

ORTHOPAEDICS



FOR PRIMARY
HEALTH CARE



LION
LEARNING INNOVATION VIA
ORTHOPAEDIC NETWORKS

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Open fractures

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Learning objectives

1. Recognise and grade an open fracture.
2. Understand the basic (non-surgical) management of an open fracture.

Introduction

Open fractures, also known as compound fractures, are fractures with a direct communication to the external environment. A wound in the proximity of a fracture should be managed as an open fracture until proven otherwise. Open fractures often occur through high energy mechanisms and are often associated with additional injuries. Common sites for open fractures are the tibia (most common open long bone fracture), ankle, phalanges, metacarpals and forearm.



Open tib/fib fracture (Image source: Dr K Laubscher)

Approach to open fractures

1. ATLS: Life before limb – ABCDEs, direct pressure on wound to limit bleeding (part of secondary survey).

2. **Grading a fracture** (Gustilo-Anderson classification): Extent of contamination, soft tissue coverage (need for flap) and presence of vascular injury are defining features when grading the fracture.

Grade	Wound Size (cm)	Soft tissue damage, fracture comminution and contamination
I	< 1	Minimal
II	1–10	Moderate
III	> 10	Severe
A		Adequate soft tissue cover
B		Soft tissue coverage requires a flap
C		Associated arterial injury requiring surgery

3. **Early antibiotics and analgesia**

Antibiotics: Early antibiotics most important intervention to prevent infection. Studies shown delay more than 3h from injury increases infection rate.

- **Grade 1 and 2:** Narrow spectrum antibiotic covering skin commensals (gram positive organisms). Local preference – **cefazolin** (1st generation cephalosporin) for 48 hours.
- **Grade 3:** Broad spectrum cover required, including cover for gram negative organisms. Local preference

- early treatment with **co-amoxiclavor cefazolin, gentamycin (and metronidazole in case of farmyard injury)** for 5 days.
- **Tetanus toxoid 0.5 ml subcutaneous.**

Analgesia

- 4. Irrigation and dressing:** As part of preparation for theatre, the wound should be cleaned with brief irrigation and sterile saline dressing should be applied. Dressing should be undisturbed until the patient is taken to theatre. Photographic documentation of the wound facilitates communication with other teams.
- 5. Neurovascular check:** Reassess the neurovascular status.
- 6. Reduce and immobilise** (with repeat neurovascular exam): Reduce and immobilise with a splint to reduce pain and limit further soft tissue injury.
- 7. Refer to orthopaedics:** Patients must be referred to orthopaedic surgeon – obtain consent, keep NPO, X-rays etc.

During surgery

Increased time to debridement does not increase infection rates, providing initial treatment was adequate (early antibiotics and sterile dressing).

- **Debridement:** Removal of all foreign matter and excision of dead and devitalised tissue.
- No benefit shown to using other irrigation fluids like soap or antiseptic solutions. Any bony fragments which are not attached to soft tissue should be removed.
- External fixation allows maintenance of

the fracture reduction while giving full and easy access to the soft tissue and wound care.

- In a hospital where the expertise or equipment is not available, open fractures can be debrided and a back slab applied. Select open fractures with clean wounds can be internally fixed in the first sitting, providing the expertise are available.
- Open fractures with clean, minor wounds can be closed primarily following initial debridement. If the wound is not closable or contaminated, it is better left open and a sterile vacuum assisted closure dressing applied.

Post-surgery

Patients should be **reassessed in 24–48 hours** for a change in dressing and assessment for further debridement. If the wound is clean, it may be closed by appropriate means. If not clean, further debridement is done and a pus swab is taken. The patient would be taken back to theatre as often as required until skin closure can be done.

Relook surgery

On relook surgery, the fracture is then treated on its merits. Options include:

1. Definitive external fixation.
2. Conversion of temporary external fixation to internal fixation.

References

1. Walters J, editor. Orthopaedics: A guide for practitioners. Cape Town: UCT; 2010.
2. Chang Y, Bhandari M, Zhu KL, et al. Antibiotic Prophylaxis in the Management of Open Fractures. JBJS Rev. 2019;7(2):e1. doi:10.2106/JBJS.RVW.17.00197

Modified images:

1. Open fracture. Available from: https://commons.wikimedia.org/wiki/File:Open_fracture_01.JPG

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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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