Staged Fixation Techniques for Severe Tib-Fib Fractures

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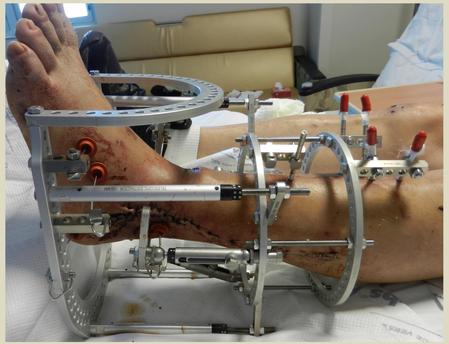
Purpose

Severe open tib-fib comminuted fractures unfortunately are very difficult to treat and often go on to a below knee amputation, due to loss of vascularity, absence of soft tissue coverage or infection. This case study presents a series of staged fixation techniques that can be considered to salvage the limb after severe trauma.

Literature Review

Depending on the severity of the injury and the soft tissue involvement, treatment for open tib-fib fractures could be done as a single or staged procedure. Goals for treatment are to avoid further damage to surrounding blood supply and to have adequate soft tissue coverage over the fixation, while accomplishing anatomic reduction with stable fixation. With severe trauma, a decision needs to be made whether to amputate or to salvage the limb. There are various things that need to be considered like; limb ischemia, amount of bone and soft tissue injury, nerve injury, and the patients age and general health and ability to heal. (1) There exist multiple scoring systems to assist the surgeon in recommending the best treatment to the patient. Some of these systems are the Mangled Extremity Severity Score, Predictive Salvage Index, Hannover Fracture Scale-97, and Limb Salvage Index. (1) When an open fracture has occurred, infection is always a concern. (2) It is recommended that the patient receive debridement within 6 hours of the accident to avoid infection. (3) Patients that have high energy trauma can be treated with staged procedures or minimally invasive plate osteosythesis techniques that can be used to avoid more soft tissue damage and wound healing complications. With any type of trauma, compartment syndrome should not be dismissed. When measurements are taken, any compartment pressure >30 mmHg should be decompressed with a fasciotomy.



Case Study

A case study is presented on a 66 year old diabetic male who sustained an open severely comminuted left tib-fib fracture. A minimally invasive plate osteosynthesis technique was used to plate the lateral aspect of the tibia and fibula, so that the overlying soft tissue would not be further damaged. Both bones were fixated through a lateral incisional approach to avoid entering the medial wound that already existed. A circular multi-plane ring external fixator was used to assist in stabilization of fracture reduction, as well as to avoid the need of placing additional internal fixation. Once the fractures had consolidated an intramedullary nail was inserted for fusion of the ankle and subtalar joints. Added stabilization of an external fixator was applied to support the internal fixation and to avoid complications of a possible Charcot event in this diabetic patient.

Analysis/ Discussion

After assessing the general overall health of the patient, vascular supply after the injury, intact innervation to the limb, and degree of contamination or infection, a decision was made to salvage the limb. This case presented us with an uncontrolled diabetic with a high energy open tib-fib fracture. Additional concerns that were addressed were losing stable internal fixation to a Charcot event. The benefit of external fixation in this case was utilized to avoid taking a set back in treatment. Staging his procedures and allowing his bone time to fully consolidate and soft tissue to be optimized prior to definitive fusion, was key in his overall outcome. The patient is 24 months postop and ambulating with the assistance of a cane. He has no pain in the salvaged limb. This case study demonstrates the benefit of using multiple forms of fixation with staged procedures, to accomplish limb salvage from severe trauma.

References

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