

WRIST: BUCKLE FRACTURES - ED

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- To ensure that Buckle fractures of the distal forearm will be treated appropriately and consistently by Emergency Department (ED) clinicians.
- Wrist splints are a safe and effective alternative to casts in the treatment of distal buckle fractures of the wrist.
- Criteria: No buckle, no splint. (except simple ulna styloid fracture)
- Exclusions: any other wrist injury
- Local Medical Officer follow-up is recommended if required instead of routine Outpatient review

CHANGE SUMMARY

- Optional 'Softcast' application or backslab for young children where wrist splint unable to be fitted.

READ ACKNOWLEDGEMENT

- **Training and assessment** - This guideline applies to Emergency Department clinical staff (Medical Officers and Registered Nurses).
- **Read only** – Physiotherapists, Orthopaedic Medical Officers

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st November 2021	Review Period: 3 Years
Team Leader:	Nurse Practitioner	Area/Dept: SCH Emergency

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Purpose and Scope

The purpose of this guideline is to assist medical officers and registered nurses when managing buckle fractures of the distal forearm.

The goal is to ensure that buckle fractures of the distal forearm will be managed in a consistent and appropriate manner by Emergency Department (ED) clinicians trained in appropriate skills.

Responsibilities

The purpose of this guideline is to ensure that nursing and medical staff in the ED can refer to indications for appropriate use and safe application of a removable wrist splint for the treatment of wrist buckle fractures.

Management is responsible for ensuring that registered nurses and medical staff who undertake this practice are provided with the appropriate knowledge and training.

Definition

Common wrist fractures in children may be classified into categories. Treatment modalities vary depending on the type of fracture. A buckle/torus fracture should be distinguished from other common fracture patterns in childhood.

Buckle (or torus) fracture: a compression injury of the bone which results in the cortex bulging outward, commonly at the distal radial and/or ulna metaphysis.



Buckles often occur with a so-called fall on outstretched hand injury ('FOOSH' injury) ⁽¹⁾. The integrity of the bone is minimally compromised and the fracture is stable. Buckle fractures can be subtle and easily overlooked, but are important to detect because the weakened part is at risk of more significant fracture if unprotected from further stress.

The child may present with pain and swelling around the fracture site and a limited range of movement of the wrist. However the findings may be minimal.

Buckle fractures are often misdiagnosed as a sprain.

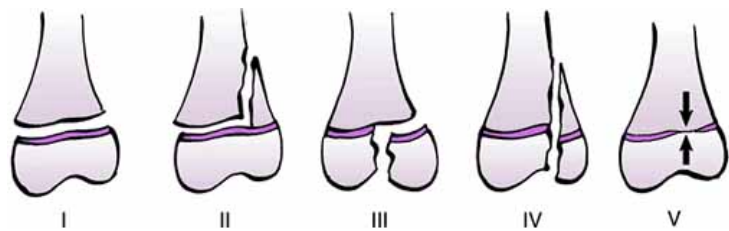
Other wrist fractures

The **greenstick** fracture typically results from bending or torsional stress, much like a bent green twig will separate under force. There is a definite break in the cortex.



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Physeal fractures involve or extend into the growth plate. The Salter Harris classification system is used to identify types:-



A less common type of fracture that may be seen in the immature skeleton is a bowing or “plastic” deformity of bone. Plastic deformity is a diffuse injury to a tubular bone that results clinically in a bent appearance of the limb without a visible focal defect of the cortex.



Assessment of the Patient

Clinicians must assess:

- Adequate lateral and AP X-rays of the wrist.
Buckle injuries are often subtle radiographically and are often most apparent on the lateral view. Assessment must include:-
 - Angulation of the fracture segment
 - Integrity of the cortex of the bone
 - Physeal (growth plate) involvement
 - Presence of any additional fracture in the same arm (other than an ulna buckle or ulna styloid fracture)
- X-rays should be reviewed by a senior clinician if contemplating use of a wrist splint
- In addition, assessment should include:-
 - Skin integrity – superficial wounds should be cleaned and dressed
 - Cognitive and motor function of the child and carers to ensure safe compliance with splint use
 - Adequacy of pain control with a splint in place. If significant pain persists a temporary backslab may be indicated and clinic review planned for the following week.

Indications

Inclusion Criteria

NO BUCKLE - NO SPLINT

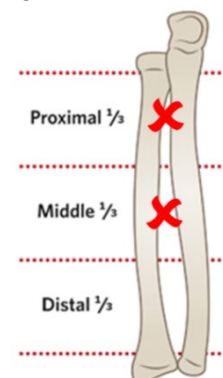
Buckle fractures of the wrist can be treated with either a backslab then a cast, or with a removable wrist splint. Research has shown that buckle fractures heal equally well in a removable splint.^{1,2,3,4,5,7} Splints offer greater comfort for the child and are more convenient⁶. They are usually preferred by children and carers.⁶

The single exception is an ulna styloid fracture which may also be managed in a removable splint

Exclusion criteria

The use of wrist splints is **NOT indicated** if there is⁸:

- Wrist sprain
- Clinical suspicion of a fracture but not visible on X-ray. These injuries may be subtle physeal fractures and warrant orthopaedic review. **A rigid backslab should be applied.**



- Buckle fracture in the proximal 2/3 of the radius and / or ulna
- Greenstick fracture (cortex of the bone is visibly separated)
- Significant angulation or obvious deformity (more than 15 degrees of the metaphysis to the shaft)
- Suspicion of or actual fracture extension involving the physis
- Additional fracture in the same limb requiring treatment with a cast
- Scaphoid pain
- Significant swelling and/or pain not relieved by splint application (recognising that oral analgesia is usually needed initially)
- Child is non-compliant or splint is ill-fitting such as young toddlers under 3 years. Consider application of a 'Softcast' (Delta-cast Soft) by a physio or authorised clinician. An alternative option is application of a backslab and review for definitive cast.

Fitting Instructions for a Wrist Splint

The patient must be measured and the appropriate splint size selected: -

1. Measure the wrist at the level of the wrist flexor crease (where the hand meets the wrist). This wrist circumference measurement is required for splint selection.



2. Select correct size of splint for the brand in stock, for example:-

Splint size	Wrist Circumference
XX-Small	Less than 12cm
X-Small	12 – 14 cm
Small	14 – 15 cm
Medium	15 – 16 cm
Large	Over 16 cm

If a wrist circumference measurement is at the upper limit of an available size, consider trying the next size and select the splint with the best fit and comfort.

3. Select RIGHT or LEFT splint
4. Lay the splint on a flat surface and place the wrist over the splint. Ensure that the rigid stays align with the **MIDLINE** of the volar/palmar and dorsal aspects of the wrist. If this is not possible then a larger or small size may be required
5. Fasten the strap at the wrist crease first



6. Ensure that the fabric edges overlap smoothly.
Adjust the remaining fastening straps for a close and comfortable fit.
7. Trim excess length off the fastening straps
8. The splint should allow free movement of the fingers and feel firm and comfortable. The palmar end of the splint should align with the distal palmar crease, not the base of the fingers.



Patient and family education

Children and carers should be instructed in the use of the wrist splint:

- Ensure that the parent /carer is able to remove and reapply the splint correctly
- Provide a factsheet – [Wrist Buckle Fracture](#)
- Explain that:
 - The splint should be worn day and night
 - The splint may be removed during bathing or to wash the splint if soiled, preferably overnight or during supervised low risk activity, then re-applied
 - The injured wrist may hurt for a few days especially during activity. This is to be expected and should settle. Simple analgesics such as paracetamol and/or ibuprofen may be required. The family should return to the ED if pain control is inadequate with use of the wrist splint.
 - There may be some swelling, which should settle after a few days.

- The wrist splint should be used for a minimum of 3 weeks, and may then be removed so that regular daily activities can resume.
Expect the wrist to be mildly stiff and sore for a few days after removal.
- The patient should avoid contact sport and rough or high risk play for a total of 6 weeks after the injury.
- Some children may be non-compliant with wearing the splint, and may need a backslab to ensure adequate immobilisation of their fracture.

Discharge and Follow-up

- Use of a wrist splint should be recorded in the Progress Note
- Radiology reports will be routinely reviewed as per local protocol. If indicated, further patient review will be arranged.
- Children with non-complex, buckle fractures of the wrist who are managed in a removable splint may be reviewed by their Local Medical Officer (LMO) as required: they do not require outpatient orthopaedic follow-up or progress x-rays.
- The family must be supplied with a fact sheet outlining splint use and given instruction on splint re-application.
- Children who have a plaster backslab applied should be referred to orthopaedic outpatient clinic in 3 to 7 days for definitive management.
- Children with ongoing significant pain not relieved by over-the-counter analgesics, neurovascular compromise, further injury or non-compliance should return to the ED for review and consideration of a cast.
- The splint is single patient use only.

Related information

[Clinical Decision Pathway](#)

[Fact Sheet](#)

[LMO Letter](#)

[Fitting a Wrist Splint](#)

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