Fracture Management for Pediatric Primary Care

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It’s all going “TIBIA”  alright !

We will review a few common orthopedic injuries, that frequently present to primary care.

They are painful and impact life activities while they are healing. Most will heal with support and activity modification, and do not require much active treatment.

This fracture management can be provided by primary care or orthopedic referral, navigating the specific needs and desires of patients and families.

Musculoskeletal Issues in Primary Care

Musculoskeletal concerns represent 6.1% of office visits for children between 3 and 14 years of age and more than 10% of those of adolescents.

Epidemiology of paediatric presentations with musculoskeletal problems in primary care

A Tan et al BMC Musculoskeletal Disorders 2018

Fracture Management: PCP vs Ortho Referral

Value-Based Treatment of Common Pediatric Fractures by Primary Care

R.MacNeille and W.Hennrikus Clinical Pediatrics 2018 57 (12) 1378-1384

VALUE = OUTCOMES/COST

Growing body of evidence supporting management of several common pediatric fractures: distal radius buckle fracture, clavicle fractures, lateral ankle injuries and toddler's fracture, by PCPs without orthopedic involvement.

For these injuries, the outcome of treatment is similar whether a PCP or orthopedic surgeon cared for the injury.

By forgoing orthopedic referral, the costs of a specialty consult visit are avoided.

PCP benefits from being able to bill for fracture care.

Use of removable DME is less costly than for casting and additional visits for cast removal.

But does increased value equate to improved patient satisfaction?

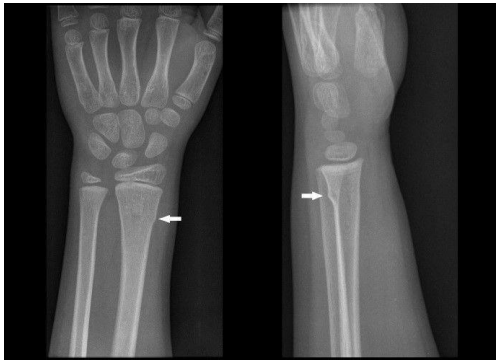
Fracture Management: PCP vs Ortho Referral

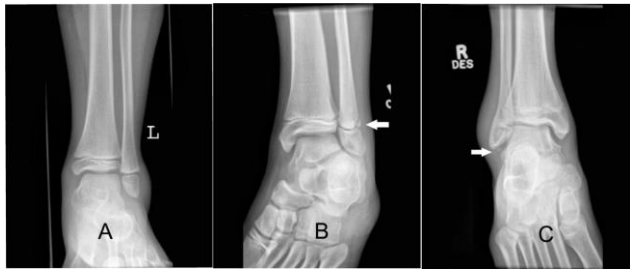
Paediatrician office follow up of minor fractures

E Koenkink and K Boutis Paediatrics Child Health 2014 19(8)

Uncomplicated midshaft fractures of the **clavicle, distal radius buckle fractures and non displaced fractures of the distal fibula** are common and can be safely managed with removable supportive devices and an emphasis on **symptomatic care.**

Due to the exceptionally low risk of complications and the limited role of the orthopedic surgeon, **recent evidence suggests that these fractures could be followed by paediatrician or family doctor.**





Fracture Management: PCP vs Ortho

Paediatrician office follow up of minor fractures

E Koenkink and K Boutis Paediatrics Child Health 2014

459 providers responded to survey

Overall 296 (69.5%) PCP's agreed that minor pediatric fractures could be followed in a PCP office

260 (57%) did not manage minor common fractures in their practice

439 (96%) treated fewer than 20 fractures/year

BARRIERS TO PCP OFFICE MANAGEMENT OF MINOR FRACTURES

(58%) lack of materials for immobilization

(44%) knowledge deficits for follow up and/or anticipatory guidance for return to sports

(38%) perceived parental preference for orthopedic surgeon

(2.7%) concerns about medicolegal issues if orthopedic surgeon not involved in care.

TREATMENT GUIDELINE SUMMARY

Table 2. Treatment Guideline Summary.

	Indication for PCP Management	Treatment	Indication for Orthopedic Referral
Buckle fracture of distal radius	• Bulging of the cortex secondary to an axial compression force • Nondisplaced • No distinct fracture line	• Splint or Velcro wrist brace • Return to activity at 4 weeks	• Complete fracture • Greenstick fracture • Fractures extending into the physis
Clavicle fracture	• Middle third fracture • Less than 100% displacement	• Sling • Follow-up X-ray at 4 weeks • Discontinue sling and initiate ROM at 4-week follow-up • Resume full activity when strength and ROM return to baseline levels	• Open fracture (ED) • Neurovascular injury (ED) • Proximal or distal third fractures • Greater than 100% displacement • Signs of delayed healing at 4-week follow-up
Lateral ankle injury	• Low-risk ankle injury as defined by OARs and LRAR • Radiograph negative ankle injury	• CAM boot • Return to activities at 4 weeks as determined by patient symptoms	• Radiographically identified fracture of the ankle or foot
Toddler's fracture	• Oblique, nondisplaced tibia fracture in a "toddler" aged child	• CAM boot for 4 weeks • Return to full activity at 6 weeks	• Non-toddler fractures of the tibia

Abbreviations: PCP, primary care physician; ROM, range of motion; ED, emergency department; OAR, Ottawa Ankle Rule; LRAR, Low-Risk Ankle Rule; CAM, controlled ankle motion.

MacNeille and Henrrikus, Clinical Pediatrics 2018

Buckle Fracture of the Distal Radius

Common injury after fall onto outstretched hand

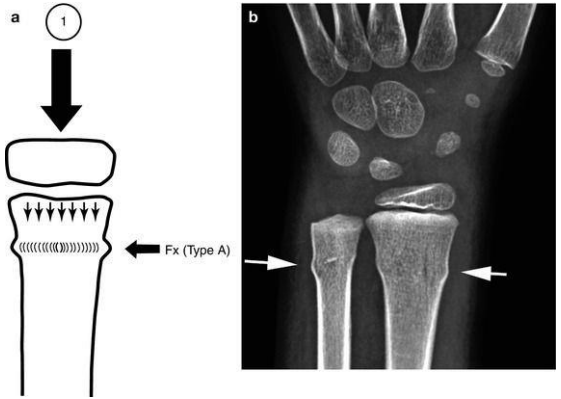
Wrist pain with motion, and/or palpation.

Reluctance to use the arm

Reluctance to bear weight through the arm

Swelling or bruising may or may not be seen.

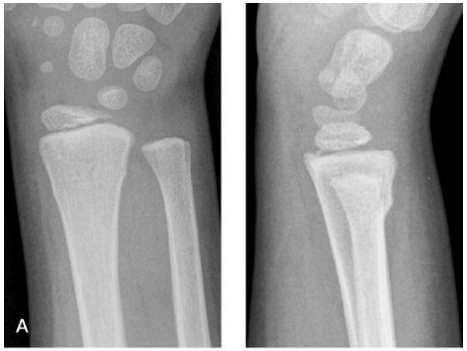
Buckle Fracture of the Distal Radius



Diagnosis made with xrays

AP/lat wrist or forearm

Buckle fracture: bulging of the cortex due to axial compression forces. **There is NO distinct fracture line or displacement.**



Buckle Fracture of the Distal Radius

Painful with range of motion, most likely supination and with weightbearing.

Buckle fractures are stable injuries.

Treatment is symptomatic. Treatment aids in pain control, and prevents uncomfortable motion.

Treatment: **brace,** splint or cast

Equivalent outcomes cast vs removable splint.

Buckle Fracture of the Distal Radius TREATMENT

Pros of short arm cast

- Strong
- Not removable, reliably present
- “Glamorous”

Cons of short arm cast

- Bulky, potential interference with fine motor activities
- Not removable
- Can’t get wet
- Second visit to remove cast

Pros of removable brace

- Removable
- Easier bathing
- Potentially easier fine motor activities
- Does not require additional visit for removal

Cons of removable brace

- Fit may be challenging
- Adequate inventory in stock
- Not colorful or glamorous

Buckle Fracture of the Distal Radius

Repeat xrays?

Not required if:

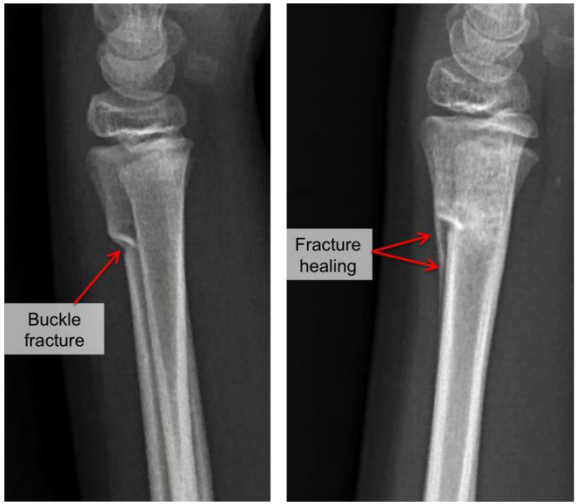
Pain improved

Range of motion improved

Weighbearing improved

If xrays, obtain AP/Lat/ oblique wrist.

Many parents prefer repeat xrays for **“peace of mind”**



Buckle Fracture of the Distal Radius

Most children are able to wean from immobilization after **4 weeks and slowly increase activity as tolerated.**

Wrist can remain sensitive for an addition couple of weeks

Return to more sport/aggressive activities when:

Pain resolving

Range of motion returns

Tolerates weightbearing in push up

Buckle Fracture of the Distal Radius

Indication for PCP Management:

Bulging of the cortex secondary to axial compression force

Non displaced

No distinct fracture line

Treatment:

Splint or velcro wrist brace

Return to activity at 4 weeks

Indication for Orthopedic Referral

Complete fracture

Greenstick fracture

Fractures extending to the physis

Clavicle Fractures

Common injury s/p fall onto outstretched hand or directly onto shoulder

Pain at shoulder

Pain with motion of arm

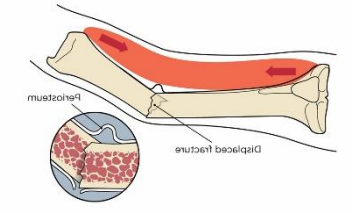
May see deformity, swelling and/or bruising

Clavicle Fracture

Diagnosis made with xrays AP clavicle

Assessment of angulation and displacement.

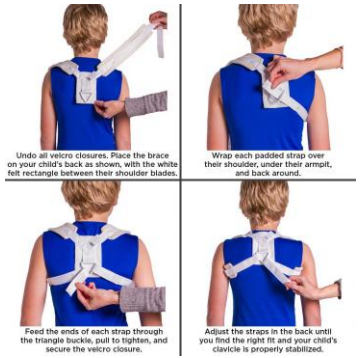
Many clavicle fractures in children are non displaced or minimally displaced because of thick periosteum.



Clavicle Fractures TREATMENT

Treatment of simple clavicle fractures is generally non operative with sling or figure of 8 harness **for comfort.**

Neither sling nor figure of 8 brace is able to hold fracture in place.



Clavicle Fracture TREATMENT

Pros of Sling

- Supports weight of the arm
- Limits movement of shoulder and arm

Cons of Sling

- Limits elbow range of motion
- Can be uncomfortable around the neck

Pros of Figure of 8 Harness

- May improve posture during healing
- More comfortable for some patients
- Less likely to precipitate elbow stiffness

Cons of Figure of 8 Harness

- Does not support weight of arm
- Can be more challenging to apply

Clavicle fractures

Reassure that posture will improve when pain improves

Importance of elbow range of motion, early on

Gentle shoulder range of motion exercises when tolerate, 2-4 weeks.

Follow up xrays in 4 weeks

If signs of delayed healing or symptoms not improving, refer to Orthopedic Surgery.

Patient can resume full activities when strength and range of motion have returned to baseline.

Fracture healing occurs over **6-12 weeks.**

Clavicle Fracture

Indications for PCP Management

Middle third fracture

Less than 100% displacement

Treatment

Sling

Follow up xray at 4 weeks

Discontinue sling and initiate range of motion at 4 week follow up

Resume full activity when strength and range of motion return to baseline levels

Indications for Orthopedic Referral

Open fractures

Neurovascular injury

Proximal or distal ⅓ fractures

Greater than 100% displacement

Signs of delayed healing at 4 week follow up

Lateral Ankle Injury: Sprain vs SH I distal fibula

Common injury inversion force during play or sport.

Pain, swelling and/or ecchymosis may be present.

May or may not be able to bear weight.

Lateral Ankle Injury: Sprain vs SH I distal fibula

Diagnosis:

Xrays: AP/lat/mortise view ankle

Are xrays needed?

OTTAWA ANKLE RULES: reduce unnecessary use of xrays

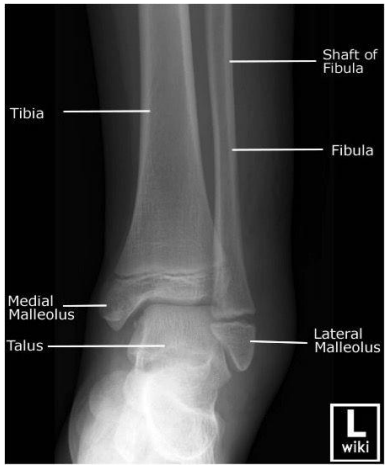
Ankle xrays are only indicated when there is bony tenderness over posterior edge of medial or lateral malleolus, or an inability to bear weight both immediately and in the ED.

Low Risk Ankle Rule is validated clinical decision rule to further reduce the xrays usage in children. Low risk exam is tenderness and swelling isolated to the distal fibula and adjacent lateral ligaments **distal to the anterior joint line** of the ankle.

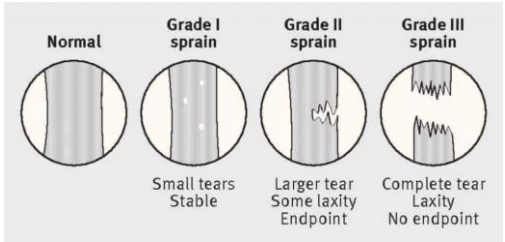
Low risk injuries: sprains, contusions, lateral talar avulsion fractures, SHI and SHII fractures of distal fibula, distal fibula buckle fractures and epiphyseal avulsion fractures.

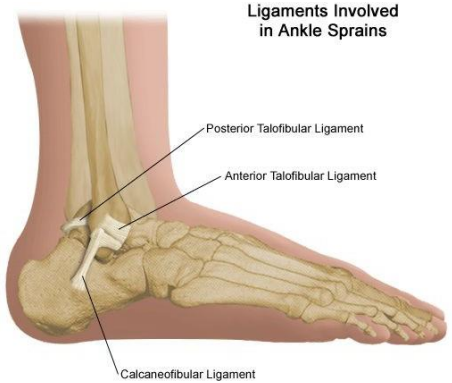
Lateral Ankle Injury: Sprain vs SHI Fibula Fracture

Growing children are more likely to injure through bone (fracture) vs through ligament (sprain)



Injuries heal over 3-6 weeks. More severe sprains can take longer to recover than fractures.





Ankle Injuries: Sprain vs SHI distal fibula fracture

Treatment: The same for stable fracture vs sprain

RICE: rest, ice, compression and elevation

Safe to weightbear when adequately comfortable to do so.

Weightbearing may be better tolerated in cast, cast boot or stirrup brace.

Lateral Ankle Injury: Sprain vs SHI Fibula Fracture

Pros of brace or boot

Removable for bathing, range of motion and conditioning exercises

Potential earlier return to baseline function

Cons of brace or boot

May be challenging to have adequate fit, particularly for younger children

Pros of Cast

Secure support and immobilization

May allow for comfortable weightbearing, sooner

Adequate fit

Cons of cast

Potential stiffness and deconditioning

Requires second visit to remove cast

Lateral Ankle Injury: Sprain vs SHI Fibula Fracture

When comfortable to weighbear out of immobilization, initiate ankle range of motion and strengthening exercises

Release to more aggressive activities when able to:

- Stand in single limb stance
- Perform single limb toe rise
- Perform single limb hop

Ankle Injuries: Sprain vs SHI distal fibula fracture

Indications for PCP Management

Low risk ankle injury as defined by Ottawa Ankle Rules and Low Risk Ankle Rules

Radiographic negative ankle injury

Indications for Orthopedic Referral

Displaced or angulated fracture of ankle or foot

Fracture that extends to physis

Persistent symptoms

Treatment

CAM boot or brace

Return to activities at 4 weeks as determined by patient symptoms

Toddler’s Fracture

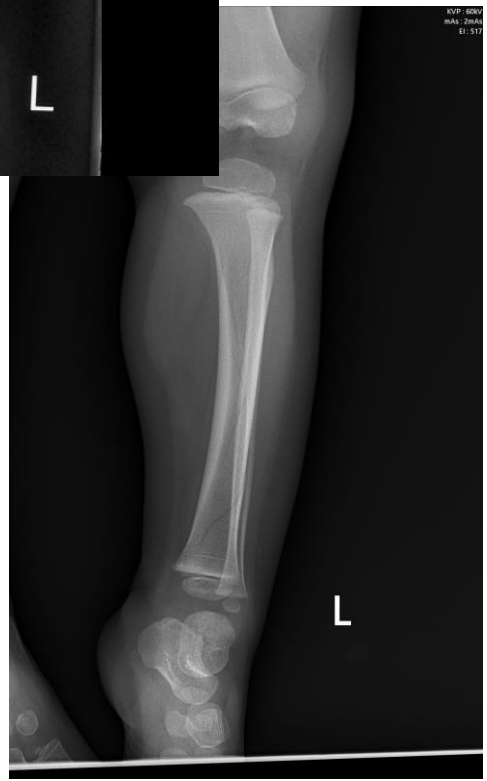
Toddler’s fractures are stable, nondisplaced, oblique fractures of the mid to distal tibia

Caused by an external rotational force

Child may limp or not want to weightbear

May or may not have tenderness to palpation

May or may not have swelling or bruising



Toddler’s Fracture

Diagnosis is made with xray:

AP/lat tibia

Fracture may be seen only on 1 view

Figure 1 - Toddler’s Fracture

Toddler’s Fractures

These injuries may be less obvious and difficult to localize

May be result of “minimal” trauma or unwitnessed event

Child may not want to walk, may only crawl or limp.

If crawling, injury is likely located below the knee

When deciding about **imaging**:

Better to get xrays of long bones vs joints.

AP/lat femur and AP/lat tibia will include hip, femur, knee, tibia and ankle.

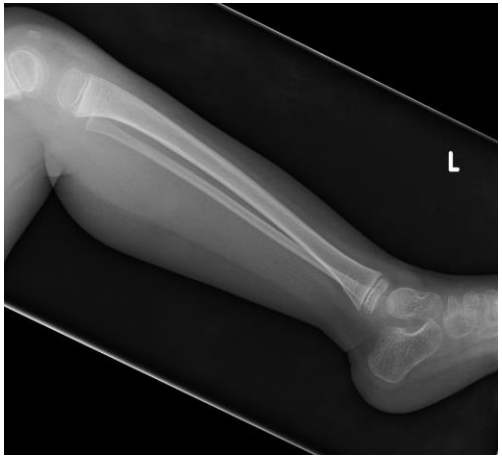
Toddler’s Fractures

Splints often applied in ED

Care to ensure adequate padding to avoid pressure sores

Typically develops over 24-48 hours.

If pain seems to be increasing in splint, need to check skin.



Toddler’s Fractures TREATMENT

Fractures will heal over 3-4 weeks.

Patients may well limp for another week or 2 after.

Treatment can be:

Activity modification, limited weightbearing without immobilization

Cast boot

Cast immobilization

Toddler’s Fractures

Indications for PCP Management

Oblique, non displaced tibia fracture in a “toddler” aged child (1-4 yrs)

Treatment

Cast boot x 4 weeks

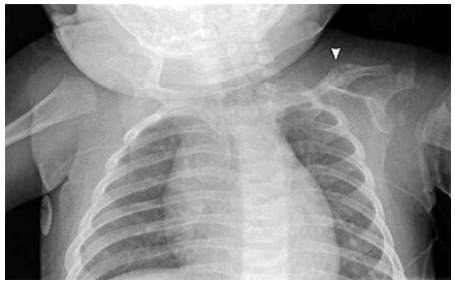
Return to full activity at 6 weeks

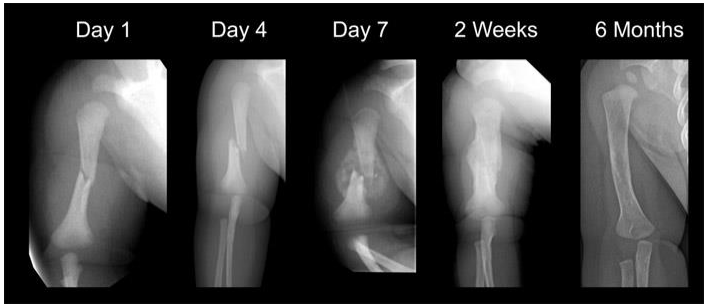
Indications for Orthopedic Referral

Any fracture of the tibia that does not meet criteria for toddler’s fracture

SPLINTING- Birth Fractures of Clavicle and Humerus

These fractures heal very quickly, typically within 2 weeks





SPLINTING Birth Fractures of Clavicle and Humerus

Symptom management with Tylenol and limitation of movement of involved arm

Splinting

Sugartong splint: appropriate for **wrist** and **forearm** injuries

Extends from palm of hand to back of hand just proximal to knuckles

Padding under Orthoplast

Care to ensure that Ace Wrap is not too tight.

Unwrap and re-wrap after the splint material has set and hardened.

Splinting

Long Arm Posterior Splint: appropriate for **elbow** injuries

Extends from lateral border of hand (fingers free) to upper arm/axilla

Flex elbow to 90 degrees, if possible. Optimum position for injury and allowing arm to rest more comfortably in the sling.

At times, this is not possible, and that is OK.

Splinting

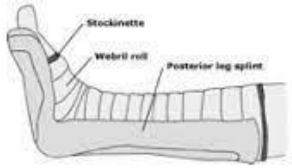
Short leg splint: appropriate for **foot** or **ankle** injuries

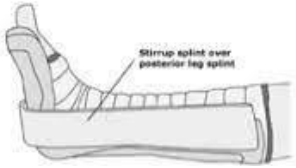
Add **stirrup** splint for additional support, especially is injury required reduction

Extends from ends of toes to upper calf/back of knee.

Dorsiflexion to neutral, ideally

Careful to have adequate **padding** at the **heel**





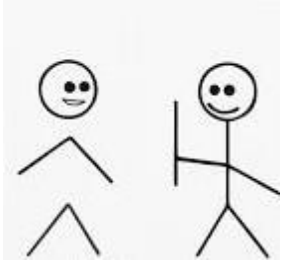
Summary: It’s all going “TIBIA”  alright !

Mother Nature is on our side :)

We have reviewed a few orthopedic injuries which are common. They are painful and impact life activities while they are healing. They heal with support and activity modification, and do not require much active treatment.

This fracture management can be provided by primary care or orthopedic referral, navigating the specific needs and desires of patients and families.

We’ve Got Your Back !



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Epic Staff Message

Epic Secure Chat

Feel free to contact us with:

Questions about xrays, injuries, or follow up, … around patients that you want to manage or ones that you want to refer.

Feel free to text me directly, if that is easiest. :)

My cell phone: 206-369-4209

Thank you for your attention!

Distal radius physeal dysfunction after fracture

Infant clavicle/humerus fracture fractures

Clavicle fracture OPERATIVE INDICATIONS

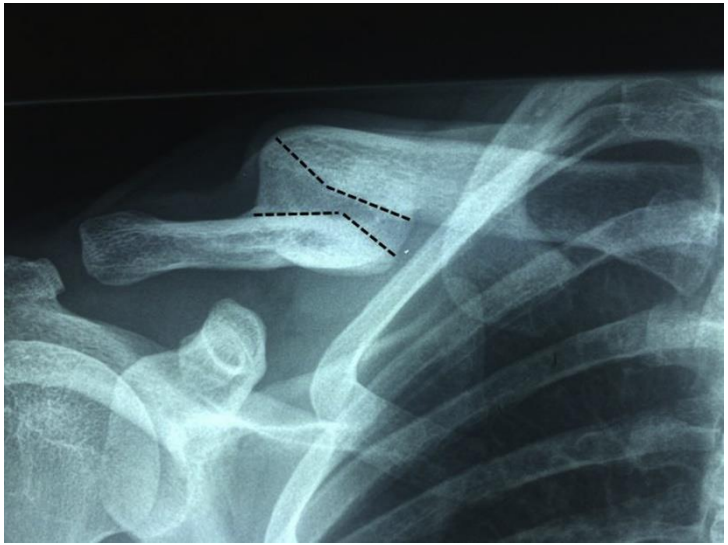
Open fractures

Neurovascular injury

Proximal or distal ⅓ fractures

Greater than 100% displacement

Signs of delayed healing at 4 week follow up



Elbow injury: Nursemaid’s vs Fracture