

Open tibial shaft fracture

Faur Cosmin

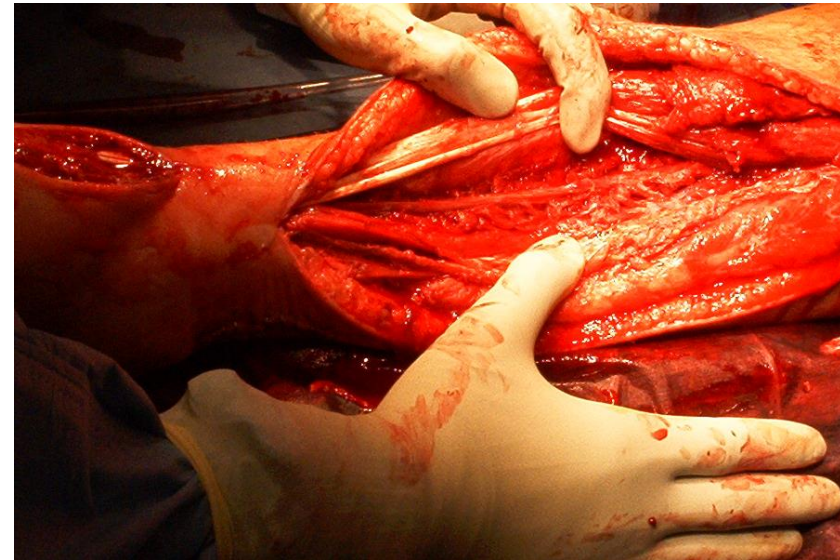
University of Medicine and Pharmacy “Victor Babes”
Timisoara

Regional Emergency Hospital “Pius Branzeu”
Timisoara



Incidence

- Open fractures of the tibia are more common than in any other long bone
- Roughly 25% of tibial shaft fractures are open



-Court-Brown, McBirnie JBJS 1995

Mechanism of Injury

- Can occur in lower energy, torsional type injury (eg, skiing)
- More common with higher energy direct force (eg car bumper)

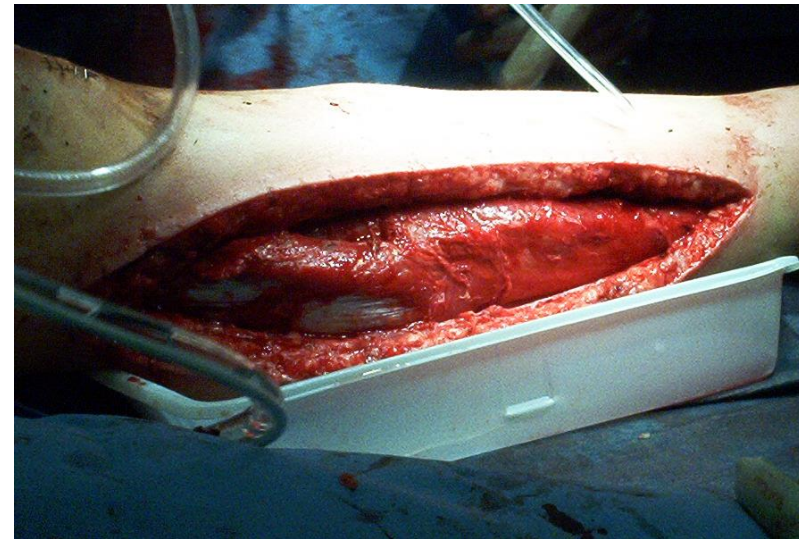
Associated Injuries

- Approximately 30% of patients have multiple injuries
- Associated fibula fracture
- Proximal or distal tib-fib joints may be disrupted
- Ligamentous knee injury and/or ipsilateral femur ('floating knee') more common in high energy fractures



Associated Injuries

- Neurovascular structures require repeated assessment
- Foot fractures also common
- Compartment syndrome



Priorities



- ABC'S
- Assoc Injuries
- Tetanus
- Antibiotics
- Fracture reduction
- Splinting

Physical Examination

- Given subcutaneous nature of tibia, deformity and open wound usually readily apparent
- Circumferential inspection
 - Lacerations
 - Ecchymosis
 - Swelling
 - Tissue turgidity



Physical Exam

- Neurologic and vascular exam
- Ankle-Brachial Index if needed
- Grading of wound done at time of surgical debridement
- Cover wound, avoid multiple exams

Initial Treatment

- ER superficial evaluation
 - Sterile dressing
 - Reduction & splint
- Tetanus prophylaxis
- Antibiotics
 - I cefazolin
 - II, III Add Aminoglycoside
 - Soil contaminant add PCN
- Antibiotic spectrum changing based on local bacterial spectrum



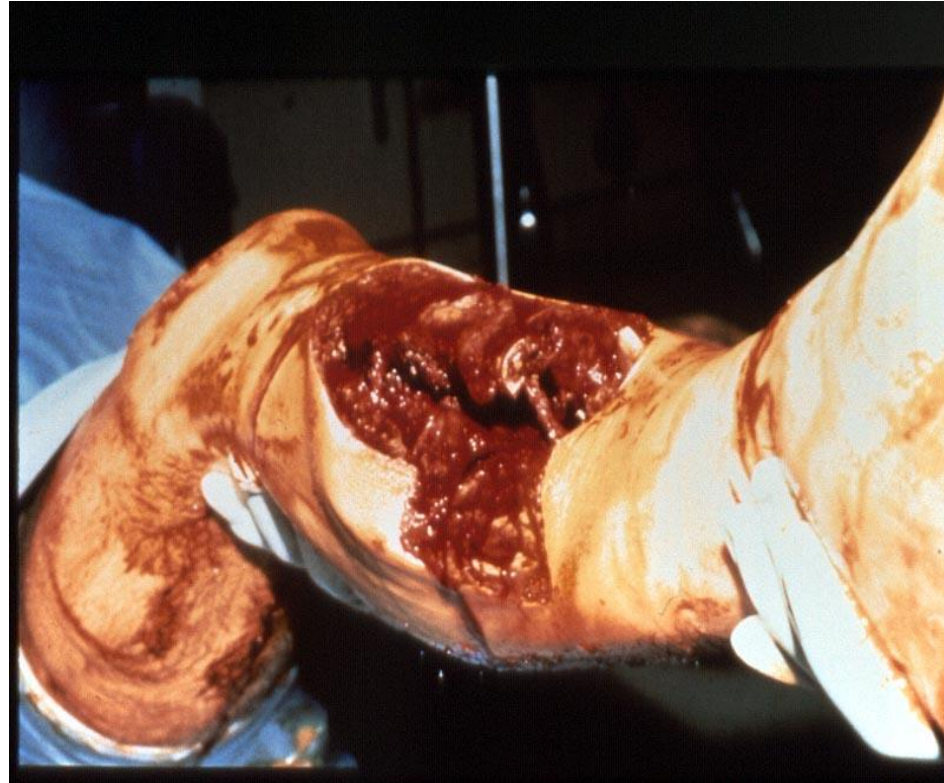
Radiographic Evaluation

- Full length AP and lateral views from knee to ankle
- Ankle or knee films for fracture extension
- Arteriography indicated if vascular compromise present after reduction



Objectives

- Prevent Infection
 - Soft tissue coverage
 - Union
 - Function
-
- Often requires staged treatment over several months



Timing of Surgical Debridement

- Controversial issue
 - Classically <6hrs
 - Currently urgent, not emergent
- Early antibiotics may be more critical
- More wound contamination requires more urgency and more frequency

-Bosse, JAAOS, 2002

-Skaggs, JBJS 2005

Treatment of Soft Tissue Injury

- Meticulous debridement
- Explore/Extend wound
- Deliver bone ends for full exposure
- Excise all foreign material, necrotic muscle, unattached bone fragments, exposed fat and fascia
 - Infection 21% vs 9% w/ improved debridement
- Fasciotomy as indicated

-Edwards, CORR 1988
-Patzakis, JAAOS 2003

Role of Irrigation

- D & I “Debridement & Irrigation”
- No consensus on volume required
- Pulse lavage
 - May remove debris vs. harmful to osteoblasts
- Antibiotics vs. Soap

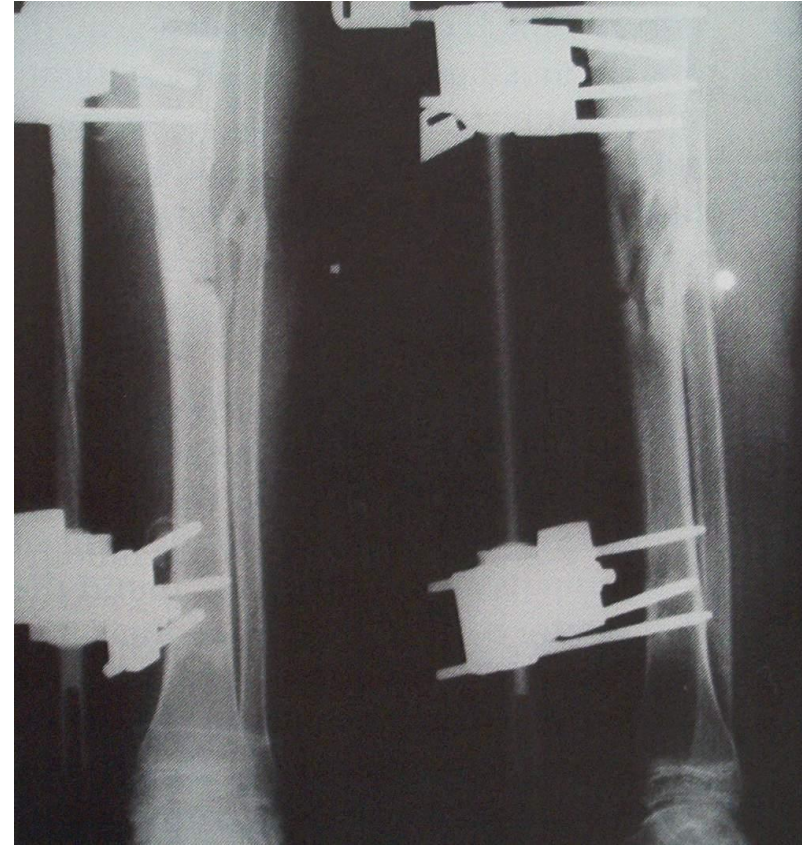
Fracture Stabilization

- Reduces risk of infection
- External Fixation
 - uniplane vs. multiplane
 - provisional vs. definitive tx
- Intramedullary nail
- Plate fixation



Advantages of External Fixator

- Can be applied quickly in polytrauma patient
- Allows easy monitoring of soft tissues and compartments



Advantages of IM Nail

- Less malunion and shortening
- Earlier weight bearing
- Early ankle and knee motion
- Reduced time to union



Complications

- Infection 1-5%
- Union >90%
- Knee Pain 56%
 - w/ kneeling 90%
 - w/ running 56%
 - at rest 33%



Case report

AGE	34 / Female
Symptoms	Left leg pain
History	A 34 year old female complaining of left leg pain after she was struck by a moving vehicle. She Denies pain elsewhere.
PMH	None Non-smoker
Physical exam	3.5 x 3 cm open wound about the medial aspect of left leg with exposed bone. Otherwise skin intact. Compartments are soft and compressible. She has appropriate pain with passive range-of-motion of the toes and ankle. Motor/sensory intact L2-S1. Palpable DP and PT pulse. Brisk capillary refill in all 5 toes.

Emergency room



X-rays: AP and lateral view



Question 1

According to Gustilo-Andersen, how would you classify this fracture?

Type I

Type II

Type III

Question 2

How would you treat this fracture?

Nonoperative (Immobilization with protected weight bearing)

Operative

Question 3

When performing a debridement and irrigation, what solution would you choose?

Normal Saline

Castile Soap

Betadine

Chloropactin

I would not perform an I&D

Question 4

If choosing operative treatment, what type of treatment would you do?

IM nail

ORIF with plate

External Fixation

I would not perform operative treatment

Question 5

What prophylactic antibiotics would administer for this injury postoperatively?

Cephalasporin (Ceftriaxone)

Vancomycin

Cephalosporin +Gentamicin

Cephalosporin+ Tobramycin

Cephalosporin + Tobramycin + Penicillin

Cephalosporin + Gentamicin + Penicillin

Question 6

0What duration of IV antibiotic would you give postoperatively?

One dose postop

24 hours IV Only

48 hours IV Only

72 hours IV Only

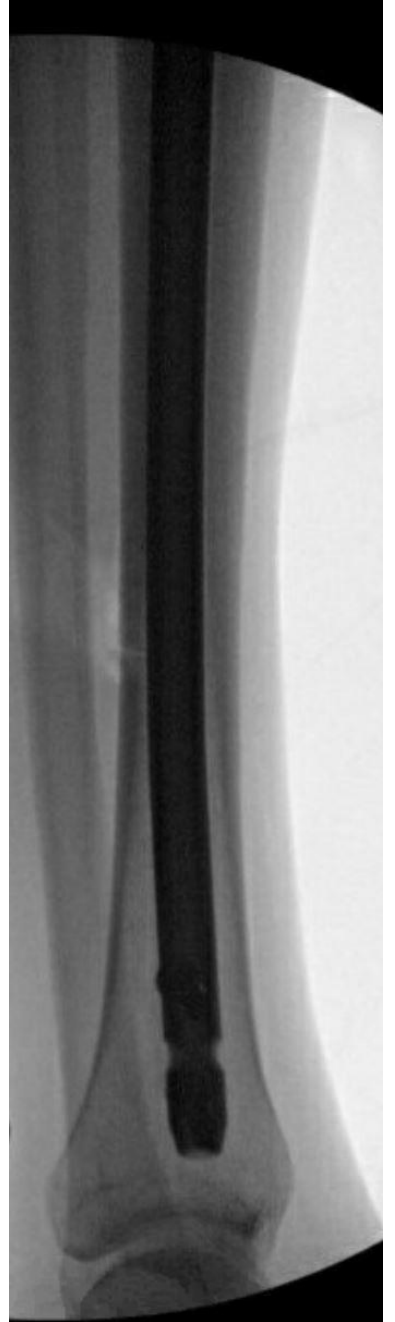
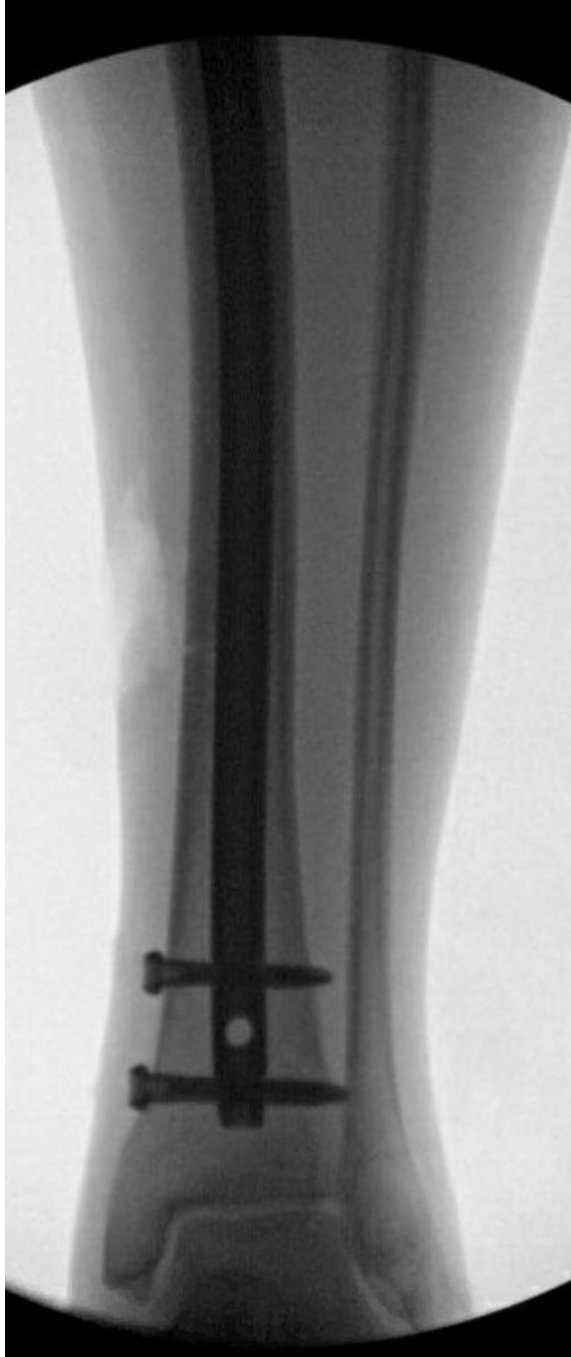
One dose postop + 3-10 days oral abx

24 hours IV + 3-10 days oral abx

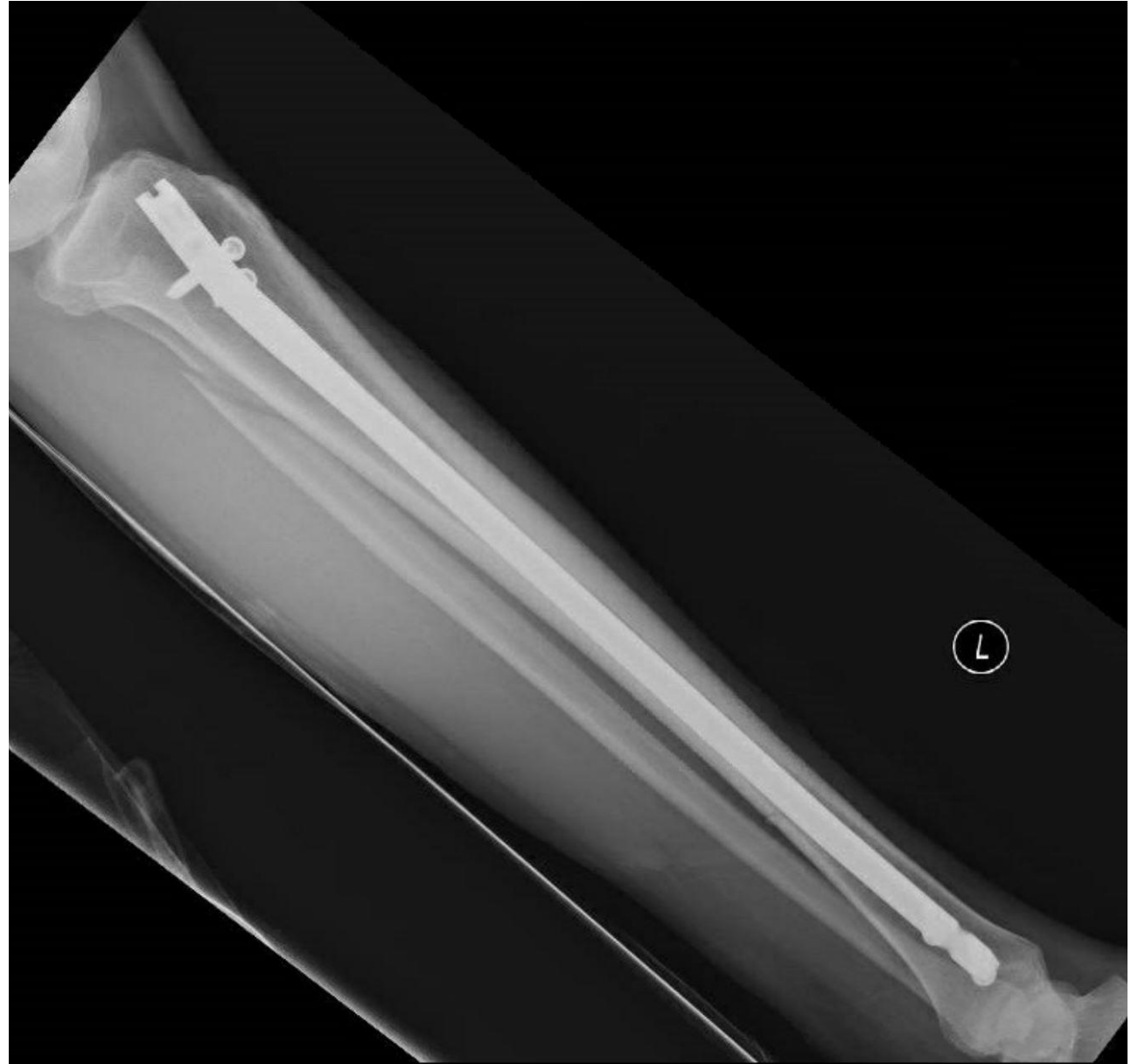
48 hours IV + 3-10 days oral abx

72 hours IV + 3-10 days oral abx

Intraoperative x-rays



Postoperative x-rays



Video - surgery

