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# PAEDIATRIC HAND FRACTURES

## EPIDEMIOLOGY

15% of all fractures seen in Paediatric Emergency Departments are located in the hand with approximately 50% caused by sporting injuries or fights. Around 70% of all fractures occur in boys and peak in the early teenage years.

## SPECIAL CONSIDERATIONS

Fracture patterns are often different in children compared to adults. Bone growth occurs through the epiphyseal plate. The hyaline cartilage is weaker than the surrounding bone and fractures occur frequently in this area. These can be classified by the Salter-Harris Classification.

Fractures can cause growth arrest leading to angular deformities or joint malalignment. Conversely, mal-united fractures can remodel with growth. Angulation will generally correct well in the plane of motion of the joint. Mal-rotation is the least reliable plane to achieve correction. The ability of the bone to remodel will decrease the further the fracture is located from the epiphysis.

Due to the thicker periosteum and plasticity of the bones in children, unicortical (greenstick) or torus (buckle) fractures can occur.

Most paediatric hand fractures heal quickly and do not need more than four weeks of protection. Even if immobilised, children rarely become stiff.

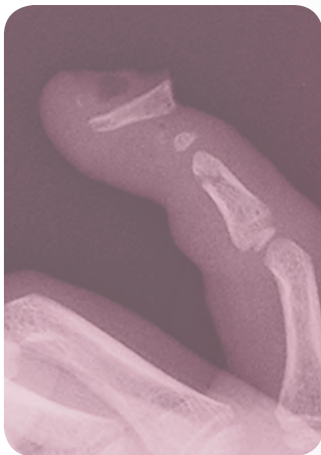
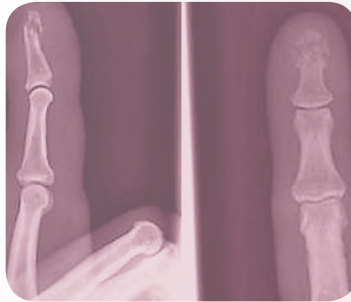


## ASSESSMENT

Children should be assessed, as per adults, utilising a look, feel and move approach. Younger children can pose challenges due to their lack of cooperation or understanding. Cadence of the hand and the passive tenodesis effect can be useful to assess rotation and angulation. Pseudomotor activity can be used to assess for nerve injury.

## TUFT FRACTURES

These are fractures of the distal phalanx which most commonly occur in toddlers and are often associated with a nailbed injury. The fracture usually reduces well with repair of the nailbed. No other specific treatment is generally required.



## SEYMOUR FRACTURE

This is usually a Salter Harris I fracture of the distal phalanx which often presents in a similar fashion to a mallet type injury with an inability to extend the finger at the DIP joint. It can be differentiated clinically by the associated injury to the base of the nail. An x-ray will confirm the diagnosis. It is important that these are not missed

to prevent osteomyelitis and mal-unions. These can be unstable injuries and require a longitudinal k-wire to stabilise the fracture.





## PHALANGEAL NECK FRACTURES

These can occur in the middle or proximal phalanges. These are very unstable fractures and can easily displace dorsally leaving a volar bone spike which prevents full flexion of the joint. It is important that they are identified early to prevent later problems. Undisplaced fractures can be managed in a splint but need careful follow-up to ensure that they don't subsequently displace. Significantly displaced fractures always require operative intervention with k-wiring to maintain the reduction.



## VOLAR PLATE AVULSION FRACTURES



These fractures are associated with forced hyperextension of the PIP joint. This is often due to the impact of a ball as typical in basketball or netball. They are usually treated with a dorsal blocking splint and early mobilisation. Typically the pain and function return quickly but the joint can remain swollen for many weeks. Parents often need reassurance that the swelling will eventually settle.

## PROXIMAL PHALANX BASE FRACTURES

These are a very common type of paediatric hand fracture. They are most frequently seen in the little finger and are mainly Salter-Harris II



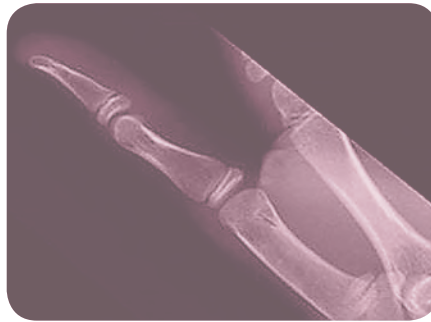
fractures. If undisplaced, they can be managed in a simple thermoplastic splint or in a sensible older child with buddy strapping. These fractures are often angulated and require a closed manipulation to correct this.

They are usually stable following this and do not require any form of operative fixation.

Skier's thumb is a specific injury of the metacarpal base involving the ulnar collateral ligament of the MCP joint. Not uncommonly an avulsion fracture is seen on the plain x-rays giving a strong indication of the diagnosis. If the avulsion fracture is undisplaced then it will generally heal well in a plaster cast. Displaced fractures may require operative intervention and can indicate a possible Stener lesion. This is where with the adductor aponeurosis interposes between the distal site of attachment of the ruptured ligament and the detached ligament preventing it from healing. These always require operative intervention to ensure proper healing and joint stability.

## BOXER'S FRACTURE

The classic fracture is of the 5th metacarpal neck resulting in apex dorsal angulation. Punching is the commonest mechanism of injury although falls can also present with the same fracture pattern. Most fractures can be managed with splintage and immobilisation as good results can be obtained with significant amounts of angulation of up to 60 degrees.



They can usually be manipulated if required and stabilised in a plaster cast until healed. If unstable, they sometimes need a K-wire for three weeks to maintain the reduction.

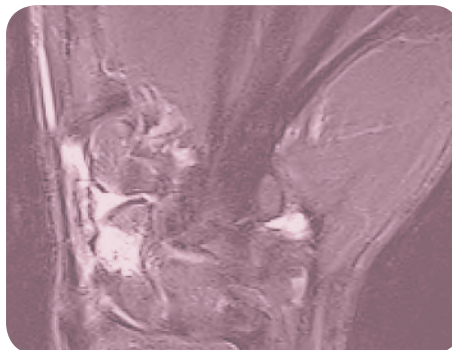


## METACARPAL BASE FRACTURES

These usually occur in the thumb and are usually extra-articular which differentiates them from the Bennett's type fracture pattern seen more commonly in adults.

## SCAPHOID FRACTURES

Whilst not common in a paediatric population, it is important that this diagnosis is not forgotten due to the potential for non-union and subsequent carpal collapse. Whilst the majority of these fractures are seen in teenage boys, they can occur in much younger ages. The injury is usually caused by a fall on to the outstretched hand. Typically, fractures tend to occur in the waist and distal scaphoid.



Proximal pole fractures are less common than in adults. Often the tenderness can be more on the volar side of the hand rather than in the classically described anatomical snuff box region. There is usually also pain on moving the wrist and sometimes on telescoping the thumb. Up to 40% of fractures may not show up on the initial x-rays. If clinical suspicion is high then an MRI scan should be obtained. Unlike in adults, the majority of fractures will heal well if immobilised early. Non-unions require operative fixation with a cannulated screw and frequently a bone graft.

## SUMMARY

*Most paediatric fractures will heal without problem if identified early and appropriately treated. Care must be taken to identify those injuries which could lead to growth abnormalities, non-union or other deformities which could lead to problems in later life.*