

# Calcaneus Interlocking Nail Treatment for Calcaneus Fracture: A Multiple Center Retrospective Study

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**INTRODUCTION:** Minimally invasive treatments for calcaneus fractures have the same outcomes and fewer complications. However, they are technically demanding, and there are a lack of reduction tools. To overcome these problems, a calcaneus interlocking nail system was developed that can make reduction and fixation minimally invasive and effective. We retrospectively studied the calcaneus fracture variables intraoperatively and followed up to evaluate the outcomes of patients treated with the calcaneus interlocking nail system.

**METHODS:** All patients in 7 institutions between October 2020 and May 2021 who had calcaneus fractures treated with calcaneus interlocking nails were retrospectively analyzed. The patient characteristics, including age, sex, injury mechanism, Sanders type classification, smoking status, and diabetes were recorded. The calcaneus interlocking nail and standard surgical technique were introduced. The intraoperative variables, including days waiting for surgery, surgery time, blood loss, incision length, and fluoroscopy time, were recorded. The outcomes of complications, AOFAS scores, and VAS scores were recorded and compared with other similar studies.

**RESULTS:** Fifty-nine patients were involved in this study; 54 were male; 5 were female; and they had an average age of  $47.5 \pm 9.2$  years (range 25–70). Two of these fractures were Sanders type I, 28 of these fractures were Sanders type II, 27 of these fractures were Sanders type III, and 2 of these were Sanders type IV. The surgery time was  $131.9 \pm 50.5$  (30–240) minutes on average. The blood loss was  $36.9 \pm 41.1$  (1–250) ml. The average incision length was  $3.5 \pm 1.8$  (1–8) cm; 57 were sinus tarsi incisions; and 2 were closed fixations without incisions. The average fluoroscopy time was  $12.3 \pm 3.6$  (10–25) seconds during the surgery. The VAS score of patients on the day after surgery was  $2.4 \pm 0.7$  (1–3). The AOFAS ankle-hindfoot score in patients who had a follow up at 12 months was  $93.3 \pm 3.6$ (85–99). During the follow up, all patients' functional outcomes were good. One patient had a superficial infection. The rate of complications of the 59 patients was 1.7% (1/59).

**DISCUSSION AND CONCLUSION:** The calcaneus interlocking nail system can have satisfactory reduction and fixation in calcaneus fractures, even in Sanders type IV. The outcomes of follow up showed good function. The calcaneus interlocking nail could be an alternative method for minimally invasive calcaneus fracture fixation.