Evaluation of Treatment Protocol of Medial Subtalar Joint Dislocations and Updates on STJ Dislocation Management Over a 25- Year Period (2000-2025)

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Statement of Purpose

Subtalar joint (STJ) dislocations are rare, high-energy injuries involving simultaneous disruption of the talocalcaneal and talonavicular articulations. Despite their infrequency, these injuries present significant diagnostic and therapeutic challenges due to the complex osseous and ligamentous anatomy of the hindfoot. This study aims to evaluate a case series of 5 cases of medial STJ dislocations over a 25- year period as well as present an updated treatment protocol.

Level of Evidence

Level of Evidence: IV

Introduction

Subtalar joint dislocation is a rare but severe injury involving simultaneous disruption of the talocalcaneal and talonavicular joints without major talar fracture, accounting for <1% of all joint dislocations. It typically results from high-energy inversion or eversion with axial load, producing displacement of the calcaneopedal unit relative to the talus; this study reviews 25 years of literature and case experience to refine modern management strategies.

The subtalar joint is a coupled articulation critical for triplanar hindfoot motion, stabilized by the interosseous and cervical ligaments with dynamic muscular support. Medial dislocations (~80%) follow inversion injuries, while lateral dislocations (~15%) result from eversion and are more often open with associated fractures; anterior and posterior types are rare. Accurate classification, advanced imaging, and precise reduction are essential to restore joint congruity and reduce long-term complications. Figure 1 shows normal anatomy of the subtalar joint whereas Figures 2 (2a and 2b) and Figure 3 note a medial and lateral subtalar joint dislocation respectively.

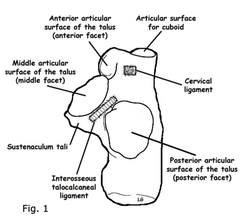

Fig. 1

Fig. 2a

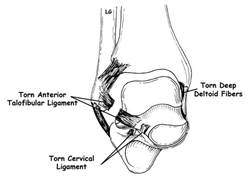

Fig. 3

Fig. 2b

Methodology

A systematic review was conducting highlighting subtaltar joint dislocations from 2000 - 2025. Exclusion criteria included studies prior to 2000, studies performed on animal models, and studies performed outside of the English language literature. Inclusion criteria included studies peformed from 2000-2025, studies performed within PubMed, Scopus, and Embase databases, and performed on individuals >18 years of age. Following this, The five case reports of medial dislocations at Roxborough Memorial Hospital were investigated and evaluated for recent treatment protocol. Table 1 highlights the studies evaluated:

Table 1: Major LIterature on STJ Dislocations (2000-2025)

Decade / Study	Key Focus	Findings / Contribution	Notes / Complications Reported
Bibbo et al., 2001	Large clinical series (JFAS)	20% AVN, 45% arthritis	Established modern outcome expectations
Mansur et al., 2004	Early motion study	Early rehab improved function	Advocated reduced immobilization time
Berkowitz & Kim, 2007	Prognostic analysis	Delay > 6 h → worse results	Stressed importance of early reduction
de Leeuw & van Dijk, 2013	Systematic review	Lateral dislocations = worst prognosis	40–60% arthritis rate
Hahn et al., 2019	Immobilization duration	≤ 4 weeks → better outcomes	Supported early motion
Sharma et al., 2021	Timing vs AVN	Reduction < 2 h → 0 AVN cases	Confirmed time-critical management
Hsu et al., 2023	3-D CT mapping	Quantified post-reduction congruity	Linked residual malalignment → arthrosis
Kim et al., 2024	Arthroscopic reduction	Safe in select cases	Reduced soft-tissue complications

Diagnosis and Imaging

Prompt imaging is critical for confirming subtalar dislocation, identifying associated injuries, and guiding management. Initial radiographs (AP, lateral, and Harris Beath views) establish the diagnosis and assess reduction. Thin-slice CT, which is considered to be the gold-standard, detects occult fractures, articular incongruity, and talonavicular malalignment that influence prognosis and surgical planning. MRI is reserved for persistent pain or instability to evaluate ligamentous or tendon injury and early avascular necrosis, with follow-up imaging at 6–12 weeks recommended to confirm maintained reduction and identify delayed complications.

Management and Treatment

All five cases were medial dislocations resulting from high-energy inversion injuries. Three patients underwent successful closed reduction with complete functional recovery and no radiographic evidence of avascular necrosis at follow-up. Two irreducible dislocations required open reduction due to posterior tibial tendon interposition and demonstrated longer rehabilitation periods with residual stiffness.Early closed reduction within two hours correlated with optimal outcomes, whereas delayed intervention led to prolonged recovery. Across reviewed literature, medial dislocations comprised approximately 80% of all STJ dislocations, followed by lateral (15%), posterior (3%), and anterior (2%) types.[5,8] Advancements in imaging and fixation techniques have significantly decreased the incidence of AVN and chronic instability since the early 2000s. Table 2 highlights a treatment protocol for STJ dislocations.

Open reduction is indicated for irreducible dislocations, most commonly due to tendon or capsular interposition, with surgical approach dictated by the direction of displacement and temporary K-wire fixation used for residual instability. Arthroscopic-assisted techniques have emerged to allow minimally invasive reduction and direct evaluation of osteochondral injury. Post-reduction care includes immobilization for 4–6 weeks with early range of motion at approximately two weeks, progression to weightbearing at six weeks, and return to full activity by three to six months. Despite appropriate management, complications such as stiffness, subtalar arthritis, and chronic instability remain concerns, emphasizing the importance of imaging surveillance and structured rehabilitation to optimize long-term outcomes.

Complications after subtalar joint dislocation are common and strongly influence long-term outcomes. Early reduction, anatomic realignment, and early mobilization are the strongest predictors of recovery, with medial dislocations achieving better return-to-activity rates than lateral or complex injuries. Despite modern management, stiffness, instability, post-traumatic arthritis, and occasional avascular necrosis affect up to 30–60% of patients.

Table 2: Injury Type with Associated Management

Injury Type	Preferred Management	Imaging Required	Expected Prognosis
Medial dislocation	Closed reduction under sedation; immobilize 4–6 weeks	X-ray → CT post-reduction	Good to excellent
Lateral dislocation	Attempt closed; if fail → open reduction via lateral approach	CT ± MRI	Fair; high risk of arthritis
Posterior dislocation	Gentle closed reduction; short immobilization	CT if uncertain	Good; rare
Anterior dislocation	Usually closed reduction, verify via CT	CT	Good
Complex / fracture-dislocation	Open reduction, internal fixation as indicated	CT + MRI	Guarded; depends on fracture pattern

Conclusion

Successful management of subtalar dislocations requires prompt anatomic reduction, advanced imaging, and structured rehabilitation. Early reduction is the strongest predictor of outcome and reduces the risk of avascular necrosis and post-traumatic arthritis. Modern CT and MRI improve detection of occult fractures and soft-tissue injury, while early mobilization enhances functional recovery. Post-traumatic subtalar arthritis remains common, particularly after complex injuries, necessitating long-term surveillance and ongoing refinement of treatment strategies.

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