

Stentoplasty for Calcaneal Fractures Ensures Favorable Clinical and Radiological Outcomes: A Retrospective Study with 9 years of follow-up.

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INTRODUCTION: The calcaneus is the most commonly fractured tarsal bone, representing 2% of all fractures and 60% of tarsal fractures. These injuries are particularly challenging due to the complex anatomy of the bone, frequent involvement of the subtalar joint, and the tendency for displacement. The optimal treatment for displaced intra-articular calcaneal fractures—surgical versus non-surgical—remains a subject of ongoing debate in the medical literature. Open reduction and internal fixation is widely regarded as the standard surgical method, though it is associated with a high complication rate. In an effort to reduce these risks, minimally invasive techniques, including balloon-assisted reduction, have recently gained attention. This study aims to clinically assess patients approximately nine years after undergoing stentoplasty.

METHODS:

This retrospective study analyzes a cohort of 14 patients (mean age 46.7 years, range 25–71) treated between 2014 and 2018 at our Department of Orthopaedics and Traumatology. All patients underwent balloon-assisted reduction combined with bone substitute or bone cement augmentation for calcaneal fractures. Inclusion and exclusion criteria are detailed in Table 1. The surgical procedure involved placing the patient in a supine position with a thigh tourniquet, performing a 10 mm lateral incision, and using K-wires for alignment and reduction of fragments. Through the lateral approach to the calcaneus, a periosteotome was inserted to mobilize fragments and restore joint height. The VBS™ (Vertebral Body Stent - DePuy Synthes Spine) device was inserted through the same incision, guided by fluoroscopy, and inflated to reestablish anatomical structure. After deflation, the reduction was held in place with the VBS™, and the resulting bone void was filled with PMMA or ChronOS Inject (DePuy Synthes) (Figure 1). Postoperatively, a splint was applied for pain management.

Patients were divided into two groups: Group 1 completed follow-up at a mean of 12 months, while Group 2—comprising 71.4% of the original group—also completed a second follow-up at a mean of 98.82 months. Clinical outcomes were evaluated using the American Orthopaedic Foot and Ankle Society score and the Visual Analogue Scale. Preoperative radiological assessment included X-rays and CT scans, with measurements of Böhler and Gissane angles recorded prior to surgery and at the first follow-up.

RESULTS: Group 1 had an average AOFAS score of 75 and a mean VAS score of 3.29/10. In Group 2, the mean AOFAS score improved to 86.67, with all patients showing progress except one. VAS scores remained consistently low, averaging 3.23/10. Minor short-term complications were observed in some cases, including residual pain, wound secretion, and talalgia in lateral decubitus; two patients developed tarsal sinus syndrome. At long-term follow-up, no major complications were reported, and most patients achieved excellent clinical outcomes. One patient could not be evaluated due to death, and four others were lost to follow-up. Radiological findings showed significant improvement in Böhler's angle, while 64.29% of cases maintained Gissane angles within the normal physiological range.

DISCUSSION AND CONCLUSION: The study indicates that balloon-assisted reduction, when combined with bone cement or substitute augmentation, leads to positive long-term results in the treatment of calcaneal fractures. The technique demonstrated high AOFAS scores, low levels of pain on the VAS scale, and a low rate of complications. It appears to be effective in restoring joint anatomy and minimizing postoperative risks. However, further studies involving larger patient populations are recommended to confirm these outcomes.