: Hand Trauma Clinic in 2 weeks Ask ED reception to make an appointment. >30%: Refer to Plastics via bleep during hours and via email OOH plastics.hands.trauma@nhslothian.scot.nhs.uk
Fracture Subluxation		Analgesia Adequate documentation Mallet splint, re-xray in splint and refer to plastics for internal fixation Mallet Finger Patient Leaflet	Refer to Plastics via bleep during hours and via email OOH plastics.hands.trauma@nhslothian.scot.nhs.uk

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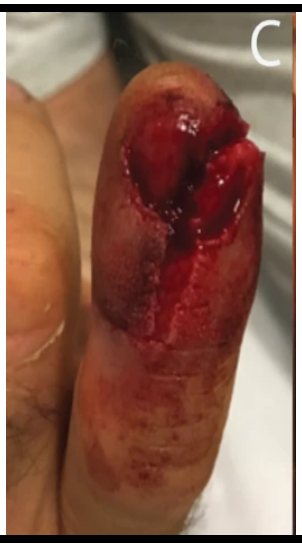
Open fracture/skin loss		Provide analgesia including ring block, elevation and dressing. X-ray Document findings including tissue loss, sensation (before ring block), movements and tetanus status. Provide antibiotics and tetanus booster if not up to date. Refer to Plastics	In-hours: refer via bleep After 21:00: refer via HAN

*AAD: Analgesia, Assess, Document

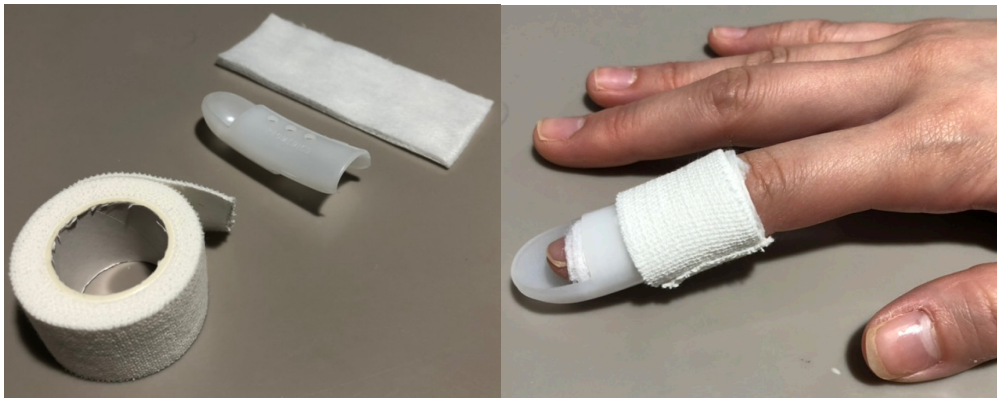
Appendix 5: Application of the Mallet Splint

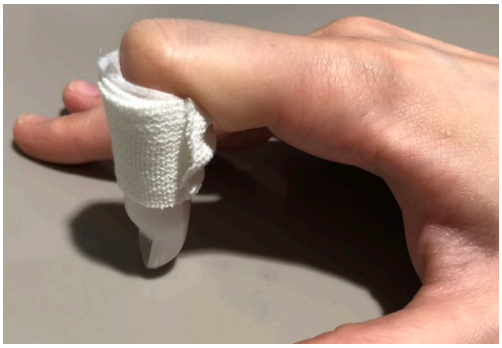
Mallet splint should fit snugly, if in between sizes, hand therapists to fashion custom made splint in clinic. For short term splint use a Zimmer splint **to DIP joint only.** Refer to Hand Clinic early if there is any doubt about adequacy of fitting.

Immobilise DIPJ only, **do not cover the IPJ or MCPJ with splint or tape**. You might need to trim the splint to shorten it if covering the IPJ. Finger joints can become stiff if immobilised so please avoid splinting the IPJ or MCPJ unnecessarily.

Apply a small piece of gauze or stockinette to protect the skin underneath the splint from sweat and friction (see pictures)

Video resource:
https://www.youtube.com/watch?v=bw__wWpHg-E





Appendix 6: Mallet Splint Patient Advice Sheet

What are mallet finger injuries?

Mallet finger injuries are caused by damage to the tendon or the bony attachment of the tendon, which normally allows you to straighten the tip of your finger. As a result of the injury, the fingertip droops.

Treatment:

The aim of treatment is to return your fingertip to as near normal a position as possible. This will take at least six to eight weeks. However, success cannot be guaranteed.

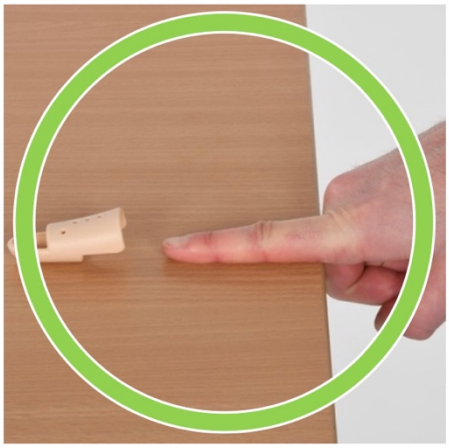
We will apply a splint to your fingertip to hold it slightly bent beyond its usual position (hyperextension). It's essential to look after and change your splints to achieve a good result. If your finger droops at any time, it may be necessary to start the splinting process again from the beginning.

The splint will be held on by tape, which may cause problems with your circulation if applied too tightly. If you find the splint is no longer holding your fingertip up as well as before, please phone us to make an appointment to have it changed as soon as you can. We will show you how to check your fingertip after a change of splint.

Splint should be worn 24 hours a day for 4-8 weeks, and not be removed for showering or washing, if splint gets wet, it should be removed as shown below and the skin and splint should be dried to avoid maceration of dorsal skin.

Getting your finger wet may cause the tape to loosen and may also make your skin sore (as may wearing waterproof glove for long periods). If you get the splint wet, it must be changed.

When removing the splint to dry the skin, the finger joints should be maintained in extension (straight) to avoid drooping of the finger and loss of position (see picture)



You must move your knuckle and other unsplinted joint while wearing the splint, otherwise the finger will become very stiff. This is then hard to treat, so prevention is best.

After 4-8 weeks the splint can be removed during the day but should still be used overnight and during sports for further 2 weeks.

What to expect after treatment:

The finger joint will be stiff on removal of splint at 6-8 weeks, **please do NOT actively force the joint to bend** as this will risk tearing the tendon again.

The area of injury, the joint and around the base of the nail may be tender for many months after the injury and may also be red in colour. A small lump may form at area of injury – this is scarring tissue and is normal.

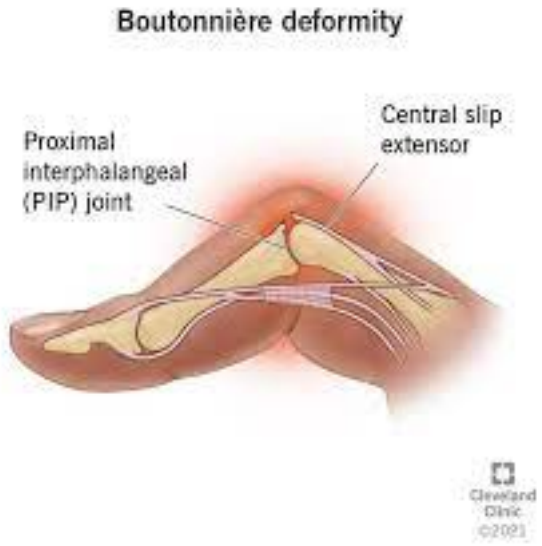
Despite best treatment you may still end up with an extensor lag at the joint, which means that the finger will continue to droop at the end. This is very common after removal of the splint, and does not mean that your treatment has failed. Rather, it is that the tendon was probably stretched at the time of injury, and hasn't stuck back down to exactly where it was torn off from. You are unlikely to have any functional issues with the finger being a little bent at the end, and it is quite safe to leave it alone.

Whom to contact if you have issues:
SJH Emergency Department: 01506 523 011

*AAD: Analgesia, Assess, Document

Appendix 7: Central Slip, Extensor Hood & Sagittal Band

What is the central slip?
There are several tendons in the hand 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. Without the central slip working the finger may develop a deformity called a boutonniere (button-hole), hyper-extension of the DIPJ and flexion of the PIPJ.



What are the signs and symptoms of injury?
Injury to the central slip usually occurs from the finger being traumatically forced into a bend, e.g. being hit by a ball, or if the joint dislocates. If the central slip is damaged the patient will be unable to straighten the PIPJ, will have pain over the dorsum of the PIPJ and associated swelling.

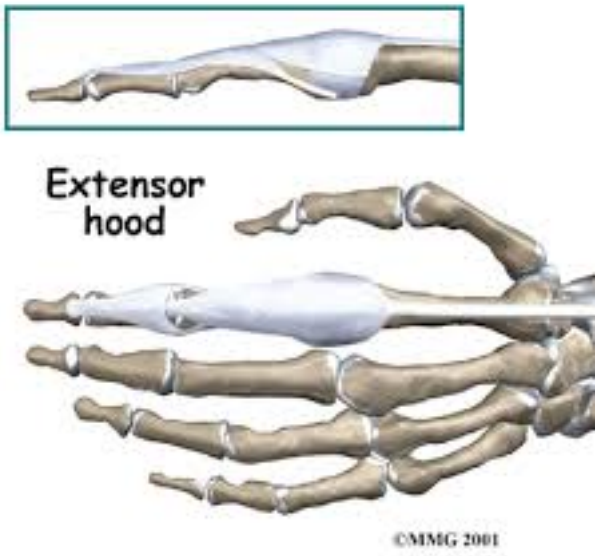
X-ray may reveal an associated fracture, a central slip injury can be due either to a fracture at the base of the middle phalanx (avulsion) or from tears in the fibres of the central slip itself (tendinous).

What treatments are available?
Apply a splint to the finger to keep the PIPJ straight. This allows the tendon / fracture to heal in a good position and refer the patient to the hand trauma clinic.

What happens if a central slip is left untreated?
If a 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.

What is the extensor hood?
The extensor hood is a triangular aponeurosis (flattened tendon) by which the extensor tendons insert onto the phalanges. The extensor hood surrounds the MCP joint laterally, medially, and dorsally, and receives tendinous fibers from the lumbricals and interossei.

Extensor hood rupture is a rare injury associated with boxing and other professional sports, it also occurs secondary to inflammatory arthritis and steroid injection.



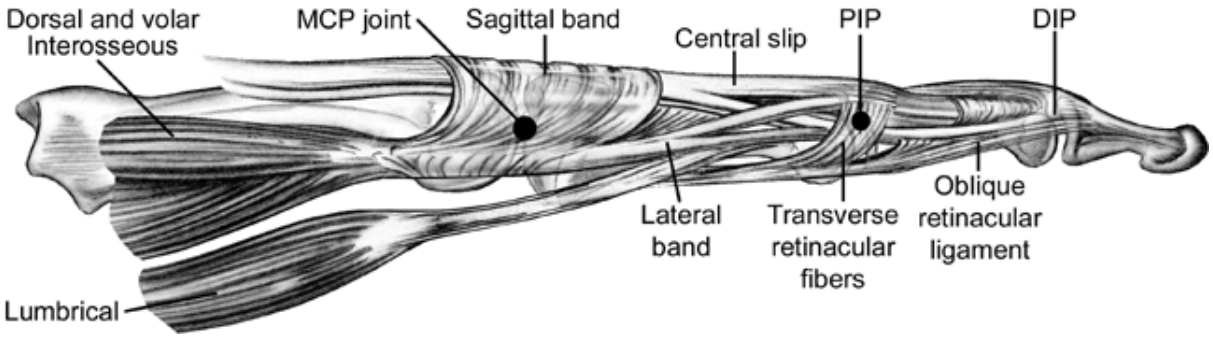
What are the signs and symptoms of injury?
Swelling, tenderness and pain over the dorsum of MCPJ/Proximal phalanx. Limited ROM at MCPJ +/- overlying wound and subluxation of the extensor digitorum communis of the affected finger at MCPJ level

What treatments are available?
Manage wound if present (washout + antibiotics +/- tetanus prophylaxis). Apply volar slab in the Edinburgh position and refer to plastics for consideration of surgical repair.

What happens if an extensor hood is left untreated?
Deformity, pain reduced ROM affecting patient's ability to use hand. This will impact the patient's ability work or take part in sport.

*AAD: Analgesia, Assess, Document

What is the sagittal band?



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

What are the signs and symptoms of injury?
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.

Diagnosis is made clinically with the inability to initiate MCP extension from flexion, but the ability to hold MCP in extension once passively extended.

What treatments are available?
Treatment of acute traumatic injuries is generally splinting where chronic injuries often require surgical reconstruction. ED treatment constitutes of splinting the affected digit in minimal flexion (i.e. keep straight), ideally a hand-physiotherapist should see the patient within a week to apply a specialist splint. If unable to access hand physio please refer to plastics on-call during hours, during OOH refer urgently via e-mail.

What happens if a sagittal band injury is left untreated?
Weakness in extending digit affected, pain and reduced ROM.

Any feedback please email reem.alsoufi@nhslothian.scot.nhs.uk

*AAD: Analgesia, Assess, Document