

ORTHOPAEDICS



FOR PRIMARY
HEALTH CARE



LION

LEARNING INNOVATION VIA
ORTHOPAEDIC NETWORKS

UNIVERSITY OF CAPE TOWN'S **ORTHOPAEDIC DEPARTMENT**

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Distal radius fractures

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updated 19.9.22

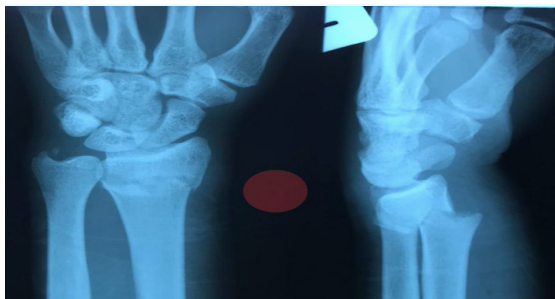
Learning objectives

1. Understand radiologic measurements to describe a distal radius fracture.
2. Know the indications for surgical intervention.
3. Know the conservative treatment and avoiding stiffness of finger joints with appropriate plaster techniques.
4. Understand which fractures require additional osteoporotic workup and management

Introduction

Distal radius fractures follow a bimodal distribution. The low energy distal radius fracture is sustained after a fall from standing height, on an outstretched hand. This is often seen in older female patients living with osteoporosis. The high energy distal radius fracture affects young individuals commonly after falls from heights or from motor vehicle accidents. In these patients the physician must examine for possible concomitant skeletal or visceral injuries. The functional outcome of the injured wrist and the hand will depend on an accurate clinical assessment of the injury, correct management, and prevention of complications.

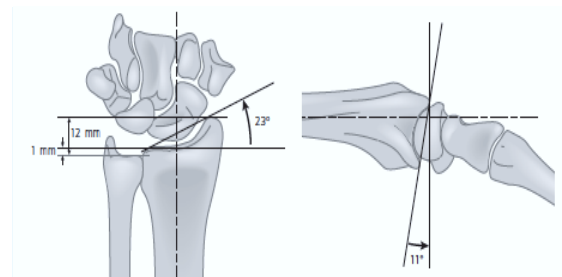
Low energy distal radius fracture



Colle's type fracture

Often an extra-articular fracture, displaying a consistent displacement pattern, including dorsal

angulation, shortening, radial deviation, and radial tilt. This is the so-called Colle's fracture, and patients typically present with a 'dinner fork' deformity of the wrist. When the angulation is volar, it is called Smith's fracture.



Normal anatomical measurements used to judge whether or not a reduction is acceptable

The radiographic criteria for an acceptable reduction of a distal radius fracture are:

- Radial length of more than 5mm.
- Radial inclination angle of more than 15o.
- Sagittal articular tilt of less than 7o dorsal tilt.

Patients are reviewed fortnightly for a fracture position check. The cast should be removed after six weeks and followed by physiotherapy.

High energy distal radius fracture

These fractures are often intra-articular and comminuted. They may present with soft tissue compromises such as open wounds or blisters.

After an initial assessment, a closed reduction should be attempted to alleviate soft tissue pressure from displaced fragments. Fractures that fail conservative treatment as per the criteria above and open fractures must be referred for surgery.

Clinical examination

Important aspects of the clinical exam are **the status of soft tissue envelope** (open vs closed fracture, swelling, blisters). Also **The neurovascular status** needs to be assessed: radial pulse, examine all 3 major nerves that cross the wrist including ulna nerve, radial nerve but most importantly the median nerve which lies in proximity of the distal radius in its volar. Furthermore, the **description of the wrist deformity** will help with the closed reduction technique.

Imaging

Plain radiographs

For a better understanding of the fracture pattern, one must obtain **dedicated wrist** views which are orthogonal to each other (Antero-posterior and lateral views as seen in the X-Ray above). In case of clinical suspicion of more proximal or more distal injuries, other appropriate radiographs should be obtained.

Assess the **distal radius anatomy for length, inclination, volar tilt, and translation** (see image of schematic drawing above)

CT Scan

This is indicated for comminuted, intraarticular fractures for preoperative planning purposes.

Management

Closed fractures

The treatment is initially conservative, a closed reduction aiming at reversing the deformity is conducted and a well-moulded below elbow plaster is applied. Typically, this is best done with the patient either under conscious sedation or under a hematoma block.

For a specific description of the application of forearm cast, please the chapter on Plaster of Paris casts.

For **Colle's type fractures** apply longitudinal **traction for a minimum of 3 minutes** with the assistant providing countertraction. Follow with **volar flexion and ulna deviation of the wrist** to correct the deformity. For **Smith type fractures** follow with **dorsiflexion** and ulna or radial deviation of the wrist to correct the deformity. In **cases of severe swelling**, a volar or back (dorsal) plaster slab is applied to maintain some reduction to allow swelling to settle. This is typically converted to a full Plaster after 5 days.

Note: the below elbow POP starts distal to 2-3cm distal to the elbow flexion crease to allow elbow flexion and ends proximal to the distal transverse palmar crease and proximal to the knuckles dorsally to allow for metacarpophalangeal joints full flexion.

Surgery is indicated If below criteria are not acceptable, in **open injuries, neurovascular injuries, with severe soft tissue compromise** (i.e. burn wounds). Relative indications are **multiple fractures** in other areas or for **patient convenience** to return to work earlier.

Paediatric considerations

In children up to an average age of 14 for females and 16 for males, the distal radius still has an open transverse growth (GP) plate responsible for longitudinal.

In fractures involving the GP, there is a risk of growth disturbance leading to shortening (complete closure) or angular deformity (partial closure).

The fracture reduction must be **gentle and attempted only in the first 48 hours of the injury**. Followed by **immobilization with a cast for 3 weeks**. It is discouraged to attempt a reduction after 48 hours since the reduction force required to **reduce an old injury may damage the GP further**. In cases of such delayed presentation in young patients it is advised to simply immobilize the wrist in a below elbow cast without attempting a reduction. Due to active growth in the distal radius, the growing distal radius is able to correct angular deformities. At least 2 years of remaining growth are required for this process to occur. Here deformities of up to 30° can be accepted in young children.

Complications

An **acute compartment syndrome** due to a tight cast must be excluded especially with large soft tissue swelling. Also, an **acute carpal tunnel syndrome** due to an excessive wrist flexion to correct deformity must be avoided. **Stiffness of the wrist and fingers** is a frequent complication, especially with poorly applied casts immobilizing metacarpophalangeal joints. **Complex regional pain syndrome** is also a known chronic complication.

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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 prioritized. Acute primary care for fractures and dislocations ranked high. Furthermore, the diagnosis and the treatment of conditions not requiring specialist referral were prioritized.

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.

Reference: 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.

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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

Michelle Willmers and Glenda Cox for their mentorship.