



Mount Auburn Hospital  
Podiatric Medicine &  
Surgery Residency

# Interference Screw Fixation of a Collagen Matrix Graft to Enhance Repair of Peroneus Brevis Tendon Degeneration

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## Statement of Purpose

**Level of Evidence:** Level IV, Case Series

### Purpose:

Our primary aim is to report outcomes following reconstruction of degenerated Peroneus Brevis Tendon (PBT) using a collagen matrix fixated with an interference screw through an intraosseous tunnel in the fifth metatarsal base. This technique has never been published before and provides many advantages compared to traditional methods of treatment.

## Methodology & Procedures

After obtaining approval from standard Institutional Review Board, 13 procedures in 12 patients were identified. Operative reports were reviewed and each patient with degenerative PBT repair utilizing interference screw of a collagen matrix graft was included in this study. 2 patients (3 procedures) were excluded since they had less than 1 year follow up. A medical record review was initiated. General demographic data, muscle strength, complications, limitations in activities of daily living, and the answer to the question of whether or not the patient would recommend this operation to a friend was reviewed.

All procedures were performed by one foot and ankle surgeon the senior author, PB. Chronic degenerated PBT was identified through clinical exam and confirmed with Magnetic Resonance Imaging. The operation begins with a small inverted U shaped incision exposing degenerated PBT (Figure 1). The tendon is then debrided and tubularized with strong non-absorbable suture in a buried baseball stitch fashion (Figure 2). A collagen matrix graft ~2x4 cm is folded to ~4mm width and is then whip stitched with absorbable suture in preparation for intraosseous fixation into the base of the 5<sup>th</sup> metatarsal (Figure 3). A drill hole is made from dorsal to plantar into the base of the fifth metatarsal and the graft is passed with a suture passer and fixated with an interference screw (Figure 4,5)



Figure 1



Figure 2

## Methodology & Procedures

The secured collagen matrix is then wrapped around the tubularized peroneus brevis tendon at its insertion (See Figures 6,7) and tied down with absorbable suture. This technique allows for a low profile closure and ultimately decreased bulk once fully incorporated. (Figure 8). Post operative protocol was similar in each patient with 2 weeks in a cast non-weightbearing, then 4 weeks in a walking cast. Physical therapy in a removable boot is started at 6 weeks. The patient is then transitioned to a lace up ankle brace and supportive shoe at 10-12 weeks. Aggressive exercise is started 4 months.



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

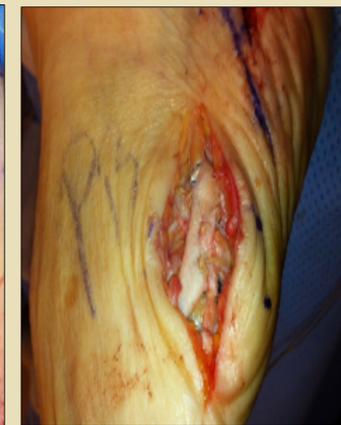


Figure 8

## Literature Review

Chronic degeneration of the peroneus brevis tendon (PBT) at its insertion to the base of the fifth metatarsal is most often caused by traumatic injury such as an inversion ankle sprain but can from repetitive overuse.<sup>1</sup> Tubularization of the peroneus brevis tendon is the mainstay of treatment; however, the repair can result in construct weakness, especially if ostectomy of the base of the fifth metatarsal is required. Repair with bone anchors has also been described however, interference screw fixation provides greater failure strength and less elongation at failure than bone anchors.<sup>2</sup> Krause and Brodsky concluded that if more than 50% of the tendon is viable tubularization should be performed. If less than 50% of the tendon is viable PBT to peroneus longus tendon transfer should be performed.<sup>3</sup> Our technique is the first of its kind to be reported and is a novel technique to preserve the PBT and alleviate pain.

## Results

10 patients with PBT degeneration that underwent tendon repair augmented with regenerative tissue matrix from 2011-2016 were reviewed. Muscle strength, subjective limitations, and the whether or not the patients would recommend the procedure to a friend were evaluated. There were 7 females and 3 males. Average age was 60.2 years and average follow 42.3 months. Each patient healed with only 1 infection that resolved with antibiotics. There was no graft rejection. 2 cases of delayed wound healing and 1 patient with persistent edema that resolved uneventfully. 5 patients reported tingling, 1 of which resolved at final follow up.

## Results continued

Muscle strength was reported at 5/5 to the PBT at final clinic visit. 75% reported no limitations in their activity and 75% of patients would recommend this procedure to a friend (only 7/10 patients provided feedback to these 2 questions). Post-operative edema, bulkiness and incision healing show excellent clinical outcomes. (Figures 9,10)



Figure 9



Figure 10

## Analysis & Discussion

Chronic Degeneration of the PBT at its insertion is challenging to reconstruct. Tubularization is the mainstay of treatment however, when the insertion is involved it can weaken the tendon. Many have struggled to treat this challenging pathology especially if 5<sup>th</sup> metatarsal base ostectomy is required or with other comorbidities such as a severe cavus foot type.

## Analysis & Discussion

In the 2 patients that would not recommend the procedure to a friend, 1 had a severe rigid cavus foot type that in hindsight needed a triple arthrodesis. The foot and ankle surgeon should take note that a severe rigid hindfoot cavus needs to be addressed before or during the procedure otherwise pain will persist despite using this correction. The other unsatisfied patient had 5/5 muscle strength at final clinic visit and their Peroneal construct was strong and intact. They have chronic DJD that is unrelated to their previous deformity masking the success of the procedure. Lastly, the other patient who reported limitations has severe spinal stenosis and recently had a laminectomy. They had drop foot prior to the procedure and report improvement compared to pre-operative level despite limitation that was never going to be completely alleviated.

One reason this is such a challenging problem is that it manifests in a difficult patient population with, at times, complex rearfoot deformity. Currently there are no published solutions for PBT insertional degeneration and we present the first of its kind with satisfactory results.

## References

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