Paediatric fractures in the Emergency Department

October 2012

Victorian Paediatric Orthopaedic Network

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The Royal Children's Hospital Melbourne

Barwon Health

Western Health
Caring for the West

Monash Children's
Southern Health

State Government Victoria Department of Health

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What this presentation covers

- Paediatric bone anatomy
- Buckle injury of distal radius
- Supracondylar fractures

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Cast immobilisation

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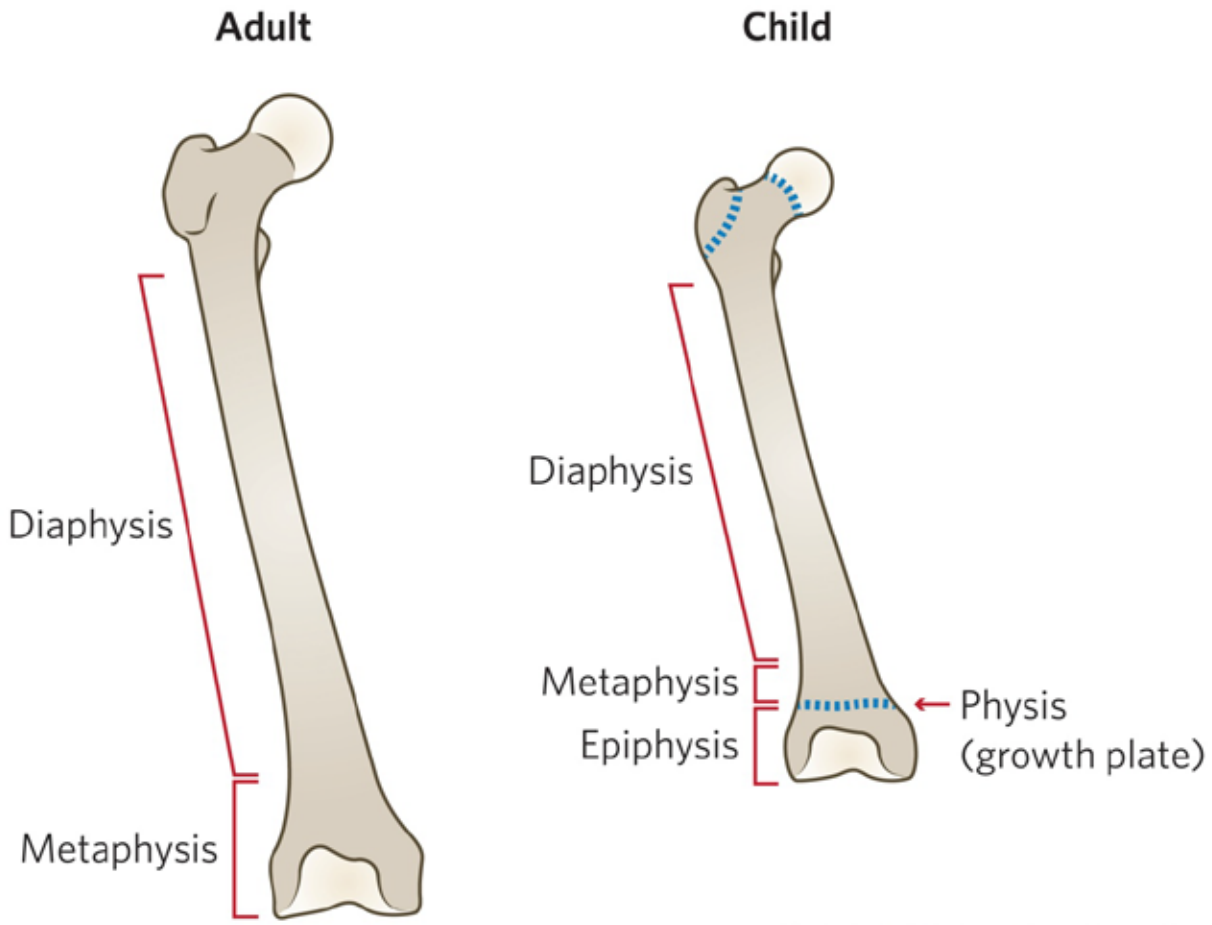
Children are different



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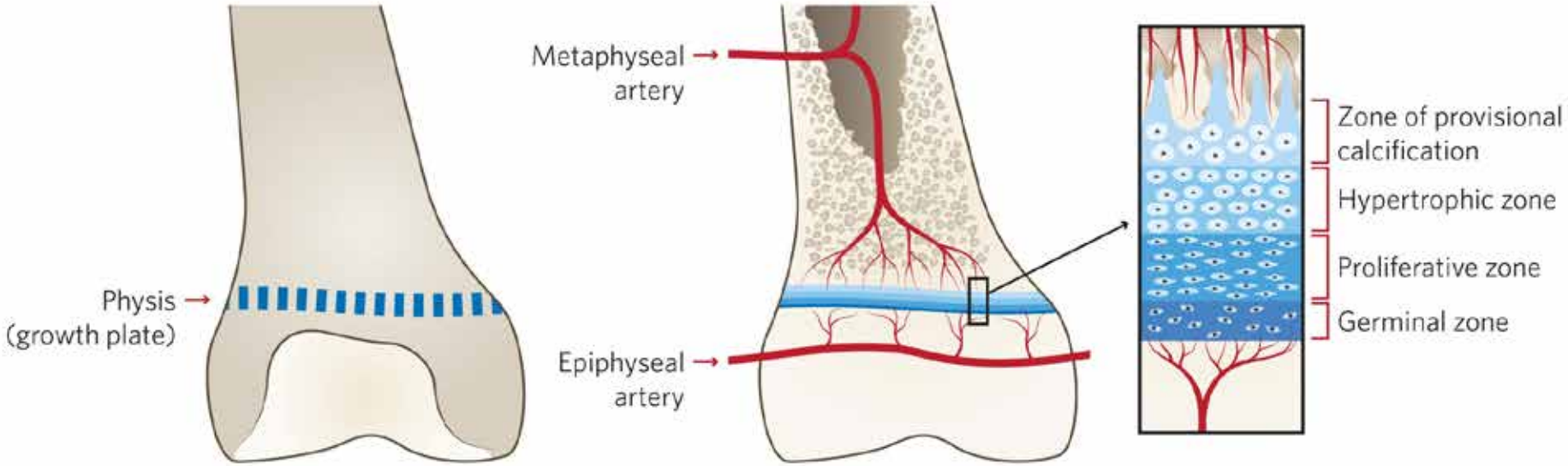
Growth plate



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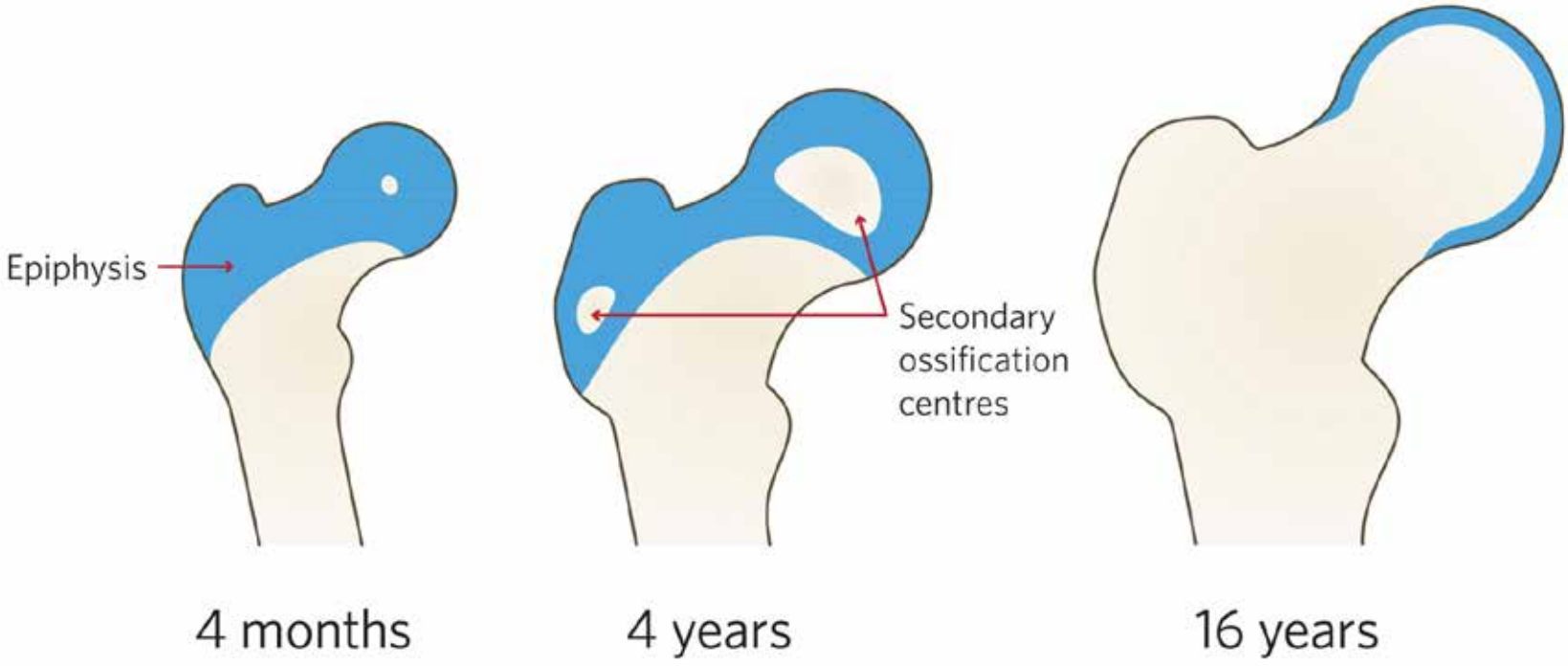
Epiphysis



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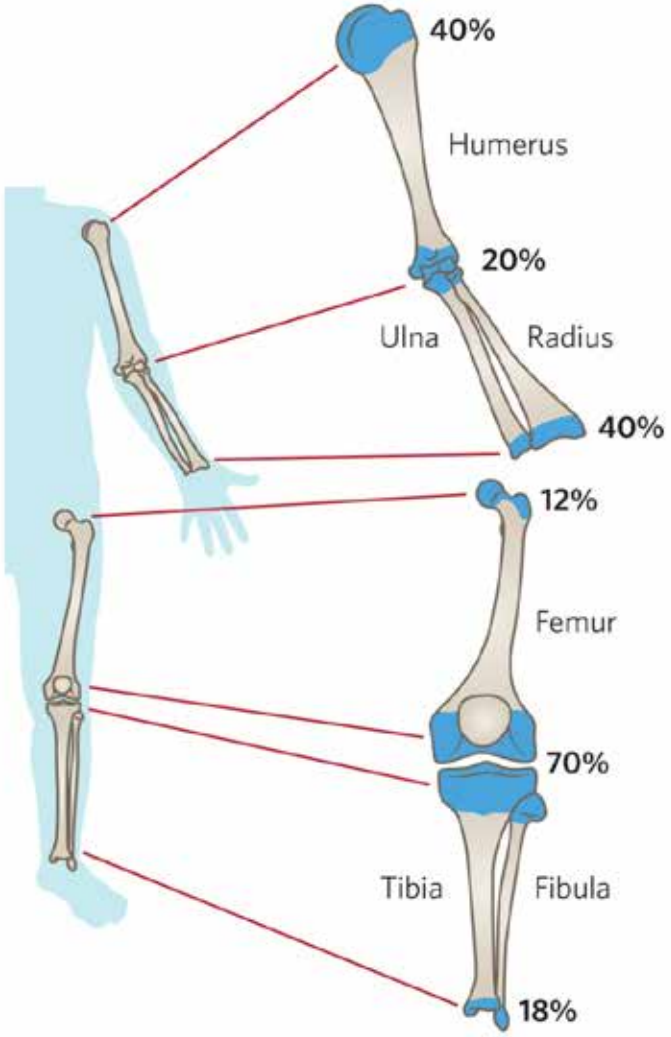
Contribution to growth



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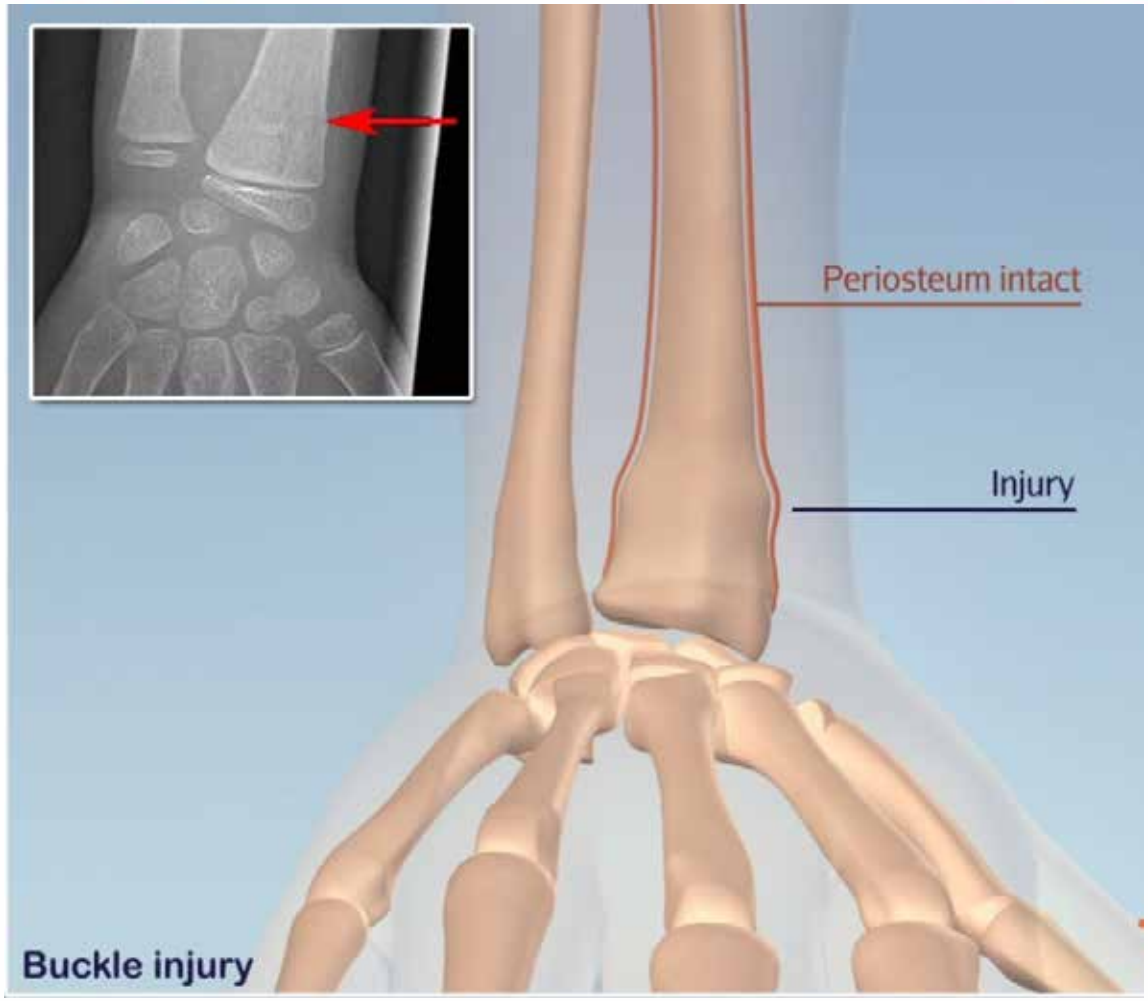
Buckle injury of distal radius



[Buckle injury video link]

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How are they classified?

- Occur in the metaphyseal region of the distal radius
- Compression injury and stable
- Need to be distinguished from complete fractures, greenstick fractures and growth plate fractures

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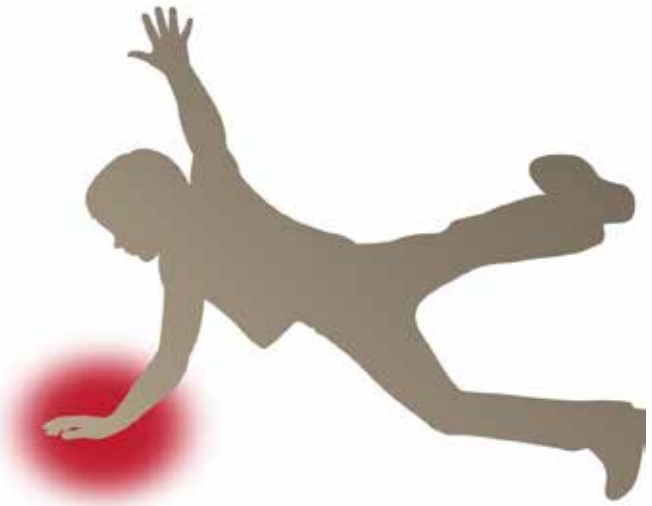
How common are they?

- Fall on outstretched hand
- Peak incidence at the beginning of the adolescent growth spurt



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What do they look like clinically?

- Pain and tenderness over distal radius
- Minor swelling but no deformity
- Wrist may be able to be moved

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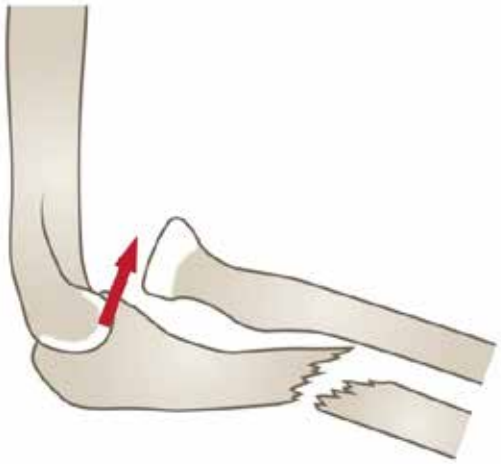
What radiological investigations should be ordered?

- If pain well localised, order wrist x-ray (AP and lateral)

- If pain not well localised, forearm x-ray should be ordered to exclude a more proximal fracture or radial head dislocation



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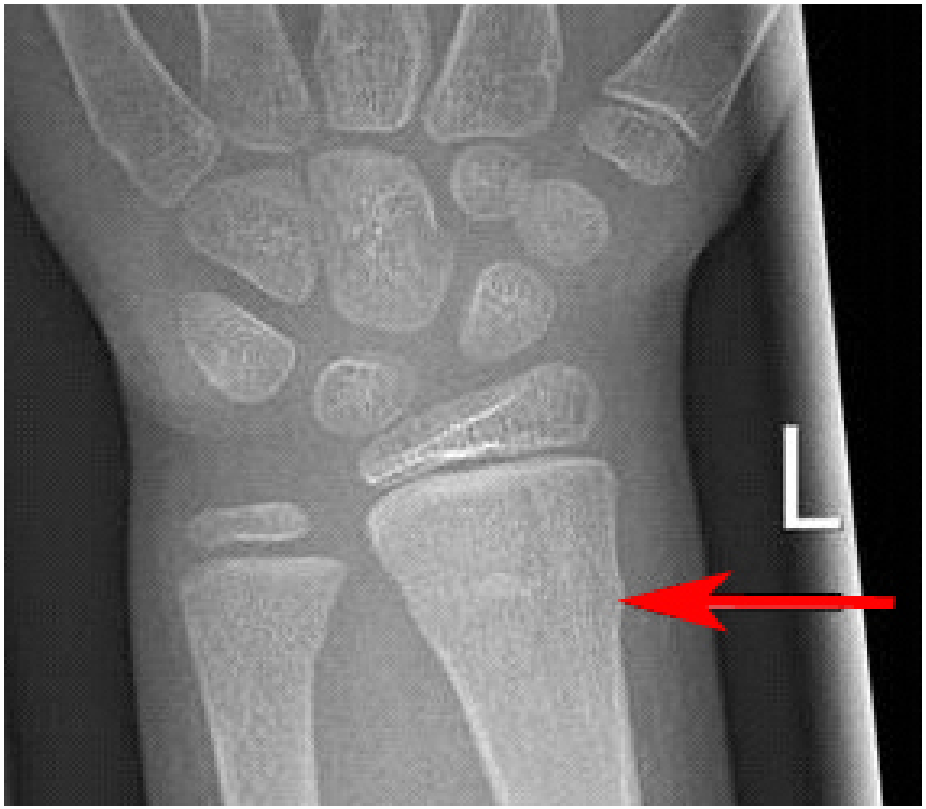
What do they look like on x-ray?



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Ensure both cortices are intact!

Greenstick fractures

Fracture on the tension (convex) side and compression side remains intact

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Ensure both cortices are intact!

Complete Fracture

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When is reduction required?

- Buckle injuries do not need manipulation
- They are not displaced and stable

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Do I need to refer to orthopaedics now?

- Buckle fractures need no referral
- Metaphyseal fractures are referred if
  - v Open fracture
  - v Fractures with associated neurovascular compromise
  - v Inability to achieve an acceptable reduction
  - v An associated arm fracture

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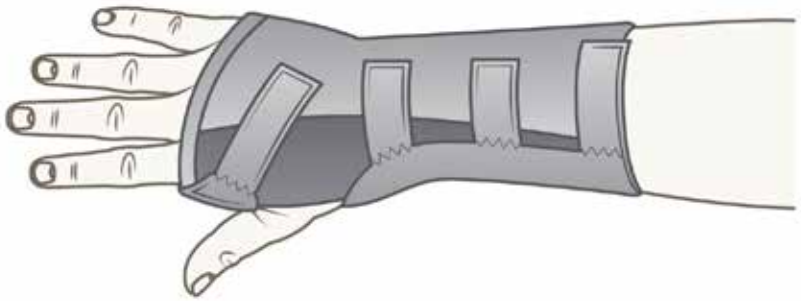
What is the usual ED management of this fracture?

- No reduction required
- Below-elbow fibreglass/plaster backslab or removable wrist splint for 3 weeks



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What follow-up is required?

- No follow-up is required by GP or fracture clinic
- Radiographic follow-up is not required
- Instruct parent to remove backslab or splint in 3 weeks
- Ensure parents understand signs for concern

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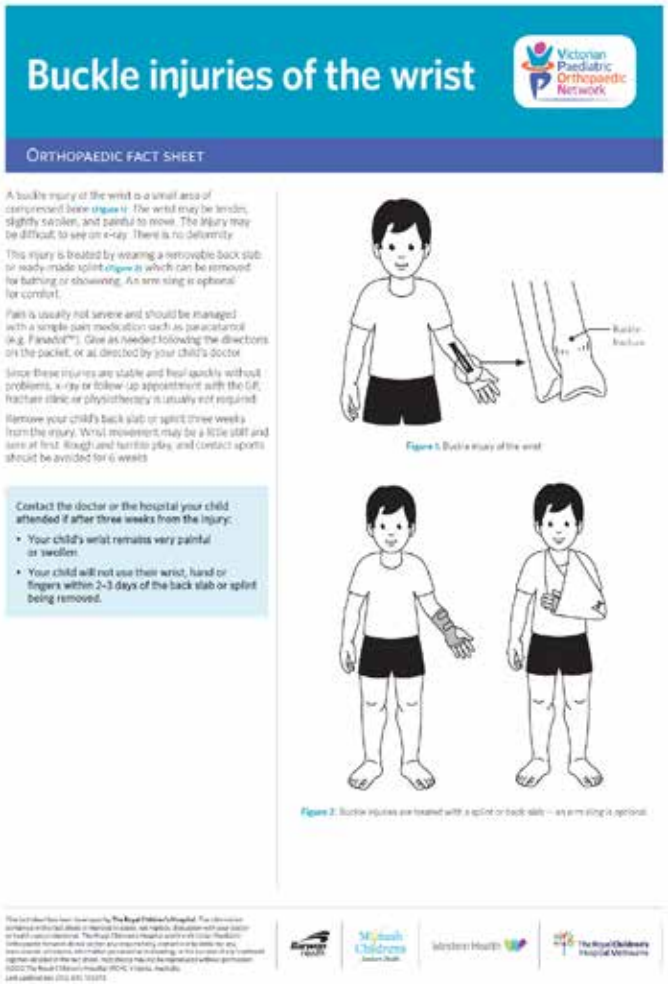
What advice should I give to the parents?

- Excellent outcome
- Rapidly back to normal function
- Buckle injury fact sheet



Buckle injuries of the wrist

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ORTHOPAEDIC FACT SHEET

A buckle injury of the wrist is a small area of compression/ bone (figure 1). The wrist may be tender, slightly swollen, and painful to move. The injury may be difficult to see on x-ray. There is no deformity.

This injury is treated by wearing a removable back slab or ready-made splint (figure 2) which can be removed for bathing or showering. An arm sling is optional for comfort.

Pain is usually not severe and should be managed with a simple pain medication such as paracetamol (e.g. Panadol™). Give as needed following the directions on the packet, or as directed by your child's doctor.

Since these injuries are stable and heal quickly without problems, x-ray or follow up appointment with the GP, fracture clinic or physiotherapy is usually not required.

Remove your child's back slab or splint three weeks from the injury. Wrist movement may be a little stiff and sore at first. Rough and tumble play, and contact sports should be avoided for 6 weeks.

Contact the doctor or the hospital your child attended if after three weeks from the injury:

- Your child's wrist remains very painful or swollen.
- Your child will not use their wrist, hand or fingers within 2–3 days of the back slab or splint being removed.

Figure 1. Buckle injury of the wrist

Figure 2. Buckle injuries are treated with a splint or back slab — an arm sling is optional.

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What are the potential complications associated with this injury?

- Not recognising injury is in fact a complete fracture or greenstick fracture
  - v inadequate splintage (requires a complete cast) and potential loss of position
  - v Follow-up in fracture clinic required

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Supracondylar fractures

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How are they classified?

- Extension injuries - 95%
  - v Distal fragment displaced posteriorly
- Flexion injuries - 5%
  - v Distal fragment displaced anteriorly

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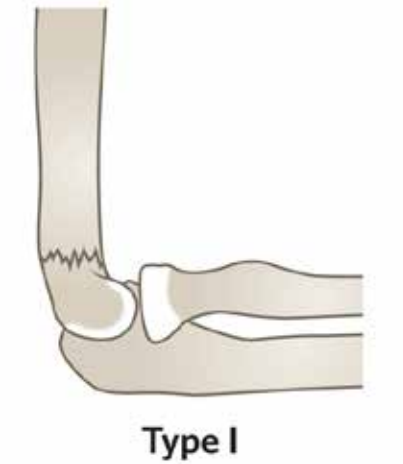
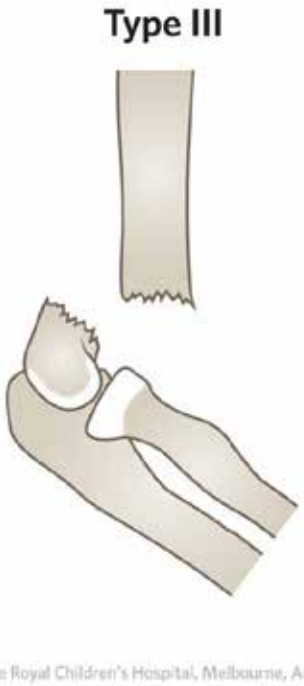
Gartland classification of extension injuries





Undisplaced

Angulated with posterior cortex intact

Displaced distal fragment, no cortical contact

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How common are they?

- Most common elbow fracture in children
- Peak age 5–8 years
- Usual mechanism is a fall onto the outstretched hand

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What do they look like clinically?

- Pain, swelling, and limited elbow range of motion
- Displaced fracture in extension seen as an S-shaped deformity
- Radial pulse should be felt and documented

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What do they look like clinically?

- Always examine for associated injuries
- Conduct neurological examination

Make a fist

Tests AIN
and median nerve

Thumbs up

Tests radial nerve

Make a star

Tests ulnar nerve

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What radiological investigations should be ordered?

- Clinically deformed fractures should be immobilised in about 30 degrees short of full extension, prior to x-ray evaluation
- AP and lateral x-rays of the distal humerus (not elbow) should be obtained
- Important to identify other injuries in the forearm

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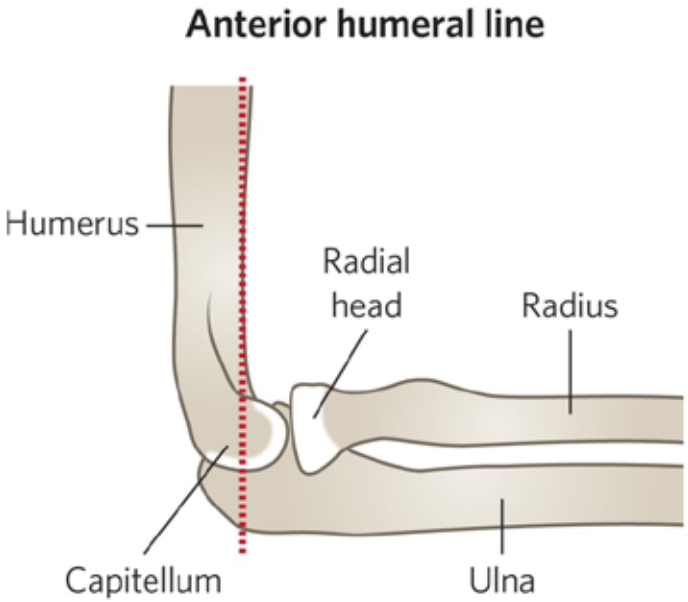
What do they look like on x-ray?

- Gartland classification based on lateral x-ray, identifying where capitellum sits in relation to a line drawn down the anterior aspect of the humerus



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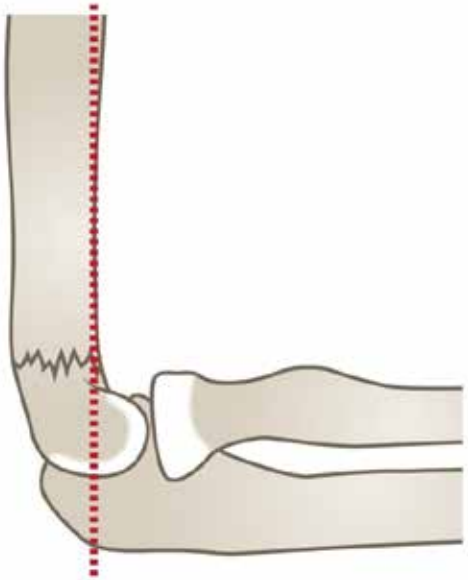
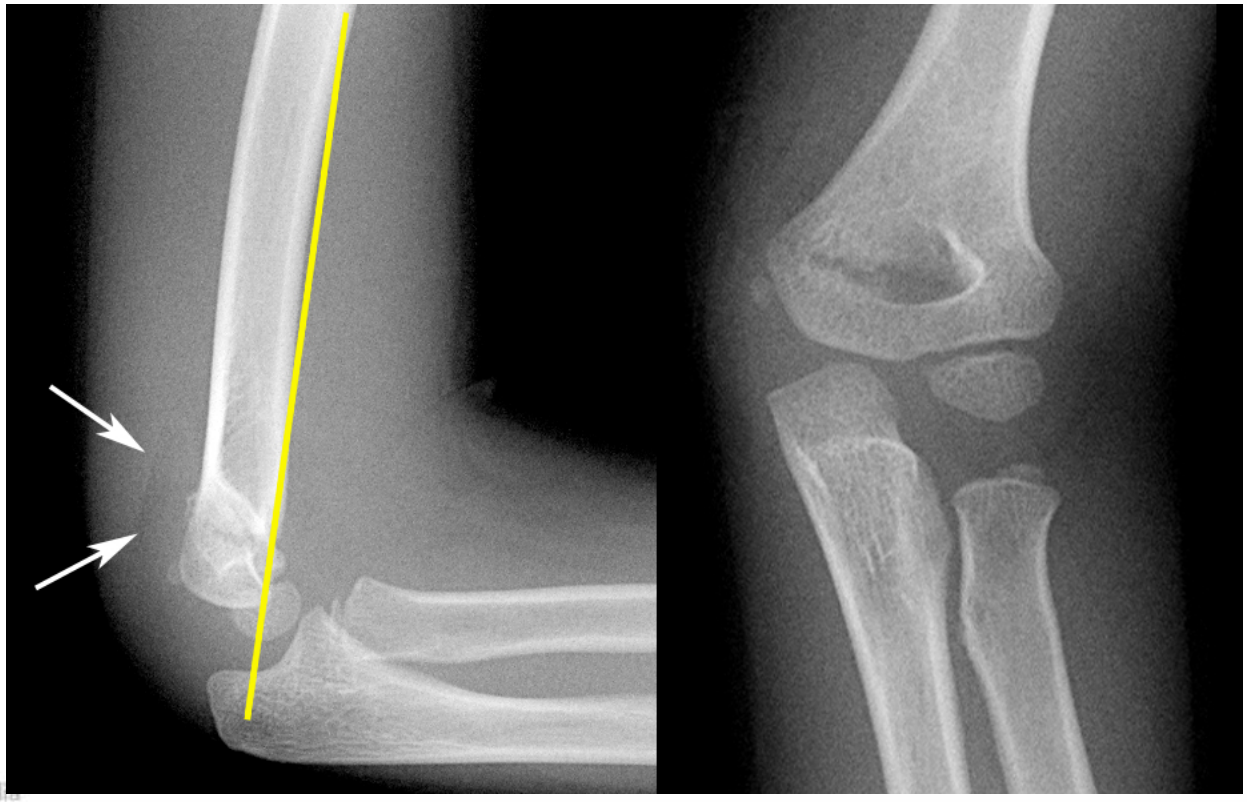
Type I supracondylar fracture





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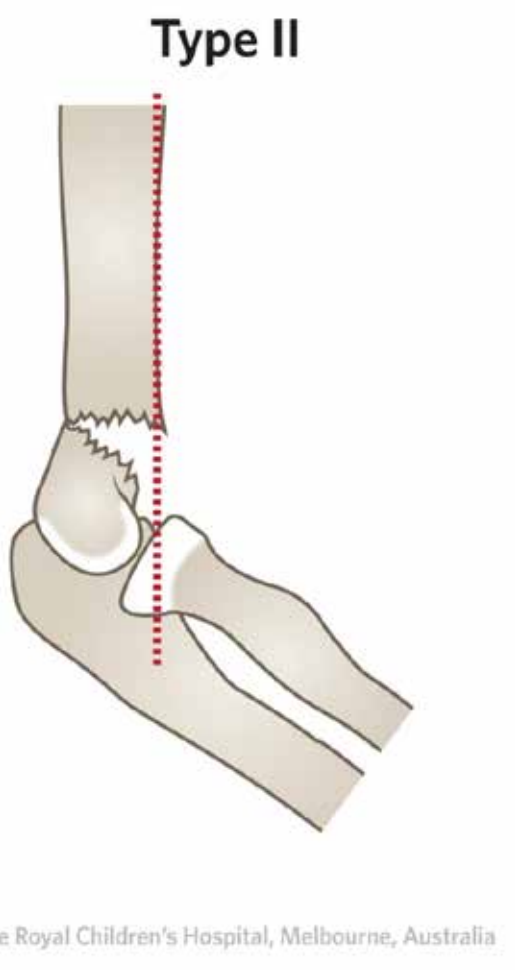
Type II supracondylar fracture



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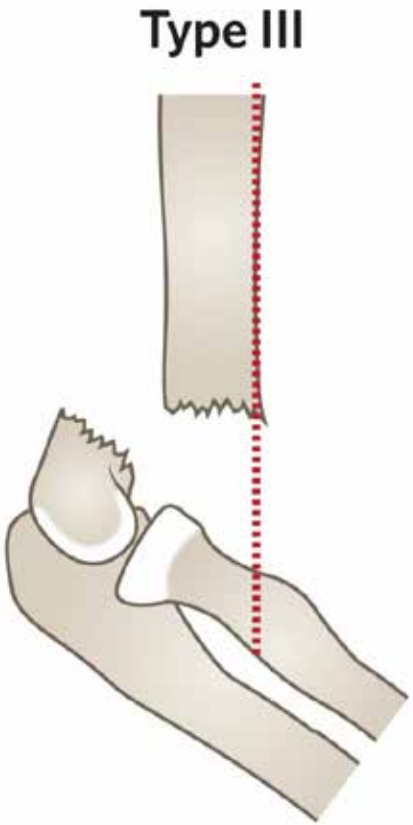
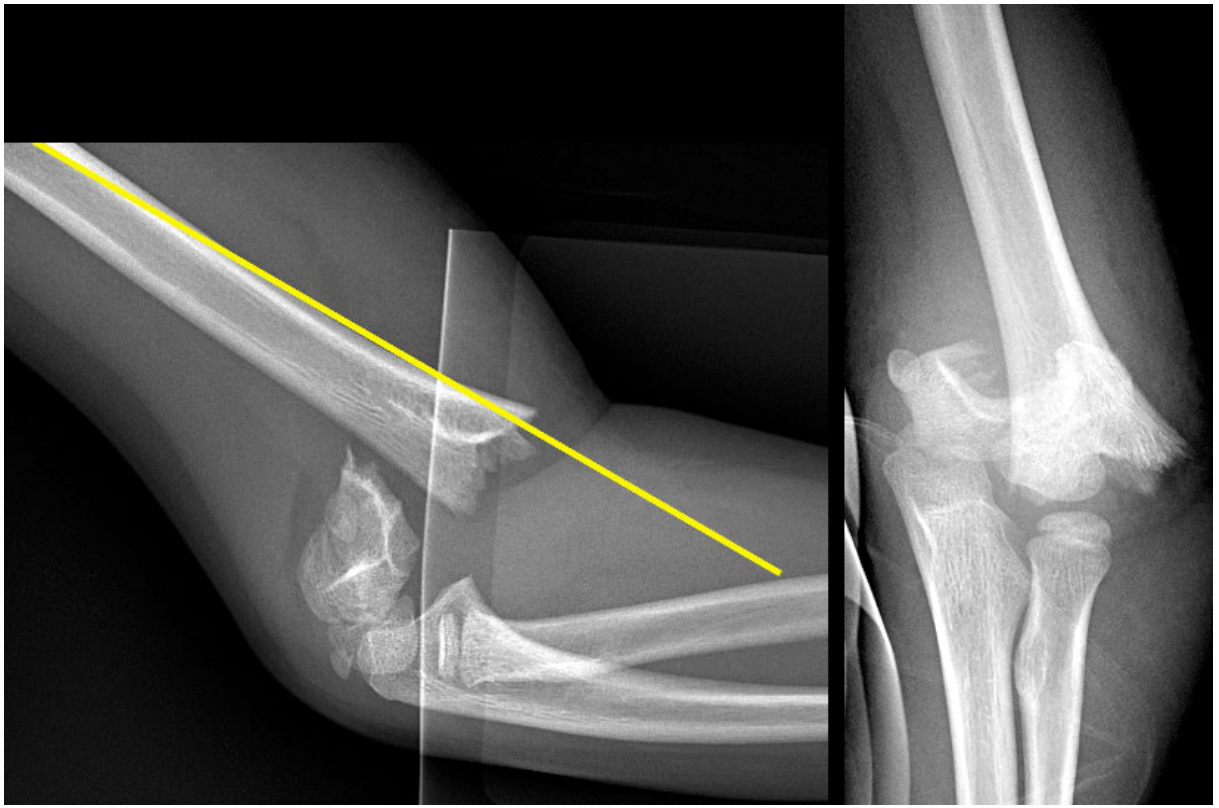
Type III supracondylar fracture





When is reduction required?

Type I	• Do not require reduction
Type II	• Need some reduction
Type III and flexion supracondylar fractures	• Reduction and percutaneous K-wire fixation

Patients should be kept nil orally until a decision about the timing of surgery is made.

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Do I need to refer to orthopaedics now?

- Absence of pulse or ischaemia
- Open or impending open fracture (large anterior bruise)
- Associated nerve injuries
- Gartland type II & III fractures
- Associated same arm forearm or wrist injury
- Flexion supracondylar fractures

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What is the usual ED management of this fracture?

Type I	• No reduction required • Immobilise in above-elbow backslab
Type II	• Refer to ortho for advice • Gentle reduction in ED or in theatre
Type III	• Refer to ortho

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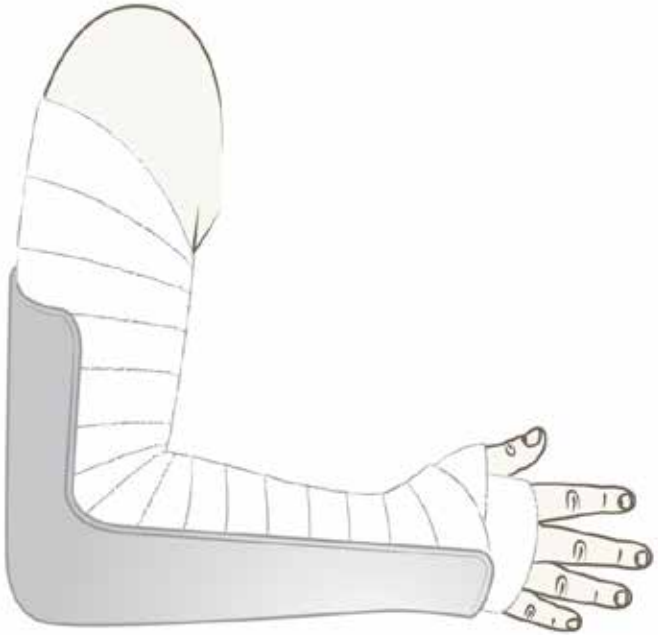
Above elbow backslab



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What follow-up is required?

- Type I
  - GP in three weeks
  - Repeat x-ray not required
- Type II
  - Fracture clinic **one week** post-injury

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What advice should I give to the parents?

- Type I
  - Sling for 3 weeks
  - Backslab and sling worn under clothing
  - Elevate limb (for the first 48 hours)
  - Marked elbow stiffness following removal of backslab
  - Movement returns with time and physiotherapy is not required

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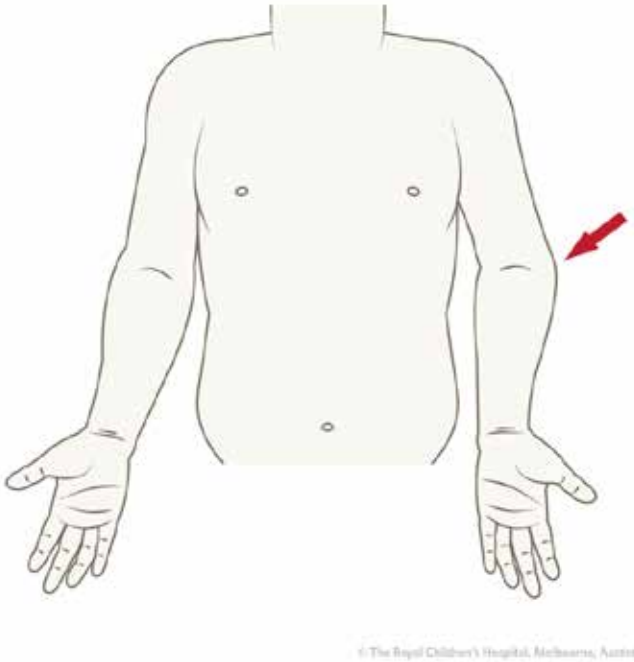
What are the potential complications?

Volkmann's



Gunstock Deformity

Parent information fact sheet

Supracondylar elbow fracture *(undisplaced)*

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ORTHOPAEDIC FACT SHEET

Your child has a simple fracture just above the elbow.

These elbow fractures require only a backslab (partial cast) and sling. The backslab and sling should be placed under loose fitting clothing, not through the sleeve (Figure 1).

The first days

In the first few days there may be swelling of the elbow, hand and fingers. During this time it is important to rest as much as possible with the elbow and hand supported on pillows (elbow and hand above the heart) (Figure 2). The sling may be removed when your child is lying down. Encourage your child to bend and straighten the fingers regularly. Check their fingers often for movement, feeling and circulation.

The elbow will be painful initially. Give a simple pain medication such as paracetamol (e.g. Panadol™) as needed following the directions on the packet, or as directed by your doctor. (Also see Orthopaedic fact sheet Fractures in children: caring for your child in an arm cast.)

Follow-up

The local doctor will review your child, and remove the backslab, three weeks after the injury. An x-ray is not required.

After the cast is removed

When the backslab is removed, the skin may be dry and itchy. Bathe with warm water and soap, and apply a gentle moisturiser. Your child should begin moving the elbow. There will be marked elbow stiffness for a prolonged period (months). Usually full mobility returns with time but this may take up to one year. Physiotherapy is not recommended. Your child should avoid sports and heavy arm use (such as climbing) for one month after removal of the backslab.

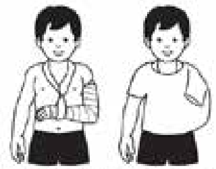

Figure 1. The backslab and sling should be placed under loose fitting clothing, not through the sleeve

When to seek urgent help

Severe pain and swelling, change in colour of the fingers (white or blue), numbness or pins and needles, and inability to move the fingers, are concerning signs that the cast may be too tight. If any of these signs occur, rest and elevate the limb for thirty minutes (Figure 2).

Take your child immediately back to the hospital emergency department, when, even after elevating the limb for 30 minutes:

- **the fingers remain very swollen**
- **the fingers remain white or blue**
- **the child complains of pins and needles, or numbness in the fingers**
- **the child is not be able to move their fingers, or complains of pain when you move them**
- **there is severe pain that is not relieved by the recommended medication at the recommended dose.**

Take your child to the hospital you attended, or the local doctor if:

- the backslab is cracked, soft, loose or tight, or has rough edges that hurt
- you are worried that an object has been pushed inside the backslab
- there is increasing pain.

Contact your child's doctor if you have ongoing concerns regarding:

- the shape of your child's arm
- how your child is using their arm.

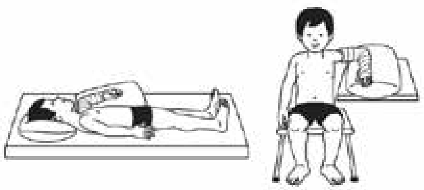

Figure 2. Raise the arm on a pillow when sitting or lying down

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Find out more

www.rch.org.au/clinicalguide/fractures

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