ORIGINAL PAPER/PŮVODNÍ PRÁCE

Chronic Instability following Isolated Subtalar Dislocations: a Case Series and Proposal for Routine MRI

Chronická nestabilita po izolovaných subtalárních dislokacích: kazuistika a návrh pro rutinní MRI vyšetření

MEHMET SÜLEYMAN ABUL, ÖMER FARUK SEVIM, HALİT MERT GÜNEŞ, ÖMER HEKIM, ENGIN ECEVIZ

Department of Orthopedics and Traumatology, Kartal Dr. Lütfi Kırdar City Hospital, Istanbul, Turkey

Corresponding author:

Ömer Faruk Sevim
Department of Orthopedics and Traumatology
Kartal Dr. Lütfi Kırdar City Hospital, Istanbul, Turkey
dromerfaruksevim@gmail.com

Abul MS, Sevım ÖF, Güneş HM, Hekım Ö, Eceviz E. Chronic Instability following Isolated Subtalar Dislocations: a Case Series and Proposal for Routine MRI. Acta Chir Orthop Traumatol Cech. 2025;92: 231–236.

ABSTRACT

Purpose of the study

Subtalar dislocations are rare orthopedic emergencies characterized by simultaneous dislocation of the talocalcaneal and talonavicular joints without an associated talar neck fracture. While these injuries are commonly managed with closed reduction and immobilization, they are often associated with chronic instability and other long-term complications due to underdiagnosed soft tissue injuries.

This study aims to evaluate the role of magnetic resonance imaging (MRI) in the management of isolated medial subtalar dislocations and propose a routine MRI protocol to predict and address chronic instability.

Material and methods

A prospective case series was conducted, including 13 patients with isolated medial subtalar dislocations. All patients underwent MRI to assess soft tissue injuries, particularly the calcaneofibular ligament (CFL) and anterior talofibular ligament (ATFL). Functional outcomes were evaluated using the Visual Analog Scale (VAS) for pain and the American Orthopaedic Foot & Ankle Society (AOFAS) scores.

Results

MRI identified complete or partial tears of the CFL and ATFL in the majority of patients. Patients with complete ligament tears reported worse outcomes, with lower AOFAS scores and higher VAS pain scores, compared to those with partial or no ligament involvement. Conservative management was effective in mild cases, while surgical reconstruction was required for patients with significant instability.

Conclusions

Routine MRI in the management of isolated subtalar dislocations enhances the detection of soft tissue injuries, facilitating timely interventions and reducing the risk of chronic instability. Integration of MRI into the diagnostic and follow-up protocol for improved patient outcomes.

Key words: subtalar dislocation, magnetic resonance imaging, ligament injuries, calcaneofibular ligament, anterior talofibular ligament.

INTRODUCTION

Subtalar dislocations are uncommon injuries characterized by simultaneous dislocation of the talocalcaneal and talonavicular joints without an associated talar neck fracture (2, 6, 8, 9, 10, 11, 17, 18, 19). These injuries are typically classified as either medial or lateral, depending on the direction of the dislocated foot in relation to the talus (8, 11, 16). Although relatively rare, subtalar dislocations can result in significant long-term complications, including chronic instability, post-traumatic arthritis, and pain (2, 6, 9, 14, 15, 17, 18).

Bibbo et al. highlighted the critical role of advanced imaging techniques, such as computed tomography (CT), in identifying fractures that might be missed on plain radiographs. Their study demonstrated that CT scans revealed occult fractures or more extensive injuries in 100% of subtalar dislocation cases, leading to changes in management in nearly half of the patients (3, 17). These findings underscore the importance

Acta Chir Orthop Traumatol Cech., 92, 2025, No. 4, p. 231–236

of detailed imaging in the early stages of injury assessment, particularly for identifying bony pathologies (3, 8, 9).

Magnetic resonance imaging (MRI) offers a superior modality for visualizing soft tissue injuries, including ligament ruptures. Its ability to provide detailed assessment of the CFL, ATFL and other stabilizing structures of the ankle and foot makes it a valuable tool in evaluating subtalar dislocations (7). Despite this advantage, the routine use of MRI in these cases is not widely implemented, potentially leading to underdiagnosis of critical ligamentous injuries that contribute to chronic instability (10). This gap highlights the need for integrating MRI into the standard diagnostic protocol for isolated subtalar dislocations.

We conducted this study to reassess the management of isolated subtalar dislocations and propose a routine MRI protocol to predict and address chronic instability. Our hypothesis was that incorporating early MRI evaluation into the diagnostic workflow, alongside conventional imaging techniques, could improve the identification of soft tissue injuries, ligament ruptures, and enable timely interventions to mitigate long-term complications (2, 9, 11, 13, 15). To enhance the reliability of our findings, we designed a prospective case series with a standardized management and follow-up protocol with MRI assessment. To the best of our knowledge, no previous studies have systematically evaluated isolated subtalar dislocations with an emphasis on MRI-based ligament injury detection and its correlation with rearfoot stability.

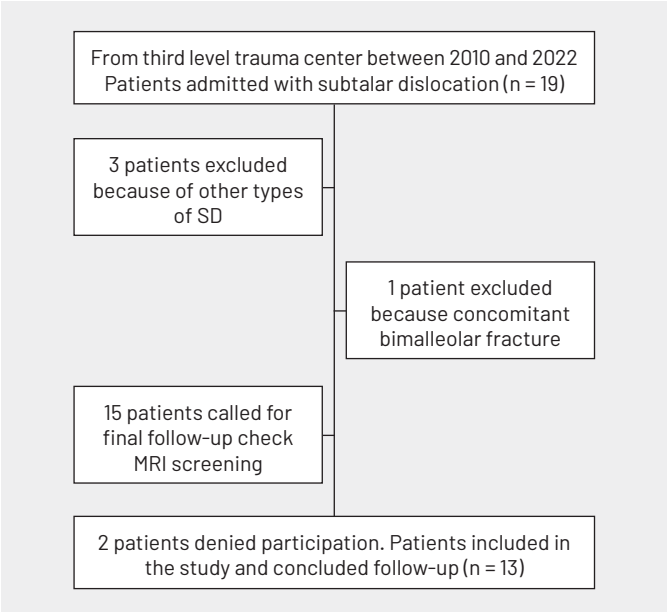

Fig. 1. **Flow diagram of patients enrolled in the study.**

MATERIAL AND METHODS

This study is a hybrid protocol analysis aimed at evaluating the outcomes of patients with medial subtalar dislocations associated with fractures, with a mean follow-up period of 7.3 years. Patients of any age or gender presenting with isolated subtalar dislocations (StD) were considered for inclusion in this study (Fig. 2–4). The inclusion criteria were as follows: (1) isolated subtalar dislocation, confirmed through clinical and radiological evaluation; and (2) absence of associated fractures on initial imaging. Patients were excluded if they had: (1) associated fractures, such as talar neck, navicular, or calcaneal fractures; (2) subtalar dislocations of types other than medial (e.g., lateral, anterior, or posterior); or (3) underlying conditions that could affect rehabilitation outcomes (e.g., peripheral neuropathy, systemic inflammatory disease). Of the 16 patients evaluated at our institution, 13 met the inclusion criteria and were enrolled in the study (Fig. 1).

All patients underwent magnetic resonance imaging (MRI) during follow-up to assess the integrity of the calcaneofibular ligament (CFL) and anterior talofibular ligament (ATFL), with the goal of identifying injuries that could contribute to

Fig. 2. **Clinical photographs showing medial subtalar dislocation in different patients(case 4-9-13) in study prior to reduction. The visible deformity demonstrates the severity and direction of the dislocation.**

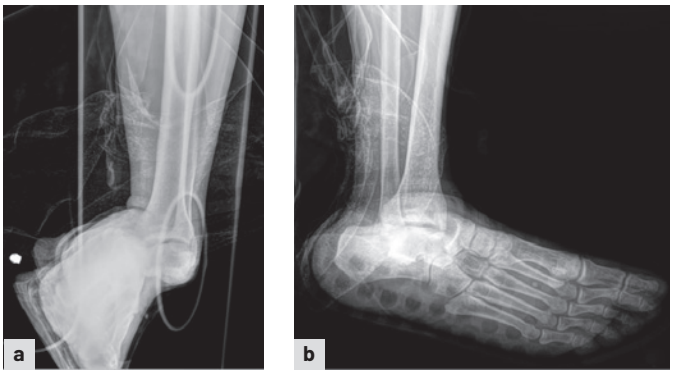

Fig. 3. **Pre-reduction anteroposterior (a) and lateral (b) radiographs of a case 8.**

Fig. 4. **Post-reduction anteroposterior (a) and lateral (b) radiographs of case 8.**

chronic instability. Functional outcomes were measured using the Visual Analog Scale (VAS) for pain and the American Orthopaedic Foot & Ankle Society (AOFAS) scores (12) for foot function. Imaging findings focused on the presence of CFL and ATFL ruptures and other abnormalities, while clinical follow-up documented recovery trajectories, weight-bearing status, and any complications reported by the patients.

A detailed summary of patient demographics, mechanisms of injury, treatment strategies, and follow-up outcomes is presented in Table 1. This retrospective study with long-term follow-up provides valuable insights into the development of chronic instability and the role of soft tissue injuries, particularly involving the CFL and ATFL, in medial subtalar dislocations with fractures.

RESULTS

This study reviewed 13 patients with medial subtalar dislocations who were treated and followed up for a mean duration of 7.3 years. The cohort consisted of 10 males and 3 females, with ages ranging from 10 to 73 years (mean: 38.2 years). The most common mechanism of injury was falls, accounting for 69.2% of cases, followed by twisting injuries in 23.1% and non-vehicular traffic accidents in 7.7%. Concomitant fractures were present in 9 patients, highlighting the complexity of these injuries.

Initial imaging with X-ray and CT scans was performed for all patients to identify fractures and assess the alignment of dislocated joints. Follow-up magnetic resonance imaging (MRI) provided critical insights into ligamentous injuries, which were often missed during the initial evaluation (14). Complete tears of the anterior talofibular ligament (ATFL) were identified in 5 patients, while partial tears were observed in 4. Similarly, the calcaneofibular ligament (CFL) showed complete tears in 3 patients and partial involvement in 5. Associated injuries, such as posterior tibial tendon edema, rupture of the superior fibular retinaculum, and subtalar joint effusions, were also detected through MRI, underscoring its value in evaluating soft tissue structures.

Functional outcomes varied across the cohort. Visual Analog Scale (VAS) scores for pain ranged from 2 to 8, with a mean score of 5.4. AOFAS scores for foot function ranged from 60 to 95, with a mean score of 79.6. Patients with normal

Fig. 5. **Coronal MRI view demonstrating a complete rupture of the ATFL (marked with an arrow). ATFL: anterior talofibular ligament.**

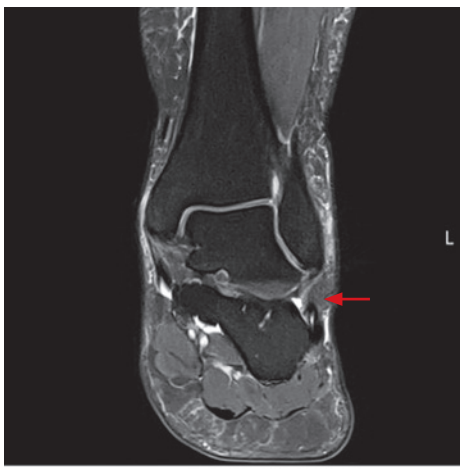

Fig. 6. **Coronal MRI view showing a torn CFL (marked with an arrow), which contributes to chronic instability following dislocation. CFL: calcaneofibular ligament.**

Acta Chir Orthop Traumatol Cech., 92, 2025, No. 4, p. 231–236

Table 1. **Summary of patients data**

CASE	SEX	AGE	SIDE	MECH. OF INJURY	CLASSIFICATION	FIRST EXAMINATION	ADDITIONAL DIAGNOSIS	INITIAL TREATMENT
1	M	10	L	Fall	Medial	X-ray, CT	None	Closed reduction
2	M	32	R	Fall	Medial	X-ray,CT	Cuboid and talus posteromedial processus fracture (R)	Closed reduction
3	F	70	R	Non-vehicular traffic accident	Medial	X-ray	None	Closed reduction
4	M	45	L	Fall	Medial	X-ray, CT	Navicula and talus avulsion fractures	Closed reduction
5	M	32	R	Fall	Medial	X-ray, CT	Talus avulsion fracture	Open reduction and external fixator
6	M	14	L	Twist	Medial	X-ray, CT	Talus posterior process and calcaneus avulsion fractıre	Closed reduction
7	F	14	L	Twist	Medial	X-ray, CT	None	Closed reduction
8	M	50	L	Fall	Medial	X-ray, CT	Talus and navicular fracture	Closed reduction
9	M	73	R	Fall	Medial	X-ray, CT	Talus posterior process fracture	Closed reduction
10	M	23	L	Twist	Medial	X-ray, CT	None	Closed reduction
11	M	28	L	Twist	Medial	X-ray, CT	None	Closed reduction
12	M	61	L	Fall	Medial	X-ray, CT	None	External fixation
13	F	52	R	Fall (stairs)	Medial	X-ray, CT	Navicula and talus posterior process fracture, open fracture (type 1)	Closed reduction

MRI findings or partial ligament involvement generally reported better outcomes, as reflected in higher AOFAS scores. Conversely, patients with complete tears of the ATFL or CFL were more likely to experience chronic instability, which negatively impacted their functional recovery.

Treatment strategies were tailored to the severity of the injuries. Closed reduction was performed in 11 cases (Fig. 3-4), while open reduction and external fixation were required in 2 cases due to severe fractures. Conservative management, including physiotherapy and orthotic support, proved effective for patients with partial ligament injuries or mild instability. However, surgical reconstruction was recommended for 6 patients who experienced chronic instability due to significant ligamentous injuries, such as complete tears of the ATFL and CFL or combined ligament damage.

DISCUSSION

The findings of this study highlight the complexity of medial subtalar dislocations and the importance of early intervention and advanced imaging for optimal outcomes. One notable observation was the high prevalence of ligamentous injuries, particularly tears of the ATFL and CFL, identified on follow-up MRI. These injuries were often missed during initial evaluations with X-ray and CT, revealing the limitations of these conventional imaging techniques in detecting soft tissue damage.[8]To the best of our knowledge, this study is the first to emphasize the role of MRI in accurately assessing ligament integrity in subtalar dislocations. Early identification of these injuries is critical, as untreated ligament damage was strongly associated with chronic instability and poorer functional outcomes in our cohort.

Functional outcomes, as measured by VAS and AOFAS scores, varied based on the extent of ligamentous involvement

FOLLOW-UP CHECKS	MRI LIGAMENT STATUS	FINAL RESULT
Mild swelling, tenderness over lateral malleolus. VAS:5 AOFAS:85	Complete tear of ATFL + Partial tear of the CFL	Team of orthopedic surgery recommended reconstructive surgery.
Ankle instability during inversion stress test. VAS:6 AOFAS:78	Partial torn ATFL + Complete torn CFL	Team of orthopedic surgery recommended reconstructive surgery.
Posterior tibial tenderness and swelling. VAS:7 AOFAS:72	Complete ATFL tear + Partial tear of the CFL+ Posterior tibial tendon edema	Team of orthopedic surgery recommended reconstructive surgery.
No pain, full range of motion. VAS:2 AOFAS:92	Normal findings	Follow-up
Mild instability on talar tilt test. VAS:4 AOFAS:88	Partial tear of ATFL + mild CFL strain	Conservative management with physiotherapy focusing on proprioception and strengthening. Recommended follow-up.
Positive anterior drawer test with tenderness. VAS:6 AOFAS:76	Partial tear of the anterior talofibular ligament ATFL and mild strain of CFL. Subtalar joint effusion observed.	Team of orthopedic surgery recommended reconstructive surgery.
Stable joint, slight tenderness during palpation. VAS:3 AOFAS:90	No significant ligament damage observed.	Follow-up
Pain on supination; stiffness noted. VAS:7 AOFAS:70	Cartilage thinning and early arthritic changes in the subtalar and tibiotalar joints	Orthotics and physical therapy prescribed.
Peroneal insufficiency VAS:6 AOFAS:74	Rupture of the superior fibular retinaculum and mild subluxation of the peroneal tendons	Surgical repair of the fibular retinaculum recommended.
None VAS:2 AOFAS:95	Normal ligament findings.	Follow-up
Lateral ankle instability VAS:3 AOFAS:87	Mild ATFL sprain with surrounding soft tissue edema	Conservative management with immobilization and subsequent physiotherapy
None VAS:7 AOFAS:68	Complete ATFL tear + CFL involvement with subtalar instability.	Surgical reconstruction considered for chronic instability.
Lateral ankle instability VAS:8 AOFAS:60	Combined injury with ATFL tear, CFL strain, and deltoid ligament partial tear.	Reconstruction of involved ligaments recommended. CT: computer tomoraphy, ATFL: anterior talofibular ligament, CFL: calcaneofibular ligament

and the presence of associated fractures (4, 13). Patients with normal or mildly affected ligament status demonstrated better recovery, while those with complete ligament tears or combined injuries experienced greater pain and reduced functionality. Studies like those by Fotiadis et al. have shown that even cases treated conservatively are prone to complications such as post-traumatic arthritis, underlining the need for detailed imaging and long-term follow-up (5). Incorporating routine MRI into the follow-up protocol could enable earlier detection of these issues, allowing for more effective treatment planning.

In the literature, these three parameters have been widely discussed as key determinants of prognosis in isolated medial subtalar dislocations (13). These are immediate reduction, secondly, the amount of energy absorbed by the soft tissues at the moment of the violent impact, and as third factor, the period of postreduction immobilization.With this study, we propose a fourth parameter: the routine use of advanced imaging modalities, particularly MRI, to assess ligamentous injuries early in the management process. This addition emphasizes the importance of detecting and addressing soft tissue injuries, such as ATFL and CFL tears, which may significantly impact long-term outcomes, including the risk of chronic instability and post-traumatic arthritis.

This study has several limitations, including its retrospective design, small sample size, and reliance on available follow-up data, which may introduce selection bias and limit generalizability. The absence of a control group prevents direct comparisons between treatment modalities, and while MRI was used during follow-up, its routine use in the acute phase was not implemented, potentially underdiagnosing early soft tissue injuries. Future prospective studies with larger cohorts and systematic comparisons are needed to validate these findings and optimize management strategies for medial subtalar dislocations.

Our study supports the growing consensus on the importance of routine MRI in the diagnostic workup of subtalar dislocations. By providing detailed insights into soft tissue injuries, MRI facilitates the development of targeted treatment plans that address both acute and long-term complications. In conclusion, medial subtalar dislocations are complex injuries that require a thorough understanding of their associated soft tissue and bony pathologies. Early reduction (1, 8, 14), routine use of MRI, and individualized treatment strategies are essential to improving patient outcomes. Surgeons should remain vigilant about the predictors of poor outcomes, such as ligament tears and associated fractures, and counsel patients about the potential for chronic instability and degenerative changes. By adopting a comprehensive and proactive approach, the long-term complications of subtalar dislocations can be minimized, ensuring better functional recovery for patients.

CONCLUSIONS

In conclusion, medial subtalar dislocations are complex injuries that require a thorough understanding of their associated soft tissue and bony pathologies. Early reduction, routine use of MRI, and individualized treatment strategies are essential to improving patient outcomes. Surgeons should remain vigilant about the predictors of poor outcomes, such as ligament tears and associated fractures, and counsel patients about the potential for chronic instability and degenerative changes. By adopting a comprehensive and proactive approach, the long-term complications of subtalar dislocations can be minimized, ensuring better functional recovery for patients. ■

References

1. Anazor FC, Dhinsa BS. Traumatic subtalar joint dislocation. Br J Hosp Med. 2023;84:1–9. doi:10.12968/hmed.2022.0211.
2. Bibbo C, Anderson RB, Davis WH. Injury characteristics and the clinical outcome of subtalar dislocations: a clinical and radiographic analysis of 25 cases. Foot Ankle Int. 2003;24:158–163. doi:10.1177/107110070302400210.
3. Bibbo C, Lin SS, Abidi N, Berberian W, Grossman M, Gebauer G, Behrens FF. Missed and associated ınjuries after subtalar dislocation: the role of CT. Foot Ankle Int. 2001;22:324–328. doi:10.1177/107110070102200409.
4. Camarda L, Abruzzese A, La Gattuta A, Lentini R, D'Arienzo M. Results of closed subtalar dislocations. Musculoskelet Surg. 2016;100:63–69. doi:10.1007/s12306-015-0380-1.
5. Fotiadis E, Lyrtzis C, Svarnas T, Koimtzis M, Akritopoulou K, Chalidis B. Closed subtalar dislocation with non-displaced fractures of talus and navicular: a case report and review of the literature. Cases J. 2009;2:8793. doi:10.4076/1757-1626-2-8793.
6. Higgins BT, Barlow DR, Heagerty NE, Lin TJ. Anterior vs. posterior approach for total hip arthroplasty, a systematic review and meta-analysis. J Arthroplasty. 2015;30:419–434. doi: 10.1016/j.arth.2014.10.020.
7. Higgins TF, Baumgaertner MR. Diagnosis and treatment of fractures of the talus: a comprehensive review of the literature. Foot Ankle Int. 1999;20:595–605. doi:10.1177/107110079902000911.
8. Jerome JTJ, Varghese M, Sankaran B. Anteromedial subtalar dislocation. J Foot Ankle Surg. 2007;46:52–54. doi:10.1053/j.jfas.2006.10.003.
9. Jungbluth P, Wild M, Hakimi M, Gehrmann S, Djurisic M, Windolf J, Muhr G, Kälicke T. Isolated subtalar dislocation: J Bone Jt Surg Am. 2010;92:890–894. doi:10.2106/JBJS.I.00490.
10. Karampinas PK, Kavroudakis E, Polyzois V, Vlamis J, Pneumaticos Sp. Open talar dislocations without associated fractures. Foot Ankle Surg. 2014;20:100–104. doi:10.1016/j.fas.2013.12.005.
11. Kinik H, Oktay O, Arikan M, Mergen E. Medial subtalar dislocation. Int Orthop. 1999;23:366–367. doi: 10.1007/s002640050396.
12. Kitaoka HB, Alexander IJ, Adelaar RS, Nunley JA, Myerson MS, Sanders M. Clinical rating systems for the ankle-hindfoot, midfoot, hallux, and lesser toes. Foot Ankle Int. 1994;15:349–353. doi: 10.1177/107110079401500701.
13. Lasanianos NG, Lyras DN, Mouzopoulos G, Tsutseos N, Garnavos C. Early mobilization after uncomplicated medial subtalar dislocation provides successful functional results. J Orthop Traumatol. 2011;12:37–43. doi:10.1007/s10195-011-0126-2.
14. Merchan ECR. Subtalar dislocations: long-term follow-up of 39 cases. Injury. 1992;23:97–100. doi:10.1016/0020-1383(92)90041-P.
15. Milenkovic S, Mitkovic M, Bumbasirevic M. External fixation of open subtalar dislocation. Injury. 2006;37:909–913. doi:10.1016/j.injury.2006.02.051.
16. Perugia D, Basile A, Massoni C, Gumina S, Rossi F, Ferretti A. Conservative treatment of subtalar dislocations. Int Orthop. 2002;26:56–60. doi:10.1007/s002640100296.
17. Ruhlmann F, Poujardieu C, Vernois J, Gayet LE. Isolated acute traumatic subtalar dislocations: review of 13 cases at a mean follow-up of 6 years and literature review. J Foot Ankle Surg. 2017;56:201–207. doi:10.1053/j.jfas.2016.01.044.
18. Specchiulli F, Gabrieli R, Di Carlo V, Maiorana B. Peritalar dislocations. The Foot. 2007;17:10–14. doi:10.1016/j.foot.2006.07.006.
19. Wagner R, Blattert TR, Weckbach A. Talar dislocations. Injury. 2004;35:36–45. doi:10.1016/j.injury.2004.07.010.