Does Lateral Ankle Instability Contribute to the Development of Plantar Fasciitis: A Retrospective Review of Outcome in Consecutive Cases

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STATEMENT OF PURPOSE

Both plantar fasciitis and ankle instability are common conditions treated by foot and ankle surgeons. While there have been studies that demonstrate increased activation of the peroneal tendons in an unstable ankle, there has been minimal literature demonstrating a relationship between ankle instability and plantar fasciitis. This review demonstrates surgical outcome in consecutive patients undergoing simultaneous lateral ankle stabilization and plantar fasciotomy.

LITERATURE REVIEW

Miller et al. demonstrated that 20% of patients who experience an ankle sprain will go on to have chronic ankle pain or instability. Plantar fasciitis is one of the most common conditions treated by foot and ankle specialists. Landorf et al. reported one million patients per year are seen for complaints of heel pain. MRI is often used to evaluate the integrity of soft tissue structures and Hudson et al. stated MRI had a sensitivity of 61.11% for detecting peroneal pathology. The peroneal tendons can protect against inversion ankle injuries. Feger et al. studied muscle activation in patients with and without chronic ankle instability. Their results demonstrated patients with chronic ankle instability had prolonged firing of the peroneus longus which lead to early fatigue and contributed to instability. The increased firing of the peroneal tendons also contributes to foot pronation, which is thought to increase stress along the plantar fascia causing patients to experience symptoms.

METHODOLOGY

A level 4 retrospective study of consecutive cases was performed from January 2015 to July 2019. Cases were identified through Current Procedural Terminology (CPT) codes for open lateral ankle ligament stabilization procedures, open plantar fasciotomy and endoscopic plantar fasciotomy. 49 patients who underwent lateral ankle stabilization in addition to concomitant plantar fasciotomy on the same extremity were identified. Procedures identified were performed by 4 different surgeons. Inclusion criteria for this study consisted of patients who underwent lateral ankle stabilization in addition to either endoscopic or open plantar fasciotomy on the ipsilateral extremity during the same surgical case who had a minimum of 10 week follow up, and who had self reported function outcomes in addition to Foot and Ankle Ability Measure (FAAM) scores completed at their initial and final physical therapy (Figure 1). Preoperative MRI results regarding presence or absence of peroneal tendon tear was also compared with intraoperative findings. Patients were excluded if documentation, imaging or follow up was incomplete.

Figure 1. Foot and Ankle Ability Measure (FAAM)

FOOT AND ANKLE ABILITY MEASURE (FAAM)

Please answer **every question** with **one response** that most closely describes your condition within the past week. If the activity in question is limited by something other than your foot or ankle **mark** not applicable.

	4 No difficulty at all	3 Slight difficulty	2 Moderate Difficulty	1 Extreme Difficulty	0 Unable To do	N/A
1 Standing						
2 Walking on even ground						
3 Walking on even ground without shoes						
4 Walking up hills						
5 Walking down hills						
6 Going up stairs						
7 Going down stairs						
8 Walking on uneven ground						
9 Stepping up/down curbs						
10 Squatting						
11 Coming up on your toes						
12 Walking initially						
13 Walking 5 min or less						
14 Walking approximately 10 min						
15 Walking approximately 15 min						
Total						

Because of your foot and ankle how much difficulty do you have with:

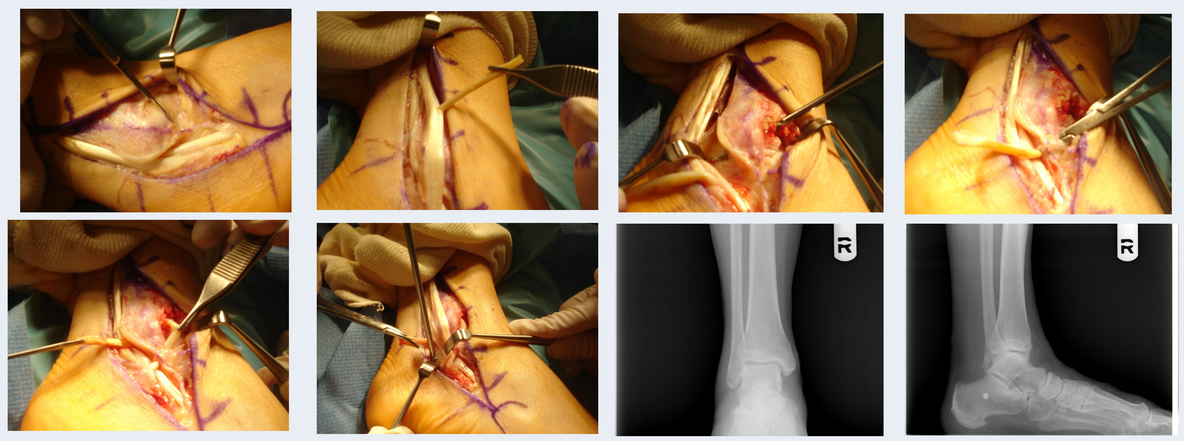
	4 No difficulty at all	3 Slight difficulty	2 Moderate Difficulty	1 Extreme Difficulty	0 Unable To do	N/A
16 Home responsibilities						
17 Activities of daily living						
18 Personal care						
19 Light to moderate work(walking /standing)						
20 Heavy work (push/pull, climb, carrying)						
21 Recreational activities						
Total						

Physical therapists completed FAAM scores for patients at both their initial assessments postoperatively and at their final physical therapy evaluation.

PROCEDURE

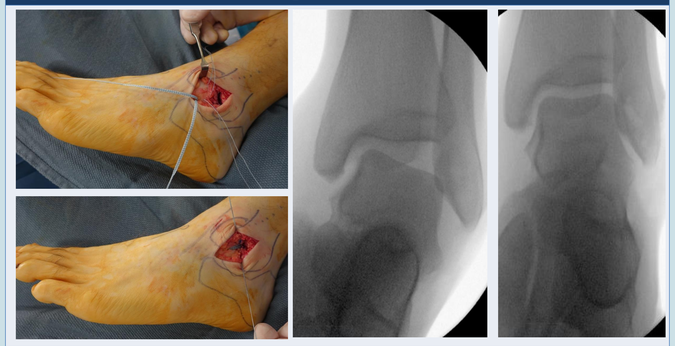
Lateral ankle stabilization was performed either performing direct Brostrom type repair, suture tape internal bracing augmentation, or direct repair with tendon transfer with suture anchor (Figure 2,3). The plantar fasciotomy is performed either through an open in-step approach or endoscopically. The medial 50% of the plantar fascia is transected. Patients are non-weight bearing for 2 weeks, followed by 4 weeks of weight bearing in a removable cast boot. Physical therapy is started at 3 weeks postop.

Figure 2. Lateral Ankle Reconstruction with Tendon Transfer



Incision made along the peroneal tendons. Peroneal tendons inspected and repaired as needed. Anterior 1/3 of peroneus longus then split from body of the tendon and carried distally. Joint capsule incised to identify ATFL and raise flap of capsular tissue. Bone tunnel drilled from anterior to posterior distal fibula. Tendon then passed from anterior to posterior through fibular bone tunnel and passed underneath peroneal tendons. 3.5 anchor then placed at the CFL and FiberWire suture from the anchor attached to transferred tendon. Standard Brostrom approach is then used to suture the ATFL and retinaculum for additional strength to the repair.

Figure 3. Internal Brace Augmentation



Following capsular incision, cuff of tissue and periosteum is raised. Two SutureTac anchors are placed in the anterior distal fibular. InternalBrace anchor then placed in talus with suture tape passed from talus anchor into fibular with separate anchor placement with ankle in corrected position.

Table 1. Results (N = 49 Feet)

Gender (M: F)	9:40
Mean Age (years)	48.7 (range 23-71)
Mean Initial Patient Reported Function Score	45.8%
Mean Final Patient Reported Function Score	83.2%
Mean Initial FAAM Score	55.6%
Mean Final FAAM Score	86%

RESULTS

There were 49 patients who underwent lateral ankle stabilization and plantar fasciotomy for chronic ankle instability and plantar fasciitis who met the inclusion criteria. There were 40 females and 9 males included in the study. The mean age was 48.7 years . The mean self reported initial function score was 45.8% and the mean self reported function score at the last physical therapy evaluation was 83.2%. The mean FAAM score at the initial evaluation was 55.6% and the mean FAAM score at the final evaluation was 86%. Intraoperative correlation of MRI findings regarding peroneal tendon tear was also performed. 33% of the cases had findings that did not correlate to the MRI results as to whether or not a tear was identified in the peroneal tendons. When a tear was present, it was more commonly seen in the peroneus brevis tendon.

ANALYSIS & DISCUSSION

This retrospective study was undertaken to assess the incidence of lateral ankle instability with concomitant plantar fasciitis as well as the functional outcomes. To our knowledge there has yet to be a study that addresses this in the literature. Limitations of this study include the relatively small number of patients, although all were consecutive which decreases exclusion bias. There were 4 surgeons performing the surgeries which can lead to inter-surgeon variability with patient selection and procedure technique. We also had a relatively short follow-up period of 10 weeks. In conclusion, the present study of consecutive patients supports a high prevalence of plantar fasciitis associated with lateral ankle instability. The diagnosis of ankle instability should be on a surgeon's diagnostic radar when evaluating a patient for plantar fasciitis. Furthermore, lateral ankle stabilization and plantar fasciotomy were found to result in significant improvement in functional outcomes.

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