

# 5<sup>th</sup> metatarsal supination: Triplane Tailor's bunion correction

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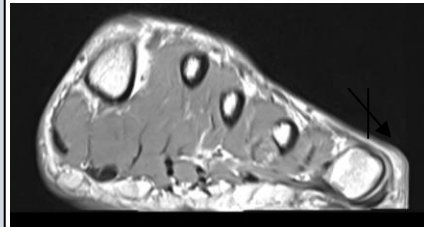
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## Statement of Purpose

Frontal plane deformities of the first metatarsal and how this contributes to pathology requiring surgical intervention has been well established in the more recent literature. The focus has been around hallux valgus providing for potential for new techniques that may provide for improved understanding and treatment of these deformities. Frontal plane deformity of the fifth metatarsal bone is not as well established and literature studying the biomechanics of this deformity and how this may lead to pathology of the fifth metatarsal is not described well in the literature. We propose studying patients with fifth metatarsal tailor's bunion deformities utilizing traditional radiography and how this type of rotational deformity can lead to pathology at the fifth metatarsal while describing our surgical technique to correct this.

## Introduction and Literature Review

This observational study includes our patients who presented with tailor's bunion deformities of the fifth metatarsal bone between January of 2018-December 2023 who underwent traditional forefoot axial radiographs to evaluate the amount of rotation of the fifth metatarsal in the frontal plane. Current standard measurements of the fifth metatarsal involve intermetatarsal angle and lateral deviation angle which mainly account for the transverse deformity. Metatarsal pronation has been described with regards to the first metatarsal and with a traditional bunion deformity but has not been described well to assess lesser metatarsals. (10-14 see below). The amount of metatarsal pronation may be compared to that of the transverse deformity as performed by Eustace et al which lends itself to possible rotational procedures as described. (15) Shape of the metatarsal head may be evaluated on AP radiograph as outlined for the first by Yamaguchi, S (16). We propose evaluating the medial border of the fifth metatarsal head for complete contour of the cartilage on this view indicating less rotation in the frontal plane. (16). Patients who underwent treatment with surgical intervention utilizing an osteotomy as described in the materials and method with fixation were studied to understand how an angled osteotomy with fixation will allow for correction of the articular cartilage and reduction of the patient's deformity while providing a more anatomic reduction of the metatarsal. Demographic data, PMH, physical exam and imaging studies will all be studied and included in this study.



## Materials and Methods

The prevalence of frontal plane deformities of the fifth metatarsal bone have traditionally focused on intermetatarsal angle and lateral deviation angle which may not take this into account as well the patients articular cartilage. By creating a metatarsal osteotomy which corrects for the abnormal articular angle and frontal plane rotation we feel we are able to provide correction in the frontal plane while realigning the articular cartilage. We describe the osteotomy in an oblique fashion from proximal to distal at the dorsal medial portion of the metatarsal head from a line perpendicular from the plantar cartilage to the plantar lateral portion of the metatarsal head where the cartilage intersects the

By creating an osteotomy in the fashion demonstrated below we believe the articular surface will be corrected from a preoperative pronated position to a more supinated position in line with the weight bearing surface of the foot. The osteotomy was then translated proximal and medial while following the path of the osteotomy which allows for correction of the rotated metatarsal. Patients were followed with postoperative radiographs noting reduction of the lateral deviation angle as well as intermetatarsal angle.

## Results

The patients lateral deviation angle and articular cartilage were corrected in this small observational study. The average lateral deviation angle from pre correction to post correction was found to be 11.1 to 6.2. While the intermetatarsal angle was also reduced to an average of 7.1, we feel the articular cartilage reduction was appreciated with this type of procedure.



## Discussion

This study aims to provide insight and analysis of the frontal plane rotation of tailor's bunion deformities as well as an understanding of unique osteotomy to correct this. Frontal plane deformities of the fifth metatarsal are common and significant and while not as prevalent as that of hallux valgus they contribute to a significant amount of pain in the podiatric population. This study provides valuable insights into these types of deformities and outlines an improved manner to evaluate these patients and may potentially lead to improved understanding of how to correct these deformities. While the significance of this type of correction remains to be understood. We welcome further long term studies to review outcomes and patient pain scores. We feel this may provide an area of study for future advances in metatarsal surgery. The results provide insight for more effective treatment strategies to treat these deformities for foot and ankle surgeons.

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