

# Arthroscopic Repair of Lateral Ankle Instability vs Open Repair with Ligament Augmentation: A Retrospective Review of Patient Satisfaction and Clinical Results

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## STATEMENT OF PURPOSE

The purpose of this study is to compare patient outcomes of arthroscopic repair of lateral ankle instability versus open repair with ligament augmentation. Objective and subjective data will be evaluated with emphasis on overall patient satisfaction, ankle-hindfoot scores, recurrence of instability, complication rates, and patient's return to regular shoe gear. Early results of the two different approaches will be compared.

## METHODOLOGY & HYPOTHESIS

A retrospective review of 60 consecutive patients (61 ankles) undergoing surgery for lateral ankle stabilization by a single surgeon (co-author) from March 2015 to December 2016 was performed. Inclusion criteria were as follows: patient's with chronic lateral ankle instability, failed conservative treatment, no prior surgical correction, positive anterior drawer or talar tilt test on exam, MRI confirmation of ATFL or CFL pathology, have undergone arthroscopic or open lateral ankle stabilization, and a minimum clinical follow-up of 6 months. Exclusion criteria were as follows: patients with any procedures performed outside of the ankle scope and lateral ligament stabilization. IRB approval was obtained from Allina Health Systems and Hennepin County Medical Center. Qualifying patient's electronic medical records were evaluated and objective data including patient's gender, age, BMI, comorbidities (diabetes, smoking), laterality of procedure, pre-operative and post-operative imaging, physical exam findings, complications, recurrence of instability, and return to regular shoe gear were evaluated. Questionnaires were sent to patient's 6 months post-operatively including AOFAS Ankle-Hindfoot Score, Karlsson-Peterson Ankle Score, and a subjective patient satisfaction rating. Statistical analysis on the data was performed using Chi-squared, Student's T, and Mann Whitney U tests. 30 patients met the inclusion criteria for the study with 15 undergoing each procedure. Analysis of the patient groups can be seen in Table 1.

Parameter	Arthroscopic	Open	P value
Patients	15	15	
Female	10 (66%)	13 (87%)	.195 <sup>1</sup>
Age	38.3 (15-59)	50.5 (35-66)	.0097 <sup>2</sup>
Left/Right	6/9	8/7	.464 <sup>1</sup>
BMI	30.8 (20.5-47.9)	35.1 (19.7-49.8)	.19 <sup>2</sup>

Table 1: Statistical Comparison of Patient Groups

Our hypothesis is that arthroscopic repair of the lateral ankle ligament complex would offer equivalent patient satisfaction rates and scores while allowing quicker recovery and return to regular shoe gear.

## PROCEDURES

15 patients underwent arthroscopic lateral ankle ligament repair. Under general anesthesia, with a popliteal block, a 21 point ankle joint inspection was performed using a 4.0mm arthroscope. Any additional ankle joint pathology was addressed at this time followed by debridement of the distal fibula in preparation for insertion of two anchors under direct visualization (Figure 1). The suture ends from the anchors were passed percutaneously to capture the inferior extensor retinaculum and either the anterior talofibular ligament, calcaneofibular ligament or both. The decision for which ligaments to repair was made based on MRI imaging along with intra-operative stress tests. The sutures were then tied down with the foot in slight dorsiflexion and eversion. Patients were placed non-weight bearing in a posterior splint.

A similar initial approach was taken for the open repair and a 21 point arthroscopic ankle joint inspection was performed. After addressing any additional pathology a curvilinear incision was made overlying the distal fibula and the peroneal tendons were inspected. The lateral ligament complex was then addressed. Intra-operative stressing of the anterior talofibular and calcaneofibular ligaments was performed and fiber tape suture was used to stabilize, repair and imbricate the affected ligaments. The foot was held in slight dorsiflexion and eversion during correction. Patients were then placed non-weight bearing in a posterior splint.

The post-operative course consisted of non-weight bearing until the 4 week mark at which point patients progressed into a CAM boot and physical therapy was started. Slow progression to full weight bearing and regular shoe gear was allowed as tolerated.

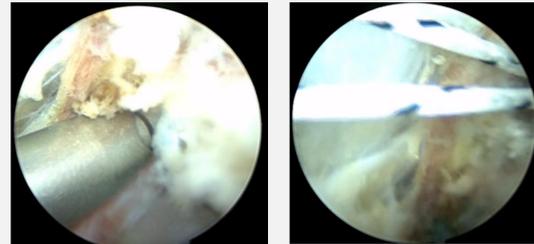


Figure 1: Intra-operative imaging of arthroscopic anchor placement

## LITERATURE REVIEW

Lateral ankle sprains with resulting ligamentous injury are one of the most common in office lower extremity pathologies. The majority are inversion type injuries with up to 20% of patients failing conservative treatment secondary to sensory motor deficits or insufficient healing of the lateral ligament complex. When conservative measures have failed, lateral ligament reconstruction is indicated to reestablish ankle stability and function. Recent trends towards arthroscopic repair offers a unique approach and allows the surgeon to address additional ankle pathology simultaneously. Arthroscopic repair is also less invasive potentially allowing for lower complication rates and quicker recovery while maintaining equal patient satisfaction rates.

Cottom and Rigby<sup>8</sup> reported on 40 patients in a prospective study looking at the results of an "all-inside" arthroscopic Brostrum type procedure. They found statistically significant improvement in post-operative VAS scores, Karlsson-Peterson and AOFAS Ankle-Hindfoot scores. Patients had a mean interval to weight bearing at 20.2 days with no incidence of neuritis or other complications. Yeo et al<sup>9</sup> performed a prospective comparison of arthroscopic repair to an open procedure. They compared a total of 48 patients finding no difference in overall success between the procedures with similar complication rates. Matsui et al<sup>10</sup> reported on recovery rates between the two procedures. Patients had equivalent clinical outcomes but the arthroscopic approach allowed return to activity at an average of 5.3 weeks vs 7.1 weeks. Arthroscopic repair also presented shorter operative times of 31 minutes compared to 44 minutes for the open repair.

## RESULTS

At the 6 month follow-up period patient's Subjective Satisfaction (1=excellent, 2=good, 3=fair, 4=poor) scores were 1.8 for arthroscopic repair vs 2.1 for open repair. No poor ratings were given for either procedure. Arthroscopic repair scored 70.1 on the Karlsson-Peterson score vs 54.1 for open repair.

The only scores to show a statistically significant difference were the AOFAS Ankle-Hindfoot with arthroscopic repair scoring 88.2 vs. 78.3 for open repair. There was no reoccurrence of instability in either group to date with no patients requiring further surgery. Return to regular shoe gear was statistically significant in favor of arthroscopic repair at 7.6 weeks vs open repair of 9.9 weeks (Table 2). Three complications were documented in arthroscopic repair including hypertrophic scarring, hematoma, and neuropraxia of the intermediate dorsal cutaneous nerve. All resolved with treatment. There was one case of superficial skin infection in open repair. (Table 3)

Parameter	A	O	P value
Subjective Scoring	1.8 (1-3)	2.1 (1-3)	.368 <sup>1</sup>
AOFAS Hindfoot Scores	88.2 (84-95)	78.3 (60-87)	.0096 <sup>1</sup>
Karlsson Scores	70.1 (42-87)	54.1 (27-82)	.139 <sup>2</sup>
Complications	3 (20%)	1 (7%)	.283 <sup>2</sup>
Recurrence	0 (0%)	0 (0%)	
Return to Shoe gear	7.6 wks (5-12)	9.86 wks (6-14)	.00148 <sup>1</sup>

Table 2: Comparison of Arthroscopic vs Open Results

## ANALYSIS & DISCUSSION

Our study directly compared an arthroscopic approach to the more conventional open repair for lateral ankle instability. It showed equal to favorable early results at six months when compared to the open procedure. Arthroscopic repair also allowed for earlier recovery indicated by the return to regular shoe gear. Patients had overall greater satisfaction rates and complications were minimal.

Patients with lateral ankle instability and failed conservative treatment may require surgical stabilization to alleviate their symptoms and resume activity. While an open Brostrum type procedure is the standard, other pathologic features are frequently involved within the ankle joint itself that would not be addressed by an isolated open repair. Lee et al<sup>11</sup> performed a review of simultaneous ankle joint pathologies in patients with lateral ankle instability. They reviewed 28 ankles and 100% were found to have some degree of synovitis or other pathology. Hintermann et al<sup>12</sup> also reported on 148 patients with intra-articular pathologic features associated with lateral ankle instability and found that 66% had cartilage damage. Ferkel and Chams<sup>13</sup> reported on 21 ankles and identified pathologic intraarticular findings in 95% of their patients. These studies show the high frequency of associated pathologies which the arthroscopic procedure allows you to address simultaneously. An arthroscopic approach also addresses the potential for earlier recovery. Karlsson et al<sup>14</sup> noted that athletes who underwent earlier mobilization after a lateral ankle ligament procedure were able to return to sporting activities earlier. This would encourage any procedure that allows for an earlier return to weight bearing, activity, and recovery.

Limitations of our study included the relatively small patient population and poor follow-up to questionnaires. The study was also retrospective in nature and without randomization. The senior author chose which procedure each patient underwent based on his own clinical judgement for the best patient outcome.

	Gender/Age (y)	Operation Technique	Complication	Progress
1	F/40	Arthroscopic	Hypertrophic Scarring	Improved
2	F/55	Arthroscopic	Hematoma	Resolved
3	F/28	Arthroscopic	Neuropraxia - Intermediate Dorsal Cutaneous	Resolved
4	F/52	Open	Superficial Skin Infection	Resolved

Table 3: Surgical Complications

Outcomes were subjectively reported by the patient and objective findings were noted by us, such that physician bias would have an influence.

## CONCLUSION

In conclusion, the benefits of an arthroscopic approach to lateral ankle instability include potential for early recovery while addressing ankle joint pathology simultaneously. This is in line with other recent literature and we believe it offers a viable option for surgical correction of lateral ankle instability. The study was limited by it's retrospective, non-randomized nature. A Randomized controlled study with a larger patient population and follow-up period would better evaluate complication rates, recovery period, and any recurrence of lateral ankle instability over time.

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