



The Opening Cuboid Osteotomy for Pes Plano Valgus

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INTRODUCTION

Evans first described his calcaneal osteotomy in 1975 for surgical correction of a flexible pes plano valgus deformity in the transverse plane by restoring the length of a short lateral column.

Little has been written regarding lengthening the lateral column through an opening cuboid osteotomy. The majority of cuboid osteotomies are closing cuboid osteotomies for clubfoot or cavus foot deformity or distraction arthrodesis procedures. As a start, Rathjen and Mubarek first described a similar “calcaneal-cuboid-cuneiform osteotomy” for correction of valgus deformities in children. The primary author utilizes the described opening cuboid osteotomy.

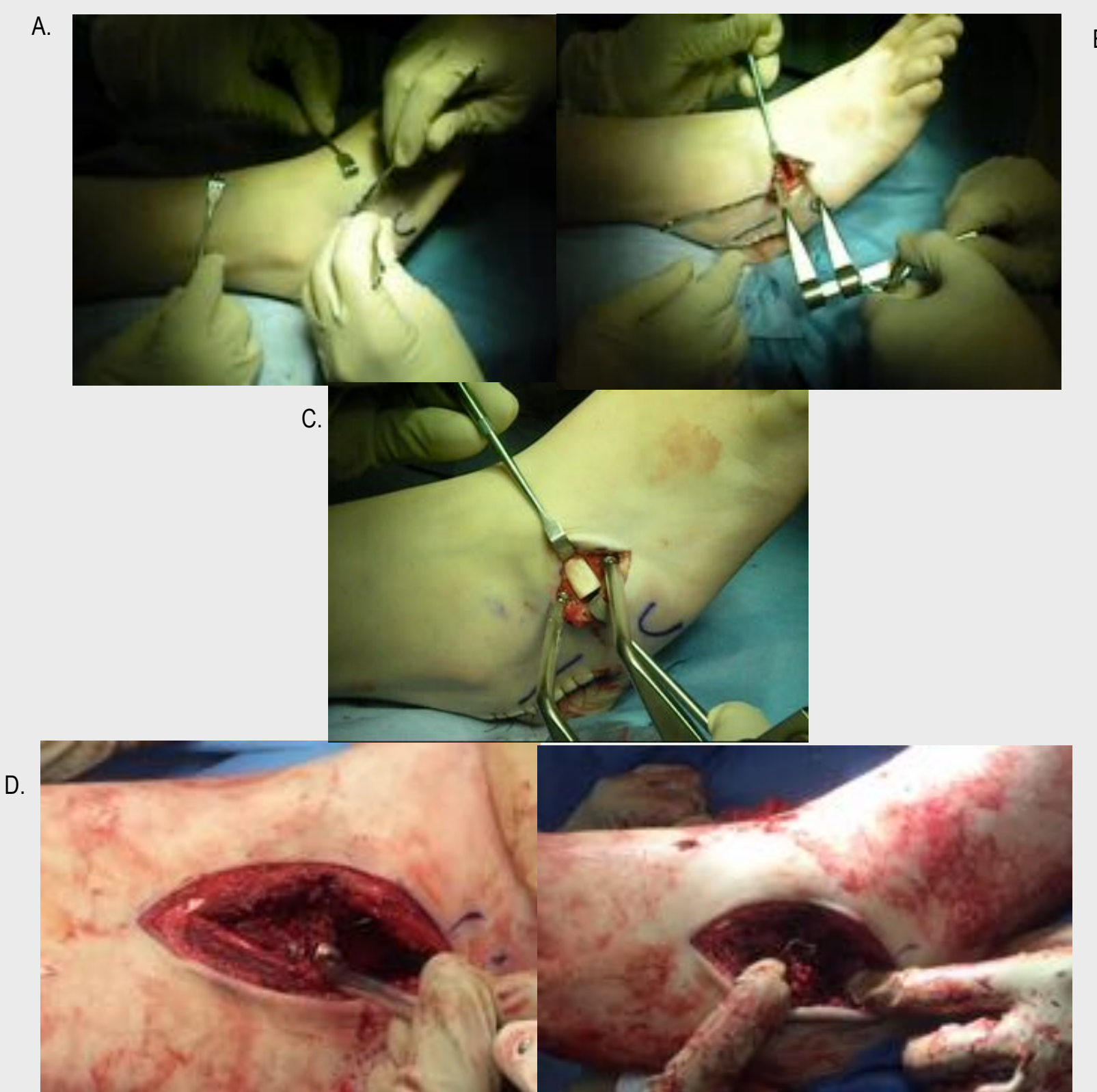
Risks of the cuboid opening osteotomy are similar to that of the Evans osteotomy and include damage to the sural nerve, peroneal tendons, flexor tendons, posterior tibial tendon, or disruption of the peroneal groove on the cuboid which may affect peroneal muscle function. Due to the unique anatomy of the calcaneus and various techniques of the Evans osteotomy, risks include dorsal displacement of the calcaneal anterior process creating an incongruous calcaneal cuboid joint. Hyer et al. found that 56% of calcanei have conjoined facets. Therefore, it is very likely the anterior facet will be violated in a traditional Evans osteotomy.

The primary author has been performing opening cuboid osteotomies with bone graft for over two decades with measurable success. Due to the predictable and constant shape of the cuboid and location, the midline cuboid osteotomy is easier, more accurate, and provides more reproducible results.

METHODOLOGY

A retrospective chart review was performed on 79 feet (54 patients) that were corrected of a flexible pes plano valgus deformity with a cuboid osteotomy with bone graft by one primary surgeon between April 2000 and December 2016 as described. There were 31 males, 23 females with an average age of 25 (range 12-78).

25 of the 54 were bilateral (46.3%). Five (5) cases included an isolated cuboid osteotomy for simple transverse and sagittal plane corrections. The remainder 49 cases included a combination of adjunct complex flat foot procedures to address complex, multi-planar deformities such as a varus producing calcaneal osteotomy, STJ arthrodesis, medial column fusion or posterior tibialis tendon repair, and gastrocnemius recession or tendo-achilles lengthening.

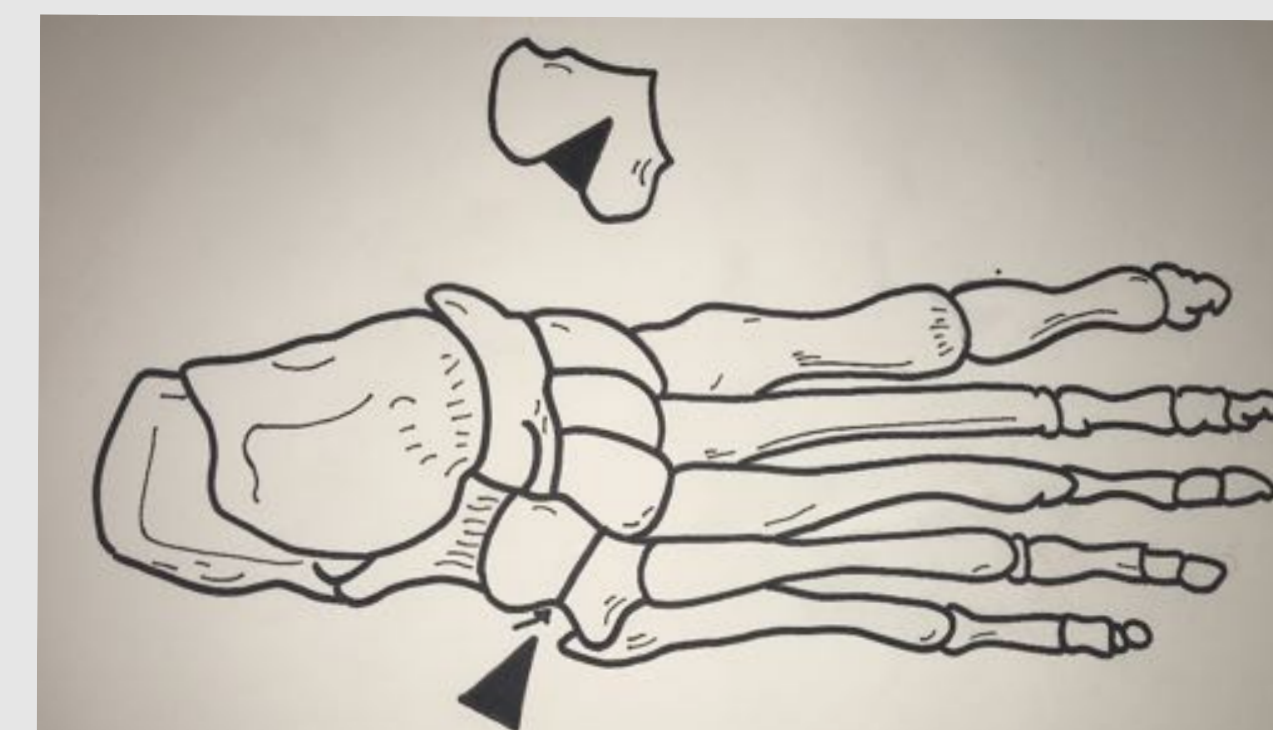


A. Incision placement. B. Distraction of osteotomy site. C. Allograft bone wedge placement. D. Allograft bone flush in the osteotomy. E. Staple Fixation.

PROCEDURE

The patient is positioned in supine with a bump placed under the ipsilateral hip to access the lateral foot. A thigh tourniquet is utilized. A 5-7 cm dorsal linear incision is placed over the calcaneal cuboid joint. Dissection is carried in anatomic layers utilizing sharp and blunt dissection. Neurovascular structures are protected. The extensor digitorum brevis muscle is reflected dorsally from the surgical wound. C-arm confirms the CC joint and to locate the mid-point of the cuboid for placement of the osteotomy. A cuboid osteotomy is performed with a saw in the mid-point of the cuboid. The medial cortex is left intact. A bone distracter is placed across the osteotomy to allow distraction for placement of the bone graft. An allograft bone wedge is placed with the apex medial and base lateral into the osteotomy site until flush with the lateral wall. The osteotomy can be fixated with a k-wire, staple, or plate. The edges of the graft are smoothed with a rasp or rotary burr. Improvement of the talocalcaneal angle is noted on AP and lateral planes on c-arm.

The patient is placed in a posterior splint in the operating room which is removed in 5-7 days followed by below knee cast for a total of 3 weeks non-weightbearing. At 4 weeks, patients are placed in a weightbearing protected boot for an additional 2-3 weeks. Physical therapy is initiated at 8 weeks and the patient is back into a shoe at 8-10 weeks.



The cuboid opening osteotomy. Drawing by Jimmy Shoffman.

RESULTS

This technique demonstrates radiographic improvement similar to other studies with radiographic improvement through Evans calcaneal osteotomy.

25 of 54 (46.3%) of patients were satisfied enough with the outcome to undergo the procedure again on the contralateral foot. The procedure described should be considered an adjunct procedure for correcting severe flat foot. Opening cuboid osteotomies have not been extensively studied to date.

The authors of this article have found successful results with this osteotomy. When weighing the risks of the Evans calcaneal osteotomy, the surgeon may wish to consider performing the opening cuboid osteotomy when appropriate.



A. Pre-operative AP and lateral radiographs. B. Post-operative radiographs demonstrating restoration of the lateral column in the transverse and sagittal planes.

CONCLUSION

Little has been written regarding opening cuboid osteotomies to address the transverse and sagittal planes and restore the lateral column in a pes valgus deformity.

The primary author has been performing opening cuboid osteotomies with bone graft for several years with measurable success. Risks of the cuboid opening osteotomy are similar to that of the Evans osteotomy. However, The author believes that given the shape and location of the cuboid, the midline cuboid osteotomy allows for smaller incision, is easier, more accurate and a more reproducible technique with measurable results.

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