



## Inferior dislocation of the proximal tibiofibular joint : a report on four cases

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**The authors report four cases of inferior dislocation of the proximal tibiofibular joint. A literature search disclosed reports on superior, anterolateral and posterolateral dislocation, but none on inferior dislocation of the proximal tibiofibular joint. The latter was associated in these four cases with fracture of the tibia, as also noted in cases of superior dislocation, and with severe neurovascular lesions.**

### INTRODUCTION

Proximal tibiofibular dislocation is a rare injury. Dubreuil (11) and Malgaigne (28) reported the first cases. A literature search only disclosed reports on superior, anterolateral and posterolateral dislocation of the proximal tibiofibular joint, either isolated or associated with a fracture of the tibia or exceptionally with an ankle fracture (1). Lyle and Henry (27) established the first classification of those injuries, which was subsequently modified by Harrisson and Hindenach (18). Anterolateral dislocation is the most frequent (49% in Lyle and Henry's review). Pellegrino (34) separates anterolateral dislocation into two types : the first type is incomplete and can be treated with closed reduction, the second type is complete and often needs surgical reduction. Posteromedial dislocation is less common (30% in Lyle and Henry's review). It is more often associated with ligamentous injury and peroneal nerve palsy (27, 43). Superior dislocation is very rare (10% in Lyle and Henry's review). It is most often associated with a fracture of the tibia and may be associated with a peroneal nerve palsy (25). Subluxation may be anterolateral or pos-

teromedial. It may be the consequence of neglected dislocation or may be seen in cases with ligamentous hyperlaxity or collagen disease like Ehlers-Danlos syndrome (29).

We report four cases of inferior dislocation of the tibiofibular joint, which were treated in our department over a few years. Isolated cases have been reported following sports injuries (26, 27), but the cause was a motorcycle accident in all our four cases.

### CASE REPORTS

#### Case 1 (fig 1a, b)

A 39-year-old male patient was admitted to the hospital in June 1995 for a Gustilo 3C open fracture of his proximal right tibia associated with ipsilateral inferior dislocation of the proximal tibiofibular joint. The apex of the fibula was fractured ; the insertion of the biceps femoris and the fibular collateral ligament on the proximal fragment were uninjured.

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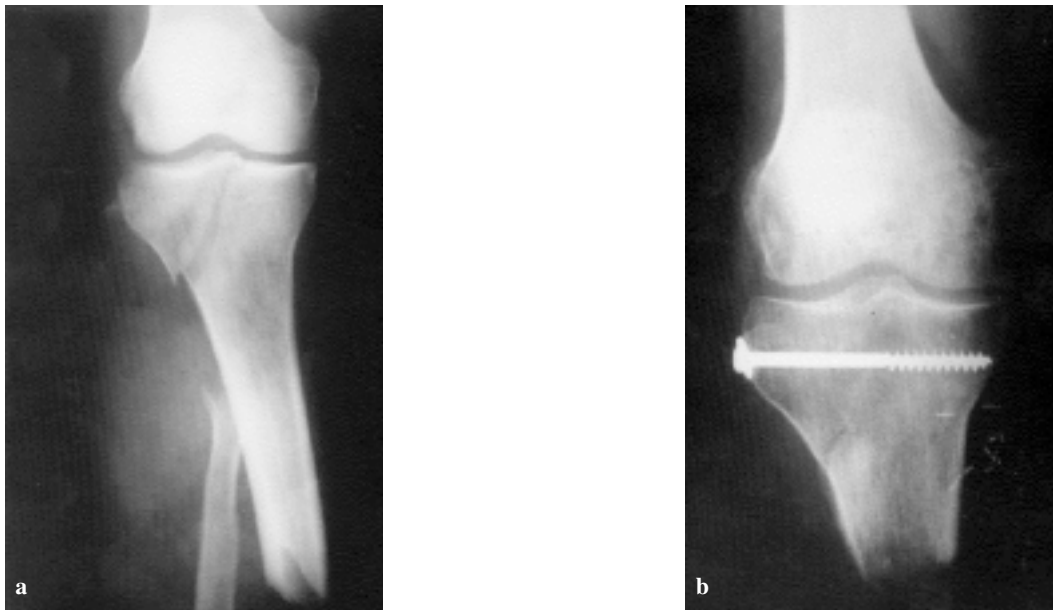
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**Fig. 1.** — (Case 1) a. Unicondylar fracture of the proximal tibia with inferior dislocation of the tibiofibular joint. b. Postoperative radiograph after below-knee amputation and fixation of the unicondylar fracture.

All neurovascular structures were torn at the midpart of the leg. A below-knee amputation was done in emergency.

The patient also presented with a distal fracture of the right radius, which was treated with percutaneous reduction and K-wire fixation.

#### Case 2 (fig 2 a, b)

A 28-year-old male patient was admitted to the hospital in March 1999 with the following lesions :

- mid-shaft fracture of the right tibia, which was treated with intramedullary nailing,
- Gustilo 3C open fracture of the left tibia with inferior dislocation of the proximal tibiofibular joint, avulsion of the fibular collateral ligament and the peroneus communis and tibialis nerves, and complex vascular injuries distal to the knee.

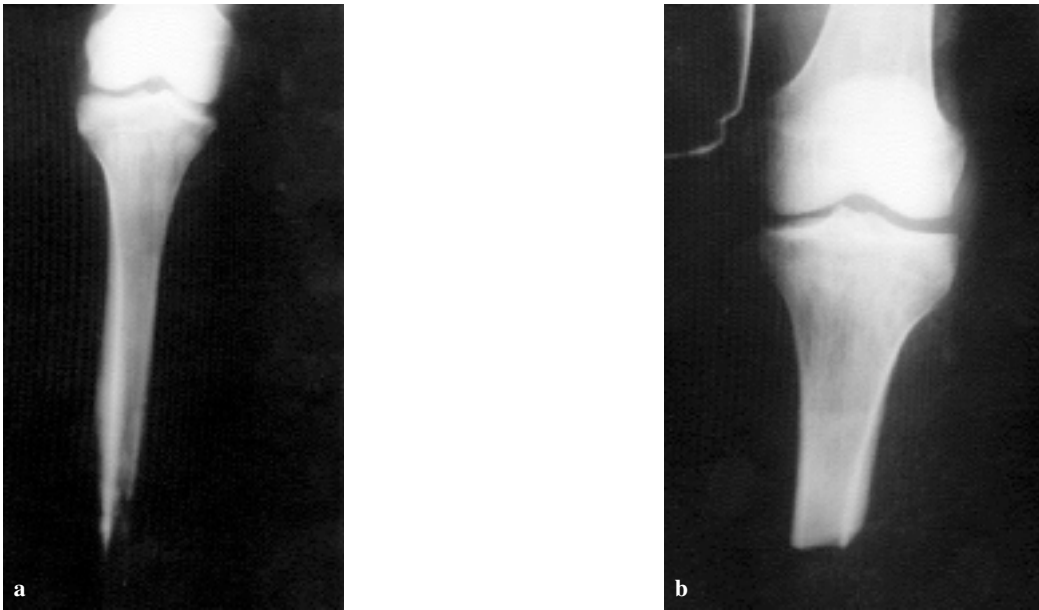
A below-knee amputation was done in emergency.

#### Case 3 (fig 3a, b)

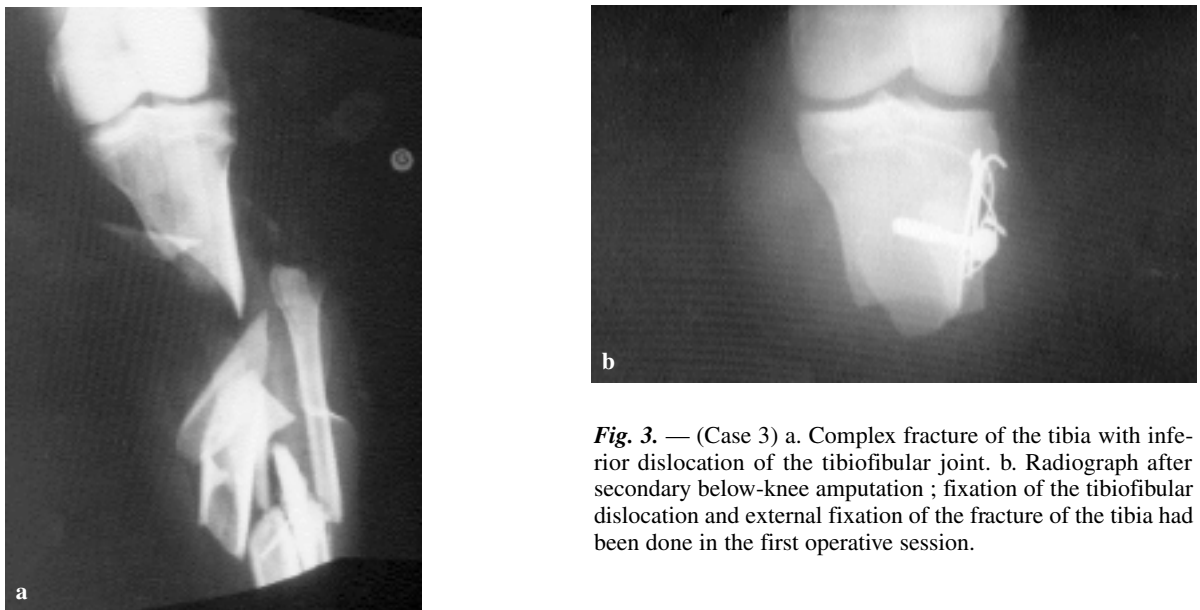
A 35-year-old male patient was admitted to the hospital in July 1998 with the following lesions : - Gustilo 3C open fracture of the left tibia with inferior dislocation of the proximal tibiofibular joint, avulsion of the fibular collateral ligament from the head of the fibula, rupture of both cruciate ligaments, rupture of the anterior and posterior tibialis arteries, avulsion of the peroneus communis nerve and partial lesion of the tibialis nerve.

- diaphyseal fracture of the left radius, associated with a comminuted fracture of the ulnar head,
- complete palsy of the left brachial plexus.

The tibial fracture was stabilised with an external fixator and the proximal tibiofibular dislocation with a transarticular screw. The fibular collateral ligament was sutured. The vascular lesions needed a bypass operation. Secondary below-knee amputation was however necessary two days later because of severe distal ischemia.



**Fig. 2.** — (Case 2) a. Fracture of the distal tibia with avulsion of the distal segment of the leg. The fibula was avulsed at the level of the tibiofibular joint. b. Postoperative radiograph after amputation below the knee.



**Fig. 3.** — (Case 3) a. Complex fracture of the tibia with inferior dislocation of the tibiofibular joint. b. Radiograph after secondary below-knee amputation ; fixation of the tibiofibular dislocation and external fixation of the fracture of the tibia had been done in the first operative session.

#### Case 4 (fig 4)

A 55-year-old male patient was admitted after a motorcycle accident in July 2001, after severe haemorrhage from a Gustilo 3C open fracture of the left tibia with inferior dislocation of the proxi-

mal tibiofibular joint, avulsion of the fibular collateral ligament from the head of the fibula, fracture of the head of the fibula, multiple vascular tears of the popliteal, anterior and posterior tibialis arteries and avulsion of the peroneus communis nerve. An arterial bypass operation was deemed technically



**Fig. 4.** — Case 4. Arteriography showing a vascular leak. Inferior dislocation of the tibiofibular joint and fracture of the head of the fibula.

impossible. He presented a cardiac arrest while on the operative table, and a life-saving amputation was performed right away; the amputation level was above the knee owing to severe associated cutaneous and muscular lesions. The patient survived his injury and is now walking with a prosthesis.

## DISCUSSION

Lyle and Henry (27) first described four types of proximal tibiofibular dislocations: anterior, posterior, superior and double. They described five cases of “double” dislocation (combined dislocation of the distal and proximal tibiofibular joints): four dislocations were upward; in the fifth case, the head of the fibula was displaced forward and the malleolus backward. Harrison and Hindenach (18) later proposed a classification of dislocations of the proximal tibiofibular joint, which other authors have used subsequently (7, 10, 31, 33, 39). It includes four types:

- superior dislocation (4, 19, 20, 22, 29, 38),
- anterolateral dislocation (6, 7, 8, 12, 14, 16, 21, 22, 27, 29, 34, 40 - 43, 46),
- posteromedial dislocation (5, 27, 29, 43),
- subluxation (2, 3, 9, 15, 17, 29, 31, 32, 37, 39, 44).

These classifications did not mention inferior dislocation of the proximal tibiofibular joint, and our literature search did not retrieve any such cases. The four cases of inferior dislocation of the proximal tibiofibular joint, which we report here, were all associated with a fracture of the tibia. The orientation of the articular surfaces of the proximal tibiofibular joint is considered as a predisposing factor by some authors (40, 41, 42, 43, 44, 45). In the four cases of inferior dislocation reported here, the mechanism was avulsion of the leg and the orientation of the articular surfaces may indeed have made this easier.

The mechanism of *anterior dislocation* is most frequently an indirect injury, with the leg flexed and adducted under the body, often associated with inversion of the ankle. The posterior proximal tibiofibular ligament is torn; the anterior proximal tibiofibular ligament generally remains intact and acts as a hinge. This same mechanism may result in disruption of the distal tibiofibular joint or fracture of the neck of the fibula. The anterior displacement of the head of the fibula could also be facilitated by a violent reflex contraction of the peroneal muscles resisting the inversion of the ankle (29, 33). Valenti (43) reported a case of anterior dislocation of the proximal tibiofibular joint associated with fracture of the tibia, cruciate ligament rupture, and avulsion of the fibular collateral ligament and biceps femoris tendon from the head of the fibula.

The mechanism of *posterior dislocation* is generally a direct anteroposterior violence. Damage to the articular capsule is important. The biceps femoris tendon, the fibular collateral ligament and the peroneus communis nerve may be damaged (43). Lyle and Henry (27) also described an indirect mechanism due to violent contraction of the biceps femoris, with the knee flexed.

*Superior dislocations* are most often associated with a fracture of the tibia (“Monteggia” like frac-

ture). Rupture of the cruciate ligament can be associated with this type of dislocation (43). In four cases reported by Lyle and Henry (27), the tibia was intact, and the superior dislocation of the fibula was secondary to an ankle injury (force acting from below on the outer edge of the foot, resulting in outward dislocation of the ankle).

*Subluxation* of the proximal tibiofibular joint may be idiopathic or may result from neglected dislocation or repeated trauma (31). Nine of ten cases of idiopathic subluxation in Ogden's series (31) presented with joint hypermobility (seven ligamentous hyperlaxity, one muscular dystrophy, one Ehlers-Danlos syndrom). Idiopathic subluxation is the only variety which occurs among children or adolescents.

There were severe vascular and neurological lesions in our four cases, requiring above or below-knee amputation either in emergency or secondarily. Vascular complications typically never occur in other types of proximal tibiofibular dislocation.

The neurological injuries affected in all four cases the peroneus communis and tibialis nerves. Contrary to the tibialis nerve, the peroneus communis nerve may be injured in other types of proximal tibiofibular dislocation. Peroneus communis nerve palsy may occur immediately (8, 16, 25, 43) or progressively (31, 38). The severity of the neurovascular lesions is related with the avulsion mechanism of the trauma. Our literature search has disclosed no case of amputation following other types of proximal tibiofibular dislocation. Rupture of the collateral ligament or an equivalent lesion (fracture of the apex of the fibula) was present in all four cases, also as a consequence of the avulsion mechanism. These lesions may be associated or not with an injury of the cruciate ligaments. These ligament lesions are not specific in case of inferior tibiofibular dislocation as they may also be found with other types of proximal tibiofibular dislocation (43).

## CONCLUSION

Inferior dislocation of the proximal tibiofibular joint is a very rare lesion. Its mechanism is specific : it results from a leg avulsion. In the four cases reported, it was associated with fracture of the tibia

and severe neurovascular lesions beyond any possibility for treatment other than amputation.

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