

Statement of Purpose

Traditionally, total fifth ray amputations are avoided to keep from disrupting the peroneal tendon complex and potentially creating an adductovarus deformity. However when a total fifth metatarsal amputation is performed it is more common to transfer the peroneal brevis to the cuboid. The aim of this study is to assess outcomes of peroneal brevis transfers to the fourth metatarsal in comparison to the cuboid to determine which is the more superior construct.

Literature Review

Fifth metatarsal wounds are attributed to offloading issues and prominent anatomy, commonly found in patients with cavus foot types (3). Furthermore these ulcerations are complicated by neuropathy and osteomyelitis. Typical treatment for these issues are partial fifth metatarsal resections leaving the base, peroneal complex, and tarsometatarsal ligaments intact. The reason that surgeons choose to keep the fifth met base is for the pronatory power of the peroneus brevis tendon. With a compromised peroneal brevis the supinatory strength of the posterior tibial tendon will force the foot into an adductovarus deformity (1).

Recurrent fifth metatarsal base ulcers are commonly seen due to the remaining styloid process subsequent to partial fifth ray amputations (4). This is why complete fifth metatarsal resections are advantageous. Furthermore having a whole lateral column makes footwear choices much easier for aftercare, conducive to activities of daily living.

Multiple studies support complete resection of infected or necrotic bone and removal of the bony prominence that prevent wound healing in addition to careful tendon transfer (2,6,8). Multiple transfer sites for the peroneus brevis have been illustrated including the cuboid, base of the fourth metatarsal, side to side anastomosis with the longus, however there has not been a consensus to which transfer site is best for long term strength and stability.

Methods

A cadaveric study was made, where the peroneal brevis and posterior tibial tendon was located, dissected, and detached. The peroneal brevis was then attached to the cuboid bone and then fourth met base using tenodesis screw. The overall strength and lateral column stability was compared in the cadavers. This was done by pulling the posterior tibial tendon with one hand and then the peroneal brevis with the other, as displayed below.



insertion to fourth met. base



insertion to the cuboid



fourth met. insertion under tension



cuboid insertion under tension

Technique

Stage 1: Partial resection of the fifth metatarsal and gathering of clean margins.

Stage 2: After about two weeks the patient is brought back to the OR where the remaining fifth metatarsal base is removed. The peroneal brevis is then found and attached to the fourth metatarsal base using a tenodesis screw.



Post-Operative Follow-Up:

65 year old patient. 12 month follow-up after staged procedure with full fifth metatarsal resection and peroneal brevis transfer to his fourth metatarsal. Patient has returned to leisurely walks and fits into an athletic shoe with no need for custom bracing. No recurrent wounds or breakdown after surgery.

Results

Our cadaveric study indicates that the overall strength and stability of peroneal brevis transfers were superior in comparison to transfers to the cuboid. This was shown under anatomic stress and tension, while pulling from both the posterior tibial tendon and the peroneal brevis, the cuboid inserted foot was more inclined to go into adductovarus.

Discussion

Full fifth metatarsal amputations with peroneal brevis transfers are a valid way to address osteomyelitis of the fifth ray. Though our study is small, and we have thus only had one patient with a year follow up, we believe that this staged procedure can get patients to resume a reasonably normal lifestyle.

References

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