

# The Use of Evans Wedge Implant for Correction of Pes Planovalgus in Subtalar Arthrodesis

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## Statement of purpose:

Hindfoot fusion is used to treat a variety of ailments including malunion, arthritis, non-unions and rigid pes planus deformity (3,7-9). Here we highlight a novel technique using an Evans bone wedge for distraction arthrodesis of the subtalar joint. This study differs from most research by the type of implant used and the surgical technique. There has been a number of studies that highlight the use of a bone block for subtalar distraction arthrodesis. The first of its kind was documented by Gallie in 1943. He described a posterior approach to subtalar joint arthrodesis with insertion of bone-block allograft from the tibia. He achieved favorable results in all test subjects, resulting in only one failed fusion. Over the years, the benefits of using this technique have been demonstrated with evidence from various research teams who cite improvement in AOFAS ankle hindfoot scores, hindfoot height, lateral talocalcaneal angle, and lateral talar declination angle (1,2,5,6,10). However, none of the aforementioned studies report use of a metallic wedge implant. In the arena of rigid pes planus, hindfoot fusion is a commonly employed method of treatment, with triple arthrodesis being the gold standard when 2 or more of the essential hindfoot joints are affected (4, 9-11). The use of metallic implant for the purposes of restoring the height of the subtalar joint however, has not been encountered in the literature. Therefore this study is the first of its kind to use an Evans wedge implant not only for distraction arthrodesis, but to use it in a manner that can correct a multiple plane deformity regardless of etiology. This study will illustrate the use of the metallic wedge implant in the case of pediatric pes planovalgus and calcaneal fracture malunion.

## Patient A



Patient A is a 39 year old female 3 years status post calcaneal malunion. Patient suffered two years with decreases in range of motion and increase in pain. Physical exam showed decreased eversion of STJ and dorsiflexion of the ankle joint. Radiographs shows there is increase in talar declination angle, widening of the calcaneal body and rearfoot varus. After failed conservative treatment attempts the patient underwent a peroneal tendolysis, TAL with isolated subtler joint distraction arthrodesis using evans wedge implant and application of external fixator.

## Patient B

Patient B was a 13 year-old female with severe pes planovalgus. Previously, the patient underwent bilateral STJ implants, however, pain persisted and marked progression of the deformity more so to the left extremity than the right. Clinically, the patient had a rigid valgus deformity of the hindfoot with decrease in dorsiflexion to the ankle. The patient underwent removal of painful hardware, triple arthrodesis with use of a evans implant, and TAL



## Surgical technique

In both cases preparation of the subtalar joint included curettage and subchondral drilling. The STJ was then distracted using a laminar spreader and the metallic implant was then inserted into the posterior facet while being positioned slightly offset medially in the articulation. This position was done in an effort to plantarflex the talar head, aid in talar declination, and restore the height of the rearfoot. The area was compressed using AO technique and 6.0mm screws from the calcaneus to the the talar body followed by the TN joint and last CC joint fusion in the case of patient B. A decision was made to perform a tendo-Achilles lengthening percutaneously, to acquire adequate dorsiflexion in both patients. Patient A was placed in an external fixator and ambulated four weeks later while patient B was placed in a posterior splint and placed non-weightbearing for eight weeks.

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## RESULTS

Patient A was ambulating after 4 weeks full weight bearing in external fixator which was removed at week 8. Patient B was nonweightbearing in a cast for 8 weeks. Both transition to camwalkers at week 8 with physical therapy for 2 months. At week 14 the patients were ambulating in normal shoe gear. At 15 months both patients have completely returned to their normal activities including light exercises and sports. There has been no loss of correction and the hardware is stable and intact.

## Patient A



## Patient B



## CONCLUSIONS

This study differs from most research available at this time by the type of implant used and technique performed that corrects for multi-plane deformities simultaneously. The surgical time is greatly reduced as multiple implant sizes are provided and can be switched out during radiographs allowing for observations of the affects of distraction on surrounding joints. Most are a type of alloy and hypoallergenic decreasing the risk of donor rejection. One of the largest benefits is if a complication should arrive the device can be removed.

The surgeons technique of placing the device posterior medially within the posterior facet of the STJ allows for changes in the sagittal plane as well as the frontal plane correcting and/ or preventing a varus deformity as well as correcting the talar declination. These changes directly affect the surrounding joints allowing for decrease pronation. The metallic construct of these implants allow maintenance of the distraction despite bone incorporation and wear.

This study is limited due to the small sample size and will require further cases and follow up to determine full long term effects of a metallic wedge implant over bone block.