Surgical Technique for Treating Acute Ruptures of the Lateral Ligament Complex of the Ankle

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Introduction

Surgical treatment of an acute lateral ligament rupture is occasionally warranted (Fig. 1). A recent randomized controlled trial indicated that, in terms of recovery of the preinjury activity level, the long-term results of surgical treatment of acute lateral ligament rupture of the ankle are the same as those of functional treatment. A recent randomized controlled trial indicated that, in terms of recovery of the preinjury activity level, the long-term results of surgical treatment of acute lateral ligament rupture of the ankle are the same as those of functional treatment¹. Although surgery appears to decrease the prevalence of reinjury of the lateral ligaments, there may be an increased risk of subsequent development of osteoarthritis. Nevertheless, surgery for acute Grade-III lateral ligament injuries is sometimes recommended for patients with high levels of physical activity and high functional demands on the ankle, such as professional athletes²⁻⁴.

Step 1: Incision

Make a skin incision from the anterior aspect of the fibula and curve it inferiorly and posteriorly.

- With the patient in a supine or lateral position on the operating table and a tourniquet applied to the thigh, make a 5 to 10-cm curvilinear, J-shaped skin incision from the anterior aspect of the distal part of the fibula and curve it inferiorly and posteriorly (Fig. 2).
- Retract the inferior retinaculum inferiorly and remove the hematoma.

Step 2: Repair

Repair the ligaments with absorbable sutures; if there is bone avulsion, pass the sutures through drill holes or use a suture anchor.

- Identify the disrupted lateral ligaments (the anterior talofibular ligament with or without injury to the calcaneofibular ligament) (Fig. 3).

- Reapproximate the torn ends of the anterior talofibular ligament and the calcaneofibular ligament using size-0 polyglyconate (MAXON) absorbable sutures (Fig. 4).
- When there is avulsion from the bone, with or without an osseous fragment, reapproximate the ligament by passing sutures through 2.0-mm holes drilled in the bone (Fig. 5-A) or with the use of a suture anchor (Fig. 5-B).
- Repair the superficial retinacular structures using absorbable sutures.

Step 3: Closure

Close the wound in layers using absorbable sutures.

Step 4: Postoperative Care

Cast immobilization for four weeks is followed by orthosis use for two weeks; muscle exercises are initiated on the first postoperative day.

- Place the ankle in a below-the-knee plaster cast, and elevate the limb for twenty-four to forty-eight hours. Prescribe crutches and anti-inflammatory medication postoperatively. Allow full weight-bearing and encourage the patient to start bearing weight as soon as it is tolerated.
- Patients wear the plaster cast for four weeks and a functional light-weight orthotic device for an additional two weeks. The ankle brace allows for dorsiflexion and plantar flexion but restricts inversion and eversion of the ankle.
- Muscle exercises are initiated while the patient is wearing the cast—on the first postoperative day—under the supervision of a physiotherapist. The physiotherapist also supervises an active muscle strengthening rehabilitation program during the two-week period in which the orthotic device is worn.

Results

In our previous randomized controlled trial comparing surgical and functional treatment of acute ruptures of the lateral ligament complex of the ankle¹, the mean score on the Performance Test Protocol and Scoring Scale for the Evaluation of Ankle Injuries was 83 ± 11 points in the surgical treatment group and 75 ± 13 points in the functional treatment group (mean difference: 8.3 points; 95% confidence interval: -0.03 to 16.6 points). All patients in both groups returned to their preinjury activity level, and all patients in both groups reported that they were able to walk and run normally. In the surgical treatment group, one reinjury was identified within a mean follow-up time of 13.9 ± 0.7 years. In the functional treatment group, seven reinjuries occurred within a mean follow-up time of 14.2 ± 0.7 years (risk difference: -32% ; 95% confidence interval: -58% to 6%).

What to Watch For

Indications

Acute complete ruptures of the lateral ligament complex in highly active individuals.

Contraindications

Chronic lateral ankle instability.

Pitfalls & Challenges

- Loss of sensation in the lateral aspect of the ankle and foot after surgery suggesting that an injury of the superficial peroneal nerve occurred during the operation. While this problem usually resolves over time without further intervention, it was reported by as many as 20% of our patients.
- Bacterial infection.

Clinical Comments

Our recent randomized prospective study comparing surgical and functional treatment of acute lateral ligament rupture of the ankle revealed no difference between groups with regard to the extent of recovery of the preinjury activity level at the time of follow-up, at a mean of fourteen years¹. The surgical treatment group had significantly fewer reinjuries and a better mean ankle score than the functional treatment group, although the difference in scores was not significant. The surgical treatment group, however, also had more osteoarthritis as seen on magnetic resonance imaging (MRI) at the time of follow-up. Thus, surgical and functional treatment of acute Grade-III ligament

ruptures of the ankle appear to produce equivalent results with respect to recovery of the preinjury activity level. Surgery seems to decrease the occurrence of lateral ligament reinjury but may increase the risk of osteoarthritis¹. The orthopaedic surgeon must evaluate whether the lack of a significant difference in the extent of recovery between surgical and functional treatment justifies the increased risk of osteoarthritis developing following surgical treatment.

Despite the higher reinjury rate in our functionally treated group, subjective recovery did not differ significantly between the groups¹. In addition, the physical activity levels did not differ between groups; therefore, reinjury and its consequences did not seem to constitute a major problem in these patients. The incongruency between the objective and subjective results is an interesting finding of the study. While the objective measures were similar between the groups, the groups differed significantly with regard to the subjective measure of giving-way episodes, and there was a nonsignificant trend toward a difference in subjective outcomes. A possible explanation may be the presence of a “reinforcement bias”; that is, subjects who underwent surgery might have been more likely to report a positive outcome to justify the inconvenience and risk of undergoing surgery and patients in the functional treatment group might have been resentful that they had not received what they considered to be the best treatment. A novel finding of the study was the degenerative changes on the MRIs of the surgically treated patients. Four of the fifteen surgically treated patients had Grade-II cartilage lesions (abnormal cartilage with lesions extending down to $<50\%$ of the cartilage depth); there was a significant difference between groups with regard to cartilage lesions.

To our knowledge, this study had the longest documented follow-up period, and MRI was performed at the time of follow-up, allowing us to reliably evaluate early signs of osteoarthritis. The reason for these chondral lesions is not known. Although it is well known that injuries predispose patients to the development of ankle arthritis⁵, it is not clear how surgical repair of the lateral ligaments of the ankle predisposes a patient to ankle arthritis compared with nonsurgical treatment of similar injuries. To further elucidate this finding, additional studies with substantially longer follow-up periods and MRI are required. The groups did not differ with respect to the dorsiflexion or plantar flexion range of motion, utilization of health-care services after treatment, objective instability measured on stress radiographs, or time for which the patient could balance on a square beam. These findings are consistent with the results of other recent high-quality studies⁶. Three complications, all lesions of the superficial peroneal nerve, occurred in the surgical treatment group¹. None of the surgically treated

patients, however, reported any symptoms at the time of the last follow-up.

A substantial number of acute Grade-III lateral ligament injuries occurs annually worldwide, and therefore treatment and required resources must be carefully evaluated. Although the cost-effectiveness of surgical treatment has been compared with that of nonsurgical treatment, nonsurgical treatment likely results in fewer days of hospitalization and the utiliza-

tion of fewer medical resources and is thus less expensive than surgical treatment. Furthermore, the functional treatment group experienced fewer complications in our study¹. It is important to point out that the decision to not operate does not mean that no treatment is given. Effective functional treatment requires a supervised progressive muscle strengthening rehabilitation program and clinical control by a physician or a physiotherapist.

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Figures

Fig. 1

Fig. 1-A Anatomical landmarks and their relationships to the ankle. **Fig. 1-B** The ruptured anterior tibiofibular (ATFL) and calcaneofibular (CFL) ligaments are depicted.

Fig. 2

A gently sloping J-shaped incision is made from the anterior aspect of the distal part of the fibula and is curved inferiorly and posteriorly. Injury to the sural nerve and the superficial peroneal nerve should be avoided.

Fig. 3

The anterior tibiofibular ligament (ATFL) and calcaneofibular ligament (CFL) are exposed and inspected.

Fig. 4

The ruptured ends of the anterior tibiofibular ligament (ATFL) and calcaneofibular ligament (CFL) are reapproximated with absorbable sutures.

Fig. 5-A Fig. 5-B

In the case of avulsion from bone with (**Fig. 5-A**) or without (**Fig. 5-B**) an osseous fragment, the ligament is reapproximated by passing sutures through 2.0-mm drill holes in the bone (**Fig. 5-A**) or through the use of a suture anchor (**Fig. 5-B**).

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Fig. 1-A, Fig. 1-B

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Fig. 2

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Fig. 3

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Fig. 4

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Fig. 5-A

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Fig. 5-B