

Percutaneous Calcaneal Displacement Osteotomy in the Pediatric Population

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[Link to Best Video](#)

Abstract: Calcaneal displacement osteotomy is a well-established surgery for correction of rigid heel varus or valgus deformity in young patients. We describe a percutaneous technique of doing this surgery which can help avoid possible complications of open surgery.

In supine position, under fluoroscopic guidance and safe zone for osteotomy on the lateral aspect of the calcaneus is marked (Figure 1). A 1 cm incision is made on the lateral calcaneus along the line of desired osteotomy and blunt dissection is carried out to the lateral cortex of the calcaneus. The tip of a side-cutting burr is introduced in the calcaneus just up to the medial cortex (Figure 2). A reducer is attached for the protection of neurovascular structures on the medial side. Two K-wires are introduced percutaneously into the calcaneus to affix a jig to the calcaneus (Figure 3). The side-cutting burr is introduced back into the calcaneus using the jig and osteotomy is initiated with vertical swiping motion controlled by the jig using the side-cutting portion of the burr, with great care to avoid plunging medially. Prior to completion of the osteotomy, the jig is removed, and the near cortex of the osteotomy is finished free-hand (Figure 4). With medial or lateral pressure on the heel, the osteotomy completion is confirmed as the heel moves freely. After confirmation of adequate displacement, the osteotomy is fixed with a partially threaded cannulated screw after countersinking the screw head to avoid hardware prominence (Figure 5). The incision is closed with 3.0 nylon suture and a short leg, non-weight bearing cast is applied and maintained for 6 weeks.

Operative Pearls

- Safe zone for osteotomy should be marked on a perfect lateral fluoroscopic image using a mini C-arm (Figure 1).
- The reducer attached to the burr acts to decrease the RPMs, intended to prevent medial soft tissue injury.
- Do not penetrate beyond the medial cortex with the tip of the burr (Figure 2B).
- Use an intravenous plastic cannula for intermittent irrigation of the osteotomy site and burr to minimize thermal injury.
- Regularly check the position of the burr and the path of the osteotomy using the mini C-arm and adjust the path of the burr if required.

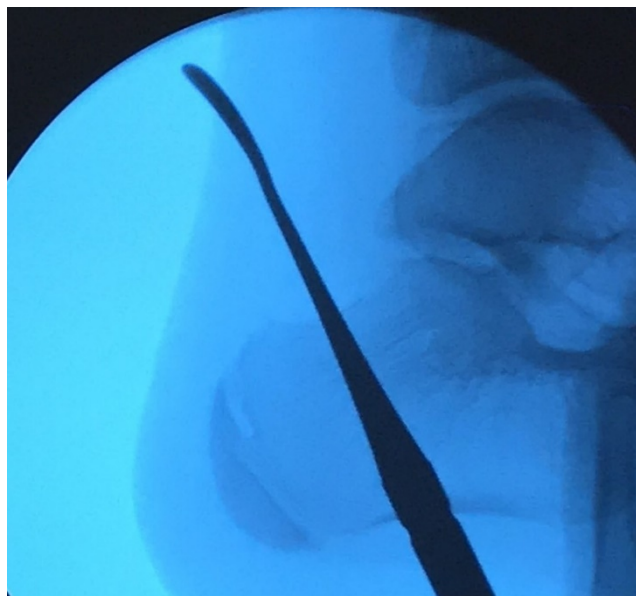
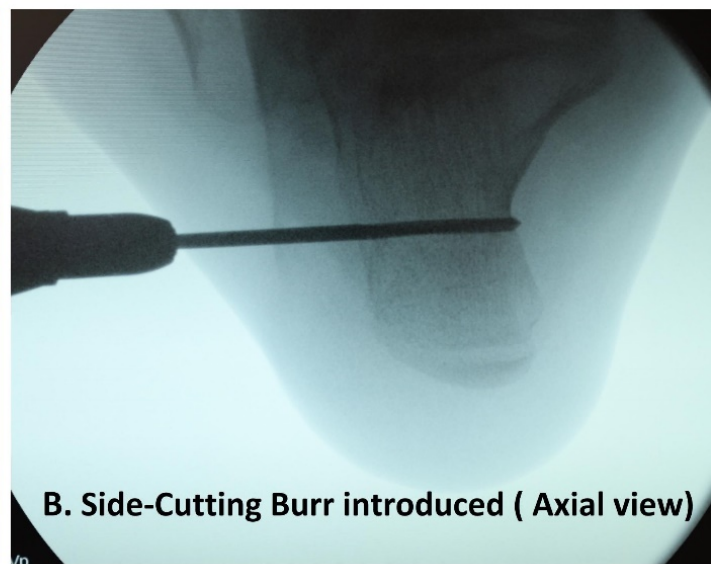


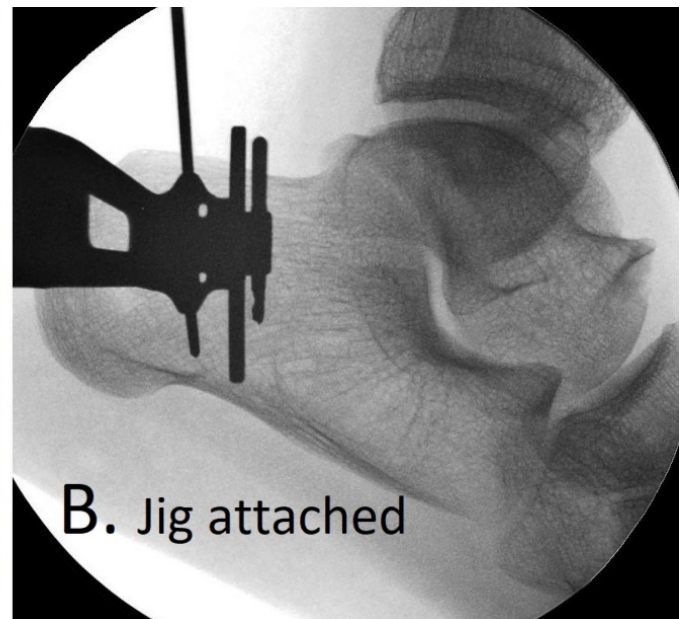
Figure 1. Safe Zone for osteotomy marked on the lateral fluoroscopic image.

Complications/Challenges

- Incision is skin only followed by blunt dissection down to bone to avoid injury to sural nerve laterally.
- Regularly check on axial view to make sure the burr is not beyond the medial cortex during the osteotomy to avoid medial neurovascular injury.
- The burr is not long enough to osteotomize both the proximal and distal aspects of the calcaneus in one sweep, hence after completing the distal cortex first, the near cortex should be done free hand (Figure 4).



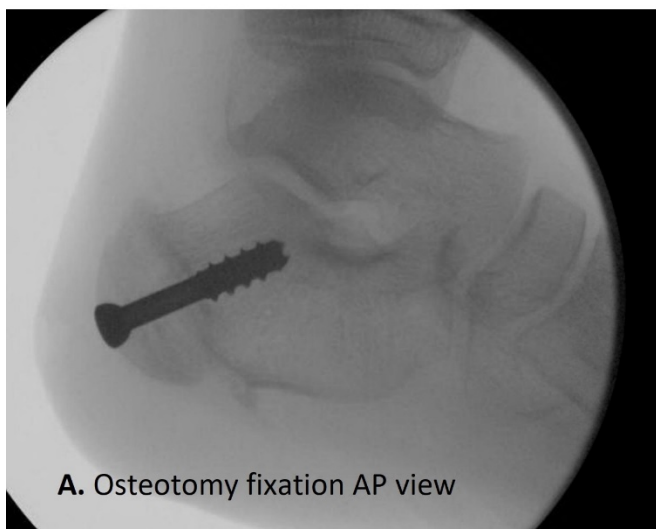
Figures 2 A and B. Side cutting burr introduced in the safe zone confirmed on axial image.



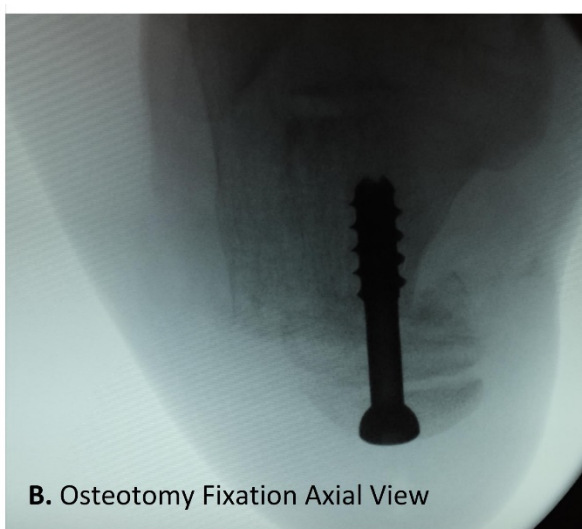
Figures 3 A and B. Cutting jig affixed to the calcaneus with K-wires and confirmed with fluoroscopy.



Figure 4. Final completion of the osteotomy freehand after removal of jig.



A. Osteotomy fixation AP view



B. Osteotomy Fixation Axial View

Figures 5 A and B. Medial slide osteotomy final fixation with screw (after countersinking).