

Arthroscopic Subtalar Joint Arthrodesis for Primary Fusion after Severe Calcaneal Fracture



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Statement of Purpose

Post traumatic arthritis is common after sustaining an intra-articular comminuted calcaneal fracture. Recent literature is trending towards primary subtalar joint (STJ) fusions for treatment. An arthroscopic STJ arthrodesis for primary fusion of the calcaneus is not a widely utilized approach. The purpose of this study is to provide a beneficial surgical technique when performing primary fusions after calcaneal fractures.

Literature Review

Intra-articular calcaneal fractures are commonly associated with high energy trauma and can be life altering injuries (1). Traditional surgical techniques for calcaneal fractures used a large expansile lateral incision for open reduction internal fixation (ORIF) in order to obtain visualization of the fracture pattern to aid with anatomic reduction (2-3). Due to the soft tissue swelling and poor incision placement this approach was wrought with wound healing complications. This led to the development of less invasive techniques like the sinus tarsi approach, percutaneous reduction, and arthroscopic assisted reduction. These new techniques have helped lower the wound healing complications, infection rates, scar tissue formation, and have similar postoperative outcomes as the traditional open technique (3-5). Even with anatomic reduction of the calcaneal fracture many calcaneal fractures go on to have postoperative pain and stiffness. These often require eventual arthrodesis of the STJ. This has led recent trends to shift towards primary fusion of Sanders type III and IV calcaneal fractures which have shown similar outcomes to ORIF procedures with the added benefit of avoiding a second procedure (6-7). In looking at the literature both arthroscopic assisted reduction of calcaneal fractures and primary fusion of calcaneal fractures have been described, however these have not been described in conjunction to the authors knowledge.

Case Study

A case is presented of a 69 year old male and who sustained a severe intra-articular calcaneal fracture. The decision was made to perform primary STJ fusion through an arthroscopic approach and screw fixation. There were no wound complications and arthrodesis site progressed to clinical and radiographic union. His pain was well controlled and he was able to return to regular shoe gear in ten weeks.

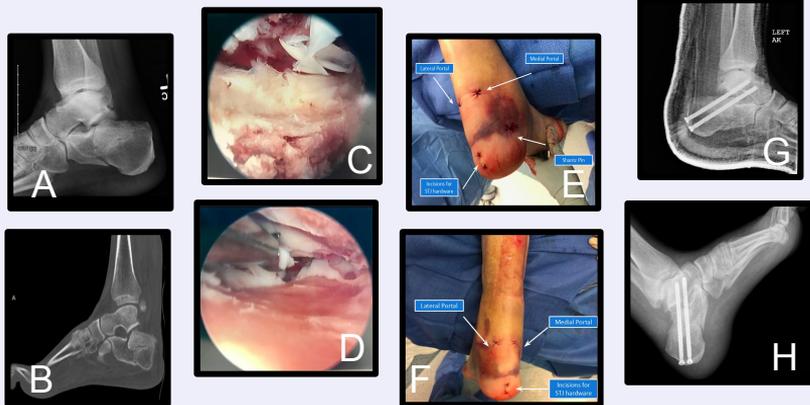


Figure 1. (A,B) Radiograph and CT imaging of intra-articular calcaneal fracture (C,D) Intraoperative arthroscopic images of fracture and arthrodesis site preparation (E-F) Portal sites and incisions (G) Postoperative radiograph (H) 6 weeks status post STJ fusion

Surgical Technique

Patient was brought to the operating room and placed in prone position on the table. A stab incision was made at the posterolateral and posteromedial aspects of the ankle at the level of the fibular tip. Stab capsulotomies were then performed to enter the joint. Arthroscopy cannula and camera were inserted through the lateral portal. The posterior aspect of the talus was identified. A large Steinman pin was inserted through the heel and weight was applied in order to achieve subtalar joint distraction for optimal exposure. A full radius resector was inserted into medial portal and posterior synovium and tissues were resected to expose the posterior aspect of the STJ. Upon inspection of the posterior facet of the STJ, an intra-articular collapsed posterior facet was noted. With the resector, all articular cartilage was resected and then fenestrated with awls. Next, bone putty was injected into the prepared subtalar joint arthrodesis site. The joint was temporarily fixated and final fixation was achieved using two 7.0 mm partially threaded cannulated screws. Intraoperative fluoroscopy was used to confirm adequate reduction, fixation, and stability of the arthrodesis. Sites were irrigated with saline and incisions were closed with 4-0 Prolene.

Analysis and Discussion

While anterior ankle arthroscopy is a widely accepted method, posterior ankle/subtalar joint arthroscopy is still a relatively novel procedure. Posterior STJ arthroscopy is viable treatment option for posterior hindfoot and ankle pathology due to precise visualization of pertinent anatomy, decreased perioperative morbidity and complication rates, as well as earlier return to activity as compared with open techniques. Conversely, complications such as nerve dysesthesia, achilles tendon tightness, complex regional pain syndrome, and infection have been reported (8). This study presents the surgical technique of an arthroscopic STJ arthrodesis for primary fusion of the subtalar joint after comminuted intra-articular calcaneal fracture. Arthroscopic STJ fusion offers quicker time to fusion, faster recovery, and is a viable alternative to open fusion which is particularly important in the case of a calcaneal fracture with significant soft tissue compromise (3-5). In this case study, the surgical approach allowed for asymptomatic return to activity following fusion without soft tissue injury or wound complications.

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