

The Management of Open Tibial Shaft Fractures



Background and rationale: Open tibial shaft fractures are increasingly common and are associated with high morbidity and costs to patient, family, and hospitals. **Inclusions:** Skeletally mature patients with open tibial shaft fractures. **Exclusions:** Patients presenting late with an established fracture-related infection.

Standards of Care

1. There must be a defined and documented pathway of care for patients presenting with open tibial shaft fractures. This includes the emergency transfer of patients with complex severe open fractures, and those with vascular injuries.
2. A primary and secondary trauma survey, including ABCD resuscitation protocol, history, and clinical examination, must be performed on arrival and documented in the patient's record. Adequate intravenous analgesia should be administered prior to limb manipulation.
3. Intravenous prophylactic broad-spectrum antibiotics and tetanus prophylaxis should be given as soon as possible and within 1 hour of presentation to the health facility, and the antibiotics should be continued until wound closure. Anti-anaerobic coverage should be added for highly contaminated wounds such as farm, sewage, and marine wounds.
4. Examination of the injured limb should include assessment and documentation of the vascular and neurological status and should exclude possible compartment syndrome. Initial emergency treatment should include exposure of the limb and taking a photograph, which should be available to the treating team, removal of gross contamination, and dressing the wound with saline soaked gauze. The limb must be re-aligned and splinted prior to transfer within or outside of the facility. AP and lateral radiographs of the entire tibia must be obtained prior to surgical management.
5. Patients should receive an explanation about their injury, treatment plan, and their expected functional outcome before and after surgery.
6. For complex severe open fractures (heavily contaminated, and/or with soft tissue loss preventing a primary wound closure):
 - Discuss the patient with a trained trauma and orthopaedic surgeon at a specialist hospital with appropriate resources.
 - Thorough debridement of soft tissues and exposure of bone ends under spinal/general anaesthesia in the operating theatre within 24 hours.
 - The patient should reach a specialist hospital within 48 hours after initial presentation to a centre without a trauma orthopaedic surgeon.
 - Surgically stabilise the fracture with an intramedullary nail or an external fixator, and soft tissue coverage or reconstruction within 72 hours of injury.
7. For moderately severe open fractures (with no visible contamination, no bone exposure and/or a wound that can be closed primarily):
 - Consider discussion and referral to a specialist hospital according to local expertise and guidelines.
 - Thorough debridement of soft tissues and exposed bone under spinal/general anaesthesia in operating theatre within 48 hours.
 - Surgically stabilise the fracture with an intramedullary nail or an external fixator and wound closure within 72 hours of injury.
8. The WHO Surgical Safety Checklist must be completed, and a single dose of prophylactic antibiotics should be given at the start of surgery. Before prepping and draping the patient, remove contamination with at least 5 litres of potable water. During debridement, all devitalised soft tissue and bone should be removed, both ends of the bone exposed, and further irrigated with a minimum of 2 litres of sterile fluid. Intra-operatively, after debridement, a photograph should be taken and be accessible to the treating team.
9. Once debridement is complete, any further procedures, e.g., Ex-fix or IM nailing, performed at the same session, should be considered as clean surgery, i.e., there should be fresh instruments and a re-preparation and draping of the limb before proceeding.
10. Primary amputation within 24 hours should be avoided wherever possible unless it has been comprehensively discussed with the patient and family by at least two senior/experienced medical practitioners.
11. All patients require post-operative AP and lateral radiographs of the entire tibia within 48 hours of the definitive skeletal stabilisation.
12. Patients should be instructed to fully weight bear as tolerated within 2 weeks of fixation, unless there are specific concerns about soft tissue status.
13. Risk of VTE should be assessed according to local guidelines. If chemoprophylaxis is required, low-dose aspirin is recommended.
14. Patients should be given information about expected functional recovery, possible complications, and rehabilitation, including advice on return to normal activities. This should be in the patient's own language and / or in an illustrative pictorial format and be available in both printed and digital formats.
15. To optimise the outcome, the patient should be given a customised follow-up protocol to ensure safe wound healing and definitive fracture union. Patients should be able to access advice or follow-up from the treating hospital if there are reported complications.
16. All cases should be audited against the above standards including fracture reduction and reported complications, including infection. The audit should be presented at the department meeting. This should be performed quarterly initially and then annually once established.