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CASE REPORT

Fracture dislocation: management and functional outcomes. Alcívar Hospital 2024-2025.

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Summary

Introduction: Ankle fracture-dislocations, especially Weber type B fractures, are serious injuries that involve both fracture and dislocation, with high energy and a risk of soft tissue involvement. Management involves accurate radiographic diagnosis and a surgical approach, often staged, to restore anatomy and stability.

Objective: This study investigated the clinical-surgical management and functional outcomes of patients with ankle fractures at Alcívar Hospital from 2024–2025 and evaluated the treatment modalities and complications.

Materials and Methods: This was a retrospective study of Weber-type fractures classified according to the AO/OTA system. Data were obtained from medical records and analyzed. Demographic and clinical characteristics, treatment modalities, and outcomes were evaluated.

Discussion: This cohort study demonstrated that pain and functional limitations are universal. 85% of patients underwent surgical treatment. Soft-tissue assessment is crucial; staged management with external fixation or Steinmann pins is vital to prevent necrosis and wound complications in patients with severe edema or in the absence of the "wrinkle sign."

Conclusion: Surgical management of Weber B ankle fracture-dislocations is effective and predominant. Appropriate soft-tissue assessment and management via staged strategies (such as external fixation or Steinmann pins) are essential to optimize functional outcomes and minimize complications, especially necrosis, thereby ensuring complete recovery.

Keywords:

Fracture-Dislocation, Treatment Outcome, External Fixators, Postoperative Complications.

Abbreviations

AO (Arbeitsgemeinschaft für Osteosynthesefragen): A Swiss foundation founded in 1958, a pioneer in bone fixation and osteosynthesis techniques.
OTA (Orthopedic Trauma Association): The American Association of Orthopedic Traumatology collaborates with the AO to update and maintain this classification system.

Supplementary information

No supplementary materials are declared.

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Authors' contributions

Hugo Villarroel Roveré: conceptualization, research, original draft writing, resources, software, supervision.

Dolores Delgado, Methodology, Data Curation, Formal Analysis, Fundraising, Project Management, Validation, Visualization, Writing, Review and Editing.

Manuel Rodríguez, conceptualization, research, original draft writing, resources, software, supervision.

Adrián Villarroel, conceptualization, research, original draft writing, resources, software, supervision.

All the authors read and approved the final version of the manuscript.

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Availability of data and materials

The datasets used and analyzed during this study are available to the corresponding author upon reasonable request.

Introduction

Ankle fractures are common musculoskeletal injuries, accounting for approximately 10% of all fractures and 12% of lower-limb fractures [1, 2]. Within this spectrum, ankle fracture-dislocation represents a more severe clinical entity characterized by a combination of a bone fracture and a tibiotalar joint dislocation [3, 4]. These injuries involve greater traumatic energy and significantly compromise joint stability, distinguishing them from ankle fractures without dislocation and are associated with worse long-term functional outcomes [5].

The most common etiological mechanism of ankle fracture-dislocations is indirect trauma, such as falls, car accidents, or forceful twisting during sports activities [6]. The persistence or magnitude of the deforming force is sufficient to compromise the remaining bone and ligamentous stability, leading to joint disruption [3]. In high-energy cases, soft-tissue involvement (skin, muscles, blood vessels) can be severe, directly influencing management strategy and increasing the risk of skin complications and infections [7, 8].

Ankle fractures are commonly classified according to the Lauge–Hansen system or the Weber–Danis classification. The Weber classification, which is based on the relationship between the fibular fracture line and the tibiofibular syndesmosis, is widely used and distinguishes among types A, B, and C [7, 8]. Weber type B fractures, which are oblique at the level of the syndesmosis, are particularly relevant in fracture locations because of their frequent association with syndesmosis instability or deltoid ligament injury, which contributes to dislocation [9].

Clinically, patients with ankle fracture-dislocation present with severe pain, edema, inability to bear weight, and often a visible joint deformity [9, 10]. The diagnosis is confirmed by standard radiographic views of the ankle (anteroposterior, lateral, and mortise) that reveal fracture and loss of joint congruity [11]. Assessment of syndesmosis stability is crucial and may require stress radiographs or magnetic resonance imaging [10, 11].

The management of these complex injuries is predominantly surgical due to their unstable nature, with the primary goal of restoring joint anatomy and stability [12, 13]. However, the presence of severe soft tissue involvement may necessitate a staged approach, prioritizing early dislocation reduction and temporary stabilization to allow for tissue recovery before definitive internal fixation [5, 14]. Precise anatomical reduction and stable internal fixation are essential to optimize outcomes and minimize the risk of long-term complications, such as post-traumatic osteoarthritis, stiffness, or chronic pain [3, 14]. This study focused on the clinical-surgical management and functional outcomes of patients with Weber B ankle fractures, a common injury pattern.

The objective of this study was to determine the clinical-surgical management of patients with ankle fracture-dislocation and their functional outcomes.

Case report

Patient 1

Diagnosis

A 28-year-old male patient, an amateur athlete, suffered a high-energy injury during a basketball game involving a pronation-abduction mechanism. He presented with acute pain, severe edema, and a grotesque deformity of the right ankle, with significant skin tension and an absence of the "wrinkle sign," indicating severe soft tissue involvement and a high risk of skin necrosis if the operation was performed immediately. Radiographs revealed a multifragmentary oblique fracture of the lateral malleolus (Weber B) with complete lateral dislocation of the talus and a fracture of the medial malleolus.

Procedure

Given the urgency of the dislocation and the critical condition of the soft tissues, emergency closed reduction was performed under sedation. To stabilize the dislocation and promote soft tissue healing, a Delta external fixator was applied. This approach allows for edema control and allows for resolution of the wrinkle sign. Once the soft tissues were stable (approximately 7 days later), open internal fixation (ORIF) of the fibula fracture with a plate and screws and of the medial malleolar fracture with screws were performed. No residual syndesmotic instability was identified.

Evolution

Following the ORIF procedure, initial immobilization was maintained, and early, pain-free mobilization was permitted at 2 weeks, with partial weight-bearing at 8 weeks and progressive full weight-bearing at 12 weeks. Radiographic consolidation was observed at 14 weeks. At 9 months of follow-up, the patient had a near-full functional range of motion, with minimal limitations and a gradual return to sports activity. A visual analog scale (VAS) pain score of 1/10 was recorded. No skin complications or infections were reported.

Functional indicator	Time
Radiographic consolidation time	14 weeks
Time for full charge	12 weeks

Range of motion (Dorsiflexion)	Almost complete
Pain scale in control	1
Time to return to daily activities	5 months
Postoperative complications	None

Figure 1. Clinical case 1.

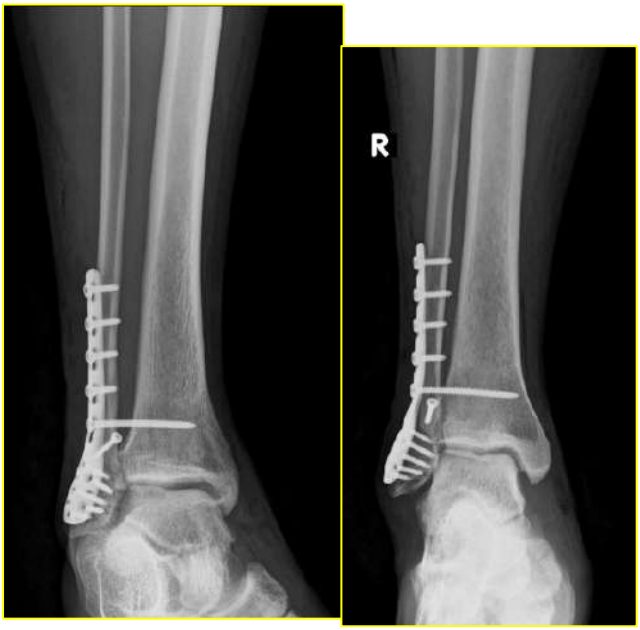

Figure 1: Patient case 1: A. Ankle fracture-dislocation B. Placement of Delta-type fixators without skin wrinkling C. Posterior internal fixation awaiting soft tissue healing.

Case 2

Diagnosis

A 55-year-old female patient with a history of controlled type 2 diabetes mellitus experienced a fall from standing height involving supination and external rotation. She presented with severe pain, considerable swelling, and an inability to bear weight on her left foot, which led to a marked deformity. Although there was no complete loss of the "wrinkle sign," the tension was high, and she was considered at high risk for immediate surgery. Radiographs revealed a transverse fracture of the medial malleolus and a distal spiral fracture of the fibula (Weber B) with posterolateral dislocation of the talus and indirect signs of significant syndesmotic injury.

Procedure

Following initial closed reduction to realign the joint, temporary stabilization and soft tissue protection were performed by inserting a percutaneous Steinmann pin to fix the dislocation from the medial tibia to the talus. This was complemented by immobilization in a plaster cast. This maneuver provides soft-tissue protection and delays definitive surgery until the edema subsides and the skin quality improves. One week later, internal fixation of the medial malleolus with screws and of the lateral malleolus with a plate and screws was performed. Syndesmosis instability was confirmed intraoperatively, and the patient was stabilized with a transsyndesmotic screw. The Steinmann pin was removed during definitive surgery.

Evolution

Owing to the severity of the injury and syndesmotic instability, the patient remained non-weight-bearing for 8 weeks, followed by progressive weight-bearing. The transsyndesmotic screw was removed at 12 weeks. Rehabilitation was intensive. At 9 months of follow-up, the patient had regained the ability to walk without assistance, although mild dorsiflexion stiffness and occasional pain (VAS score 2/10) persisted with prolonged activity. Fracture consolidation was confirmed at 16 weeks. Careful soft tissue management prevented skin complications.

Functional indicator	Time
Radiographic consolidation time	16 weeks
Time for full charge	16 weeks
Range of motion (Dorsiflexion)	Slight residual stiffness
Pain scale in control	2
Time to return to daily activities	6 months
Postoperative complications	Residual stiffness, occasional pain.

Figure 2. Clinical case 2.

Figure 2: A. Ankle fracture-dislocation B. Placement of temporary fixation using Steinmann nail C. Posterior internal fixation awaiting soft tissue healing.

Case 3

Diagnosis

A 22-year-old male patient, a motorcycle driver, was involved in a traffic accident when he collided with a car. He presented with direct trauma to his left ankle, with an approximately 1 cm wound on the lateral aspect, active bleeding, intense pain, evident deformity, and functional limitations. Upon admission, the patient was hemodynamically stable and presented with distal pulses. Radiographic studies revealed a Weber C-type suprasyndesmotic fracture of the left ankle associated with ankle joint dislocation, which was challenging to reduce immediately, unstable, and associated with suspected deltoid ligament interposition.

Procedure

In the initial intervention, due to significant edema and joint instability, an external fixator in a delta configuration was applied for temporary stabilization and soft-tissue protection for 1.5 weeks. During the definitive surgery, internal fixation was subsequently performed via a long anatomical plate and two transsyndesmotic screws, in addition to ligamentous repair of the anterior talofibular complex, syndesmosis, and deltoid ligaments.

Evolution

The patient progressed favorably after definitive stabilization. Weight-bearing restriction was indicated for the first 8 weeks, with progressive weight-bearing initiated according to radiographic consolidation, healing time of the interosseous membrane and ligamentous components, and clinical status. The vascular and neurological integrity of the limb was maintained throughout. Adequate soft-tissue protection during the initial use of an external fixator prevented skin complications and facilitated definitive reconstruction.

Functional indicator	Time
Radiographic consolidation time	18 weeks
Time for full charge	16 weeks
Range of motion (Dorsiflexion)	with moderate stiffness (greater in dorsiflexion and inversion)
Pain scale in control	2-4
Time to return to daily activities	5 months
Postoperative complications	Residual stiffness, occasional pain.

Figure 3. Clinical case 3.

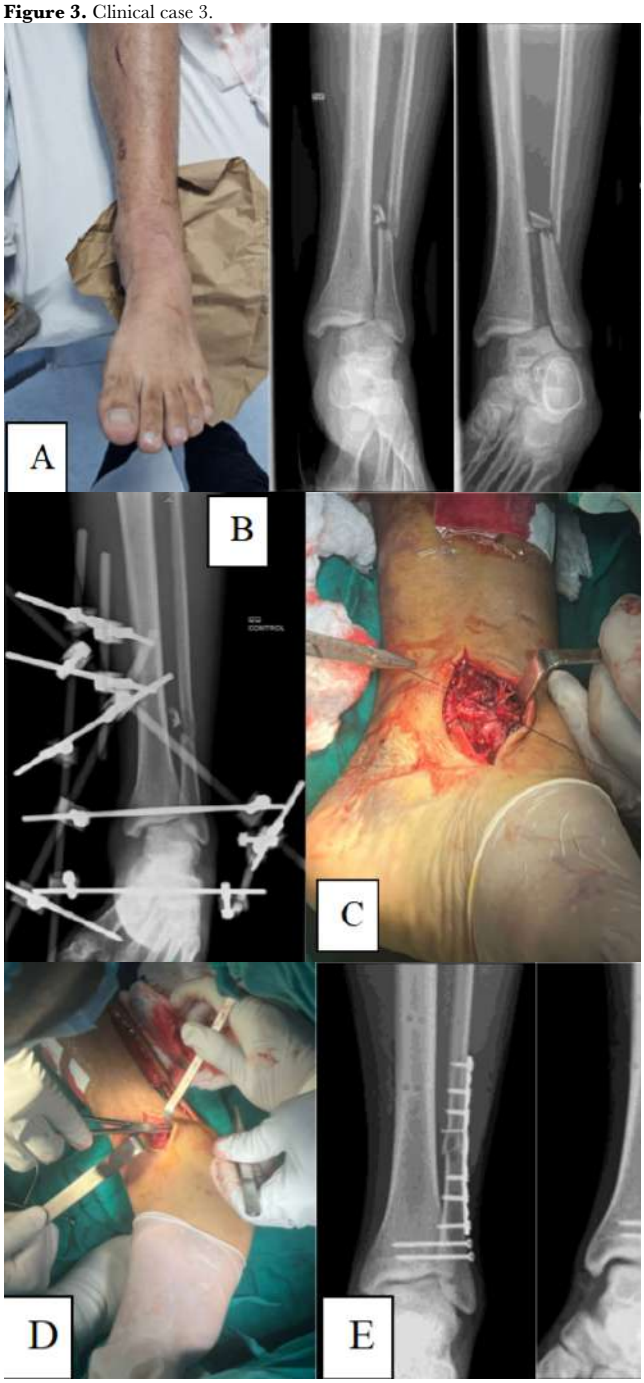

Figure 3: A. Ankle fracture-dislocation B. Placement of external fixation using disposable external fixators in Delta configuration C. Repair of medial side of ankle of deltoid ligaments D. Repair of anterior talofibular ligament and syndesmosis E. Definitive internal fixation of ankle + multiligament repair .

Discussion

Ankle fractures, particularly Weber B fractures involving dislocation, present a significant challenge in traumatology [15]. Our study, which was conducted at Hospital Alcívar, revealed that the affected population was predominantly female (66%) and male (33%), with a mean age of 36 years. This finding is consistent with the literature, including the study by Torres and Bolívar (2024) [16], which reported a female prevalence of 53% and a mean age of 39.56 years in their cohort. Classic symptoms, including pain, functional limitations, and edema, were confirmed in 100% of the patients in our cohort, highlighting the acute and evident nature of these injuries. The presence of deformity and crepitus further indicates severity, especially in cases of associated dislocation [17].

A critical aspect of managing ankle fracture-dislocations, especially those with high-energy or large-displacement mechanisms, is the assessment and management of the surrounding soft tissues. Severe skin and subcutaneous tissue involvement, manifested by significant edema or the absence of the "wrinkle sign" (when the skin is so taut that it cannot be wrinkled), indicates a high risk of complications such as skin necrosis, wound dehiscence, or infection if immediate open internal fixation is performed [18, 19]. In these situations, a staged approach is recommended and has become the preferred strategy at our institution.

The illustrative cases presented demonstrate the application of this principle in practice. In the first case, the severity of the soft-tissue injury led to the decision to use delta external fixation as an initial measure. This method allows rapid reduction and stabilization of the dislocation, relieves tension on the skin, and allows edema to subside and soft tissues to recover before definitive internal fixation [5, 18]. The second case, although less urgent initially than the first regarding the soft tissues, also benefited from minimally invasive temporary stabilization. Insertion of a percutaneous Steinmann pin from the medial tibia to the talus, along with a splint, reduced the dislocation and maintained stability, allowing the skin to heal before a more extensive intervention. In the third patient, significant instability was evident, even with a posterior surgical splint that restricted most of the ankle and covered 50% of the tissues. This, along with increasing edema, led to the decision to use external fixation, with the delta type as our preferred choice [18]. This technique, already known as the Steinmann pin technique, is percutaneous and minimizes soft-tissue disturbance, thereby reducing the risk of cutaneous complications compared with immediate open surgery in an edematous or tense environment [18,19]. Importantly, soft-tissue improvement, as evidenced by the return of the "wrinkle sign" and reduction in edema, is a prerequisite for definitive surgery, as failure to meet this criterion significantly increases the risk of severe postoperative complications, such as necrosis and infection.

Surgical management was the primary strategy in our cohort at Hospital Alcívar, as reported in the study by Torres and Bolívar (2024), and was applied in 85% of patients [1]. This preference for surgical intervention is consistent with the current literature on unstable ankle fractures and fracture-dislocations, which emphasizes the importance of anatomical reduction and stable fixation for restoring joint congruity and preventing long-term complications [12, 13, 16]. The ability to restore syndesmosis is a critical prognostic factor, and recent studies suggest that primary dislocation is not a negative prognostic factor for successful surgical treatment of syndesmotic injury [15].

Patient progress is a key indicator of treatment success. In our cohort at Hospital Alcívar, 100% of fractures healed, and the majority (52%) received rehabilitation, which is consistent with the findings of Torres and Bolívar (2024) [1]. Notably, 10% of patients experienced treatment failure, with a greater proportion in the conservative management group [1]. This finding reinforces the idea that, in fracture-dislocations and unstable fractures, surgical treatment is often the safest approach to ensure adequate consolidation and minimize the risk of complications [12, 14]. Early, protocol-based rehabilitation is essential for functional recovery, as it enables restoration of ankle range of motion and strength [16].

The complications of ankle fractures can be significant and include persistent chronic pain (reported in up to 20–40% of patients), joint stiffness, posttraumatic osteoarthritis, and, less frequently, pseudoarthrosis or infections [3, 14]. The presence of an initial dislocation increases the risk of poorer functional outcomes and complications, including associated chondral and osteochondral lesions [3, 14]. Careful soft tissue management, as discussed, is crucial to mitigate the risk of wound complications that could compromise the final outcome.

Conclusions

Fracture-dislocations are complex injuries requiring precise clinical and surgical management to achieve optimal functional outcomes and prevent long-term complications. Soft tissue assessment is a determining factor in the treatment strategy. A staged approach (with external fixation or Steinmann pins for the initial dislocation) is essential in cases of significant compromise or absence of the "wrinkle sign" to allow for tissue regeneration and reduce the risk of necrosis and

other wound complications. Definitive surgical treatment, once soft tissue conditions are optimal, has proven effective for anatomical restoration and fracture consolidation, especially when accompanied by appropriate rehabilitation. Attention to anatomical reduction, stable fixation of the fracture and syndesmosis, along with a rigorous rehabilitation program and meticulous soft tissue management, are critical factors that positively influence a patient's functional recovery.

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Ankle luxofracture, management and functional outcomes. Alcívar Hospital 2024 – 2025.

Abstract

Introduction: Ankle luxofractures, especially Weber type B fractures, are serious injuries that involve both fracture and dislocation, with high energy and a risk of soft tissue involvement. Management involves accurate radiographic diagnosis and a surgical approach, often staged, to restore anatomy and stability.

Objective: This study investigated the clinical-surgical management and functional outcomes of patients with ankle dislocations at Alcívar Hospital from 2024--2025, evaluating treatment modalities and complications.

Materials and Methods: This was a retrospective study of Weber-type fractures classified according to OA/OTA. Data were obtained from medical records and analyzed. Demographic and clinical characteristics, treatment modalities, and disease evolution were assessed.

Discussion: The cohort demonstrated that pain and functional limitations were universal. Eighty-five percent of the patients received surgical treatment. Evaluation of soft tissues is crucial; staged management with external fixation or Steinmann pins is vital to prevent necrosis and wound complications in patients with severe edema or in the absence of the "wrinkle sign".

Conclusion: Surgical management of Weber B-type ankle fractures is effective and predominant. Assessment and proper management of soft tissues via staged strategies (such as external fixation or Steinmann's nail) are essential to optimize functional outcomes and minimize complications, especially necrosis, thereby ensuring complete recovery.

Keywords: Fracture-dislocation, Treatment outcome, External fixators, Postoperative complications.

Statements

Ethics committee approval and consent to participate

This method is not required for clinical cases.

Publication consent

The authors obtained written consent from the patients for the publication of images, radiographs and specific studies.

Conflicts of interest

The research has no financial interests or conflicts of interest.

Use of generative AI

The authors declare that they did not use generative AI.

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