Fibular Lengthening Osteotomy Following Traumatic Fibular Malunion

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Statement of Purpose

Fibular malunion following ankle fracture is a significant cause of pain and early degenerative joint disease. This may ultimately lead to ankle arthrodesis or replacement. This present study examines the radiographic and functional outcomes of a patient who underwent fibular lengthening osteotomy (FLO) for correction of post-traumatic fibular malunion.

Literature Review

Weber et al (1998) discussed the results of a horizontal osteotomy which he developed in 1981 to correct for post-traumatic malunion of the fibula. Deformity, pain and limitations to activities of daily living can occur following traumatic shortening of the fibula. In this study, 6 patients underwent fibular lengthening osteotomies. 3 osteotomies were transverse and 3 were z-lengthening in the frontal plane. There were no differences in outcome between the two osteotomies. The authors correlated poor outcome with presence of arthritis at the time of the osteotomy. The authors noticed, however, that a reduction of pain and improved function at work was obtained even in patients with arthritic changes at the time of the osteotomy. They, therefore recommended the osteotomy even in these patients³.

Wensen et al (2011) reviewed the literature regarding a reconstructive osteotomy for treatment of fibular malunion. The studies showed excellent results in more than 75% of patients. Wensen determined reconstruction is a viable option to postpone ankle fusion or supramalleolar osteotomies. They also indicated that the timeline of arthritis progression is unpredictable. Due to the unpredictable progression of the deformity, the authors suggest the best results will be obtained if action is taken as soon as the diagnosis is made, and the ankle is still functional³.

Case Study

The patient was a 38 year old female who sustained a right ankle fracture, which was minimally displaced when seen in the Emergency Department (Figure 1). The patient was splinted and followed up as an outpatient. She complained of increasing pain two days later and x-rays were obtained. Further displacement of the fibula was noted as well as widening of the medial gutter (Figure 2).

Fracture blisters precluded immediate open reduction internal fixation (ORIF), and a delta frame was applied for temporary stabilization. Definitive ORIF was performed 10 days later using a fibular intramedullary nail and suture endobutton.

Final fluoroscopic imaging demonstrated disruption of Shenton’s line, a broken dime sign, ankle mortis incongruity, as well as malpositioning of the syndesmotic fixation (Figure 3). Subsequently over the next 17 months, she began to develop pain and valgus deformity of the ankle. The surgeon who performed the initial surgery had since left the practice, and she was seen by another surgeon in the group.

Due to the aforementioned radiographic and clinical findings the surgeon elected for reconstruction via fibular lengthening osteotomy. The goals of surgery were to restore length to the fibula, correct malalignment, stabilize the syndesmosis and ankle mortise, decrease pain, and increase function and level of activity.

Radiographically, we achieved anatomic fibular length and rotation and a congruent ankle mortise. This was confirmed by the continuity of Shenton’s line and the intact dime sign. The AOFAS score increased from 20 to 60, and VASFA decreased from 131 to 105.

Clinically, the patient was noted to have a stable ankle with neutral hindfoot. She related satisfaction following the reconstructive procedure, however she noted that she still experienced pain and swelling. The authors suggested this is normal post operative recovery. Longer follow-up would provide further insight to the patients return to function and activity level.

Conclusions

It is common following fractures of the lateral malleolus for the fibula to shorten, rotate, and become unstable. Chronic pain and post traumatic arthritides are likely sequelae if fractures of the lateral malleolus are left untreated or undertreated. One must ensure correct fibular length, alignment, and rotation during ORIF. This can be assured by restoring the dime sign and Shenton’s line, and checking for joint space congruity. This study shows that, if fibular malunion occurs with resulting functional limitation, FLO is a viable, joint sparing option to restore normal ankle kinematics.

The field would benefit from further research and long term studies showing the success rates of treating fibular malunion with the fibular lengthening osteotomy.

References


Image Legend:

Figure 1. Immediate Post-op
Figure 2. 4 months post-operative
Figure 3. Post-op
Figure 4. Intraoperative
Figure 5. Final postoperative
Figure 6. Intraoperative
Figure 7. Final postoperative
Figure 8. Intraoperative
Figure 9. Final postoperative

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