



Use of a Continuous External Tissue Expander in the Conversion of a Type-IIIB Fracture to a Type-IIIA Fracture

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Figs. 1-2. Initial clinical photos and radiographs of the Open Tibia Fracture



Figs. 3-4. External Tissue Expander two days after application, radiographs of tibia 10 months after injury

Introduction:

There are a variety of coverage methods available to the Orthopaedic Surgeon for Type-IIIB Gustilo and Anderson tibial fractures. The classic coverage options are free and rotational flaps that carry potential anesthesia complications, near-constant surveillance, and issues with patient compliance, graft failure, and elevated cost. External tissue expansion is a newer adjunctive modality in the management of open wounds. Though this technique has been previously described for fasciotomy and ulcer coverage, to our knowledge, continuous external expansion has never been reported in open fracture wound management, specifically in converting a Type-IIIB tibia fracture to Type-IIIA. We describe an individual treated at our institution an external tissue expander for the conversion of Type-IIIB Gustilo and Anderson tibia fracture to Type-IIIA fracture.

Methods:

A retrospective review of one individual treated in this manner at our institution was conducted. Data was derived from inpatient surgical records, outpatient notes, and clinical photographs and radiographs.

Results:

The patient in this series sustained a Type-IIIB tibia fracture and underwent delayed primary closure of his wounds with the aid of an external tissue expander. This occurred two days after placement of the tissue expansion device. No additional soft tissue coverage was necessary, and the wound healed without complication. The fracture was treated definitively with a circular external fixator. At latest follow-up, the patient's wound was well healed, and radiographs demonstrated interval healing of the fracture.

Discussion and Conclusion:

There is a need for prompt coverage of Type-IIIB Gustilo and Anderson tibial fracture wounds in order to reduce infection rates, malunion, nonunion, and a host of other negative outcomes that can occur with delayed osseous coverage. External tissue expanders offer the surgeon a device that can rapidly facilitate closure of full-thickness soft tissue wounds by applying continuous tension. This technique offers the benefit of a one-time application that is easy to apply, is cost-effective, and can significantly improve fracture coverage options with a cosmetically acceptable result. Though this technique has been previously described for fasciotomy and ulcer coverage, to our knowledge, continuous external expansion has never been reported in open fracture wound management, specifically in converting Type-IIIB to Type-IIIA open fractures. Further studies are needed to determine optimal applications for this new technique, although our early success with this method indicates that it may be a valuable tool in the management of Type-IIIB open fractures.