Retrospective study of surgical outcomes for management of ankle fractures utilizing the Ilizarov technique

Purpose
The purpose of this study was to evaluate the outcomes of surgical ankle fracture repair with the use of a 3-ring multi-planar external fixator (Ilizarov).

Materials and Methods
A retrospective analysis was performed on 21 patients (17 males and 4 females) with bi-malleolar or tri-malleolar ankle fractures. Indications for the Ilizarov technique included a radiographic finding of a bi-malleolar or tri-malleolar unstable ankle fracture with the same indication for open reduction internal fixation. All 21 patients had a 3 ring multi-planar external fixator, which consisted of 2 proximal tibial rings and 1-foot plate, applied to the affected limb. Two-wire fixation was used on each of the proximal rings: a medial face wire and a posterior/lateral to anterior/medial wire. The foot plate fixation consisted of 2 proximal tibial rings and 1-foot plate, applied depending on the fracture condition for proper reduction and realignment of the ankle mortise. All wires were tensioned to the external frame. All ankles were acutely distracted 4-5 mm following reduction and fixation of fracture in order to offload the joint and minimize secondary DJD.

Results
All 21 patients had successful ankle fracture reduction and fixation with the use of the Ilizarov technique. This is based on clinical and radiographic consolidation of the fracture sites without significant malalignment and with evidence of a stable ankle mortise. 18 patients reported satisfactory post-op ankle range of motion with 3 patients complaining of diminished ROM secondary to ankle DJD. All patients healed all fracture sites uneventfully and resumed their regular daily activities without major complications. Minor complications included 5 pin tract infections which resolved with antibiotics and local wound care. From 1998 to present, none of the patients has required a fusion.

Discussion/Conclusion
We found the Ilizarov technique to be a viable method for the management of bi and tri-malleolar fractures. The lead author advocates the initial use of multi-planar external ring fixator in order to provide early ambulation to the patient, and at the same time perform an ankle diastasis using the external ring fixator to provide increase range of motion at the ankle joint post ring fixator. We also found it to be beneficial with the morbidly obese patient, which are incapable of following a nonweightbearing protocol. Finally, vascular compromised patients will profit from possible tissue necrosis that might arise from an open reduction internal fixation technique.

References

Figure 1: Preoperative AP Ankle View.
Figure 2: Preoperative Lateral Ankle View.
Figure 3: Model of Proper Placement.
Figure 4: AP Ankle with External Fixator.
Figure 5: Lateral Ankle with External Ring Fixator.
Figure 6: Post Operation AP Ankle.
Figure 7: Post Operation Lateral Ankle.