Journal of BioMed Research and Reports
2026 Volume 10, Issue 4
DOI: 10.59657/2837-4681.brs.26.242

BioRes Scientia
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Mini-Review

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The Maissoineuve Fracture: A Literature Review

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Abstract

The Maissoineuve Fracture, first described by Dr Jacques Maissoneuve in 1840 [1], resulted from descruption of the medial structures and a proximal fibular fracture. Subsequently numerous authors have described variations of this injury pattern involving the medial ankle structures and proximal fibular fractures. Lauge-Hansen then classified these injuries as a variant of the pronation- external rotation pattern [2].

Keywords: maissoineuve fracture; injuries; syndosmosi

Introduction

Proximal tibio-fibular dislocations initially were described by Dubreuil in 1844 [4]. I performed a literature review on both of these injuries.

Mechanism of injury and Diagnosis

To my knowledge, an injury that includes a medial malleulus avulsion combined with a proximal tibiofibular dislocation has not been previously reported.

Jehlicha et al [6] reported on a "Bosworth fracture of the ankle". This injury involved a proximal fibular fracture combined with an ipsilateral distal fibular fracture and a medial malleolar fracture. Slawky and West [11] reported a case of a forty-six-year-old woman who presented with a proximal Maissoneuve-type fibular fracture and an associated distal fibular fracture at the level of the syndosmosis.

Del Castillo and Geiderman described the importance of making proximal tibiofibular radiographs when patients present with an ankle pain. Recommendations included the assertion

that one should suspicious of a Maisonneuve fracture pattern when there is an isolated fracture of the posterior tibial tubercle, if there is evidence of deltoid ligament disruption or fracture of the medial malleolus in the absence of a lateral malleolar fracture, if there is tenderness of the anteromedial capsule of the syndesmosis, or if tender less over syndesmosis.

Those authors reinforced the principle of examining both ends of a long bone when a fracture is present at one end. Gabrion et al], described the cases of four patients who had an inferior dislocation of the proximal tibiofibular joint. One of the patients had an associated tibial fracture, but none of them had an associated fibular fracture. Wang et al reported on the magnetic resonance imaging diagnosis interosseous membrane injuries in association with Massoinauve fractures of the fibula and noted that the interosseous membrane typically was ruptured distal to distal third of the fibula but that the rupture usually did not extend up to the level of the proximal fibular fracture. Lock et al reported the case of a patient with a missed Massoinauve fracture who presented with a chief complaint of medial ankle pain and normal radiographs of the ankle.

Those authors recommended that the physical examination of the all-ankle injuries, should include the proximal part of fibula.

Healy et al reported on a triplane fracture that was associated with a proximal fibular fracture in an adolescent wrestler and recommended awareness of the Massonaive fracture pattern in association with triplane injuries in the adolescents. Hensel and Harpstrite reported on a Massonaive fracture that was associated with a bimalleolar ankle fracture-dislocation. The patient in that study had a distal fibular fracture, a lateral ankle dislocation, a Massoinaiuve fracture of the proximal part of the fibula and a medial malleolar fracture.

Treatment strategies

The literature related to syndesmosis fixation is controversial with regard to the number of screws, the size of screws, and the position of the screws relative to the tibiotalar joints.

Numerous treatment strategies have been proposed. Weening and Bhandari reviewed the technical aspects of syndosmotic screws fixation and found that,

despite variations in treatment, most patients achieved good quality of life and functional outcomes. McBryde et al recommended placing the syndosmotic screws 2 cm proximal to the joint line.

Sproule et al recommended placing screws 4 cm proximal to the tibio-talar joint.

Thompson and Gesink found that a 4.5 mm screw had no biomechanical advantage compared with a 3.5 mm screw. Xenos et al found that two screws were biomeccanically stronger than a single screw. Duchesneau and Fallat recommended either one or two screws for partial diastasis and two bicortical screws for complete diastasis.

Jung et al demonstrated that the use of a plate-screw construct helps to distribute forces across the syndesmosis as compared with the use of two screws alone.

De Suoaze et al, in a study of 150 patients who had operative treatment of an external rotation fracture of the ankle, reported 90% rate of satisfactory results after an average duration of follow-up of 3.5 years. Pankovic reported on seventeen Maissonauve fractures and recommended surgical treatment when there was a proximal fibular fracture and a rupture of the deltoid ligament or a fracture of the medial malleulus. Obeid et al, in a study of five Massonauve-type fractures that were treated with a single syprassyndesmotic percutaneous diastasis screw, reported excellent results and reccomanded this method as an easy, effective, and minimally invasive procedure with a good functional outcome. Sproule et al, in a review of fourteen patients who had operative treatment of a Massonauve fracture, reported 86% rate of satisfactory results after an avarege duration of follow-up of 25.3 months. Those authors recommended surgical intervention to maintain reduction of the fibula into the notch of the fibia in order to avoid shortening of the fibula, lateral tarsal displacement, and subsequent painful ankle arthrosis.

Babis et al, in a report of on twenty-six patients who had operative treatment of a Massonauve fracture, recommended repairing lateral and medial ligamentous structures with the placement of one or two syndosmotic screws and reported an 88.4% rate of satisficary Clinical results after an average duration of follow-up of 6.5 years. Duchesneau and Fallat performed a literature review on the meccanism of injury, classification and surgical fixation techniques, and recommended surgical treatment for all Massoneuve fractures to stabilize the fibula and to prevent the shortening with resultant valgus talar shift that can lead to painful degenerative osteoarthritis.

Hardware removal after syndosmotic fixation is controversial.

Dislocation of proximal tibiofibular joint is a rare injury. Ogden described four types of dislocation: subluxation, anterolateral dislocation, posteromedial dislocation, and superior dislocation. The diagnosis is based on clinical examination, plain anteroposterior and lateral radiographs, and CT if it is necessary.

There is a paucity of data regarding the treatment of proximal fibular dislocation in the medical literature. The recommended treatment is closed reduction, which is usually successful. Surgery is performed in cases which reduction is not possible or is not maintened. Miettinen et al described a technique for fixation involving a portion of the biceps femori muscle tendon and the use of interference screw fixation in the proximal part of the tibia.

Other authors have recommended reconstructing the joint with an iliotibial band graft, various forms of kirschner-wire fixation, and proximal resection of the fibular head.

Conclusion

I believed that I was unable to find an association between a Massonauve-type fracture and an ipsilateral pure proximal tibiofibular dislocation. This injury bears consideration during
the diagnostic workup of a patient with an ankle injury.

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Cite this article: Bernardino S. (2026). The Maissoineuve Fracture: A Literature Review, *Journal of BioMed Research and Reports*, BioRes Scientia Publishers. 10(4):1-3. DOI: 10.59657/2837-4681.brs.26.242

Article History: **Received:** March 03, 2026 | **Accepted:** March 14, 2026 | **Published:** March 27, 2026