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# RUPTURE OF THE POSTERIOR TALOTIBIAL LIGAMENT WITH THE AVULSION OF A BONE FRAGMENT FROM THE TALUS

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Rupture of the deltoid ligament is a rather frequent ankle injury provided that it occurs in combination with an injury to other ankle ligaments or with a malleolar fracture. Earlier investigations (Cedell 1967) have shown, for instance, that the medial component of a supination-outward rotation injury of stage 4, in 25 per cent, consists of a rupture of the deltoid ligament, and that in these combined skeletal and ligament injuries this ligament is most often damaged in its anterior part while the posterior part remains intact.

Isolated rupture of the deltoid ligament, on the other hand, is a rare injury. Lauge-Hansen (1942) states that rupture of the deltoid ligament can occur as a quite isolated injury, so-called stage 1, in pure pronation and pronation-outward rotation injuries. In Broström's (1966) material of purely ligamentous ankle injuries the frequency of rupture of the deltoid ligament amounted to only 2–3 per cent. Other authors, like Staples (1965), assert that rupture of the deltoid ligament hardly ever occurs as an entirely isolated phenomenon.

Isolated rupture of the posterior talotibial ligament, i.e. the posterior part of the deltoid ligament only, seems to be an extremely rare or even unknown injury, judging from the comprehensive literature on ankle injuries that is available. During the last three years the author has met with four cases of this ligament rupture which could be diagnosed thanks to the occurrence of a pulled-off bone fragment, consisting of the very insertion of the ligament in the talus. The purpose of this paper is to give an account of the clinical symptoms, the radiographic appearance and the operative findings that characterize this special ligament rupture.

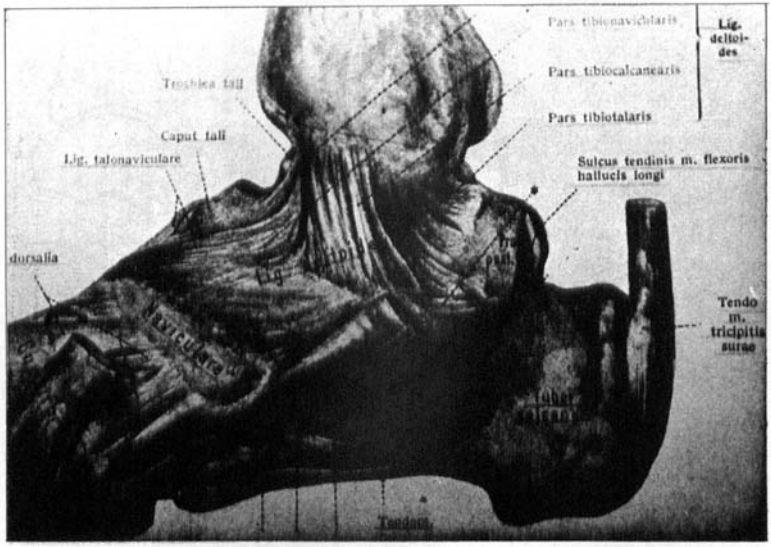


*Figure 1. The deltoid ligament (from Rauber-Kopsch: Lehrbuch und Atlas der Anatomie des Menschen).*

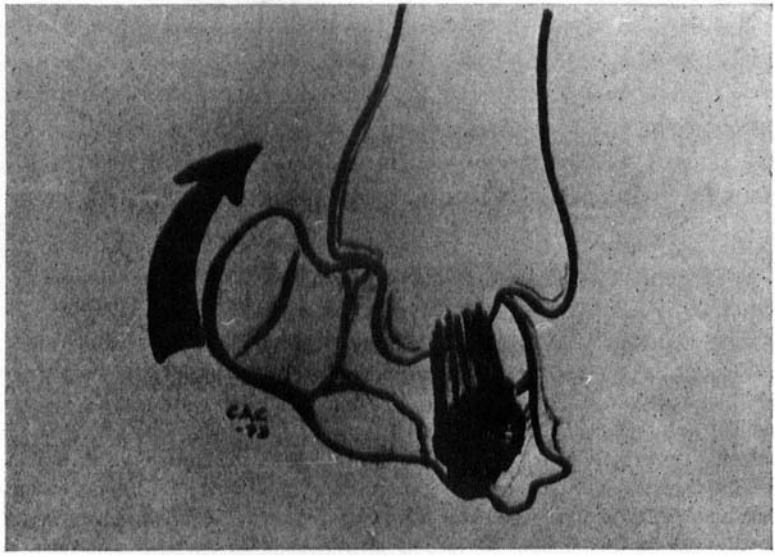

*Figure 2. Dorsal extension and pronation trauma with rupture of the posterior talotibial ligament.*

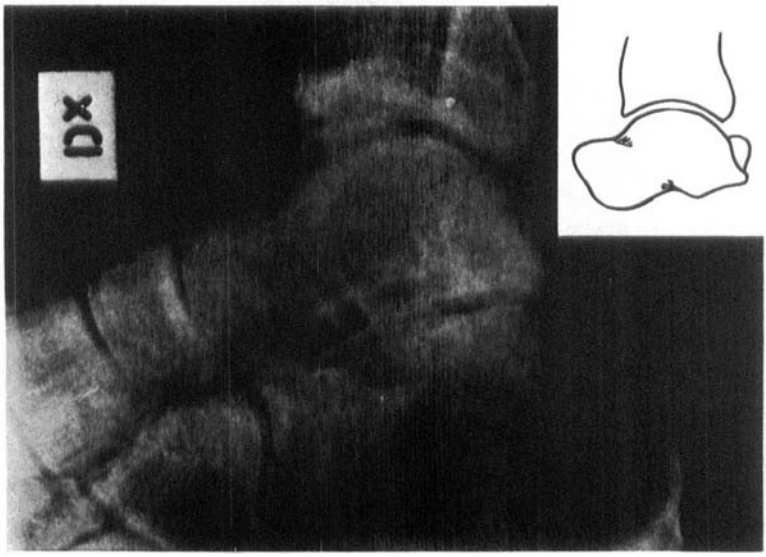


*Figure 3. Rather large bone fragment in the right ankle (orienteerer, aged 38).*

### *Anatomy*

The posterior talotibial ligament runs from the dorsal and distal part of the medial malleolus and inserts in the medial tubercle of the talus (Figure 1). This ligament stabilizes the joint when the talus occupies a position of dorsal extension and pronation in the ankle mortise. With a heavy breaking force in the direction of dorsal extension and pronation the strength of the ligament is exceeded and a rupture occurs which can be combined with the avulsion of a bone fragment from the talus (Figure 2).

## MATERIAL

The patients were all young active sportsmen, aged 38, 25, 22 and 20. The oldest was an orienteerer, the others were football players. In practising their sport, all of them had received a heavy distortion trauma to the right ankle followed by swelling in the medial part of the joint, pain and difficulty in putting weight on the foot. All were examined by a doctor who prescribed rest and a bandage. None of the ankles were immobilized in plaster. At first the injury seemed to heal and the patients took up their sports activity again. However, gradually a relapse occurred with repeated periods of medially localized pain and swelling. At last a permanent state of insufficiency occurred, forcing the patients to give up their sport entirely. As a rule the patients managed to walk and run on even ground

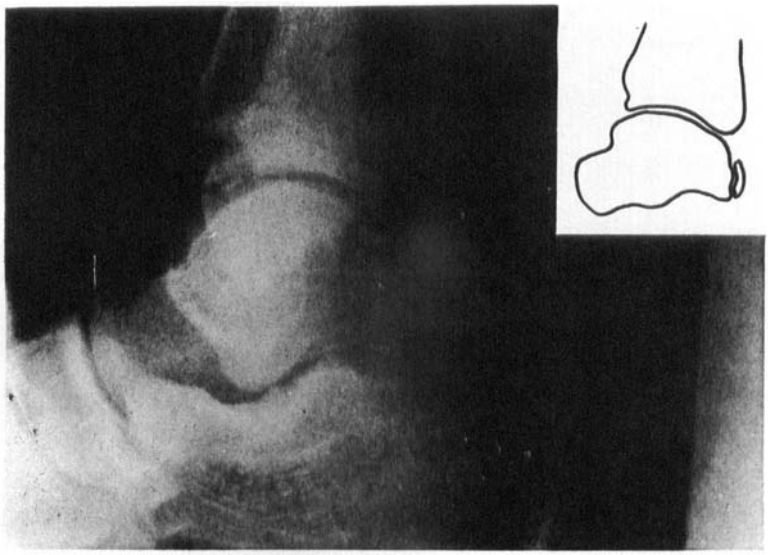

*Figure 4. Small bone fragment in the right ankle (football player, aged 20).*

but could not manage more demanding exercises like running on uneven ground, making a sudden change of direction or stopping short when running, tackling an opponent or kicking the ball, etc. As a rule, the state of permanent insufficiency developed over a period of about a year or more after the original injury.

The clinical examination revealed the occurrence of an obvious swelling behind the medial malleolus with a blotting-out of its normal contour and a palpable rounded, bony and most often tender formation corresponding to the talus. Otherwise, the ankle was painless and had a normal mobility and stability.

*Radiographic appearance*

Roentgenological examination of the ankles of the four patients showed the occurrence of a bone fragment of varying size situated medially and dorsally to the talus (Figures 3 and 4). Repeated examinations of one patient showed a transformation from several small and faulty mineralized bone fragments to one large and rather highly mineralized bone fragment indicating the formation of callus or even new bone (Figures 5 and 6). In this case a fragment bed in the talus was diagnosed as well.

*Operative findings*

Three patients were operated on. A short curved skin incision was made across the bony formation behind the medial malleolus. Access to the medial tubercle of the talus was accomplished by dissection between the tendon of the long flexor muscle of the toes and the tendon of the long flexor muscle of the big toe (Figure 7). In all the patients a rather loose bone fragment was found, surrounded by

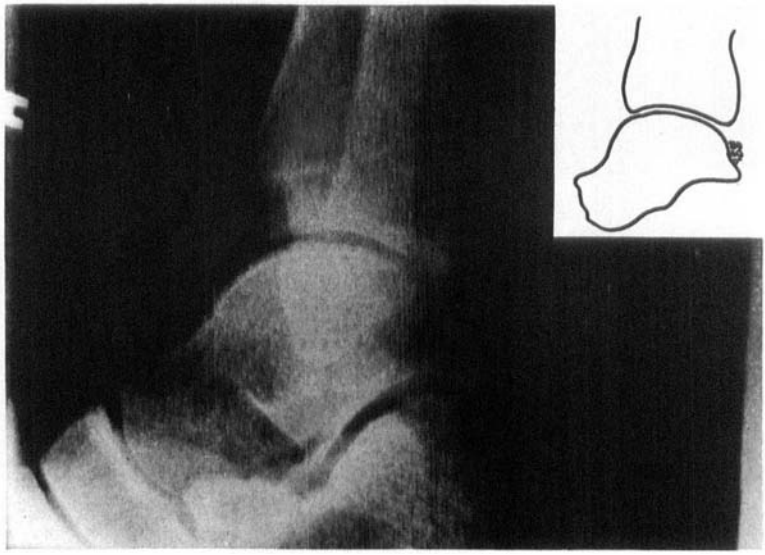

*Figure 5.*

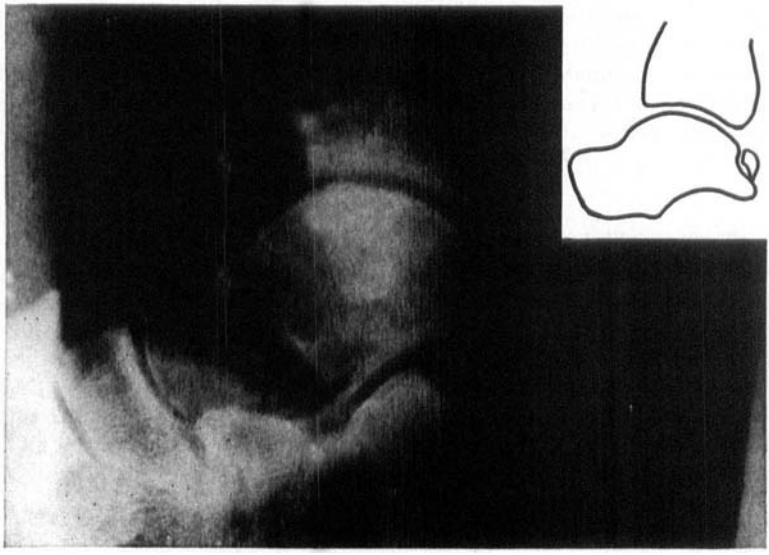

*Figure 6.*

***Figures 5 and 6. Right ankle of a football player, aged 25. In 1971 (Figure 5): Several small bone fragments. In 1972 (Figure 6): One large bone fragment and visible fragment bed in the talus.***

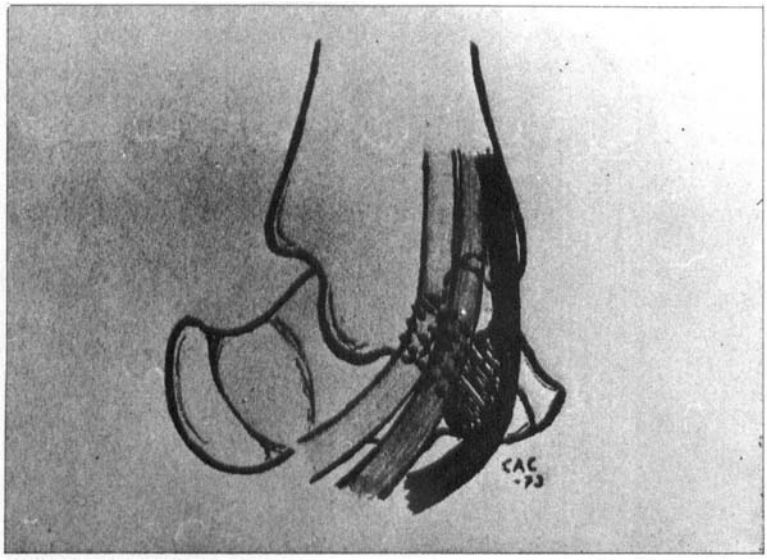

*Figure 7. Schematic drawing showing the position of the avulsion fragment belonging to the medial tubercle of the talus.*

fibrous tissue and belonging to the talus. The bone fragment showed characteristics of a real pseudarthrosis, i.e. the fracture surface was covered by a layer of cartilage and supplied with marginal osseous deposits. The bed of the fragment was situated just in front of the sulcus of the long flexor muscle of the big toe. The size of the bone fragment was about 0.5 × 1 × 2 cm, in one patient a little larger (Figure 8). The bone fragments were extirpated because a reconstruction of the ligament seemed to be unrealistic, considering the narrow and scarred circumstances locally. The size of the bone fragments was altogether much larger than the roentgenological examination indicated. Their size, however, was in good agreement with the clinical examination.

## RESULTS

The observation time was ½–3 years. All the patients took up their sports activity without restriction within three months after the operation and had no residual symptoms.

## DISCUSSION

Isolated rupture of the posterior talotibial ligament is, with all probability, a very rare ankle injury. The author has not found mention of this ligament rupture in the literature previously. The four cases that

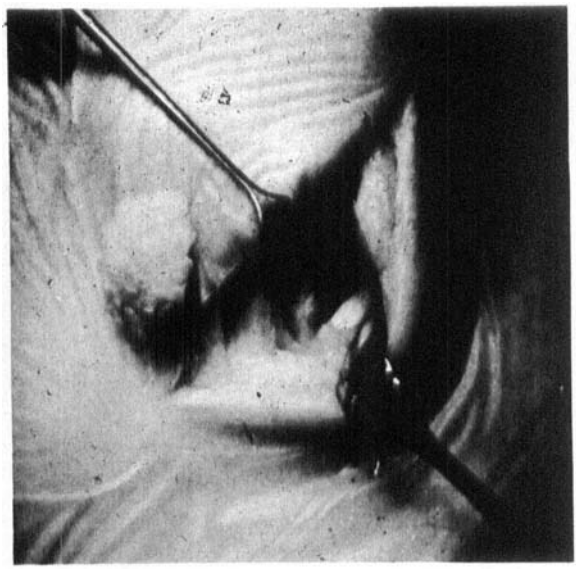

*Figure 8. Bone fragment extirpated. Incision behind the medial malleolus (same patient as Figure 4).*

have been reported in this paper were, strangely enough, met with in active sportsmen. It is not known if this injury is found in sportsmen only though it is not improbable as, by experience, they often expose their ankle ligaments to a heavy burden. The injury has, however, not been given attention in literature on sports injuries, either (for instance Blazina & Westover 1965). Of course anybody can suffer a heavy dorsal extension and pronation trauma to the ankle, for instance when slipping or on making a false step on uneven ground. Perhaps the injury heals to such an extent that the ligament, so to speak, stands the burdens of everyday life.

The ligaments of the ankle very seldom rupture with the avulsion of bone fragments from their origin or insertion (Broström 1966, Cedell 1967). Instead, most of the ruptures appear in the very ligament itself. Contrary to the so-called ligamentous fractures these ligament ruptures only very seldom present any healing problems. The bone fragments, on the other hand, often show healing disturbances and most of them probably only heal by fibrous union with the risk of remaining unstable and hence resulting in a relapse of the symptoms. With all probability all the patients in this material sustained such a ligamentous fracture of the talus, followed by a pseudarthrosis. Knowing that only a minority of the ruptures of the ankle ligaments are combined with bone fragments one can directly conclude that an injury to the

posterior talotibial ligament may not be as rare as it seems to be. Our very rare diagnosis of this ligament rupture may, among other things, depend upon the good prognosis of the injury and on the fact that the posterior talotibial ligament, in contrast to the anterior talofibular ligament, is not very important for the stability of the ankle joint.


## SUMMARY

Isolated rupture of the posterior talotibial ligament is probably a very rare injury. The author has diagnosed this ligament injury in four sportsmen, who had a chronic state of insufficiency with medial pain and swelling in the ankle joint. Clinical examination revealed the occurrence of a bony and tender formation behind the medial malleolus which at operation was found to be an unhealed avulsion fragment belonging to the medial tubercle of the talus. All the three patients operated on could after fragment extirpation take up their sports activity without restriction.


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