

# Conservative treatment of an anterior-lateral ankle dislocation without an associated fracture in a diabetic patient: a case report

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Anterior or anterior-lateral dislocation of the ankle is a rare condition that can be treated conservatively as well as any other similar types of ankle dislocations without associated fractures. We present a case report of an anterior-lateral ankle dislocation with a concomitant avulsion injury of the ankle's anterior capsule in a diabetic patient that was treated conservatively. At the patient's visit 12 months after the initial injury, he was asymptomatic with full range of motion of the ankle joint. To our knowledge, we could not identify this type of an injury in a diabetic patient that was treated successfully with conservative treatment in the existing literature.

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Ligamentous injuries of the ankle joint and malleolar fractures are common (1) but isolated closed ankle dislocations are rare (2). Ankle dislocations usually present with an open injury that is accompanied by soft tissue disruption and adjacent malleolar fracture (3–6). The most common type of ankle dislocation is the posterior type, which in most cases is the result of a high-energy trauma that produces a combination of plantarflexion and forced inversion or eversion of the foot (3, 4, 7). Information about the mechanism of trauma is of great importance for early diagnosed dislocation (8). Multiple predisposing factors for ankle dislocation may include hypoplasia of the medial malleolus, recurrent ankle sprains, ligamentous laxity or neuromuscular weakness, and deficient soft tissue coverage of the talus. The bony architecture of the ankle does not provide anteroposterior stability, instead, this is provided by the joint capsule and ligamentous structures (3, 7, 9, 10). Both lateral and medial ankle dislocations have been reported by various authors (4, 8, 11). The anterior ankle dislocation is an uncommon injury but has been reported in the

literature (4, 12, 13) with the anterior-lateral type being rarely documented (14). Moreover, review of the literature revealed that most of the reported closed ankle dislocations without concomitant fractures were treated conservatively with prompt reduction and cast immobilization (1, 4, 7, 15).

The goal of this case report is to present a literature review and a short-term follow-up of a complete anterior-lateral dislocation of the ankle in a diabetic patient that was treated successfully with closed reduction and immobilization.

## Case report

A 70 year-old male presented to the emergency department of our institution after being involved in a motor vehicle accident. He had sustained a minor injury of the head (Glasgow Coma Scale 15/15), the chest (seat belt burn) and lower extremities (bruises). His major complaint was severe pain of the right ankle. His past medical history was significant for diabetes mellitus controlled with an oral hypoglycemic (metformin) for 6 years with satisfying control of blood glucose levels. The patient's

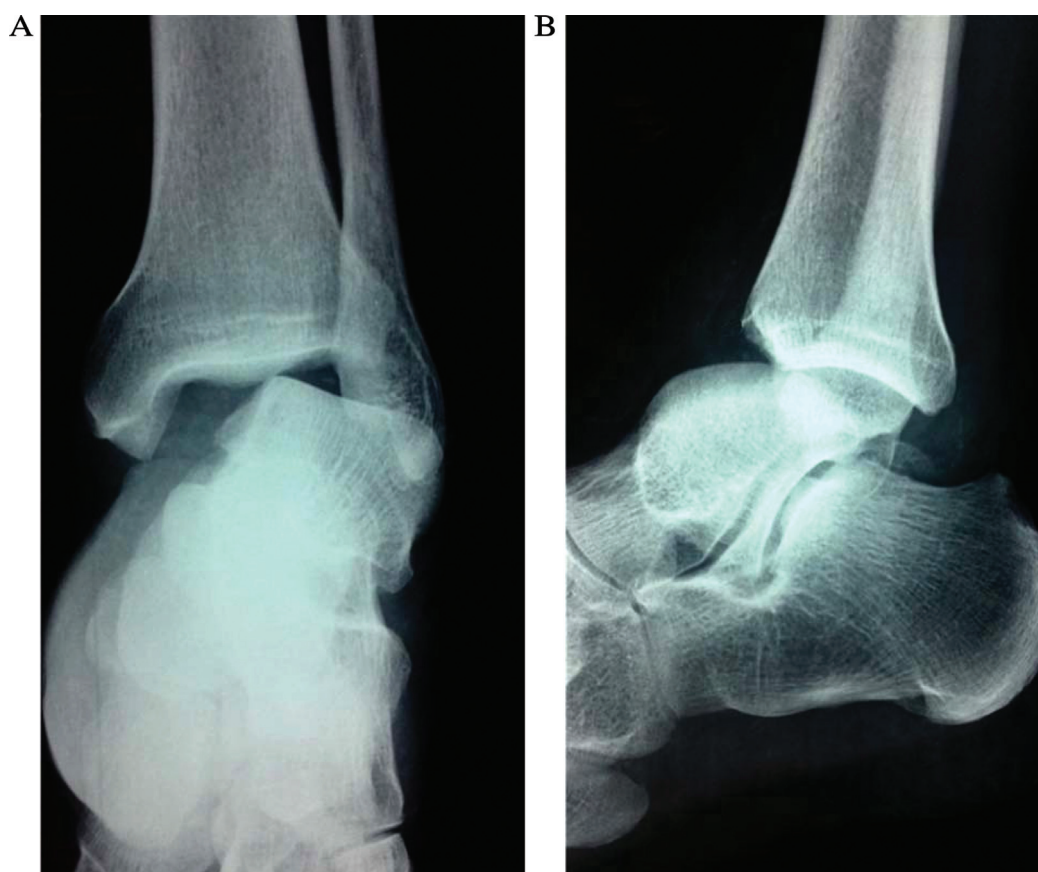
medical history did not reveal any previous high-energy damage of the right ankle and clinical examination of other joints was negative for hypermobility. No other medical or surgical history was reported.

Upon initial inspection, there was moderate edema of the right ankle region and obvious anterior-lateral dislocation of the talus with the forefoot in line. The right foot had normal skin temperature, pedal pulses were palpable and there was slight hypoesthesia of the dorsal aspect in comparison to the contralateral foot. Further clinical examination was impossible due to the patient's level of discomfort. The initial plain radiographs (anteroposterior and lateral views of the ankle joint) confirmed the diagnosis of talar dislocation, but also the absence of any fracture (Fig. 1). Owing that there was no fracture and major neurovascular trauma, an attempt of closed reduction was performed at the emergency department at approximately 1½ hours after the injury.

The closed reduction was achieved by axial traction of the calcaneus with one hand while the other hand was placed at the dorsal aspect of the midfoot with the foot held in slight plantarflexion for a couple of minutes, followed by lateral compression and external rotation of the talus and, finally, dorsiflexion of the foot in a way to redirect the articular line of the ankle joint. The attempt

was successful and confirmed with radiographic imaging after the closed reduction (Fig. 2). Maintenance of reduction was accomplished with a posterior ankle splint while the patient remained at the hospital for observation. General measures for pain and edema of the closed reduction included elevation of the right lower extremity, ice therapy, oral analgesic and non-weight bearing status to the right foot. After 3 days of hospitalization, the patient was discharged without any complications. Ten days later, the edema had subsided significantly, the splint was changed to a cast and partial weight-bearing was allowed for 5 weeks followed by full weight bearing for the next 3 weeks.

After 8 weeks, the lower extremity cast was removed and the patient was followed with standard and stress radiographic views. At that time, there were no signs of instability and the range of motion of the right ankle was satisfactory and painless. The American Orthopedic Foot and Ankle Society (AOFAS) score was 77/100. The patient was then allowed to full weight-bearing status without the use of additional cast applications. One year after the initial injury, the radiological findings were negative for any signs of osteonecrosis or early signs of ankle arthritis (Fig. 3). The right ankle was pain-free with similar range of plantarflexion and dorsiflexion as



*Fig. 1.* Radiographic ankle views at the initial presentation showing the anterior-lateral dislocation of the ankle (A, B).



*Fig. 2.* Post-reduction radiographic views with splint application (A, B).



*Fig. 3.* Final radiographic views at 1-year follow-up (A, B).

compared to the left ankle [plantarflexion: 0–44° (right), 0–46° (left)/dorsiflexion: 0–15° (right), 0–16° (left)]. The AOFAS score at the 1 year follow-up was increased to 90/100.

## Discussion

The first case of tibiotalar dislocation without an accompanying fracture of the ankle was described by Peraire in 1913 (4). Wilson et al. reported the first large series of 14 cases collected from the literature and added two cases of their own (4, 12). Although multiple cases of ankle dislocations have been reported in the literature, there is rare mentioning of an anterior-lateral dislocation of the ankle, especially in diabetic patients.

Closed ankle dislocation without an associated fracture or disruption of the tibiofibular syndesmosis is rare and only a small series have been reported in the literature (1, 2, 4, 7, 11, 15, 16). The ligaments are stronger than the malleoli, so that ankle dislocation is usually accompanied by fracture (4, 9). Cases of open dislocation of the ankle without fracture have been also reported and are common (1, 4, 6). Ankle dislocations are caused primarily by motor vehicle accidents, with the second most common cause being sports trauma and these usually occur in young athletes (17). The tibiotalar dislocation can be easily misdiagnosed especially in polytraumatized patients. Stress radiographs are not always necessary for the diagnosis. Pertinent information about the mechanism of trauma injury is paramount in order to make an accurate and timely diagnosis (4, 18).

Tibiotalar dislocation is classified by Fahey and Murphy into five types, based on the direction of the dislocation (19). The ankle dislocation can be anterior, posterior, medial, lateral, upward or a combination of these (1). Posterior dislocation is the most common. The wider anterior talus wedging results in forced widening of the joint and could be accompanied by either disruption of the tibiofibular syndesmosis or fracture of the lateral malleolus. This occurs most commonly when the ankle is plantarflexed. Anterior dislocation occurs when a posterior force is applied to the tibia with forced dorsiflexion. Lateral and medial dislocations occur from forced eversion, inversion or rotation of the ankle (4, 12, 13).

According to a study on cadavers (20), the author was able to manually dislocate the ankle medially or laterally without associated tibia or fibular fracture by placing an inversion or eversion stress on a maximally plantarflexed foot. The supporting structures that failed were the anterolateral part of the joint capsule followed by the anterior talofibular and calcaneofibular ligaments. The author assumed that once the ankle had been dislocated, the talus and the foot were pulled posteriorly by the Achilles tendon. The talus has a rhomboidal shape when viewed from its superior aspect and its

posterior portion is narrower than the anterior portion. Plantarflexion places the narrowest portion of talus in the ankle mortise which is the most unstable position. An inversion force causes ligamentous and capsular failure which causes the potential for ankle dislocation with or without fracture. The mechanism of pure ankle dislocation has also been described by Riviera et al. (10).

The published literature supports the non-operative treatment of closed ankle dislocation without fracture. Closed injuries have been treated conservatively with prompt reduction and cast immobilization and the results were reported to be good to excellent (1, 4, 5, 7, 8, 15, 16, 21). It is absolutely necessary to check the neurovascular status of the foot before and after manipulation. After achieving a satisfactory reduction, the integrity of the ankle ligaments, especially the deltoid ligament, should be evaluated with stress radiographs. Consideration must also be given to other anatomical anomalies, especially hypoplasia of the medial malleolus, which must be addressed as part of the final treatment plan. Failure to achieve reduction may require open reduction (5). Complications, such as the loss of ankle range of motion, stiffness or residual instability, and early arthritis, were reported following closed treatment of ankle dislocations (7).

In lateral ankle dislocations, as presented in this case report, rupture of the anterior and posterior talofibular ligaments, as well as rupture of the calcaneofibular ligament have been reported as probable causes (8, 22). The association of the lateral with the anterior type of ankle dislocation could be the result of a posterior force applied to the tibia with the ankle in dorsiflexion and rupture of the talofibular and calcaneofibular ligaments. The anatomical characteristics of the talus and the positioning of the ankle mortise during dorsiflexion make this injury rare.

## Conclusion

Early diagnosis and treatment of this rare type of anterior-lateral ankle dislocation is paramount in the overall patient's successful outcome. Our rare case was reported in a diabetic patient that was treated conservatively with closed reduction and cast immobilization. Continuous post-operative care is essential in this type of population with known diabetes related complications.

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