Lothian NHS Board

Lothian NHS Board
Mainpoint
102 Westport
Edinburgh
EH3 9DN
Main Switchboard: 0131 242 1000

www.nhslothian.scot

Date 01/062026
Your Ref
Our Ref 11378

Enquiries to Richard Mutch
Extension 35687
Direct Line 0131 465 5687
loth.freedomofinformation@nhs.scot
richard.mutch@nhs.scot

Dear

FREEDOM OF INFORMATION – PAEDIATRIC UPPER LIMB FRACTURES

I write in response to your request for information in relation to paediatric upper limb fractures.

Question:
Section 1: Department details
1. Type of department
    - Paediatric ED
        - Mixed ED with paediatric area
        - General ED seeing children
        - Minor injury unit or urgent treatment centre
        - Other

Answer:
Paediatric ED — Paediatric ED – RHCYP
Mixed ED with paediatric area (integrated with the rest of the ED) – St Johns

Question:
2. Does your department have a written local guideline for paediatric upper limb fractures?
    - Yes
    - No
    - Unsure

Answer:
Yes

Question:
If Yes - would you be able to share it please with us?
1. Which guidance most strongly informs local practice for your paediatric patients?
    - NICE (National institute of Clinical Excellence)
    - BOAST (British Orthopaedic Association)
    - BSCOS (British society of Children's orthopaedics) template or local adaptation
    - Local orthopaedic guideline

- Local Emergency Department guideline
- Other

Answer:
Enclosed
Local Emergency Department guideline - Yes

Question:
4. Is a virtual fracture clinic available for paediatric fractures?
    - Yes
    - No
    - Only for selected fracture types - could you specified which ones please?

Answer:
There is virtual trauma meeting with outcomes and follow up decided by the orthopaedic team.

Question:
5. Are written discharge leaflets routinely given for paediatric fractures?
    - Always
    - Usually
    - Sometimes
    - Never

For each of the following fractures for each of your departments could you answer the questions for your paediatric patients?

Answer:
Yes, however we moving toward our discharge information being available on QR code.

Question:
Clavicular fracture (uncomplicated closed midshaft clavicle fracture)
1. Usual immobilisation
    - No immobilisation
    - Broad arm sling
    - Collar and cuff
    - Figure-of-8 brace
    - Other

Answer:
Broad arm sling - Yes

Question:
2. Usual follow-up

- No routine follow-up
- Virtual fracture clinic
- Face-to-face fracture clinic
- Orthopaedic clinic only if adolescent or displaced
- Other

Answer:
No routine follow-up - No routine f/u. PIFU

Question:
3. Is orthopaedic discussion routinely required from ED?
    - No
    - Only if significantly displaced, skin compromise, open fracture, or neurovascular concern
    - Yes for most clavicle fractures
    - Other

Answer:
Is orthopaedic discussion routinely required from ED? - No

Question:
Closed Supracondylar humerus fracture
1. Gartland I or radiologically occult but clinically suspicious supracondylar injury: usual immobilisation
    - Collar and cuff
    - Posterior backslab
    - Above-elbow cast
    - Other

Answer:
Gartland I or radiologically occult but clinically suspicious supracondylar injury: usual immobilisation - Collar and cuff

Question:
2. Gartland I: usual follow-up
    - No routine follow-up
    - Virtual fracture clinic
    - Face-to-face fracture clinic
    - Other

Answer:
No routine follow-up - PIFU 2 weeks - RHCYP
No routine follow-up – St Johns

Question:

3. Gartland II or III: usual first ED step
    - Backslab and refer orthopaedics
    - Immediate orthopaedic review in ED
    - Admit under orthopaedics
    - Transfer to another centre
    - Other

Answer:

Gartland II or III: usual first ED step - Above elbow cast and refer to fracture clinic and virtual trauma meeting.

Question:

4. For Gartland II or III injuries, is reduction or manipulation attempted in ED before theatre or admission?
    - Never
    - Occasionally in selected cases
    - Usually
    - Unsure

Answer:

For Gartland II or III injuries, is reduction or manipulation attempted in ED before theatre or admission? - No

Question:

5. Is neurovascular status formally documented before and after immobilisation or reduction?
    - Always
    - Usually
    - Sometimes
    - Never

Answer:

Is neurovascular status formally documented before and after immobilisation or reduction? Usually - TRAK short code.

Question:

Lateral closed condyle fracture

1. Undisplaced lateral condyle fracture: usual ED immobilisation
    - Backslab
    - Above-elbow cast
    - Sling only
    - Other

Answer:
Undisplaced lateral condyle fracture: usual ED immobilisation Above elbow soft cast

Question:
2. Undisplaced lateral condyle fracture: usual follow-up
    - Face-to-face fracture clinic within 1 week
    - Virtual fracture clinic
    - No routine follow-up
    - Other

Answer:
Face-to-face fracture clinic within 1 week yes – RHCYP.
Virtual Fracture clinic - they will normally organise Fracture clinic follow-up in one week - St Johns.

Question:
3. Displaced or uncertain lateral condyle fracture: usual ED pathway
    - Backslab and orthopaedic discussion
    - Immediate orthopaedic review
    - Admit or transfer
    - Other

Answer:
Backslab and orthopaedic discussion yes

Question:
Radial neck or radial head fracture
1. Undisplaced or minimally angulated fracture: usual immobilisation
    - Collar and cuff
    - Broad arm sling
    - Backslab
    - Other

Answer:
Collar and cuff - Yes

Question:
2. Undisplaced or minimally angulated fracture: usual follow-up
    - No routine follow-up
    - Virtual fracture clinic
    - Face-to-face fracture clinic
    - Other

Answer:

No routine follow-up PIFU 2-3 weeks – RHCYP
No routine follow-up – St Johns

Question:

3. For more displaced or intra-articular injuries, what is the usual ED pathway?
    - Orthopaedic discussion then discharge in immobilisation
    - Admit under orthopaedics
    - Transfer to another centre
    - Other

Answer:

Orthopaedic discussion then discharge in immobilisation - Yes

Question:

Buckle fractures

1. Usual immobilisation
    - No immobilisation
    - Soft bandage
    - Removable wrist splint
    - Soft cast or backslab
    - Circumferential cast
    - Other

Answer:

Soft bandage - Yes

Question:

2. Is the child usually discharged from ED with no planned follow-up?
    - Yes
    - No
    - Depends on clinician
    - Unsure

Answer:

Is the child usually discharged from ED with no planned follow-up? YES, PIFU 2-3 weeks – RHCYP.
Is the child usually discharged from ED with no planned follow-up? YES – St Johns

Question:

3. If follow-up is arranged, what is usual?
    - No follow-up
    - Virtual fracture clinic

- Face-to-face fracture clinic
- GP follow-up
- Other

Answer:
If follow-up is arranged, what is usual? Not usually arranged - RHCYP
If follow-up is arranged, what is usual? No follow-up - St Johns

Question:
4. Are parents or carers advised to remove immobilisation at home?
    - Yes
    - No
    - Depends on device used

Answer:
Are parents or carers advised to remove immobilisation at home? - Yes

Question:
5. Is a written buckle fracture advice leaflet routinely given?
    - Always
    - Usually
    - Sometimes
    - Never

Answer:
Is a written buckle fracture advice leaflet routinely given? - Usually.

Question:
Distal radius greenstick or undisplaced metaphyseal fracture
1. Usual immobilisation
    - Removable wrist splint
    - Below-elbow backslab or soft cast
    - Below-elbow full cast
    - Above-elbow cast
    - Other

Answer:
Removable wrist splint - Yes depending on degree of pain

Question:
2. Usual follow-up
    - No routine follow-up
    - Virtual fracture clinic

- Face-to-face fracture clinic
- Other

Answer:
No routine follow-up PIFU 2-3 weeks - RHCYP
No routine follow-up - St Johns

Question:
3. Is home removal of immobilisation routinely advised?
   - Yes
   - No
   - Depends on fracture pattern

Answer:
Is home removal of immobilisation routinely advised? - Yes

Question:
Distal radius closed displaced fracture or distal radial physeal injury
1. If reduction is required, is this usually attempted in ED?
   - Yes, usually
   - Yes, in selected cases only
   - No, usually managed by orthopaedics after admission
   - Unsure

Answer:
If reduction is required, is this usually attempted in ED? - If reduction is required this would be offered in the ED – RHCYP
No, usually managed by orthopaedics after transfer/recall to tertiary Paediatric ED – St Johns

Question:
2. Post-reduction immobilisation
   - Below-elbow backslab
   - Below-elbow full cast Yes
   - Above-elbow backslab
   - Above-elbow full cast
   - Other

Answer:
Below-elbow full cast Yes - RHCYP
Below-elbow back slab - St Johns

Question:
3. Usual follow-up

- Virtual fracture clinic
- Face-to-face fracture clinic within 1 week
- Admit under orthopaedics
- Other

Answer:

Usual follow-up - Depends on extent of injury sometimes PIFU, sometimes fracture clinic - RHCYP

Other referred to ortho paediatrics and either transferred for manipulation or followed up in clinic – St Johns

I hope the information provided helps with your request.

If you are unhappy with our response to your request, \you do have the right to request us to review it. Your request should be made within 40 working days of receipt of this letter, and we will reply within 20 working days of receipt. If our decision is unchanged following a review and you remain dissatisfied with this, you then have the right to make a formal complaint to the Scottish Information Commissioner within 6 months of receipt of our review response. You can do this by using the Scottish Information Commissioner's Office online appeals service at www.itspublicknowledge.info/Appeal. If you remain dissatisfied with the Commissioner's response you then have the option to appeal to the Court of Session on a point of law.

If you require a review of our decision to be carried out, please write to the FOI Reviewer at the email address at the head of this letter. The review will be undertaken by a Reviewer who was not involved in the original decision-making process.

FOI responses (subject to redaction of personal information) may appear on NHS Lothian's Freedom of Information website at: https://org.nhslothian.scot/FOI/Pages/default.aspx

Yours sincerely

ALISON MACDONALD
Executive Director, Nursing
Cc: Chief Executive
Enc.

Finger and hand injuries

Anatomy of the hand

The hand is a complex collection of bones, nerves, tendons and muscles. Injuries to the hand need to be asessed carefully with knowledge of the normal anatomy. It avoids confusion if you name (rather than number) the digits and metacarpals.

Radiographic

T thumb

I index finger

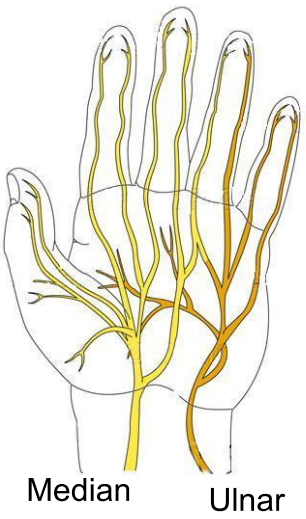
M middle finger

R ring finger

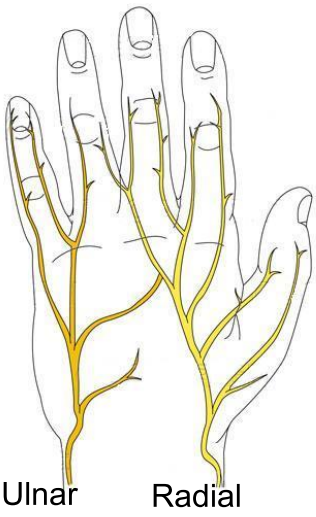
L little finger

Nerves

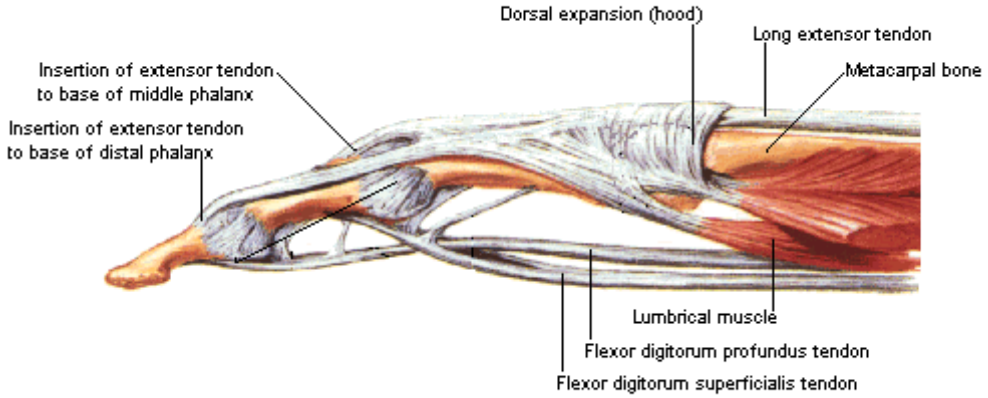
palm



dorsum



Tendons



Note that there are two flexor tendons.

> **Flexor digitorum profundus** (fdp) flexes all the fingers at the distal interphalangeal joint (dipj), but can't flex an individual finger. Test it is intact by holding the proximal interphalangeal joint (pipj) in extension and ask the patient to flex the dipj.
>
> **Flexor digitorum superficialis** (fds) flexes the finger at the pipj. Test it is intact by holding the dipjs of the other fingers in extension (to prevent fdp working) and ask the patient to flex the finger.

Hand Wounds

Wounds in the hand need careful assessment to ensure there is no damage to underlying muscles, tendons and nerves.

Crush injuries should be X-rayed to check for an underlying fracture. If present, the wound will need careful cleaning and antibiotic prophylaxis. In a co-operative child this may be possible under ring block in the Emergency Department, or may to be done by the plastics team under GA. Discuss with senior staff.

Injuries to the nail bed need careful repair and splinting of the nail fold. Again, in an older, co-operative child this may be possible under ring block in the Emergency Department, or may to be done by the plastics team under GA. Discuss with senior staff.

Injuries caused by glass must be x-rayed to exclude a foreign body within the wound. Some foreign bodies can be safely removed under local anaesthesia in the Emergency Department. Discuss with senior staff.

Nerve injury will result in alteration (though not necessarily absence) in sensation distal to the wound. Refer patients with altered sensation to the plastic surgery team for exploration in theatre.

Complete tendon division will result in loss of function, but partial division will not. Wounds that are likely to involve tendons (e.g. deep wounds to the dorsum of the hand) need to be carefully explored. In a child, this is usually best done in theatre by the plastics team.

Wounds that extend into the small muscles of the hand are highly likely to have involved other structures and should be referred to plastics for exploration in theatre.

Most other hand wounds can be managed by careful cleaning and either steristrips or non-adherent dressing. Stitches are not often required. Seek advice from senior staff if you are uncertain how to manage a wound.

Metacarpal fractures

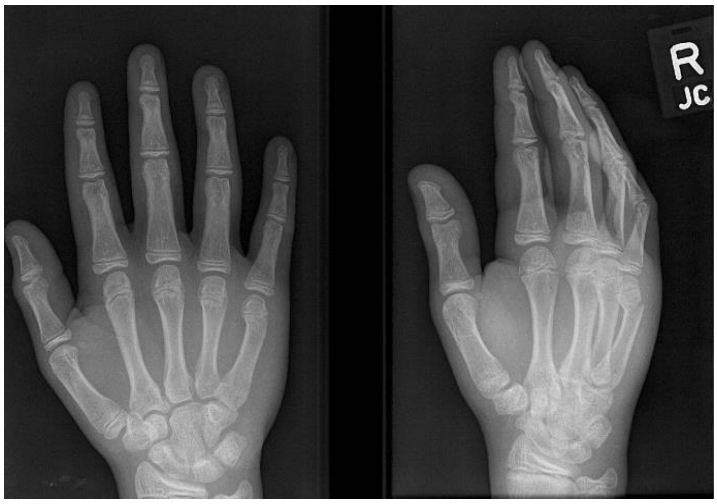
These fractures arise from a fall onto a clenched fist, or from a punching injury. Beware of overlying wounds caused by teeth – these need to be treated as bite wounds and carefully explored and cleaned, often in theatre.

Assess carefully for rotation – if present the fracture will need to be reduced. Discuss all rotated fractures with the senior staff or the orthopaedic registrar on call.

Fractures of the thumb metacarpal are managed conservatively unless there is significant angulation or displacement. Place in a softcast Brunner cast or wrist splint with thumb extension which family remove after 2 weeks. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement 5 days after cast removal. Discuss displaced / angulated fractures with ED senior staff or the orthopaedic registrar.

Fractures of the finger metacarpals are usually managed conservatively even if there is fairly significant angulation as the functional recovery is usually excellent. Rotated or displaced fractures should be discussed with ED senior staff or the orthopaedic registrar on-call. Otherwise, provide analgesia, tubigrip with buddy strapping (or a volar slab if very sore) for 2 weeks. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement after a further week. Avoid contact sports for 3 weeks.

Fracture of little metacarpal neck with a little volar angulation



Finger injuries

See above for management of wounds.

Undisplaced fractures of the proximal or middle phalanx can be treated with analgesia, and buddy strapping for 7 days then mobilisation. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement after a further week. Avoid contact sports for 3 weeks. Give patients a filled in “Minor finger fractures leaflet.”.

Rotational deformity, angulation or displacement may need to be corrected. This may be possible under ring block in the Emergency Department - discuss with senior staff. Arrange face-face ED clinic follow-up in 1 week if deformity present (wether MUA done or not).

Volar plate injuries – hyperextension of the pipj injures the ligaments on the volar aspect of the joint – the volar plate. There may be an associated avulsion fracture from the base of the middle phalanx. There is tenderness, swelling and reduced ROM at the joint. If there is no fracture present, buddy strap for a few days and advise the parents to encourage the child to mobilise after this. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement after 2 weeks.

Dislocated finger joints – are relatively rare in children, confirm the diagnosis on X-ray prior to treatment. The joint should be reduced under a ring block by applying longitudinal traction. A post reduction X-ray should be taken to confirm the reduction, then manage as for undisplaced proximal / middle phalangeal fracture above.

Fractures of the distal phalanx often result from crush injuries. Closed fractures without mallet deformity that do not involve the interphalangeal joint can be protected with a mallet splint or padded finger dressing for a week. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement after a further week. Avoid contact sports for 3 weeks. Give patients a filled in “Minor finger fractures leaflet.”.

Compound fractures need careful cleaning and antibiotic prophylaxis, repair and splintage of associated nail bed injuries may be necessary. In a co-operative child this may be possible under ring block in the Emergency Department, or may need to be done by the plastics team under GA.

Subungual haematomas – the nail should be trephined to give pain relief by allowing drainage. Perform an X-ray to look for an underlying fracture – if present provide antibiotic prophylaxis as the fracture is now compound.

Mallet finger – forced hyperflexion of the dipj causes avulsion of the extensor tendon. There is loss of active extension at the dipj, but passive extension is normal. X-ray to see if a bony fragment is visible. Very large fragments can be fixed back into place – discuss with plastics registrar. Treat all other mallet fingers in a mallet splint for 6 weeks (continuous use), the 2 weeks just at night. Warn patient that the joint will be stiff for some time but this should improve with time. Provide details for adhoc clinic review if they have concerns at any stage.

Thumb injuries

See above for management of wounds

Remember that the thumb only has two phalanges. See above for the management of thumb metacarpal injuries.

Undisplaced Salter I injuries (the equivalent of a 'sprain' in adults) of the proximal phalanx usually result from a hyperextension injury (common at Hillend!). There is swelling and tenderness around the metacarpophalyngeal joint with a restricted ROM. The X-ray is unremarkable. Treat with analgesia, place in a removable Brunner cast or wrist splint with thumb extension for 2 weeks prior to removal at home. and advise gentle mobilisation. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement after a further week.

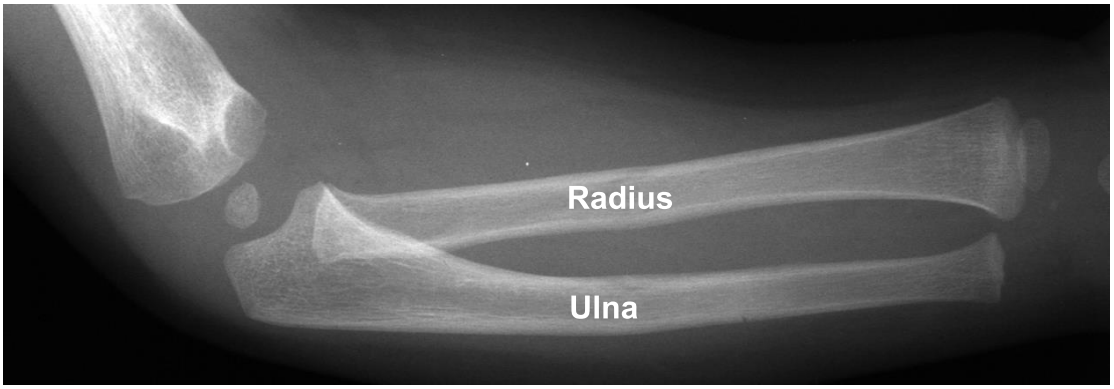
Proximal phalanx fractures without clinical deformity can be managed in teh same way as a Salter I injury (see above). If there is a clinical (or significant radiographic) deformity the fracture will need to be reduced prior to application of the cast. This is often possible under ring block – discuss with senior ED staff. Arrange face-face ED clinic follow-up in 1 week

Distal phalanx fractures (see finger injuries)

Forearm and wrist injuries

Anatomy of the wrist and forearm

H	Hamate
C	Capitate
Td	Trapezoid
Tm	Trapezium
P	Pisiform
T	Triquetral
L	Lunate
S	Scaphoid



Clinical features of wrist / forearm injuries

Usually caused by a fall onto outstretched hand (FOOSH). Can present with very obvious deformity or with subtle swelling and very localised tenderness – which can be difficult to elicit.

Need to exclude:	Radial artery occlusion		
	Nerve injury	Ulnar	small muscles of hand
		Median	thenar (LOAF) muscles
		Radial	wrist & finger extensors

NB: X-Rays should include full forearm to detect radial head fractures, which can give wrist pain

Carpal bone injuries

Tenderness in the anatomical snuffbox in a child over 8 yrs of age should be investigated with scaphoid X-rays not a forearm view – although scaphoid fractures are rare under 12 yrs of age.

Definite scaphoid fractures should be placed in a below elbow softcast and brought back to fracture clinic in 6 weeks.

Clinical scaphoid fractures – tenderness in ASB / scaphoid tubercle with reduced wrist movements but no X-ray abnormality should be treated in a wrist splint without thumb extension. Arrange a telephone review appointment in 2 weeks. This allows the diagnosis of small, undisplaced fractures that may be radiographically silent on the initial films. Give patient a removable cast/splint leaflet

Fractures of the other carpal bones are relatively rare in children. Small avulsion fractures can usually be treated in a below elbow soft cast and discharged to trauma meeting.

Distal Radial Fractures

These are very common injuries in children. Careful examination will show maximum tenderness at the distal radius (as against the anatomical snuff box) and will differentiate from scaphoid injury.

Undisplaced Salter I injuries of the distal radius are common. They have the clinical signs of a fracture but the X-ray is normal. If the child is 6yrs of age or older they should be treated with a wrist splint (no thumb extension) for up to 3 weeks and given the “removable case/splint” leaflet which explains how to reduce time in splint and arrange follow up if still sore. If the child is aged 5yrs or under the wrist splints are often too big and a below elbow soft cast can be applied which is peeled off by parents in 2 weeks. Provide the parents with the appropriate advice leaflet which details how to arrange a clinic review if the child is not recovering as expected.

Distal radius fractures with no angulation. If the child is 6y or over they can be treated in a wrist splint without thumb extension or removable soft cast If the fracture is very painful, such that you would consider a full below elbow cast, use a below elbow soft cast which is still peelable by parents after 3-4 weeks. If the child is aged 5yrs or under an above elbow peelable cast is applied which can be removed by parents after 2-3 weeks. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement a week after removal.

Distal radius fractures with minimal (<15°) angulation can usually be treated conservatively as remodelling is likely to produce a satisfactory outcome. Treat in a softcast (above elbow if sore on pronation / supination or age< 2yrs). Discharge with advice to remove the cast after 4 weeks. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

Displaced / angulated (>15º) distal radial fractures are likely to need an MUA. Fast the child, provide analgesia and discuss with ED senior / refer to the orthopaedic registrar.

Displaced Salter II fracture of the distal radius

Mid forearm fractures

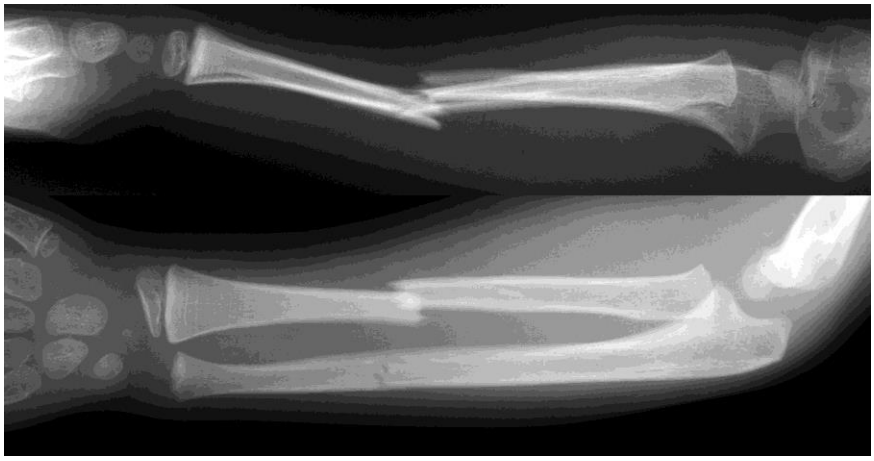
These are much more likely to be angulated / displaced and often have a rotational deformity. The potential for remodelling is less than in the distal forearm. If in doubt – discuss with senior ED staff or the orthopaedic registrar.

Undisplaced mid forearm fractures – treat in a full above elbow soft cast for 4-6 weeks with advice to remove the cast at home and mobilise gently. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

Beware the isolated ulna fracture – check that the radial head is not dislocated and the isolated radial fracture – check that the distal radio-ulnar joint is intact (see **Monteggia and Galeazzi** fractures).

Displaced / angulated mid forearm fractures – Confirm that radial pulse and distal neurological function is intact, fast the patient, provide analgesia and discuss with senior / refer to orthopaedic registrar.

Angulated forearm fractures



Plastic bowing – Usually occurs in the younger child. No true fracture is seen, but the forearm bones are bent. This heals well and remodels unless there is significant clinical deformity (in which case refer to orthopaedic registrar). treat in a full above elbow soft cast for 4 weeks with advice to remove the cast at home and mobilise gently. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

Fracture dislocations in the forearm

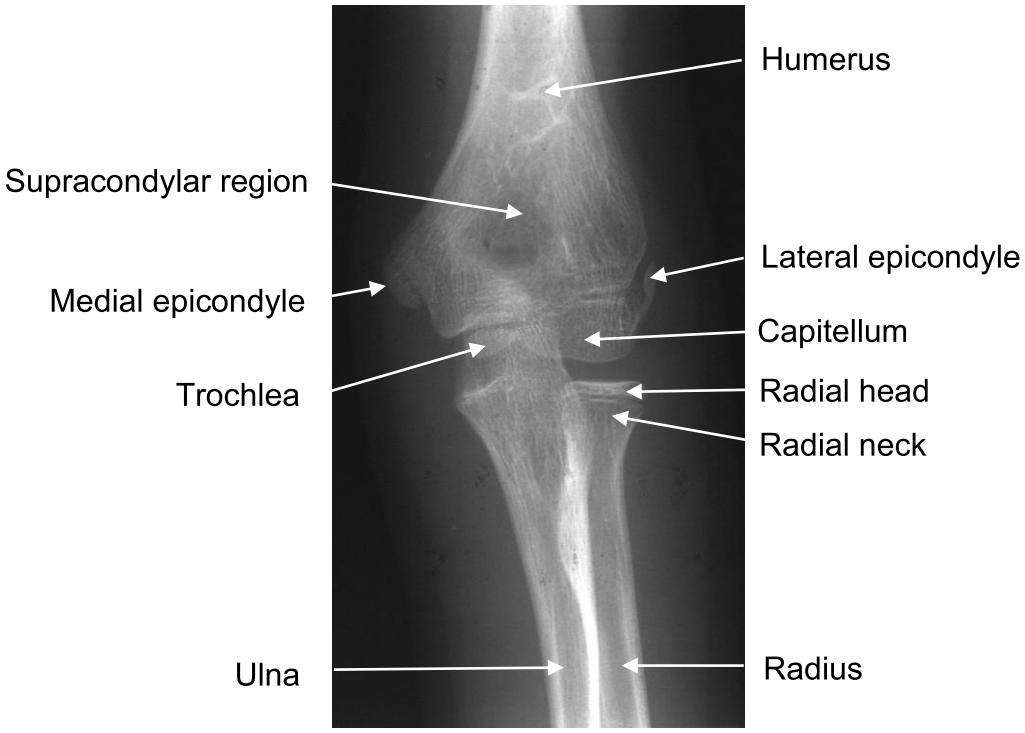
Monteggia fracture-dislocation - this is the combination of an ulnar fracture and dislocation of the radial head. The radio-capitellar line will be disrupted. Provide analgesia and a backslab, fast the patient and refer to the orthopaedic reg for reduction.

Monteggia fracture dislocation

Galeazzi fracture-dislocation – the combination of a radial fracture and disruption of the distal radioulnar joint. On a true lateral of the wrist the distal ulna sits above the distal radius. Provide analgesia and a backslab, fast the patient and refer to the orthopaedic reg for reduction.

Elbow injuries

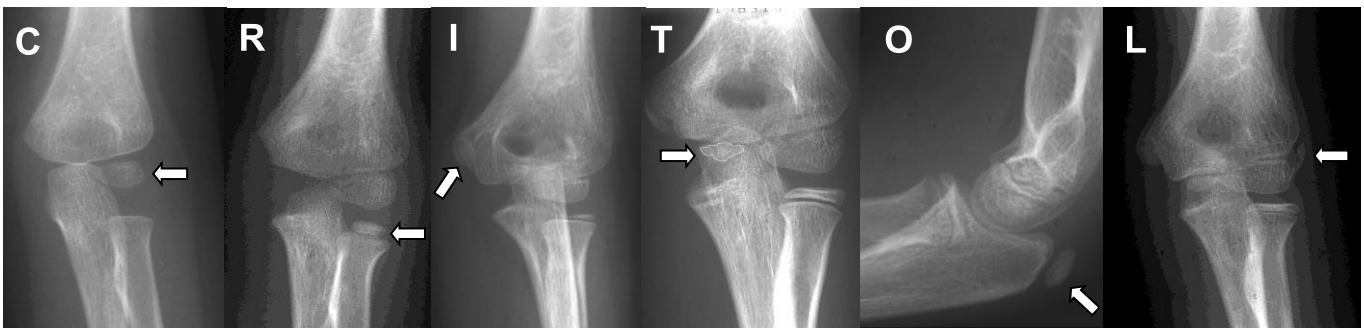
Anatomy of the elbow



X-rays of the elbow can be very difficult to interpret in children as a large amount of the paediatric elbow is made of cartilage, which is radiolucent. It is important to understand the normal ossification sequence within the elbow, as this will help you identify injuries that displace ossification centres.

Normal sequence of ossification in the child's elbow.

Capitellum	aprox. age 2
Radial head	aprox. age 4
Internal epicondyle	aprox. age 6
Trochlea	aprox. age 8
Olecranon	aprox. age 10
Lateral epicondyle	aprox. age 12



On a lateral elbow X-rays look for

Fat pad displacement

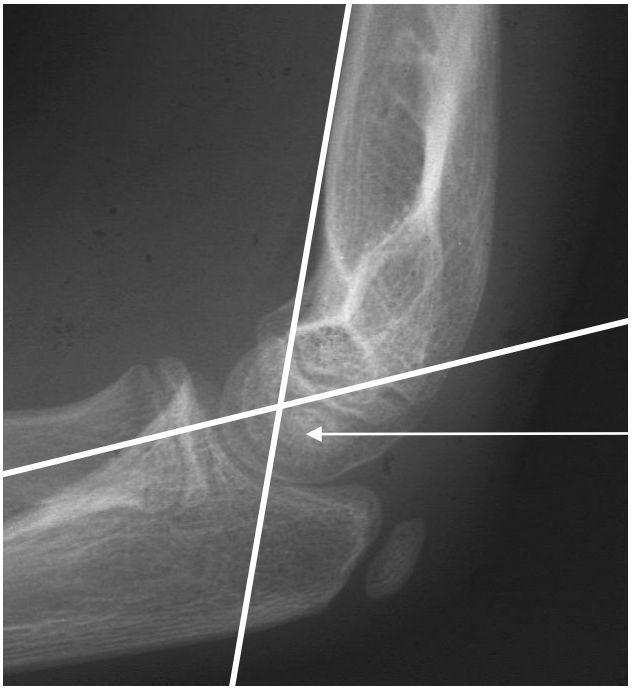
anterior pad is visible in normal X-rays but is pushed away from the bone by effusion or haemarthrosis. A posterior fat pad is abnormal if visible

An abnormal anterior humeral line

about 1/3 of the capitellum should be in front of it. If abnormal it suggests a supracondylar fracture with angulation.

An abnormal radio-capitellar line

should pass from centre of radial shaft through capitellum. Abnormal with radial head or elbow joint dislocation.



Clinical features of elbow injuries

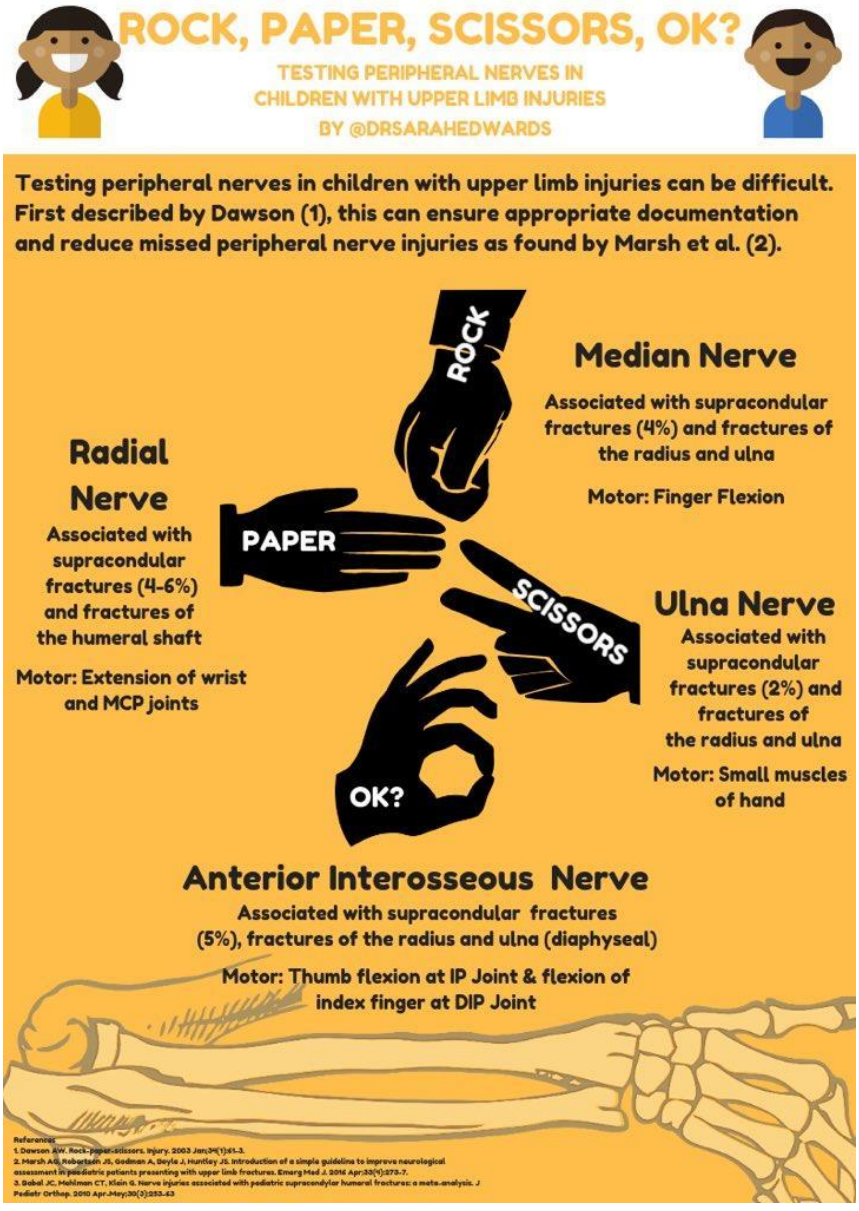
Usually caused by fall onto outstretched hand but also arise from fall directly onto the elbow.

Most elbow fractures are intra-articular and produce a haemarthrosis that can be identified clinically and on X-ray. Loss of extension occurs with any effusion in the joint, and in the context of trauma is highly suggestive of an elbow fracture. Therefore, ability to fully extend the elbow effectively excludes an intra-articular fracture. Injuries to the distal humerus in particular will also result in soft tissue swelling.

Need to exclude: Brachial artery injury (esp if marked swelling)

Nerve injury	Ulnar	small muscles of hand
	Median	thenar (LOAF) muscles
	Radial	wrist & finger extensors

One way to do this is ‘Rock, Paper, Scissors, OK (see below)



Proximal radial injuries

Radial head / neck fractures – can be subtle (may see fat-pads only). If undisplaced / minimally displaced, manage in a collar and cuff for 2-3 weeks with gradual mobilisation. Provide details for adhoc clinic review if they still have pain, swelling or reduced range of movement a week after removal.

Borderline cases should also be referred to the trauma meeting to ensure the orthopaedic team are happy with the plan.

If significantly displaced or angulated (>30º), fast the child, provide analgesia and refer to the orthopaedic registrar.

Radial head dislocations – causes disruption of the radiocapitellar line which is best seen on the lateral view. May occur in isolation or in conjunction with a fracture of the ulna (see Monteggia fracture-dislocation). Fast the child, provide analgesia and refer to the orthopaedic registrar.

Pulled elbow - A longitudinal pull on the hand (e.g a toddler pulling away from an adult who is holding their hand) can sublux the radial head through the annular ligament. The child holds the arm hanging at their side and will not flex the elbow. The elbow is not swollen or bruised. X-ray (to exclude a fracture in case the diagnosis is not pulled elbow) is not needed with a good history and this presentation.

There are many ways of reducing pulled elbow. Most simply, flex to 90 degrees and supinate then pronate while applying longitudinal pressure towards the joint. You may feel a 'click' in a fresh injury. The child will cry, so explain what you have done to the parents and leave them for 10 minutes. Hopefully the child will be using the arm normally when you return. No follow up is needed.

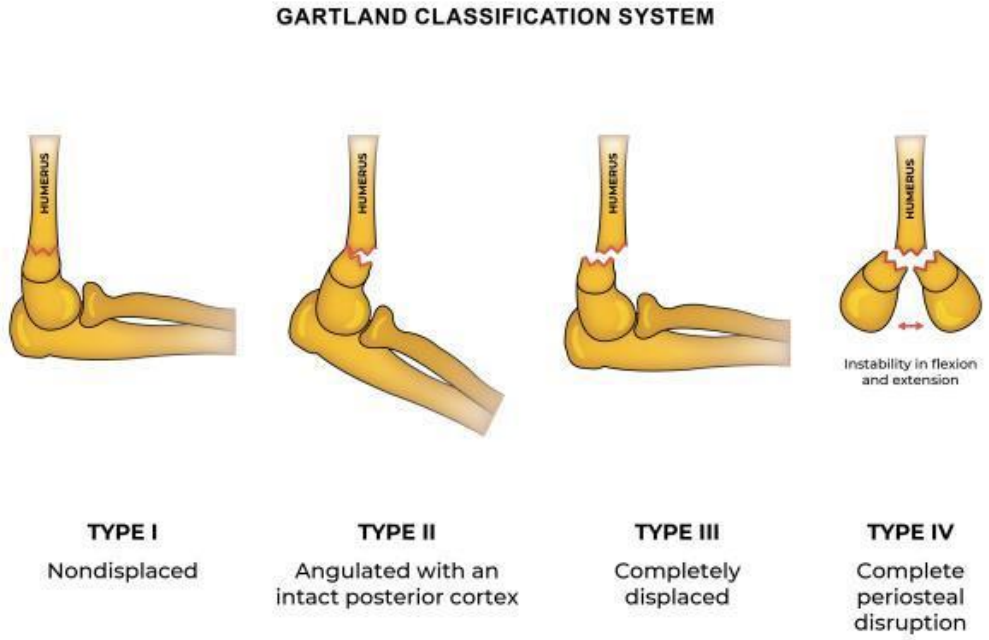
If it happened hours ago, local swelling may prevent reduction. The child can go home in a collar and cuff with face to face review in the ED clinic in 3-5 days. Tell the family to cancel the appointment if the child starts to use the arm normally.

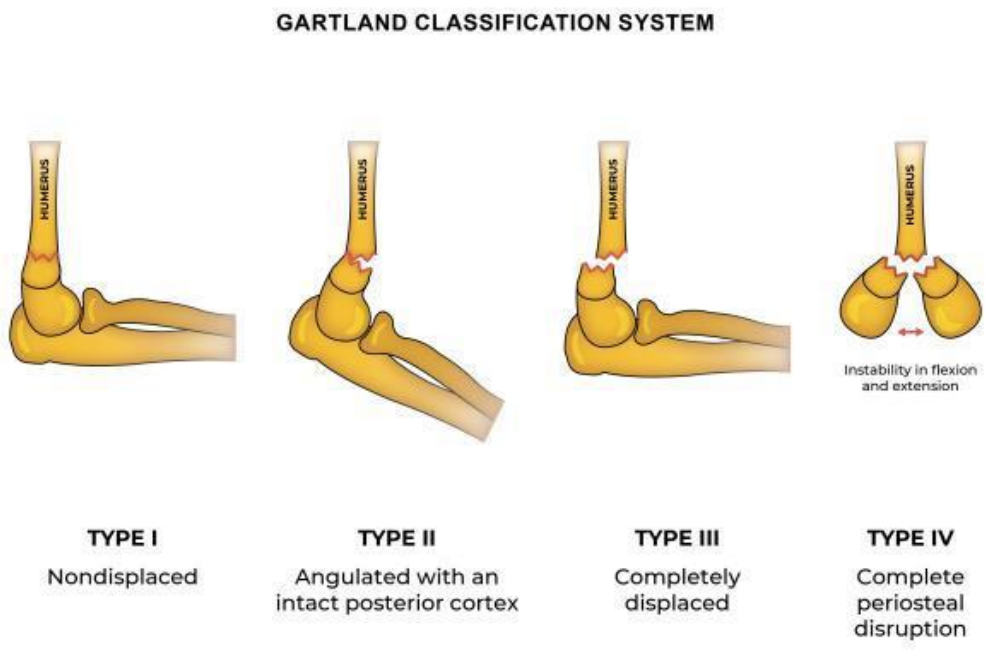
Proximal ulnar injuries

Olecranon fractures – usually enter the humero-ulnar joint. They can disrupt active extension at the elbow joint by separating the triceps insertion from the rest of the humerus. If there is any displacement careful reduction, fixation and splintage is required to regain and preserve articular congruity – fast the child, provide analgesia, a backslab and refer to orthopaedics. Undisplaced fractures with preserved triceps function can be treated in an above elbow softcast or backslab with fracture clinic follow up in 1/52.

Distal humeral injuries

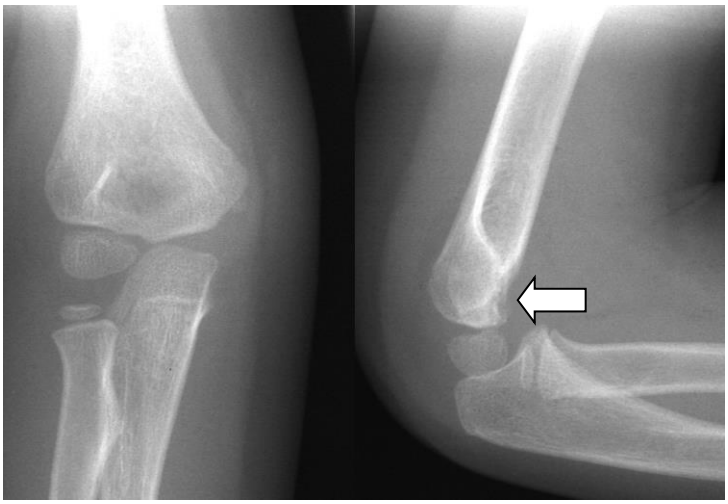
Supracondylar fractures – may be subtle and undisplaced ,with elevated fat-pads only or a small cortical disruption or often not visible on initial XR but can also be significantly angulated / displaced. They are graded according to the Gartland classification system (below)





Gartland Type I/ Undisplaced/ Elbow effusion only - manage in a collar and cuff under clothes or if very sore above elbow softcast. Advise removal at home and gradual mobilisation after 2 weeks. Provide details for adhoc clinic review if they still have pain, swelling or significantly reduced range of movement a week after removal. NB: these injuries can result in significant elbow stiffness, so ensuring proper mobilisation is important.

Subtle supracondylar Fracture (Gartland I)



Gartland Type II - if minimal angulation can be re-xrayed in an above elbow cast with the arm flexed beyond 90 degrees. If position satisfactory on check XR discharge with fracture clinic appointment in 1 week and refer to the Trauma meeting to ensure the orthopaedic team are happy with the plan. Discuss all other fractures with an ED senior or the orthopaedic registrar (fast the child and provide analgesia).

Angulated supracondylar Fracture (Gartland II)

Gartland Type III / IV - Fast the child, provide analgesia, a backslab and refer to the orthopaedic registrar.

Lateral condylar fracture – these injuries are usually more significant than they appear as there is a large amount of cartilage involved. Make sure you have seen an internal oblique view (out of cast) – the radiographers are usually very good and do this extra view automatically – as it shows the true degree of displacement.

If undisplaced / very minimally displaced manage in an above elbow softcast / backslab with fracture clinic appointment in 1 week and refer to the Trauma meeting to ensure the orthopaedic team are happy with the plan

For displaced fractures, fast the child, provide analgesia, a backslab and refer to orthopaedics.

Lateral condylar fracture

Medial condylar fracture – this is rare and like a lateral condylar fracture should be accurately reduced and fixed - provide analgesia, a backslab and refer to orthopaedics.

Lateral epicondylar injuries – these are relatively rare. Unless the epicondyle is very displaced or incarcerated within the radio-capitellar joint (in which case – refer to orthopaedics) they are usually managed conservatively. Provide analgesia, a backslab and refer to the next fracture clinic (within 1 week).

**Medial epicondylar injuries - ** If associated with a dislocation of the elbow they may become trapped in the joint. Reduction of the dislocation under sedation *may* be performed in the ED but this should only be done *after* discussion with the ED consultant +/- orthopaedics.

If not associated with a dislocation, or the dislocation has been reduced, management depends on the degree of displacement. If <1cm of displacement they can be managed with an above elbow soft cast with advice for removal at home after 3 weeks then gradual mobilisation. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

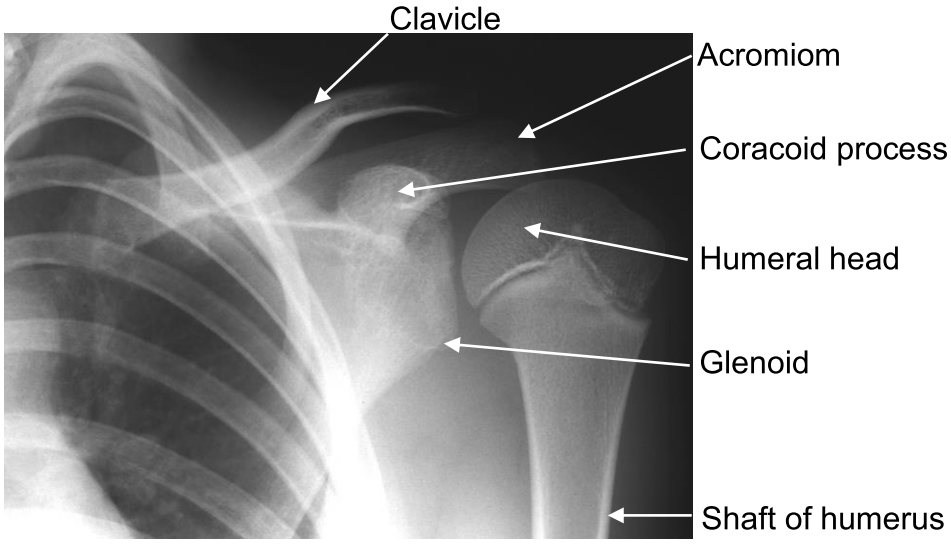
If the medial epicondyle is trapped in the elbow joint, or displaced > 1cm provide analgesia, a backslab and refer to orthopaedics.

Elbow dislocation with medial epicondyle trapped in joint

Isolated elbow dislocation – should be reduced under sedation (discuss with ED consultant) and then managed with an above elbow soft cast with advice for removal at home after 4 weeks then gradual mobilisation. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

Shoulder and upper humeral injuries

Anatomy of the shoulder



Clinical features

Common mechanisms of injury for shoulder injuries include falls onto outstretched hand (FOOSH) and falls directly onto the shoulder.

One of the most consistent clinical findings in all shoulder injuries is a reduced range of movement. Also look and feel for localised swelling / deformity – particularly over the clavicle.

Need to exclude:

Brachial plexus injury	
Axillary nerve injury	assess sensation in the 'badge' area over the deltoid
Radial nerve injury	esp. in humeral shaft fractures Check active wrist extension

Clavicle injuries

Clavicle fractures – are very common in children and may even arise from birth trauma. There is usually localised tenderness and swelling over the clavicle and reduced ROM at the shoulder. As initial x-rays may not demonstrate the fracture, and the management in children is always conservative (even for very angulated or displaced fractures) we diagnose clavicle fractures clinically and would only request x-rays if it is not possible to

make a definite diagnosis clinically and further investigation for an alternative diagnosis would be required if a fracture is not apparent on XR.

If you suspect a clavicle fracture, provide the child with analgesia, place in a broad arm sling for 10-14 days with gradual mobilisation after this. Older children will usually need to use the sling some of the time for another 2-3 weeks, younger children may not. Provide the relevant ED advice leaflet along with details for adhoc clinic review if they are not managing to mobilise, or have limited range of movement 4-6 weeks after their injury. It is normal for a palpable lump in the clavicle to persist beyond this – but particularly in younger children this will remodel with time.

If you are unsure about the diagnosis, discuss with a member of senior ED staff, or bring the child back for face to face review in the ED clinic in a few days time.

Acromioclavicular joint disruption - is rare in children (who usually fracture the clavicle instead). Shoulder x-rays in children may be misinterpreted as showing ACJ disruption as there is a wide gap on the x-ray between the acromiom and clavicle due to incomplete ossification. Ask a senior if you think you have a child with ACJ disruption.

Humeral injuries

Proximal humeral fractures - involve either the anatomical neck (epiphyseal plate) or the surgical neck (metaphysis). Almost all can be managed conservatively in a collar and cuff with analgesia and advice to mobilise after 2 weeks without any formal follow-up. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

Fracture of ‘surgical’ neck of humerus

Salter Harris II fracture of proximal Humerus

Humeral shaft fractures – are usually clinically obvious with swelling, tenderness and instability. Spiral fractures in very young children should raise the suspicion of non-accidental injury. Radial nerve injury may occur (discuss with orthopaedic registrar if present). Mid-shaft fractures usually remodel well and functional results are good with conservative management.

For minimally displaced / stable fractures manage in a collar and cuff with gradual mobilisation after 3 weeks. Provide the relevant orthopaedic service advice leaflet (on our intranet page). Refer to the trauma meeting to confirm the orthopaedic team are happy with the plan.

For displaced / unstable fractures - provide analgesia and immobilise in as good an anatomical position as possible in a high above elbow backslab / softcast. Provide a fracture clinic appointment in 1 week and refer to the Trauma meeting to ensure the orthopaedic team are happy with the plan

Angulated midshaft humeral fracture

Spiral humeral fracture

Gleno-humeral dislocation

Gleno-humeral dislocation - is rare in children, whose epiphyseal plate is relatively weak making proximal humeral fracture much more common. Anterior dislocation is the most common, and produces the classical squared off appearance of the shoulder. Assess for injury to the axillary nerve. Reduction under sedation *may* be performed in the ED but this should only be done *after* discussion with the ED consultant. General anaesthesia may be required (refer to ortho). Once reduced, manage in a collar and cuff for two weeks and refer to physiotherapy.. If an associated fracture is present, also provide a fracture clinic appointment for 2 weeks post injury.

Squared off appearance of shoulder in anterior dislocation, and associated X-ray