

Paediatric Pearls

Minor Injuries Series

Episode 4: The wrist

Like in adults, the wrist is a very common location for injury. As an impulse to falling we stretch out our hands and arms to protect our head and torso, and hence the acronym FOOSH – fall on the outstretched hand, that you may come across in orthopaedic and Emergency Department documentation. The wrist is the most common upper limb fracture in adults, and is most common in children along with the supracondylar (see [episode 2](#) of this series in [December 2012 / January 2013](#)). Whilst the supracondylar occurs in the 4-8y age group, wrist fractures which are typically distal radius fractures, can occur at any age.

As always with paediatric injuries there are some special considerations when assessing and treating wrist injuries:

1. does the mechanism fit with the history and the child's developmental stage?
always consider non accidental injury
2. does the bony injury affect the growing bone – ie is there a fracture through the growth plate of a bone?
3. will the child tolerate the normal management?
→ most young children would not find manipulation of a fracture using entonox and iv analgesia or a 'haematoma block' (injecting local anaesthetic directly into the fracture site) acceptable, so most requiring reduction go to theatre for manipulation under general anaesthesia
4. can we allow a greater degree of angulation of a fracture because a young child's bone will remodel better than an adults?

If a child presents with wrist pain after injury, take your history, ensure it fits with the clinical picture, and then examine after adequate analgesia, remembering to assess the whole limb all the way up to the clavicle, and checking distal neurovascular status (pulses, capillary refill time in fingertips and sensation of radial, median and ulnar nerves). Your decision to x-ray will be based on any signs of swelling/ deformity/ bruising, or significant tenderness or neurovascular deficit. Standard views are AP (anteroposterior) and lateral.

So let's look at the AP x-ray of the wrist at a number of different ages:



infant

child

older teenager / adult

You can appreciate there is a great variation in the appearance of the bones at this joint – as an infant, the epiphysis of the ulna is not even radio-opaque and the bones that are visible appear to be floating around the joint (when in actual fact it is just that the bones are not well ossified so are not apparent on x-rays).

By childhood the bones are all visible but growth plates remain - the black line between metaphysis (shaft) and epiphysis (endplate).

By mid teens (girls slightly earlier than boys) the bones resemble the adult skeleton – and you can tell your patient that if the growth plates are no longer visible then their arm won't grow any longer!

Despite the differences at different ages, the most common injury at the wrist for all ages is a dorsally angulated fracture of the distal radius. You might have heard of a Colles' fracture – dorsally displaced, anteriorly angulated, and impacted distal radius fracture – but this is typically an injury of older people with osteoporosis. In children the same mechanism is much more likely to cause a greenstick fracture. These are where the cortex is not breached because the bones are more flexible and bend instead of breaking. Paediatric bones also have the propensity to remodel well so greater degrees of angulation are acceptable the younger the child (and you should speak to the orthopaedic team for advice on specific angles at specific ages).



Shown above is a typical injury after a FOOSH, with anterior / dorsal buckling of the distal radius always best appreciated on the lateral film. This can be managed conservatively in a backslab with fracture clinic follow up – most are converted to full fibreglass cast at first appointment and then taken out of a cast at 3-4 weeks. There has been a fair amount of research into using only a splint for simple greenstick wrist fractures – and the findings are encouraging in terms of patient outcome, comfort, use of resources etc, so you may find your local department advocates splints in place of casts from the day of presentation.



Above shows a much less common but more unpleasant injury - a Salter-Harris injury (if you remember from [Episode 3](#), the Salter-Harris classification lists 5 possible fractures involving the growth plate of any paediatric bone). This injury is a Salter-Harris Type III - where the fracture is through the metaphysis of the radius and extends to the growth plate but does not extend into the epiphysis (note also the angulated fracture of the distal ulna) – these should all be discussed with orthopaedics as many will need operative management to produce the best outcome.

Beware of injuries to both distal forearm bones or to one forearm bone distally and the other proximally. Always assess the elbow and along the whole forearm and consider the need for whole forearm or elbow x-rays as well. There are two nasty injuries that may be missed if we are not thorough in our assessment:

1. Monteggia – usually an ulnar shaft rather than distal ulna fracture, with dislocation of the radial head
2. Galeazzi – usually a fracture of the radial shaft with dislocation of the ulnar styloid at the wrist

FINALLY: don't ever forget scaphoid – see next month's Paediatric Pearls!