



## Anterior ankle dislocation without associated fracture A case with an 11 year follow-up

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**Ankle dislocations without concomitant malleolar fractures, also called pure ankle dislocations, are rare injuries. We present what appears to be the third documented case of a true anterior pure ankle dislocation described in international literature. The mechanism, the management and the complications of this rare injury, are also discussed.**

**Keywords :** ankle ; dislocation ; pure ankle dislocation ; malleolar fracture.

### INTRODUCTION

Ankle dislocations without concomitant malleolar fractures, also called pure ankle dislocations, are rare injuries (7,9). Peraire reported the first radiologically documented case in 1913 (8). Since then only small series or isolated cases have been presented in literature.

The injury occurs most commonly in young individuals and is most frequently due to motor vehicle accidents, sports activities, and falls (9).

We report a case of anterior ankle dislocation and discuss the mechanism, the management and the complications of this rare injury.

### CASE REPORT

A 26-year-old male presented to the emergency room after being involved in a high-velocity motorcycle accident in which he sustained an injury to

his left ankle. The left ankle was acutely painful and obviously deformed, with the entire foot displaced anteriorly. There were no skin lesions, and the neurological and vascular status of the left foot was noted to be intact. Plain radiographs confirmed the clinical diagnosis of an anterior ankle dislocation, and revealed no fractures or avulsions (fig 1). Closed reduction was immediately performed under intravenous sedation. Reduction was achieved by longitudinal traction, with the knee flexed, and by applying a posteriorly directed force on the left foot with the ankle stabilized. Post reduction radiographs showed anatomic reduction of the ankle. The patient was treated with a short leg cast in the neutral position for 6 weeks with no weight-bearing for the first 3 weeks.

After removal of the cast, moderate swelling persisted with good range of motion of the ankle. Physical therapy was started and the patient was advised to progressively bear weight on the foot. Clinical and radiological follow-up was continued

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*Fig. 1.* — Anterior ankle dislocation without associated fractures.



*Fig. 2.* — Radiograph showing no degenerative disease or avascular necrosis after eleven years of follow-up.

for one year after the accident. The patient reported complete disappearance of pain and returned to sports activities. The range of motion in dorsiflexion presented a limitation of  $10^\circ$  compared with the uninjured side, but this was not functionally significant. At the final follow-up 11 years later, the patient did not have clinical symptoms, or instability. The follow-up roentgenograms revealed no signs of degenerative disease or avascular necrosis, except for moderate ossification in the deltoid and the lateral ligaments of the ankle (fig 2).

### DISCUSSION

The ankle does not have discrete stabilizing structures ventrally and dorsally, as its surface is almost entirely covered by articular cartilage (1,9). Medially and laterally however, the ankle has strong stabilizing structures such as the tibial and fibular malleoli and the two collateral ligamentous complexes that reinforce the thin capsule (9).

As a matter of fact ankle dislocations without associated fracture of the malleoli or of the posterior border of the tibia, are thought to occur rarely

because of the relatively greater strength of the ligaments compared with the malleoli (3). Furthermore the distal tibia and the medial and lateral malleoli form a mortise into which the talar dome fits with the malleoli limiting rotation of the talus, giving mechanical stability (12).

However, medial malleolus hypoplasia, ligamentous laxity, weakness of the peroneal muscles and previous ankle sprains have been suggested as predisposing factors for pure ankle dislocations (7).

Many classifications of this lesion have been proposed by several authors based on the direction of the dislocation or have described the deformity in relation to its incidence (2,9).

Posteromedial dislocations are more common than other types of dislocations because of the tendency to land with plantar flexion and inversion of the ankle in a fall from a height (2). On the other hand, pure anterior dislocations of the ankle are extremely rare and only four cases have been described in international literature until now, but two of these are reported as anterolateral ankle dislocations (4,10). Our patient appears to have the longest follow-up reported in English literature.

The mechanism of injury generally consists of high-energy trauma, which produces a sufficient posteroanterior force applied on the foot in extreme plantar flexion resulting in anterior ankle dislocation (11). Plantar flexion has been suggested to be the unstable position of the tibiotalar joint because the narrow part of the talar body lies within the ankle mortise, allowing anterior dislocation (6).

Closed reduction under anaesthesia or intravenous sedation is usually the recommended treatment for pure ankle dislocation. Early anatomic reduction should be attempted because any delay could prolong potential neurovascular compromise. The hindfoot must be held with one hand and with the knee flexed to allow relaxation of the sural triceps. Longitudinal traction is applied, followed by a posteriorly directed force on the foot with the ankle stabilized. At the end of this maneuver the joint must be immobilized through the application of a cast for 6-9 weeks. It has been suggested that it is not necessary to repair the medial collateral ligament (4,12).

Irrigation and debridement of wounds initially, with delayed closure five to nine days later is essential for open injuries. It has been found that patients with open dislocations who were treated with capsule repair and patients treated conservatively for a closed dislocation all had good results in the long-term with no symptoms of instability (5).

Prompt closed reduction of anterior ankle dislocation is recommended to avoid soft-tissue or neurovascular compromise. Excessive foot swelling can cause vascular deficit of the anterior tibialis artery or dorsalis pedis artery. Additionally, injury of the tibial nerve, superficial peroneal nerve, or sural nerve has been reported. In severe cases, damage to the neurovascular structures may necessitate amputation (9).

Prognosis after ankle dislocation without fracture is usually good, except for open injuries which are associated with unfavorable results. Advanced age, injury to the inferior tibiofibular ligaments, presence of vascular injuries and delayed reduction are thought to be negative prognostic factors (4).

Generally the patients complained of discomfort in their ankle after increased activity and occasion-

ally of pain with inversion or supination of their ankle. Although most patients may have some residual loss of motion involving dorsiflexion, plantar flexion, inversion and eversion, this is not functionally significant (4,7).

Avascular necrosis following tibiotalar dislocation is rare because the major vessels are not significantly disrupted in this type of injury.

Significant blood supply is maintained because of vascular contributions from the capsular and ligamentous connections between the navicula, calcaneus, tibia, and the talus (12).

Besides, according to several authors, no instability is incurred and joint stiffness is extremely rare (4,7,10). However 25% of the patients with pure tibiotalar dislocations present with degenerative changes in the ankle joint, after long-term follow-up (4). Calcification of the deltoid, calcaneo-fibular and talar-fibular ligaments has been noted after pure ankle dislocation but without clinical significance. Chronic post-traumatic peroneal tendon dislocation due to forced plantar flexion has been reported once (10).

In conclusion pure dislocation of the ankle has a good long term prognosis if prompt reduction is performed. Careful documentation of the neurovascular status is mandatory before and after reduction. Despite the residual decrease in range of motion there are no functional limitations. Generally after long term follow-up the patients do not have clinical symptoms. Instability, avascular necrosis and degenerative changes in the ankle are very rare.

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