Isolated Gastrocnemius Recession as an Alternative to Arthrodesis for Midfoot Arthritis

Lisa Thatcher, DPM[a], Derek Anselmo, DPM[b] and David Erfle, DPM[c]

[a, b]Resident Physician, Phoenixville Hospital PMSR/RRA, Phoenixville, PA

[c]Partner, Healthmark Foot and Ankle Associates, Phoenixville, PA

Introduction

Midfoot arthrodesis has been described as the gold standard of treatment in end-stage degenerative joint disease (DJD) for many years[1]. With its' numerous complications, technical difficulty and variable post-operative results, this treatment option is reserved for patients who have failed all other modalities of treatment[2]. While arthrodesis remains a reasonable option for treating this condition, other surgical options remain unexplored, including those used to correct a significant deforming force. Most literature describes gastrocnemius lengthening as an adjunct procedure or as part of multilevel surgery[3,4,5]. In our literature review, there were no articles that described this procedure in isolation for recalcitrant midfoot DJD.

Much literature has described equinus as a deforming force on the foot and ankle that can lead to numerous foot and ankle pathologies. These include, but are not limited to: Achilles pathology, retro- and plantar-calcaneal spurring, plantar fasciitis, neuroma, hammertoe, metatarsalgia, hallux abductovalgus, pes planus, and midfoot DJD.

Notably, DiGiovanni et al. performed a prospective comparison study of two groups, a patient and a control group, each consisting of 34 patients (n=68). The patient group was diagnosed with metatarsalgia, or related forefoot and midfoot symptoms while the control group was asymptomatic. Each group was subjected to Silfverskiold testing using an electrogoniometer. Results revealed less ankle dorsiflexion with knee extended in the patient group when compared to the control group. Their findings concluded that isolated gastrocnemius equinus may contribute to forefoot and/or midfoot pathology[6].

Another study focused on gastrocnemius recession for metatarsalgia. Morales-Munoz et al. performed a prospective study of 78 feet and 52 patients (n=52) with mechanical metatarsalgia, and associated gastrocnemius equinus. Each patient underwent open gastrocnemius recession. Pre-op VAS and AOFAS were 7.4 and 46.8, respectively. Post-op VAS and AOFAS were 3.0 and 81.7 respectively. All patients were followed for 6-months post-operatively with no clinical worsening in symptoms[7]. This study supports gastrocnemius recession for a symptomatic condition caused by gastrocnemius equinus.

Purpose

The purpose of this study was to determine the efficacy of performing an isolated gastrocnemius recession for surgical treatment of symptomatic midfoot DJD as an alternative and less invasive surgical option for treating this condition.

Methods and Procedure

A systematic review was performed at the primary surgeon's office, with search criteria focused on patients undergoing isolated gastrocnemius recession for the treatment of symptomatic midfoot DJD. In our study, a search was performed using CPT code: 27687 (Gastrocnemius recession involving lengthening the tight portion of the Achilles tendon). Once these patients were identified, an ICD-9 and ICD-10 code search was conducted using ICD-9 code 715.17 (DJD of foot/ankle), and ICD-10 codes M19.071 and M19.072 (Primary osteoarthritis, right and left foot and ankle respectively). Eleven patients were identified under the above search criteria (n=11) with follow-up recorded over a 40-month period. Phone surveys were conducted using the AOFAS scoring system both pre-operatively and post-operatively. Of the 11, eight responded to the survey (n=8). Pre-operative and post-operative AOFAS midfoot scores were compared to post-operative scores using a paired t-test.

Inclusion criteria included: midfoot pain recalcitrant to conservative management for at least six-months duration. Midfoot arthritis was diagnosed based off of the Menz grading scale, including a score of at least 2 at each of the affected joints[8]. All patients were given the option to proceed with an isolated gastrocnemius recession versus a midfoot arthrodesis. An open procedure consisting of a modified Baker technique was performed in isolation on each patient. The post-op protocol consisted of NWB for one week, protected weight-bearing in a CAM walker from weeks 2-4, then ambulation without restriction in regular shoe gear at week four.

Figure 1. A. Incision planning for open gastroc recession, B. Modified Baker gastroc recession, C. Final closure

Results

Of the 11 patients identified in our systematic review, 8 were available for follow-up (n=8). The average AOFAS midfoot score improvement was 44.62 (18-78) or 107% ($p < 0.01$). Two patients had post-op AOFAS scores two times higher than pre-op and one had tripled her score. All subjects reported sustained improvement since pre-operative evaluation with a mean time to follow-up of 28-months (12-40). None of the patients in this cohort required subsequent midfoot arthrodesis. Seven of eight reported full resolution of symptoms at the follow-up interval and all patients surveyed indicated that they were satisfied with the outcome of their surgery.

Table 1: *Statistical Analysis*

	Pre-op (n = 8)	Post-op (n = 8)
Mean	39.125	83.75
Standard Deviation	18.44	9.07
df	7	
t	6.04	
t Critical, two-tail	2.36	
p	0.001	
95% CI	2.36	

7 of 8

Patients Reported Full Resolution of Symptoms

Zero

Patients Went on to Fusion

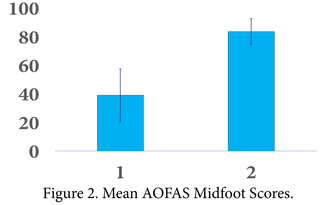

Figure 2. Mean AOFAS Midfoot Scores. (1 = Pre-op, 2 = Post-op)

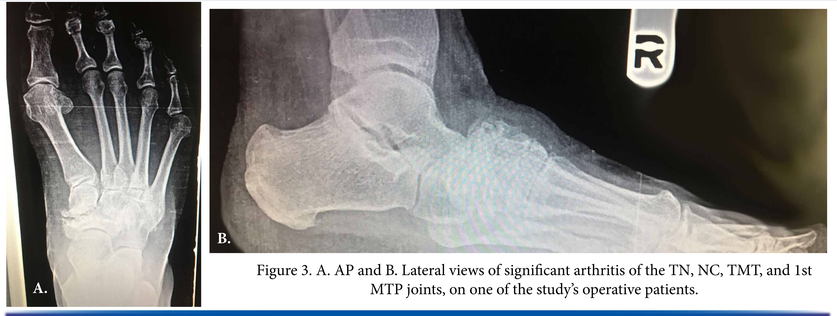

Figure 3. A. AP and B. Lateral views of significant arthritis of the TN, NC, TMT, and 1st MTP joints, on one of the study's operative patients.

Discussion

This was a proof of concept retrospective case series to determine if a gastrocnemius recession could alleviate functional pain associated with midfoot arthritis. There were only eight patients included in the final analysis, as three were lost to follow-up, but the degree of improvement (mean 107%), length of follow-up (mean 23 mo.) and uniformity of results ($p < 0.01$) are considerable. It is worth noting that the two patients with the highest post-op score had the lowest pre-op scores. While the AOFAS midfoot scoring system lacks scientific clinical validation, it is widely used and accepted, and is the only patient reported outcome assessment tool specific to the midfoot. Another limitation to this study was the lack of a prognostic classification for midfoot osteoarthritis, so patients could not be stratified according to severity of disease. We believe our results indicate that a gastrocnemius recession is an effective treatment option for symptomatic midfoot osteoarthritis, and should be considered when treating this condition.

References

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