Clinical Guideline

MANAGEMENT OF ACUTE PAEDIATRIC HAND INJURIES

SETTING  Children’s Emergency Department (CED), Bristol Royal Hospital for Children
FOR STAFF  Emergency Nurse Practitioners (ENPs), CT/ST3+ CED doctors, CED consultants
PATIENTS  All children with hand injuries

GUIDANCE

- For each injury please identify the features listed in bullet points in each column and manage as described below.
- Red column: All same day referrals should be made by phone to the Plastic Surgery SpR on call (contact via switch).
- Amber column: There are 3 CED plastics trauma clinic appointment slots available daily, Mon – Fri. These can be booked via the CED reception staff. Only ENPs, middle grades (ST3+) and Consultants are able to directly book patients into clinic. Junior rotating staff (paediatric/GPST/F2) should first discuss the case with an ENP, middle grade (ST3+) or consultant.
- If all CED allocated slots are booked up within given time frame for referral, please discuss with a member of the ENP staff who can add patients directly to the regional plastics booking form. If no ENP staff are available or there are no spaces available on the regional booking form, please contact on call Plastics SpR to discuss.
- Occasionally the plastics SpR may need to contact a member of the CED reception staff to book one of their patients into a CED clinic slot. In this circumstance the CED reception staff will identify a suitable appointment time and book the patient in on Medway on their behalf.
- There may sometimes be heightened anxiety as a result of a child’s career or sporting aspirations. While this should not alter management it is reasonable to lower the referral threshold to provide additional reassurance in these cases.

Contents (Fast Links):
- Closed Injuries
- Open Injuries
- Notes
## MANAGEMENT OF CLOSED INJURIES

<table>
<thead>
<tr>
<th>INJURY</th>
<th>Manage solely by ED/ENP</th>
<th>Book into next plastics acute paeds trauma clinic &lt;3/7</th>
<th>Refer same day to on-call Plastics SpR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed bony mallet</td>
<td><strong>ALL</strong> to be referred</td>
<td>• Displaced &lt;1mm fracture gap&lt;br&gt;• &lt;50% joint involved&lt;br&gt;• No subluxation</td>
<td>• Grossly displaced &gt;1mm fracture gap&lt;br&gt;• &gt;50% joint involved&lt;br&gt;• Any volar subluxation of distal phalanx</td>
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<td>Manage in stack / mallet splint&lt;br&gt;Repeat lateral XR in splint if displacement or joint involvement.&lt;br&gt;Refer as may need early moulded TP splint and physio</td>
<td>Manage in stack / mallet splint and repeat lateral XR&lt;br&gt;May need earlier review for operative management.</td>
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<tr>
<td>Closed soft tissue mallet</td>
<td><strong>ALL</strong> to be referred</td>
<td>• No subluxation&lt;br&gt;• No fracture</td>
<td>• Persistently subluxed or dislocated despite manipulation and stack / mallet splint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manage in stack / mallet splint</td>
<td>Manage in stack / mallet splint and repeat lateral XR.&lt;br&gt;May need earlier review for operative management. (Very rare)</td>
</tr>
</tbody>
</table>
| Volar plate injury | • No subluxation/stable VP  
| No fracture  
| Stable collaterals and central slip |  
Manage in buddy taping for two weeks. 4 weeks off sport. |  
| • Avulsion fracture  
| Suspected collateral instability |  
Manage with extension/dorsal block splint (Zimmer/Thermoplastic)/ buddy taping. Please strap to finger on ipsilateral (same) side as injured ligament. |  
| • Avulsion fracture with >1mm fracture gap or >25% joint surface  
| Grossly unstable collaterals / volar plate  
| Subluxed / persistently dislocated PIPJ | Manage in volar slab. May need early review for operative management. |
| 5th Metacarpal neck fracture  
N.B. Requires AP/Oblique/Lateral views | • Minimally displaced  
| No rotation/ scissoring |  
ALL to be referred | Manage in Volar slab in POSI |  
| • Grossly displaced/ angulated (>40 deg)  
| Unstable despite attempted reduction  
| Any rotation, scissoring | Manage in Volar slab in POSI  
Many need surgical management |
| 5th Metacarpal shaft fracture | • Minimally displaced  
| Impacted  
| No rotation, scissoring |  
ALL to be referred | Manage in Volar slab in POSI |  
| • Grossly displaced/ angulated (>40 deg)  
| Unstable despite attempted reduction  
| Rotation at rest or scissoring on flexion | Manage in Volar slab in POSI  
Early referral as may need surgery |
| Metacarpal fracture (2\textsuperscript{nd}, 3\textsuperscript{rd}, 4\textsuperscript{th}) | • Minimally displaced  
• No rotation, scissoring | • Displaced/ angulated  
• Unstable despite attempted reduction  
• Rotation at rest or scissoring on flexion |
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<tr>
<td><strong>ALL</strong> to be referred</td>
<td>Manage in buddy tape fractured digit to adjacent, with volar slab POSI.</td>
<td>Consider MUA under Entonox or haematoma block then manage in buddy tape fractured ray digit to adjacent, with volar slab POSI. May need MUA/ fixation</td>
</tr>
</tbody>
</table>

| 1\textsuperscript{st} Metacarpal fracture | • Minimally displaced  
• Extra-articular  
• May be SH II type  
• No UCL/RCL instability | • Grossly displaced/angulated (>40)  
• Unstable despite attempted reduction  
• Intra-articular (Bennetts or Rolando type) |
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<tbody>
<tr>
<td><strong>ALL</strong> to be referred</td>
<td>Consider MUA under Entonox or haematoma block. Manage in plaster thumb spica to include the wrist*. IPJ can be free.</td>
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</tr>
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</table>
| Salter Harris II phalanx Fracture | • Buckle fracture or minimally displaced  
• <15 degrees angulation on x-ray  
• No deformity clinically (i.e. no radial or ulnar deviation)  
Buddy tape to adjacent digit (opposite to fracture site if possible) 2/52  
Off contact sports 4/52 | • Displaced fracture  
• Clinical deformity  
Consider MUA under Entonox or haematoma block. Re-x-ray AP and lateral  
If acceptable, buddy tape and volar slab | • Grossly displaced that is irreducible despite attempted MUA and re-x-ray  
Manage with Buddy tape and volar slab  
May need MUA +/- fixation in theatre |
| --- | --- | --- | --- |
| Closed Tuft fracture | • No associated nail bed injury/ dorsal graze of any kind  
• Mild pulp graze/ bruising allowed  
Do not trephine associated subungual haematoma  
Mallet splint for comfort for 2/52  
Advice to elevate, analgesia and off sport for 2-4 weeks. Discharge | | |
<table>
<thead>
<tr>
<th>Condition</th>
<th>Minimal displacement/ deformity</th>
<th>Grossly displaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phalanx fracture (not tuft fractures or SH II fracture)</td>
<td>Manage with buddy tape and volar slab</td>
<td>Manage with Buddy tape and volar slab. May need MUA +/- fixation in theatre</td>
</tr>
<tr>
<td>Central slip injury</td>
<td>No fracture</td>
<td>Associated fracture</td>
</tr>
<tr>
<td></td>
<td>In joint / not subluxed</td>
<td>Subluxed</td>
</tr>
<tr>
<td></td>
<td>Volar slab POSI</td>
<td>Dislocated/irreducible</td>
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<tr>
<td>UCL 1st MCPJ</td>
<td>Limited ROM</td>
<td>Limited ROM</td>
</tr>
<tr>
<td></td>
<td>Possible ligament instability (grade 2 or higher)</td>
<td>Gross swelling</td>
</tr>
<tr>
<td></td>
<td>Fracture base proximal phalanx</td>
<td>Fracture base proximal phalanx</td>
</tr>
<tr>
<td></td>
<td>Manage in POP thumb spica*</td>
<td>Manage in POP thumb spica Refer as may need surgery on specific lists</td>
</tr>
</tbody>
</table>

- Phalanx fracture (not tuft fractures or SH II fracture):
  - ALL to be referred
  - Minimal displacement/deformity
  - Grossly displaced
  - Manage with buddy tape and volar slab
  - May need MUA +/- fixation in theatre

- Central slip injury:
  - ALL to be referred
  - No fracture
  - In joint / not subluxed
  - Volar slab POSI

- UCL 1st MCPJ:
  - Full ROM
  - No ligament instability
  - No fracture
  - Manage in POP thumb spica
  - Limited ROM
  - Possible ligament instability (grade 2 or higher)
  - Fracture base proximal phalanx
  - Ligament instability (grade 3)
  - Refer as may need surgery on specific lists

- Central slip injury:
  - ALL to be referred
  - No fracture
  - In joint / not subluxed
  - Volar slab POSI

- UCL 1st MCPJ:
  - Full ROM
  - No ligament instability
  - No fracture
  - Manage in POP thumb spica
  - Limited ROM
  - Possible ligament instability (grade 2 or higher)
  - Fracture base proximal phalanx
  - Ligament instability (grade 3)
  - Refer as may need surgery on specific lists

Reassurance, off sport two weeks and thumb strap Futura for support if needed – GP follow up at 2 weeks to ensure no need for physio,
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<tr>
<th>Condition</th>
<th>Reduced +/- volar plate avulsion fragment</th>
<th>Unable to reduce</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPJ dislocation</td>
<td>Manage in extension block splint/ Volar slab in POSI</td>
<td>Manage in extension block splint/ Volar slab in POSI</td>
</tr>
<tr>
<td>MCPJ dislocation</td>
<td>Reduced/Enlocated on post-reduction XR.</td>
<td>Unable to reduce</td>
</tr>
<tr>
<td>Subungual haematoma</td>
<td>Buddy tape to adjacent digit and volar slab in POSI</td>
<td>Buddy tape to adjacent digit and volar slab in POSI</td>
</tr>
</tbody>
</table>

- **ALL to be referred**
- **No tuft fracture**
- **Non-displaced nail bed**
- **Trephine if severe pain**
- **Reassure and discharge**
- **Associated open injury**
## MANAGEMENT OF OPEN INJURIES

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| Nail bed injury | • Nail plate intact  
• Subungual haematoma <50% width of nail plate  
- No distal phalanx fracture  
Finger dressing or mallet splint for comfort. Advice to elevate, analgesia and off sport for 2 weeks. Discharge | • Displaced/missing nail plate with obvious nail bed laceration  
• Subungual haematoma >50% width nail plate  
• Distal phalanx fracture  
Finger dressing or mallet splint for comfort. Oral antibiotics (co-amoxiclav or clarithromycin if penicillin allergic). | • Questionable viability  
• Grossly contaminated  
Finger dressing or mallet splint for comfort. Oral antibiotics (co-amoxiclav or clarithromycin if penicillin allergic). |
| Flexor tendon injury hand | ALL to be referred  
Washout (ideally ring block), non adherent dressing  
Im mobilise POP Volar slab in POSI  
Tetanus if needed/ IV ABx | • Closed FDP avulsion  
Im mobilise POP Volar slab in POSI | • Please call with all suspected open flexor injuries  
Washout (ideally ring block), non adherent dressing  
Im mobilise POP, Volar slab in POSI  
Tetanus if needed/ IV ABx |
<table>
<thead>
<tr>
<th>Extensor tendon injury hand</th>
<th>ALL to be referred</th>
<th>• Please call with all open extensor injuries Washout (ideally ring block), non adherent dressing Immobilise POP Volar slab in POSI Tetanus if needed/ IV ABx</th>
</tr>
</thead>
</table>

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<thead>
<tr>
<th>Open fracture (excluding distal phalanx tuft fractures)</th>
<th>ALL to be referred</th>
<th>• Open injury (excluding distal phalanx tuft fractures) Consider MUA. Washout out, tack or tape skin closed where possible. Non adherent dressings. IV ABx Immobilise in Volar slab in POSI.</th>
</tr>
</thead>
</table>

| Amputations/tissue loss | • Small area (<1/3 pulp) • skin only/ fat at base • no exposed bone Finger dressing. Advice to elevate. Discharge | • ALL others Tip to be wrapped in damp (saline soaked) gauze, in plastic bag, put into plastic bag that contains mixture of ice and water and put into the fridge. |
GLOSSARY OF TERMS:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CED</td>
<td>Children’s Emergency Department</td>
</tr>
<tr>
<td>XR</td>
<td>X-ray</td>
</tr>
<tr>
<td>PIPJ</td>
<td>Proximal Interphalangeal Joint</td>
</tr>
<tr>
<td>MCPJ</td>
<td>Metacarpophalangeal Joint</td>
</tr>
<tr>
<td>POSI</td>
<td>Position Of Safe Immobilisation</td>
</tr>
<tr>
<td>MUA</td>
<td>Manipulation Under Anaesthesia</td>
</tr>
<tr>
<td>UCL</td>
<td>Ulnar Collateral Ligament</td>
</tr>
<tr>
<td>RCL</td>
<td>Radial Collateral Ligament</td>
</tr>
<tr>
<td>IPJ</td>
<td>Interphalangeal Joint</td>
</tr>
<tr>
<td>ROM</td>
<td>Range Of Movement</td>
</tr>
<tr>
<td>FDP</td>
<td>Flexor Digitorum Profundus</td>
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</tbody>
</table>

NOTES

- * If unable to perform thumb spica can consider futura splint with thumb extension but must come back next day for thumb spica under plaster techs
- Please check tetanus status for all wounds
- This guideline is designed to improve everyone’s experience of managing hand injuries; Patients, CED, Plastics and will hopefully form the basis for all our referring units (including Southmead, all MIU’s) to use. Please feedback any comments to Emily West or Will Christian.

RELATED DOCUMENTS

- None

AUTHORISING BODY

- Children’s ED Governance

SAFETY

- If in doubt at any point, please ask a senior colleague or phone the on call Plastics Registrar

QUERIES

- Please contact the on-call plastic surgery SpR via switch for all clinical queries