# Tibial Shaft Fracture

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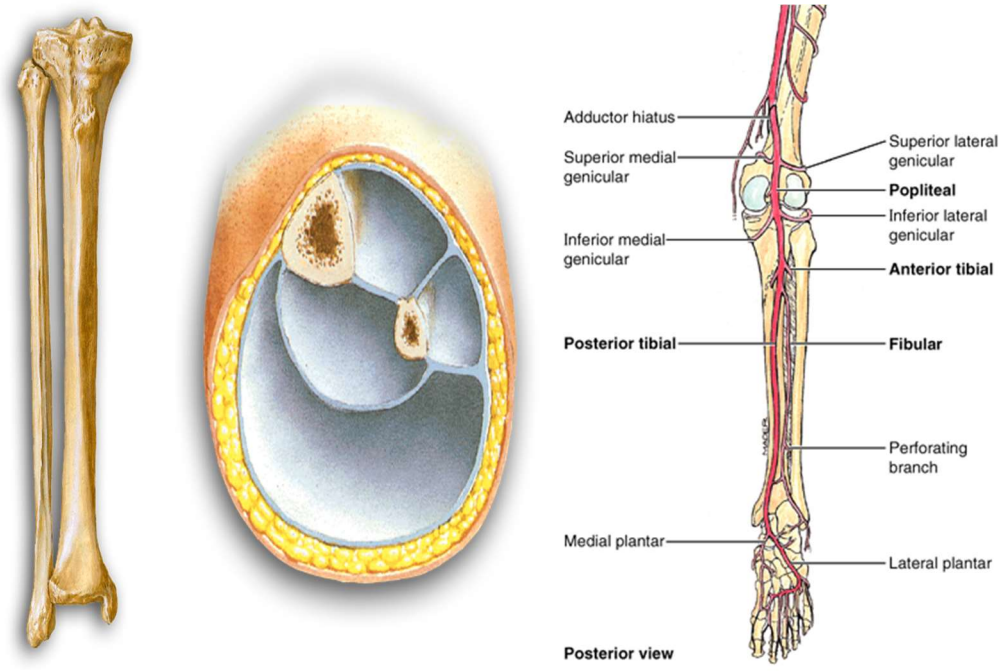
## Introduction

Fracture of the tibia is the most common long bone fracture which accounts for 26 tibial shaft fracture in 100,000 population per year. Aside from most common long bone fracture, tibia is one of the most common "open" fractured bone and tibial shaft fracture has the highest non-union rate for all long bone fracture.

## Anatomy

Tibia is a long tubular bone with triangular cross section and four fascial compartments (anterior, lateral, superficial and deep posterior). Its anteromedial border is subcutaneous hence the risk for open fracture. Blood supply comes from posterior tibial artery posteriorly, anterior tibial artery anteriorly and peroneal artery laterally.

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## Mechanism of Injury

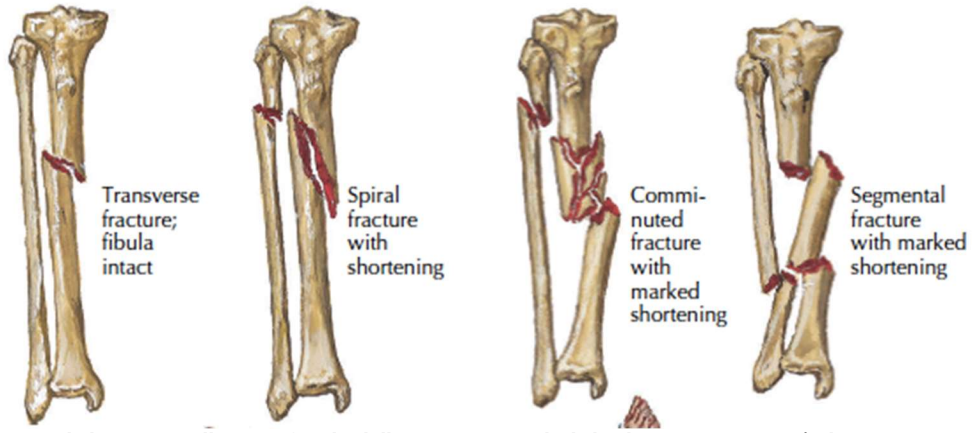
Tibial shaft fracture usually is a result of the following:
High energy bending from vehicular injury, fracture pattern is usually a transverse, comminuted displaced fracture. Segmental and highly comminuted fracture are usually linked with extensive soft tissue injury

Penetrating injury from gunshot wound, where comminuted fracture commonly occurs.

Low energy bending, facture pattern is usually shorth oblique or transverse sometimes with butterfly fragment.

**Classification:**
**Descriptive:**

Open vs closed
Anatomic Location: Proximal, Middle or distal third
Configuration: Transverse, oblique, segmental, comminuted

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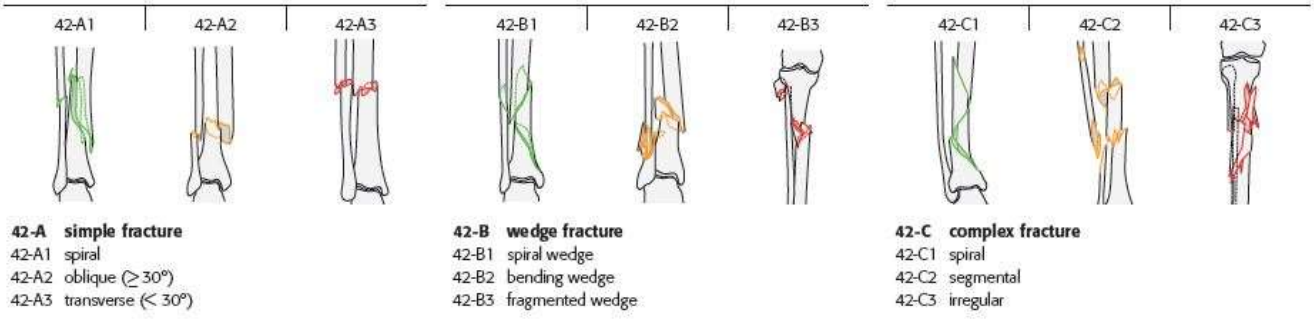
## AO Classification




https://cms.aot-start.org/index.php/lower-extremity/tibia-shaft/

Presentation

At the ER, the mechanism of injury, time of injury and place of injury should be reviewed.

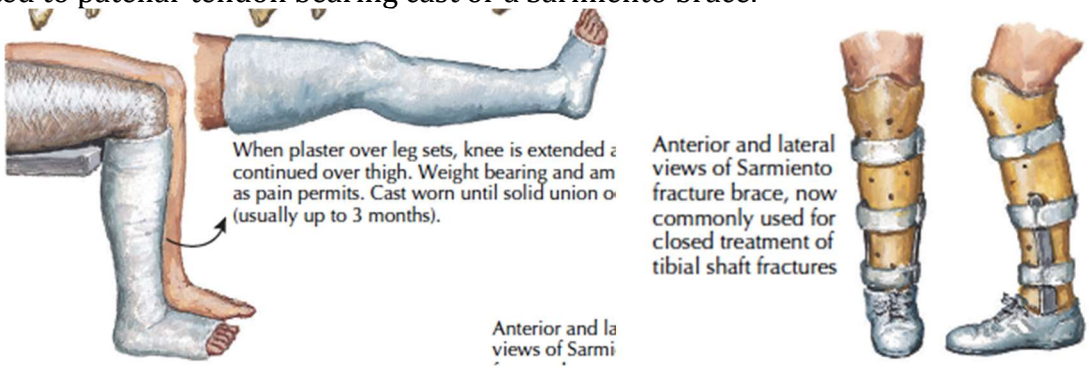
On examination, ABCD of trauma should always be must be examined. Usual symptoms are pain, inability to ambulate/bear weight and gross deformity.

On physical examination, we should inspect for deformity/angulation/rotation. Soft-tissue injury 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.

Neurologic examination must be thorough, check for deficit on the motor and sensory distribution of the superficial peroneal(eversion of foot) deep peroneal (ankle dorsiflexion and big toe extension), and tibial nerve (plantar flexion). Pulses of the dorsalis pedis and posterior tibialis artery must be evaluated. And signs of compartment syndrome must be elicited Radiographs must also be obtained.

Treatment:
Non-operative Treatment
Indications:
Closed low energy fracture with acceptable alignment:
< 5 degrees varus-valgus angulation
< 10 degrees anterior/posterior angulation
> 50% cortical apposition
< 1 cm shortening
< 10 degrees rotational malalignment

A long leg cast is usually placed on fractured Lower extremity, after 3 to 6 weeks, it may be converted to patellar tendon bearing cast or a Sarmiento brace.

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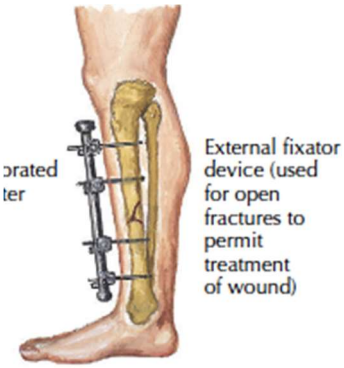
**Operative Treatment:**
**External Fixation**

Generally reserved for temporary fixation of open fractures and for damaged control orthopedics.

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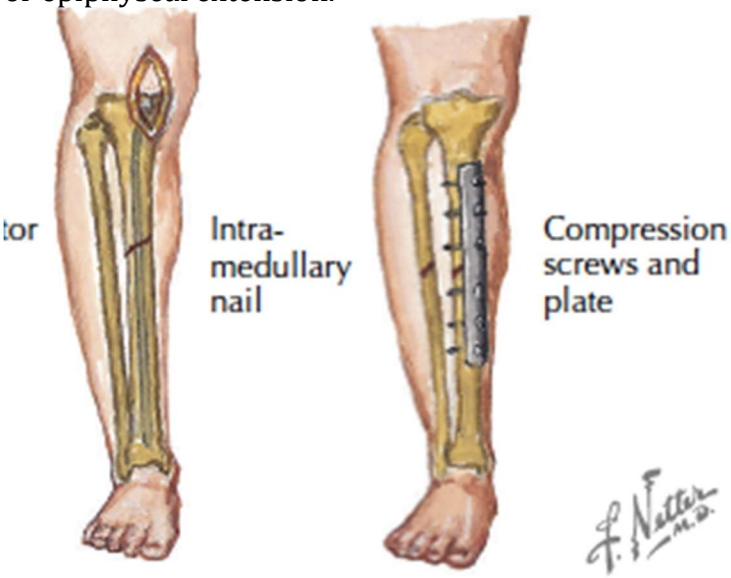
**Intramedullary Nailing and Plate Fixation**

These methods offers more stable fixation compared to external fixation but there is a risk for infection. IM nailing has the advantage of preserving the soft tissue and the periosteal blood supply. Biomechanically, it also has an advantage in controlling the rotation, translation and alignment. For plates fixation, it is usually used on fracture with metaphyseal or epiphyseal extension.

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**Complications:**

Malunion
Non-union
Infection (from open fracture)
Compartment syndrome
Neurovascular injury

References:

Court-Brown C et.al. Rockwood and Green's Fracture in adults. 8th edition

Egol K, Koval K and Zuckerman J. Handbook of Fractures. Fourth edition. 2010. Lippincott, Williams and Wilkins.

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