

# Guideline

## Hand Injuries – Emergency Management in Children

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Applicable to	Medical and Nursing staff involved in the care of children with hand injuries				
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### Purpose

This document provides clinical guidance for all staff involved in the care and management of a child presenting to the Emergency Department at Queensland Children's Hospital (QCH) with a suspected or confirmed hand injury.

### Scope

This guideline applies to all staff involved in the emergency care and management of children with suspected or confirmed hand injuries.

### Related documents

#### Procedures, Guidelines, Protocols

- [CHQ-GDL-00721 Emergency management and discharge follow up of minor fractures](#)
- [CHQ-GDL-01202 Children's Health Queensland Paediatric Antibiocard: Empirical Antibiotic Guidelines](#)
- [CHQ-GDL-01023 Tetanus Prophylaxis in Wound Management](#)
- [CHQ-GDL-60031 Mammalian bites](#)
- [CHQ-PROC-17997 Care and preservation of human body parts procedure](#)

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## Fractures – general principles

### Background

Fractures of the bones of the hand account for 10% of all fractures<sup>30</sup>. In children, the majority of hand fractures are phalangeal fractures.<sup>31</sup>

### Assessment

Key features in history

- Mechanism and time of injury
- Site of pain +/- associated injuries
- Hand dominance

Key features on examination

- *Inspection*: assess for the presence of deformity, wounds, bruising and swelling
- *Bony tenderness*
- *Range of motion*: this can be assessed gently prior to imaging but is unlikely to change initial management. Post imaging (if indicated) it is essential to assess for joint stability and associated soft tissue injuries.
- *Rotational deformity (if suspect a phalangeal or metacarpal fracture)*: ask the patient to flex the fingers as if making a fist. In the normal hand the fingers should sit next to each other, without overlap. Note that rotation of the fifth finger in towards and beneath the fourth finger can be a normal variant.
- *Neurovascular function*
- *Is imaging required to confirm/exclude fracture?*



#### ALERT

Always remember to examine the joints above and below the site of injury

### Management

The management of hand fractures can be broken down into 6 steps:

- (1) Diagnosis – clinical and radiological
- (2) Pain management – both pre and post diagnosis
- (3) Reduction (if indicated)
- (4) Immobilisation
- (5) Consideration of surgical options (as necessary)
- (6) Follow up<sup>32</sup>

## Referrals

- To discuss the management of a hand injury, contact the Hand Team via switch (Orthopaedics or Plastic Surgery depending on the on-call roster).
- Referrals for follow up in clinic should be to either an Orthopaedic Fracture Clinic or Plastic Surgery Clinic depending on the on-call roster.

## Phalangeal Fractures (Table 1)

Site of fracture	Key examination features	Management and follow up	Indications for hand team consult
<b>Distal Phalanx</b>  <i>Mechanism:</i> Often direct impact or crush injury	Assess for nail involvement  Assess tendon function	<b>Reduction</b> as required – best done with digital nerve block +/- sedation depending on the specific patient  <b>Immobilisation</b> of the distal interphalangeal joint  <b>Follow up:</b> Hand clinic 1-2weeks	Open fracture  Neurovascular compromise  Suspected tendon injury ( <i>remember partial tendon injuries can have preserved function</i> )  Intra-articular involvement (involving over 30% of the joint surface)  Significant displacement or angulation which cannot be resolved in ED <sup>33</sup>  Associated nailbed injury
<b>Middle Phalanx</b>  <i>Mechanism:</i> Direct impact, twisting or axial load	Assess tendon function with specific testing of DIP and PIP joints <sup>34</sup> (often associated with tendon injury)  Assess for a rotational deformity	<b>Reduction</b> as required – best done with digital nerve block +/- sedation depending on the specific patient  <b>Immobilisation</b> – buddy strapping should suffice in stable non-displaced fractures. If the fracture has required reduction, then buddy strap and also apply a gutter slab  <b>Follow up:</b> Hand clinic – timeframe will depend on specific fracture and should be included in referral  Fractures which have been successfully reduced should be reviewed within the first week if possible as there is a risk of loss of reduction (contact the on-call hand team to ensure they are aware of patient)	Open fracture  Neurovascular compromise  Suspected associated tendon injury ( <i>remember partial tendon injuries can have preserved function</i> )  Intra-articular involvement  Unstable fracture  Volar plate injuries with >30% of the joint surface involvement <sup>34</sup>  Transverse fractures with >10% angulation or 2mm shortening or <b>rotational</b> deformity (these generally require operative management. <sup>35</sup> )

<p><b>Proximal Phalanx</b></p> <p><i>Mechanism:</i> Direct impact, rotational force or hyperextension injury<sup>36</sup></p>	<p>Assess for malalignment (often unstable)</p> <p>Assess tendon function</p> <p>Assess for a rotational deformity</p>	<p><b>Reduction</b> as required – best done with digital nerve block +/- sedation depending on the specific patient</p> <p><b>Immobilisation</b> – buddy strapping should suffice in stable non-displaced fractures. If the fracture has required reduction, then buddy strap and also apply a gutter slab</p> <p><b>Follow up:</b> Hand clinic – timeframe will depend on specific fracture and should be included in the referral.</p> <p>Fractures which have been successfully reduced should be reviewed within the first week if possible as there is a risk of loss of reduction (contact the on-call hand team to ensure they are aware of patient).</p>	<p>Open fracture</p> <p>Neurovascular compromise</p> <p>Suspected associated tendon injury (<i>remember partial tendon injuries can have preserved function</i>)</p> <p>Intra-articular involvement</p> <p>Unstable fracture</p> <p>Transverse fractures with &gt;10% angulation or 2mm shortening or <b>rotational deformity</b> (these generally require operative management). <b><u>No rotational deformity is acceptable.</u></b><sup>35</sup></p>
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## Metacarpal Fractures (2<sup>nd</sup>-5<sup>th</sup>) (Table 2)

Site of fracture	Key examination features	Management and follow up	Indications for hand team consult
<p>Subdivided based on location (head, neck, shaft and base)</p> <p><i>Mechanism:</i> Direct force with enclosed fist (punch injury)</p>	<p>Assess tendon function</p> <p>Assess for rotational deformity</p>	<p><b>Reduction</b> as required – best done with a metacarpal block or haematoma block +/- sedation depending on the specific patient</p> <p><b>Immobilisation</b> – buddy strapping and a gutter slab. Simply buddy strapping which is being trialled in adults is not currently accepted practice in paediatrics.</p> <p><b>Follow up:</b> Hand clinic – timeframe will depend on specific fracture</p>	<p>Open fracture</p> <p>Neurovascular compromise</p> <p>Suspected tendon injury (<i>remember partial tendon injuries can have preserved function</i>)</p> <p>Intra-articular involvement</p> <p>Significant displacement, angulation or <b>rotational deformity</b> which cannot be resolved in ED<sup>33</sup></p>

## Acceptable angulation and shortening for metacarpal fractures<sup>37</sup>(Table 3)

	Acceptable Shaft Angulation (degrees)	Acceptable Shaft Shortening (mm)	Acceptable Neck Angulation (degrees)
Index & middle finger	10-20	2-5	10-15
Ring finger	30	2-5	30-40
Little finger	40	2-5	50-60

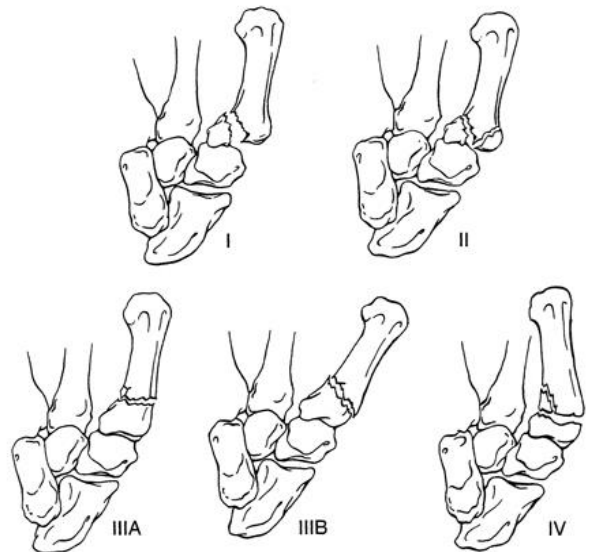
## Thumb Metacarpal Fractures

The thumb has significant anatomical differences to the other fingers and is functionally of greater importance so management of first metacarpal fractures varies from the other fingers.

There are 5 types of thumb metacarpal fracture, these are summarised below<sup>38</sup>.

### Image 1: Types of thumb metacarpal fractures

- |      |   |
|------|---|
| I    | Bennet's fracture- dislocation (intraarticular) |
| II   | Rolando's fracture (intraarticular)             |
| IIIa | Transverse (extraarticular)                     |
| IIIb | Oblique (extraarticular)                        |
| IV   | Proximal epiphysis involvement                  |



**Table 4: Thumb Metacarpal Fractures**

	Key examination features	Management and follow up	Indications for hand team consult
<i>Mechanism: Axial load to partially flexed thumb<sup>39</sup></i>	<p>Confirm site of maximal tenderness (often confused with distal radius or scaphoid injury)</p> <p>Assess tendon and ligament function (Ulnar collateral ligament injuries are commonly missed<sup>27</sup>)</p>	<p><b>Immobilisation</b> – extraarticular fractures are generally managed non-operatively in a thumb-spica cast.</p> <p><b>Follow up:</b> Hand clinic – timeframe will depend on specific fracture</p>	<p>Open fracture</p> <p>Neurovascular compromise</p> <p>Suspected tendon or ligamentous injury (<i>remember partial tendon injuries can have preserved function</i>)</p> <p>Intra-articular involvement</p> <p>&gt;20degrees of angulation or &gt;2mm shortening. <b>No malrotation is acceptable</b></p> <p>Salter Harris injuries (particularly SH type III)</p>

## Carpal Fractures

Paediatric carpal bone fractures are rare and can be difficult to diagnose. They often present in a non-specific manner and x-rays can be unreliable. The scaphoid is the most commonly fractured paediatric carpal bone<sup>20</sup>.

## Ossification

The order of ossification of the carpal bones is fairly uniform but the age at which this happens is variable.

**Table 5: Approximation of ages associated with carpal ossification<sup>40</sup>:**

Capitate	1-3months
Hamate	2-4months
Triquetrum	2-3years
Lunate	2-4years
Scaphoid	4-6years
Trapezium	4-6years
Trapezoid	4-6years
Pisiform	8-12years

**Table 6: Carpal Fractures**

Scaphoid fracture	Key examination features	Management and follow up
<p><i>Mechanism:</i></p> <p><i>Scaphoid fractures are often the result of a fall onto an outstretched hand</i></p>	<p>Assess for significant swelling</p> <p>Assess for bony tenderness</p>	<p><b>Immobilisation</b> – Confirmed scaphoid fractures should be managed in a thumb-spica cast.</p> <p>If despite a normal x-ray there is strong clinical suspicion of scaphoid fracture, immobilise in a thumb-spica cast and refer to Hand clinic. An MRI may be of value in patients with persistent clinical symptoms<sup>41</sup></p> <p><b>Follow up:</b> Hand clinic – 1-2weeks</p>

## Tendon Injuries

### Background

Tendon injuries account for 29% of hand injuries<sup>26</sup>. Most are open injuries, but closed injuries such as avulsions can occur and are commonly missed.

### Anatomy

The extensor and flexor systems are distinct, with different anatomical and functional roles. As a result, extensor and flexor injuries are managed differently and have different prognoses.

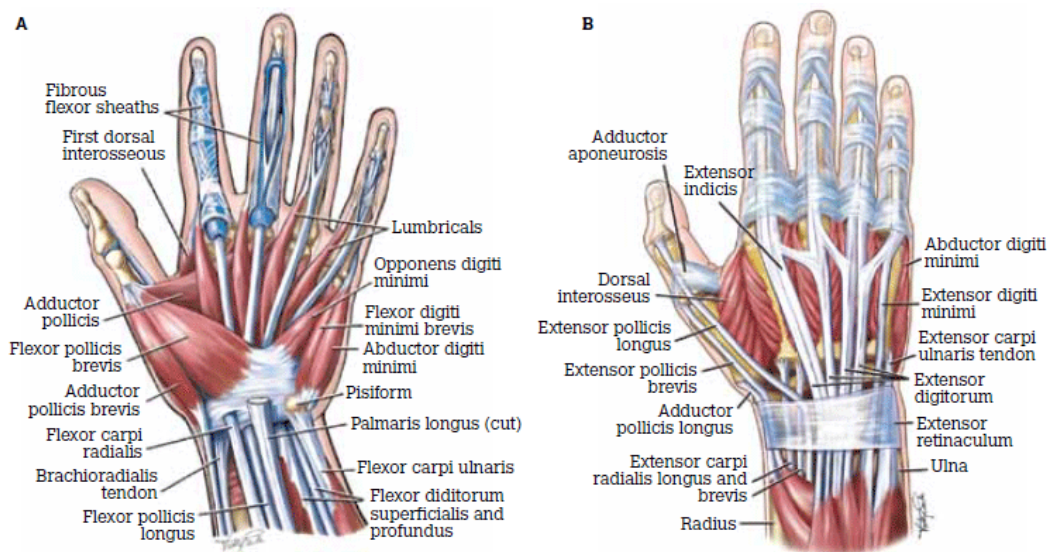
#### Flexor

- Forms a unit within the tendon sheath and associated pulleys
- Flexor digitorum profundus (FDP) and flexor digitorum superficialis (FDS) stay close to the bones of their associated digit assisted by the flexor sheath and pulley ligaments (4 or 5 annular ligaments and 3 cruciate ligaments)

#### Extensor

- There are 8 tendons in the extensor surface of the hand with multiple cross-connections at the level of the MCPJ
  - Four common extensor tendons (extensor digitorum)
  - Extensor indices for the 2<sup>nd</sup> digit
  - Extensor digiti minimi for the 5<sup>th</sup> digit
  - Extensor pollicis longus + brevis for the 1<sup>st</sup> digit



**Image 2: Tendon Injuries**

Taken from Brukner P, Khan K. Clinical Sports Medicine. 3<sup>rd</sup> edition. Mc-Graw Hill 2006

**Tendon injuries - general principles****Open injuries****Assessment**

- Mechanism of injury will give a clue to which tendon may be injured
- Small lacerations can cause severe tendon damage, so every laceration in the hand needs meticulous examination and visualization of the tendon. This may require extending the laceration (in a Z-shape) if adequate visualization is not possible. Some wounds cannot be explored completely in the ED and therefore may need further exploration in theatre.
- Examination of the function of the tendons alone does not suffice. Even partial rupture of 90% of a tendon can appear functionally normal initially, only to rupture completely when loaded a few days later<sup>26</sup>

**Management**

## Complete rupture

- Refer to hand team for surgical repair

## Partial rupture

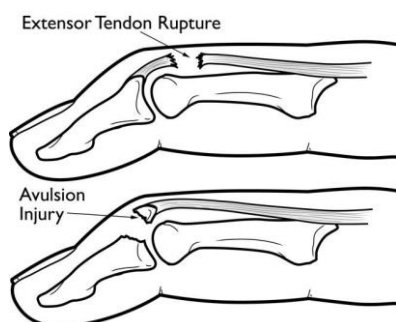
- Discuss all with on call hand team.
- Rupture <60% of the tendon's diameter can be treated conservatively with studies showing that in such cases, conservatively managed partial tendon ruptures had higher tear-resistance than surgically managed ones<sup>26</sup>

## Closed injuries

- Rare in children
- Tendon under suspicion of injury should be isolated and tested
- If assessment of tendon function is normal but history suggests potential tendon injury, such as athletes or forceful blunt trauma against resistance, obtain formal ultrasound.
- Imaging:
  - Ultrasound is a valuable tool allowing dynamic imaging and detection of inflammation<sup>26</sup>
  - Plain x-ray is utilised for the diagnosis of associated bony avulsions
  - MRI allows a more specific differentiation of the inflammatory process but is rarely needed<sup>26</sup>

## Specific Examples

### Mallet Finger

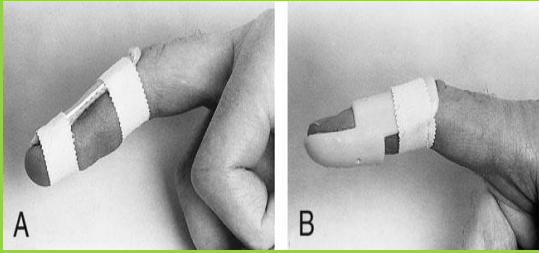


- Flexion deformity of the DIPJ due to disruption of the extensor mechanism
- Two main types: tendinous mallet (extensor tendon pathology) and bony mallet (avulsion fracture of the distal phalanx)<sup>19</sup>
- Due to forced flexion of the DIPJ during active extension<sup>19,26</sup>. Common mechanism is striking the fingertip when attempting to catch a ball, thus the eponymous name 'baseball finger'.

**Image 3: Mallet Finger** Taken from Orthoinfo by American Academy of Orthopaedic Surgeons

Assessment	Management
<p>Examination<sup>19</sup></p> <ul style="list-style-type: none"> <li>• Tender, swollen finger</li> <li>• Inability to actively extend the DIPJ</li> </ul> <p>Investigation</p> <ul style="list-style-type: none"> <li>• Plain x-ray (AP, lateral, oblique)<sup>19</sup>. Lateral view is usually the best to visualize a bony mallet</li> <li>• There may be associated volar subluxation of the distal phalanx in serious injuries</li> </ul>	<p>Management<sup>19</sup></p> <ul style="list-style-type: none"> <li>• Tendinous mallet           <ul style="list-style-type: none"> <li>○ Splinting</li> </ul> </li> <li>• Bony mallet           <ul style="list-style-type: none"> <li>○ 1/3 or more articular surface involvement or volar subluxation of the distal phalanx               <ul style="list-style-type: none"> <li>▪ Consult hand team</li> </ul> </li> <li>○ Less than 1/3 of articular surface involved               <ul style="list-style-type: none"> <li>▪ Closed reduction with dorsal pressure</li> <li>▪ Dorsal splint</li> <li>▪ Repeat x-ray to ensure adequate reduction with dorsal splint applied</li> </ul> </li> </ul> </li> </ul>

### Splinting<sup>19</sup>



- DIPJ in neutral extension, PIPJ not immobilized
- DIPJ should never be allowed to drop into flexion. Assistance should ideally be used when changing splints
- Continuous splinting for 6-8 weeks, with fortnightly follow-up
- Once healed, further 2-3 weeks of night splinting

**Image 4: Splinting** Taken from Orthoinfo by American Academy of Orthopaedic Surgeons

### Jersey Finger

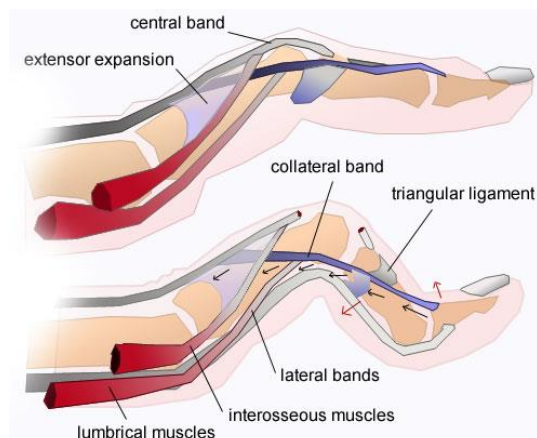


- Disruption of FDP at the DIPJ
- Due to forced extension of the DIPJ during active flexion<sup>19</sup>. This can happen when the football player grabs the *jersey* of another player during a tackle.

**Image 5: Jersey Finger<sup>27</sup>**

Assessment	Management
<p>Examination</p> <ul style="list-style-type: none"> <li>• Tender swollen finger along the volar surface of the DIPJ</li> <li>• Isolate FDP by extending the finger. Inability to actively flex the DIPJ is pathognomonic for an FDP tendon rupture.</li> <li>• PIPJ and MCPJ flexion is preserved due to FDS and the lumbricals, respectively.</li> </ul> <p>Investigation</p> <ul style="list-style-type: none"> <li>• Plain x-ray (AP, lateral, oblique) to assess for associated bony avulsion</li> </ul>	<p>Management<sup>19</sup></p> <ul style="list-style-type: none"> <li>• Finger splinted immediately in slight flexion of the DIPJ and PIPJ.</li> <li>• Consult hand team for all jersey finger injuries. There is no role for conservative management. Delays in repair can lead to retraction, fibrosis and resultant functional impairment</li> </ul> <p>Prognostic Factors<sup>26</sup></p> <ul style="list-style-type: none"> <li>• Time interval between trauma and surgery</li> <li>• Extent of retraction of tendon</li> <li>• Remaining blood supply</li> <li>• Presence and size of an osseous fragment</li> </ul>

## Boutonniere deformity



- Disruption of the central tendon of the extensor tendons at the level of the PIPJ with subsequent slip of both lateral tendons leading to hyperflexion at the PIPJ and hyperextension at the DIPJ
- Due to either direct severing of the central slip by a laceration or direct trauma to the flexed PIPJ on the dorsal aspect of the joint, e.g. being hit by a ball or bat.

Image 6: Boutonniere deformity<sup>29</sup>

Assessment	Management
<p><b>Examination</b></p> <ul style="list-style-type: none"> <li>• Obvious deformity may not always be present at time of injury</li> <li>• Elson's test is useful in such injuries where deformity is not yet apparent (generally associated with concurrent extensor injury) <ul style="list-style-type: none"> <li>○ Place PIPJ in 90degrees of flexion and ask patient to extend PIPJ against resistance</li> <li>○ Inability to actively extend the PIPJ indicates an abnormal Elson's test<sup>28</sup></li> </ul> </li> </ul> <p><b>Investigation</b></p> <ul style="list-style-type: none"> <li>• Plain x-ray (AP, lateral, oblique) to assess for additional bony injury</li> </ul>	<p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Non-operative for closed injuries less than 4weeks old with splinting in full extension for 6weeks</li> <li>• Operative if open wound or associated displaced avulsion fracture<sup>29</sup></li> </ul>

## Fingertip Injuries

### Background

Fingertip injuries refer to injuries distal to the distal interphalangeal joint and insertion of the long flexor and extensor tendons of the digit<sup>9</sup>. They are the most common injury of the hand accounting for 2/3 of all hand injuries, with the most frequent mechanism being jamming/crushing the finger between the door and its frame<sup>9,25</sup>. The non-dominant hand is most frequently involved, and most injuries involve a single digit<sup>25</sup>.

## Assessment

### Key features in history

- Injury: time of injury, mechanism of injury, associated injuries, bleeding, treatment so far
- Patient: age, relevant medical history, hand dominance (if established), tetanus status, hobbies

### Key features on examination

- Pulp, nail and bone all need to be examined in order to accurately classify the type of injury<sup>15</sup>

## General Management

### (1) Analgesia<sup>9,25</sup>

- A stepwise approach to analgesia is appropriate in most cases
- Digital block is necessary if wound exploration or procedures are required to the injured digit
- Procedural sedation may be required in the younger or non-compliant child

### (2) Haemostasis

- Pressure and elevation may be adequate for minor injuries<sup>9</sup>
- Consider a digital tourniquet using a T-RING if available or rubber glove/Penrose drain tied and clamped around the digit base
  - Make sure not to leave tourniquet on!
- Alternatively dip the tip of injured finger in 1% lignocaine + adrenaline (10-20 mLs) for 5 minutes<sup>13</sup>. This provides haemostasis and an additional local anaesthetic effect.

### (3) Wound irrigation

- Use 0.9% normal saline, noting the literature suggests using 100 mL per 1 cm of wound

### (4) Dressing

- Non-adherent dressings (e.g. Adaptic or Mepitel) are recommended for all fingertip wounds<sup>9,12</sup>.
- It is often useful to have the parents take a picture before the dressing is applied for future comparison.

### (5) Splinting

- A mouldable aluminium splint or a plastic cap splint is recommended for additional protection<sup>9</sup>
- A splint should be applied for all fractures.

### (6) Tetanus immunisation

- Remember [tetanus prophylaxis](#) as per usual guidelines

### (7) Antibiotics

- Prophylactic antibiotics are **not** routinely recommended for clean/minimally contaminated fingertip injuries, even with associated fracture.<sup>5,10,19</sup>
- Antibiotic prophylaxis is indicated if the wound is heavily contaminated or secondary to an animal bite.
- For heavily contaminated wounds use:
  - Cephalexin PO 25mg/kg (max 500mg) QID for 3/7

- OR Flucloxacillin PO 25mg/kg (max 500mg) QID for 3/7
- If the wound occurred whilst in water, refer to the CHQ Paediatric Antibocard.
- If the wound is secondary to an animal bite refer to Mammalian bite guideline and the CHQ Paediatric Antibocard

## Specific Injuries

### Pulp Defects

#### Haemostasis

- Often the main problem with these injuries is obtaining adequate haemostasis
- Initial attempts such as tourniquet, pressure and elevation, or dipping the tip in 1% lignocaine + adrenaline solution can be effective but temporary. There is a high chance of re-bleeding and patients often end up having bulky dressings to maintain haemostasis
- There is anecdotal evidence in the off-label use of 2-octyl-cyanoacrylate (e.g. Dermabond) to achieve haemostasis without short or long-term complications.

#### **Superficial, clean, small defects (<1cm<sup>2</sup> or proportionally smaller in children) with minimal or no bone exposure**

- Conservative management with serial dressings<sup>9,18,24</sup>
- In a descriptive prospective study, 200 patients with pulp loss were managed with weekly OpSite film dressings which resulted in good recovery with normal anatomy and near normal two-point discrimination at an average of 20 days<sup>17</sup>.
- Other dressing regimes using non-adherent dressings and shorter dressing change intervals (e.g. 2-3 days) are also likely to be successful.

#### **Defects >1cm<sup>2</sup> or complex lacerations<sup>9,18</sup>**

- Consult on call hand team
- Generally, require surgical intervention (e.g. local flap coverage)

## Fingertip Amputations

### Assessment

#### Ischaemic time

- It is well recognised that the greater the ischaemic time, the lower the chance of successful re-plantation. The upper limits are thought to be approximately 8 hours for warm ischaemia and 30 hours for cold ischaemia (4°C)<sup>9</sup>

#### Anatomical zone affected



- It is important from a surgical perspective to determine the level of the injury. One of the methods commonly used is the Ishikawa Zones<sup>20</sup>.
  - Zone I: between fingertip and middle of nail
  - Zone II: between middle of nail and nail-fold
  - Zone III: between nail-fold and mid-point between the nail-fold and DIPJ
  - Zone IV: between the mid-point between the nail-fold and DIPJ and the DIPJ

## Specifics of management

- (1) **Management of the amputated part** (See the [CHQ Care and preservation of human body parts](#) procedure)
  - Irrigate the amputated part with sodium chloride 0.9%
  - Moisten a sterile combine with sodium chloride 0.9% and wrap around the amputated part. Place the wrapped part in a water-tight plastic bag
  - Create an ice water slurry by mixing ice cubes and water. Place the plastic bag in the slurry, ensuring that the amputated part does not come into direct contact with the slurry<sup>21</sup>
  - Place a patient ID label on the container, confirming the patient ID with a second staff member
  - Complete the Patient tissue/amputated appendages tracking log [See Appendix 1](#)
  - The amputated part should remain in close proximity to the patient at all times
  - When appropriate, obtain a plain x-ray of the amputated part, as well as the injured finger<sup>25</sup>



### ALERT

Amputated parts should not be placed in direct contact with water or ice due to the risk of tissue freezing and maceration



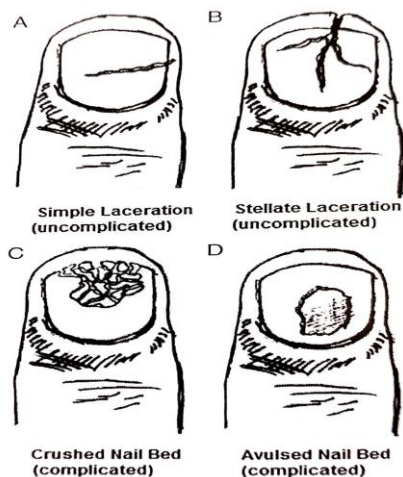
### ALERT

Amputated parts should remain in close proximity to the patient at all times

- (2) Consult hand team in ALL cases
  - Children have a much higher chance of successful re-plantation (~98%) compared to adults<sup>20,24</sup>. All fingertip amputations in children should therefore be considered for re-plantation<sup>9,25</sup> and discussed urgently with the hand team.
  - Distal amputations that preserve at least ½ of the nail bed can be managed either by performing a composite graft (reattaching the amputated tip as a graft) or by leaving the area to heal by secondary intention. Composite grafts have the highest chance of success if done within 5 hours of injury so hand team consults should occur early<sup>24</sup>.
  - Oblique amputations (at angles <45 degrees to the long axis) typically need surgery involving replantation or flap coverage<sup>23</sup>.
  - The thumb provides 40% of hand function<sup>9</sup> and thus thumb amputations should be urgently assessed and definitively managed

## Nail Bed Injuries

### Background



Nail bed injuries occur in 15-24% of fingertip injuries. The most common mechanism is a finger jammed in a door (67%) and this most commonly occurs in the home (59%)<sup>1</sup>.

Primary repair is very much desired and can prevent long-term complications in 90%<sup>1</sup>. Improper initial management may lead to significant long-term consequences such as chronic pain, altered sensation, finger deformity, and reduced grip function<sup>9</sup>.

**Image 7: Pattern of nail bed lacerations**

### Assessment

#### Examination

- Assess integrity of nail plate and for presence of a subungual haematoma
- Assess nail bed
  - If nail plate disrupted, remove nail plate
  - Assess pattern and degree of nail bed injury, particularly involvement of the proximal germinal matrix
- Neurovascular status
- Associated injuries

#### Investigation

- Plain X-ray (AP, lateral, oblique)<sup>19</sup> in all injuries to exclude fracture

### Management

#### Indications for referral to hand team

- Complicated nail laceration<sup>1,9</sup>
- Any nail bed involvement<sup>1,9</sup>
- Unstable underlying distal phalanx fracture<sup>10</sup>
- Underlying tendon injury

#### Subungual haematoma with intact nail plate



These can be managed with trephination using a heated paperclip or needle (former recommended but needle often more available), regardless of their size and even in the presence of a stable undisplaced distal phalanx or tuft fracture<sup>10,11,19, 24</sup>.

Uncomplicated nail bed lacerations (linear or stellate laceration).

**At QCH, all patients should be discussed with the hand team who will determine the most appropriate treatment on a case-by-case basis.**

Those presenting <24hrs, with or without a stable undisplaced distal phalanx fractures (usually tuft), may be repaired in the ED with no additional complications compared to repair by the hand team.

### General principles

- Dressings
  - Use a non-adherent dressing (e.g. Adaptic or Mepitel) with dressing change at 3-5 days<sup>9,12</sup>
- Tetanus immunisation
  - Remember [tetanus prophylaxis](#) as per usual guidelines
- Antibiotics
  - Prophylactic antibiotics are **not** routinely recommended for clean/minimally contaminated nailbed injuries, even with associated fracture<sup>5,10,19</sup>
  - Antibiotic prophylaxis is indicated if the wound is heavily contaminated or secondary to an animal bite.
  - For heavily contaminated wounds use:
    - Cephalexin PO 25mg/kg (max 500mg) QID for 3/7
    - OR Flucloxacillin PO 25mg/kg (max 500mg) QID for 3/7
  - If the wound occurred whilst in water, refer to the [CHQ Paediatric Antibiocard](#).
  - If the wound is secondary to an animal bite refer to [Mammalian bites guideline](#) and the [CHQ Paediatric Antibiocard](#)

### Follow up

- Fingernails grow at an average rate of 1 mm per week<sup>2</sup>. Full nail growth can take months.
- Simple nail bed lacerations managed in the ED can be followed up with the patient's GP

## Consultation

Key stakeholders who were involved in the development of this guideline:

- Emergency Department Registrar and SMOs
- Plastic Surgery Fellow and SMO
- Orthopaedic SMO
- Infectious diseases SMO
- AMS Pharmacist

## Definition of terms

Term	Definition	Source
Dermabond™	Skin adhesive device in the form of 2-octylcyanoacrylate, a trademark product of Ethicon.	<a href="http://www.ethicon.com/healthcare-professionals">http://www.ethicon.com/healthcare-professionals</a>
Liquiband™	Skin adhesive device in the form of 2-butylcyanoacrylate, a trademark product of Liquiband®	<a href="http://www.liquiband.com/">http://www.liquiband.com/</a>

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## Guideline revision and approval history

Version No.	Modified by	Amendments authorised by	Approved by
1.0 27/11/2020	Senior Medical Officer, Emergency Department	Divisional Director, Critical Care	Executive Director Clinical Services QCH

<b>Keywords</b>	Hand, fracture, tendon, nail, boutonniere, jersey, mallet, carpal, metacarpal, scaphoid, digit, amputation,00764
<b>Accreditation references</b>	NSQHS Standards (1-8): 1 Clinical Governance, 3 Preventing and Controlling healthcare Associated Infections, 5 Communicating for Safety ISO 9001:2015 Quality Management Systems: (4-10)