

# ORTHOPAEDICS



FOR PRIMARY  
HEALTH CARE



# LION

LEARNING INNOVATION VIA  
ORTHOPAEDIC NETWORKS

EDITOR: **MICHAEL HELD**

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

# Acute injuries around the elbow

by Ntambue Kauta & Stephen Roche

## Learning objectives

1. Understand neurovascular, soft tissue and range of motion assessment.
2. Known X-Ray signs which need referral.
3. Prolonged immobilisation will lead to stiffness and needs to be avoided.

## Introduction

The elbow is a complex hinge joint consisting of the radiocapitellar, ulnohumeral and proximal radioulnar joints. It allows flexion, extension and rotation of the forearm relative to the arm.

Injuries around the elbow are commonly caused by high energy impact.



The following injuries will be discussed in this chapter:

- Elbow dislocation
- Distal humeral fractures
- Radial head fractures
- Olecranon fractures

The attending physician must follow the advanced trauma life support (ATLS) management protocol for all these high energy injuries, conduct a thorough

neurovascular and soft tissue assessment, and document the findings.

## Elbow dislocation

The elbow joint is stabilised by strong static and dynamic anatomic structures (joint capsule, ligaments and muscles crossing the joint). It takes a high energy impact to dislocate the elbow joint.

The most common dislocation pattern is posterolateral; the proximal radius and ulnar joint are often not disrupted as both bones move out of the joint posterolaterally.

## Clinical assessment

- ATLS approach.
- Neurovascular status assessment.
- Soft tissue assessment.
- For grossly deformed joints and in situations where radiology facilities are not available, every dislocated joint should be documented, reduced and followed by radiography.

## Radiographic assessment

Helps to decide whether you are dealing with a simple or complex dislocation.

Simple dislocations have no associated fractures.

Complex dislocations are associated with certain fractures such as radial head, coronoid, capitellum or olecranon fracture.

The association of elbow dislocation, radial head and coronoid fractures is termed the ‘terrible triad’ due to the treatment challenges it poses to the treating surgeon.

## Management

After an initial clinical and radiographic assessment, the dislocation must be reduced.

Use the standard sedation protocol available.

### Simple dislocations

For posterolateral dislocation (most common), a coupling of traction on the forearm, counter traction on the arm with downward pressure on the olecranon and gentle flexion should reduce the elbow.

Reassess and document neurovascular status. Obtain control radiographs.

Assess elbow stability by gentle extension of the elbow from 90° to 30° extension.

If stable throughout this arc, the joint is deemed stable. Immobilise in an arm sling for two weeks and start range of motion.

If re-dislocation occurs at 60°, reduce the elbow again, flex to 90°, pronate the forearm and test stability. If it is stable in pronation, then immobilise in pronation using commercially available braces or an above-elbow back slab.

If re-dislocation occurs between 90° and 60°, the joint is deemed unstable, reduce it again, immobilise in a back slab and refer to the orthopaedic surgeon for further assessment and surgical consideration.

### Complex dislocations

- Attempt reduction as for simple dislocations.
- Immobilise in a back slab and refer to an orthopaedic surgeon.
- Neurovascular status must be carefully assessed and documented.

## Distal and intra-articular humeral fractures



- Undisplaced extra-articular fractures may still be treated conservatively, provided they remain well-aligned

(less than 15° of varus/valgus, anterior/posterior apex angulation).

- Displaced intra-articular fractures are best treated surgically to allow early range of motion and avoid elbow stiffness.
- The initial treatment is to immobilise the limb in an above elbow back slab.
- Undisplaced fractures should be treated conservatively for four to six weeks and followed by physiotherapy.

## Radial head fractures

The management of isolated radial head fractures depends on the degree of displacement and the number of bony fragments.

Undisplaced fractures are treated in an arm sling for three weeks, and early range of motion is encouraged.

Angulated fractures by more than 30° should be reduced by the described technique and immobilised in an above-elbow back slab for three weeks.

Displaced isolated bony fragment from the radial head: a haematoma block with local anaesthetic is advised to relieve pain and examine for a mechanical block to pronation and supination. If there is no mechanical block, treat as for undisplaced fractures; if there is a mechanical block, the patient should be referred for surgery.

Displaced and non-reducible fractures should be referred for surgery.

Radial head fractures associated with elbow dislocation should be managed as

per the complex elbow dislocation treatment protocol.

## Olecranon fractures

Undisplaced olecranon fractures are treated conservatively in an above-elbow back slab for four to six weeks.



Displaced olecranon fractures debilitate the elbow extension mechanism (the triceps tendon pulls on the olecranon to extend the elbow). They warrant an open reduction and stable fixation to restore the extensor mechanism.

Other indications for surgical treatment include open fractures, trans-olecranon fracture dislocation, multiple ipsilateral or contralateral injuries.

## References

Bhandari, M. Evidence-Based Orthopedics, First Edition, 2012, Blackwell Publishing

Blom A, Warwick D, Whitehouse M, editors. Apley & Solomon's system of orthopaedics and trauma. CRC Press; 2017 Aug 29.

Green DP. Rockwood and Green's fractures in adults. Lippincott Williams & Wilkins; 2010

**Editor:** Michael Held

**Conceptualisation:** Maritz Laubscher & Robert Dunn

**Cover design:** Carlene Venter  
(Creative Waves Brand Design)

**Developmental editing and design:**  
Vela Njisané and Phinda Njisané

## 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.

## DISCLAIMERS

Although the authors, editor and publisher of this book have made every effort to ensure that the information provided was correct at press time, they do not assume and hereby disclaim any liability to any party for any loss, damage, or disruption caused by errors or omissions, whether such errors or omissions result from negligence, accident, or any other cause.

This textbook is not intended as a substitute for the medical advice of physicians. The reader should regularly consult a physician in matters relating to his/her health and particularly with respect to any symptoms that may require diagnosis or medical attention.

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.

The individual authors of each chapter are responsible for consent and rights to use and publish images in this book.

© The Authors 2021



Licensed under a Creative Commons Attribution (CC BY) 4.0 International Licence.

## 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.