

Open Fractures

Donnel Alexis Rubio, MD, FPOA
Associate Professor, UP College of Medicine
Clinical Associate Professor, Department of Orthopedics UP-PGH

Definition:

Open fracture is defined as an injury where the fracture and the fracture hematoma communicate with the external environment through a traumatic defect in the surrounding soft tissues and overlying skin. (Court-Brown C et.al. Rockwood and Green's Fracture in adults. 8th edition.) Tibia and the phalanges are the most common fractured bone complicated with open wounds.

Classification:

Gustilo and Anderson Classification

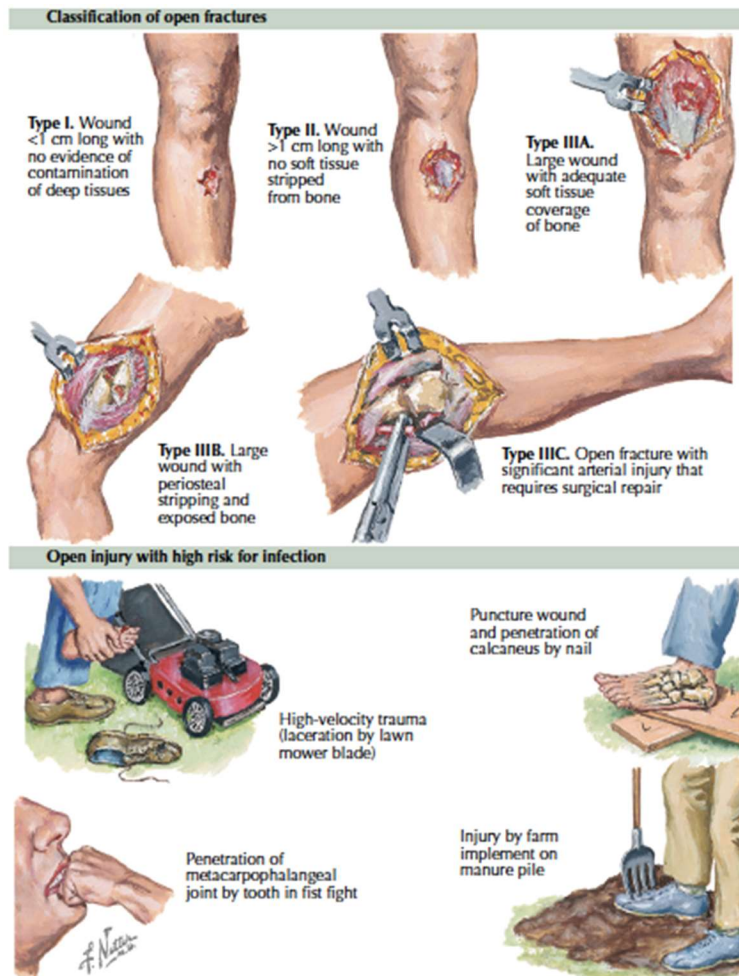


Illustration. Musculoskeletal System Part III. 2nd edition

Iannotti J et.al. The Netter Collection of Medical

Problems encountered in treating open fracture is that the wound exposes the fracture hematoma to contamination thereby increasing risk for infection for type I infection

rate is 0-2%, 2-12% for type II and 10-50% for type III. It adds potential complex soft tissue reconstruction requires multiples surgeries and prolonged Hospitalization. Complication include infection, non-union, and wound healing problems. (Diwan A et.al. Principles and Practice of Open Fracture. Chinese Journal of Traumatology. 2018)

Presentation:

Open Fractures are often caused by high energy injury. At the ER, the mechanism of injury, time of injury and place of injury should be elicited.

On examination, ABCD of trauma should always be must be examined. Soft-tissue damage must be evaluated. We should note that a skin injury may not positioned directly over the fracture site and may lie at a distant site. It may connect with the fractured bone under degloved skin. Hence any fracture associated with a wound in the same area must be deemed open until proven otherwise by surgical exploration.

Neurovascular examination must be thorough, and signs of compartment syndrome must be extracted. Radiographs must also be obtained.

The basic principle in the initial management of open fracture are the following:

1. Prompt initiation of appropriate antibiotics
 2. Wound debridement to remove any dead space or doubtful tissue at the OR
 3. Profuse lavage of the wound to reduce the size of the inoculum
 4. Fracture stabilization
 5. Reconstruction of the soft tissue envelope to protect the zone of injury form infection
- (Diwan A et.al. Principles and Practice of Open Fracture. Chinese Journal of Traumatology. 2018)

Current recommendations for Type fracture 1 and 2 is early coverage for Gram (+). examples of antibiotics that can be given are 1st generation cephalosporins, flouroquinolone and Clindamycin. For Type III coverage for gram negative must be added; additional aminoglycoside is recommended. For patients with gross contamination, either penicillin and/or metronidazole is added for anaerobic coverage. Tetanus prophylaxis must also be given.

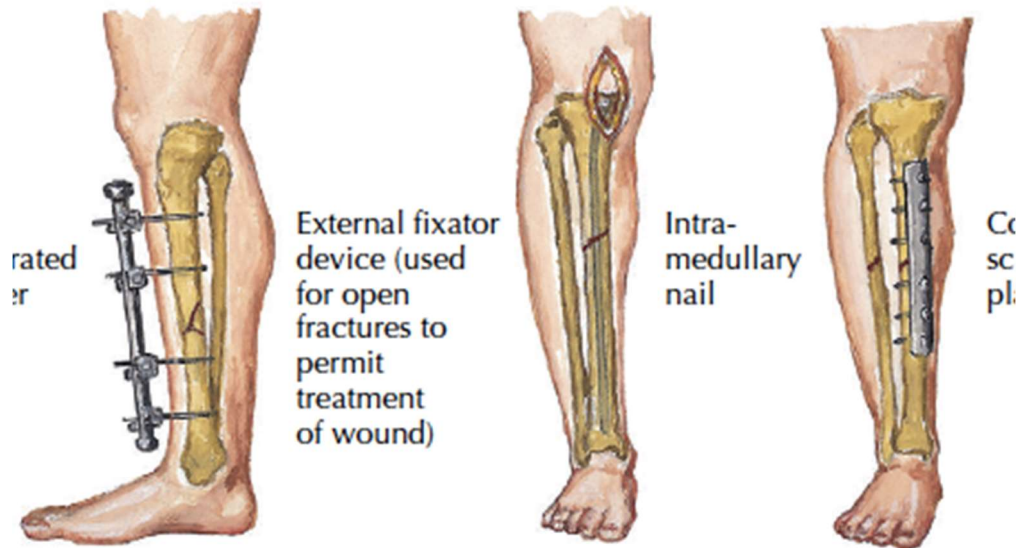
Surgical debridement is considered as one of the most important procedures for open lower limb fractures. Debridement should be done by an experienced team.



Contraindication for immediate closure are the following: gross contamination of feces, dirt, stagnant water, farm injuries, freshwater injuries, delay to initiation of antibiotics

>12h and questionable viability of initial surgery. A useful policy is “whenever in doubt, do not close.”

Early stabilization of the bony skeleton is an essential in open fracture management. Any major motion or shearing forces will continue to disrupt local soft tissues and prevent definitive soft tissue healing.



Iannotti J et.al.The Netter Collection of Medical Illustration. Musculoskeletal System Part III. 2nd edition

Complications of open fractures include infection, non-union, and wound healing problems. (Diwan A et.al. Principles and Practice of Open Fracture. Chinese Journal of Traumatology. 2018)