

ORTHOPAEDICS



FOR PRIMARY
HEALTH CARE



LION

LEARNING INNOVATION VIA
ORTHOPAEDIC NETWORKS

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Paediatric fractures: A general approach

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Learning objectives

1. Understand the differences between adult and paediatric fractures.
2. Identify greenstick, buckle and growth plate fractures.
3. Understand the basic principles of managing paediatric fractures.
4. Exclude non-accidental injuries (NAI).

Clinical assessment

1. **History:** In very young children, get additional history from parents or caregivers. Determine the time and mechanism of the injury. Be wary of changing stories and an implausible history. Fractures in non-walkers should raise suspicions of NAI.
2. **Examination:** Assess the child from head-to-toe using the 'look, feel and move' approach. In small children look for pseudo-paralysis (unwillingness to move a limb) and refusal to weight bear. Also look for swelling, deformity and bruising. Feel for tenderness or crepitus.
3. **Special investigations:** Start with X-rays of the affected limb or limbs. Also, apply the rule of 2:2 views (AP and lateral), two joints (above and below). In the case of uncertainty, two sides to compare to the normal side.

How are children's bones different from adult bones?

Children have **growth plates** that may be confused with fractures; an X-ray of the contralateral side for comparison can assist if you are not sure. Children's bones are also **elastic** and can bend without breaking. They

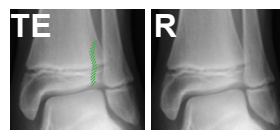
also have **remodelling** potential. The closer the fracture to the growth plate, the greater the remodelling potential.

Growth plate injuries

In children, the weakest point around a joint is the growth plate. In adults, it is usually the ligaments of the joint.

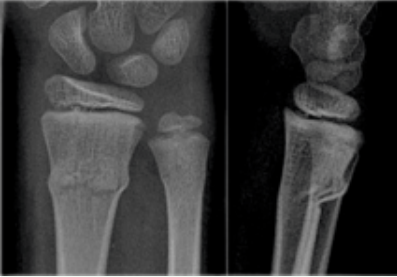
Growth plate fractures occur in typical patterns and are described using the Salter-Harris classification. The word **SALTER** (I – Straight across, II – Above, III – Lower, IV – Through Everything and V – cRush) is a useful acronym to remember this classification.

- Type II fractures are by far the most common
- Type III and IV are intra-articular fractures and require anatomical reduction.
- Type V is associated with a high rate of growth disturbance.



Greenstick and buckle fractures

- **Buckle fractures** occur when the thin cortex buckles under the force of a fall, but no displacement occurs, and continuity of the cortex is not disrupted.



Buckle fracture of the distal radius

- **Greenstick fractures** occur when a force breaks one cortex, but the other remains intact and acts as a hinge.



Greenstick fracture of the radius with an associated buckle fracture of the distal ulna

Principles of management

- Buckle fractures, regardless of which bone is involved, can be managed with simple immobilisation in the form of a backslab, cast or removable splint. Immobilisation for the upper limbs is typically 2–3 weeks and the lower limbs 3–4 weeks.
- All diaphyseal fractures, including greenstick, should be reduced and immobilised until union is achieved. Immobilisation can be in the form of a plaster cast (tibia fractures), a backslab (fractures around the elbow) or a sling (clavicle and proximal humerus fractures).
- Residual deformity can be accepted depending on the location of the fracture and the age of the child.
- Typical time to union is three weeks for the upper limb and six weeks for the lower limb.
- Operative treatment is seldom indicated and will be dealt with in separate chapters.

Resources

Modified images:

Tib/fib growth plate. Available from:

https://commons.wikimedia.org/wiki/File:Tib_fib_growth_plates.jpg

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(Creative Waves Brand Design)

Developmental editing and design:
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ABOUT THE BOOK

Informed by experts: Most patients with orthopaedic pathology in low to middle-income countries are treated by non-specialists. This book was based on a modified Delphi consensus study* with experts from Africa, Europe, and North America to provide guidance to these health care workers. Knowledge topics, skills, and cases concerning orthopaedic trauma and infection were prioritised. Acute primary care for fractures and dislocations ranked high.

Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritised.

* Held et al. Topics, Skills, and Cases for an Undergraduate Musculoskeletal Curriculum in Southern Africa: A Consensus from Local and International Experts. JBJS. 2020 Feb 5;102(3):e10.

THE LION

The Learning Innovation via Orthopaedic Network (LION) aims to improve learning and teaching in orthopaedics in Southern Africa and around the world. These authors have contributed the individual chapters and are mostly orthopaedic surgeons and trainees in Southern Africa who have experience with local orthopaedic pathology and treatment modalities but also in medical education of undergraduate students and primary care physicians. To centre this book around our students, iterative rounds of revising and updating the individual chapters are ongoing, to eliminate expert blind spots and create transformation of knowledge.

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The information in this book is meant to supplement, not replace, Orthopaedic primary care training. The authors, editor and publisher advise readers to take full responsibility for their safety and know their limits. Before practicing the skills described in this book, be sure that your equipment is well maintained, and do not take risks beyond your level of experience, aptitude, training, and comfort level.

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ACKNOWLEDGEMENTS

This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada. Thanks to Johan Fagan, Michelle Willmers and Glenda Cox for their mentorship and support.