

Management of Open Fractures

Purpose

Open fractures are high energy injuries that have increased risk of infection due to potential exposure of bone and deep tissue to a variety of environmental debris. Infection can lead to serious complications including nonunion of wounds and osteomyelitis.

Definitions

Gustilo-Anderson Classifications for open fractures

Type I fracture	open fracture with clean wound <1cm long
Type II fracture	open fracture with laceration >1cm long without extensive soft tissue damage
Type III (A-D) fracture	open segmental fracture, open fracture with extensive soft tissue damage, or traumatic amputation.

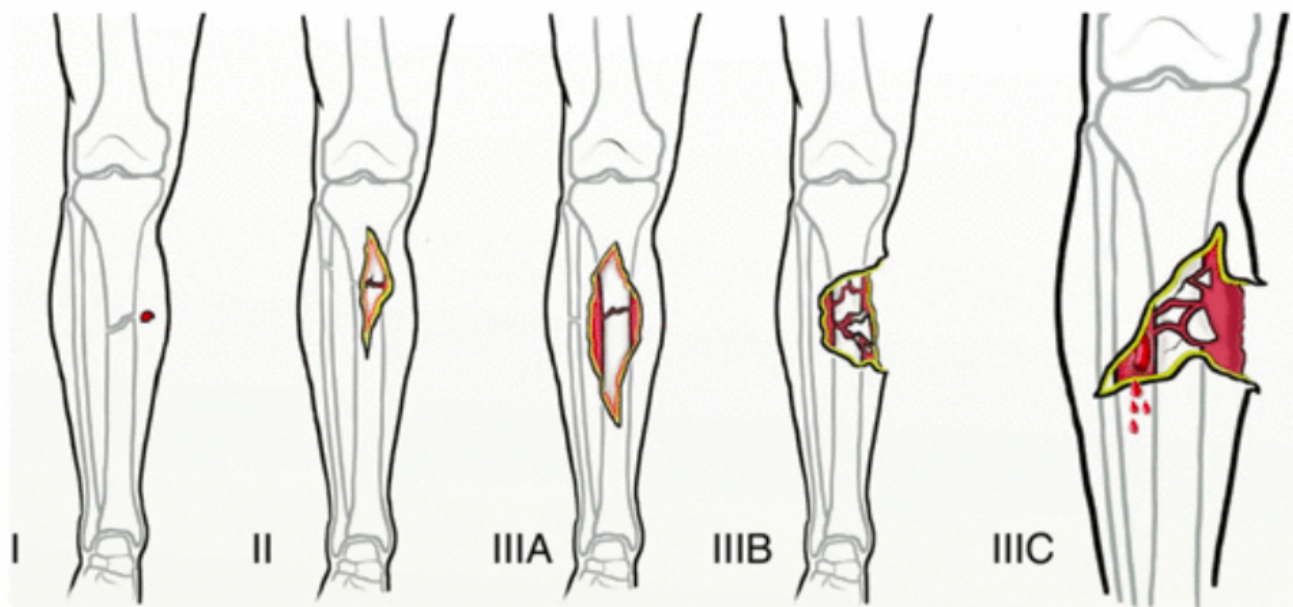


TABLE 1. Open Fractures—Gustilo Classification^{1,2}

Type I	Open fracture with a skin wound <1 cm in length and clean.
Type II	Open fracture with a laceration >1 cm in length without extensive soft tissue damage, flaps, or avulsions.
Type III	Open segmental fracture with >10 cm wound with extensive soft tissue injury or a traumatic amputation (special categories in Type III include gunshot fractures and open fractures caused by farm injuries).
III _A	Adequate soft tissue coverage.
III _B	Significant soft tissue loss with exposed bone that requires soft tissue transfer to achieve coverage.
III _C	Associated vascular injury that requires repair for limb preservation.

Antibiotic Prophylaxis:

1. Intravenous antibiotic prophylaxis should be given to patients with open fractures **within 60 minutes** of presentation to reduce the risk of infection.
2. Antibiotic prophylaxis and duration is based upon the risk of infection utilizing the Gustilo-Anderson Classification System (listed above), with increasing rates of infection associated with higher grades.
3. Please refer to: Antimicrobial Stewardship Program Open Fracture Prophylaxis Protocol on the Nebraska Medicine intranet (<https://www.unmc.edu/intmed/divisions/id/asp/surgical-prophylaxis/index.html>), or the EPIC order set entitled Antibiotic Prophylaxis for Open Fractures (304010005108) for specific antibiotics, dosing, and frequency.

Operative Treatment:

1. Open fractures should be taken to the operating room on an urgent basis for irrigation and debridement within 24 hours of initial presentation or sooner whenever possible.
2. When possible, skin defects overlying open fractures should be closed at the time of initial debridement.

Performance Improvement:

1. All long bone open fractures will be monitored through the Trauma Performance Improvement Process. Specific indicators include:
 - Time from arrival to first antibiotic dose.
 - Time from arrival to initial irrigation and debridement.

References

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6. Rodriguez L, Jung HS, Goulet JA, Cicalo A, Machado-Aranda DA, Napalitano LM. Evidence-based protocol for prophylactic antibiotics in open fractures: Improved antibiotic stewardship with no increase in infection rates. *J Trauma Acute Care Surg*. 2014;77(3):400-408.

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