

# Proximal Tibiofibular Fixation Using a Dynamic Syndesmosis Fixation Device

C Main, B Norris, R Jensen

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## Abstract

We present a case report of proximal tibiofibular joint instability treated with a dynamic syndesmosis fixation device. A dynamic fixation device allows for micro-motion at the proximal tibiofibular joint. With some limited motion at the proximal tibiofibular joint, the fibula is able to migrate inferiorly and increase ankle stability. This has a distinct advantage over traditional fixation techniques, such as arthrodesis, which do not allow motion and may contribute to long-term ankle injuries.

## BACKGROUND

Proximal tibiofibular subluxation is an uncommon injury that results in moderate instability and discomfort about the knee joint. Isolated injury to the joint is often the result of a wide variety of traumatic sports related injuries including violent twisting or a direct blow.<sup>1</sup> Due to stability afforded by the LCL, dislocation of the proximal tibiofibular joint requires the knee to be in a flexed position.<sup>1</sup> Most injuries result in the inability to pivot and plant the affected side at the ankle with day to day instability. Associated injuries are rare, however, the peroneal nerve can be injured.

Traditionally there are four patterns of injury to the proximal tibiofibular joint, three classifications of dislocations including anterolateral, posteromedial and superior (anterolateral being the most common) and one of subluxation that is often the result of chronic instability.<sup>3</sup>

Injury occurs most commonly in the second to fourth decades of life. Historically a little over half of patients with acute dislocations require surgical correction for recurring symptoms. The major concern with surgical fixation is the development of osteoarthritis in the ipsilateral ankle joint due to decreased motion. This article presents a case in which dynamic (TightRope™, Arthrex, Naples, Florida) fixation was used to stabilize the proximal tibiofibular joint.

<sup>2</sup>

## CASE REPORT

A 48 year-old female presents with a history of left proximal tibiofibular joint instability and three episodes of posterior dislocation of the fibular head causing her knee to lock in a flexed position. Her latest episode spontaneously reduced

with mild manipulation. Prior MRI examination of the left knee revealed no apparent reason for dislocation. The patient history is also positive for degenerative joint disease in her knees bilaterally. Physical examination of the left knee revealed mild soft tissue swelling along the proximal tibiofibular articulation. Range of motion, strength and stability were all normal. The patient was tender to palpation along the fibular head as well as the proximal tibiofibular articulation. The fibular head demonstrated marked increase in motion with an anterior and posterior drawer in relationship to the tibiofibular articulation. Due to the history of recurrent symptoms the patient underwent surgery.

## Figure 1

Figure 1: Lateral view of left knee showing posterior dislocation



Open reduction of the proximal tibiofibular joint dislocation was performed. Since it was anticipated that the patient will require future surgical intervention for the degenerative joint disease in her left knee, a treatment was selected to allow for some micro-motion while requiring no future surgical need for removal of hardware. Two syndesmosis fixation devices (TightRope™; Arthrex, Naples, Florida) were placed anterior lateral to posterior medial and posterior lateral to anterior medial in a diverging fashion to secure the proximal tibiofibular joint. A bioabsorbable screw was placed just below the level of the syndesmosis fixation device from posterior lateral to anterior medial for secure and final fixation. Intraoperatively there were no further signs of anterior-posterior subluxation or dislocation of the fibular head.

Immediately postop the patient was placed on a continuous positive motion machine in non-weight bearing status and physical therapy was initiated. Recovery was uneventful and the patient fully resumed her activities of daily living. One year later the patient presented for total knee replacement of her right knee. She has reported no more episodes of left fibular head subluxation or dislocation.

### Figure 2

Figure 2- Post fixation with device in place



## DISCUSSION

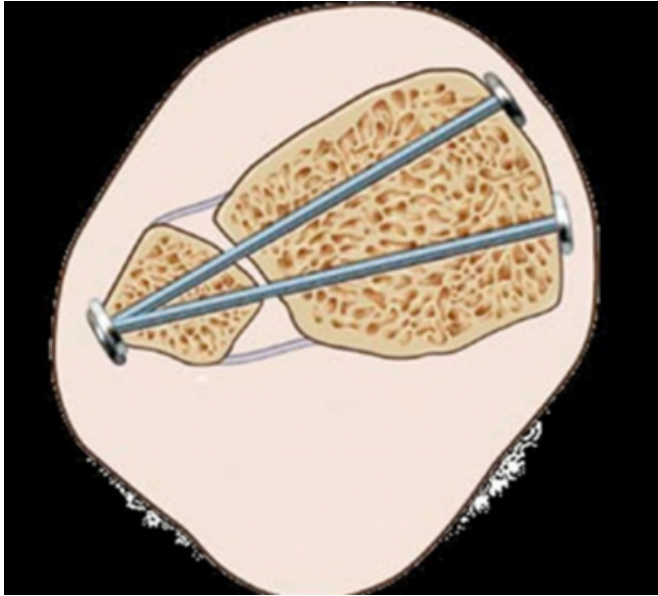
Traditional surgical treatment options for chronic proximal tibiofibular dislocations include arthrodesis, resection of the fibular head and reconstruction of the proximal tibiofibular joint. Resection of the fibular head presents similar concerns

as arthrodesis, including arthritic changes of the ankle joint, and may also compromise the fibular collateral ligament.<sup>1</sup> This may lead to knee instability and have an effect on gait. Therefore, this approach is best reserved for salvage therapy.<sup>1</sup> Cutting studies have revealed the stability of the joint to be present unless the fibular collateral ligament was cut or the knee was flexed past 80 degrees.<sup>1</sup> Therefore, to preserve joint stability ligamentous reconstruction is another option. Ligamentous reconstruction of the proximal tibiofibular joint is primarily recommended for athletes and children because this procedure avoids the possible loss of knee stability that may occur with the other surgical options.<sup>4</sup> Reconstruction also avoids the possible loss of the physis seen with resection of the fibular head which would affect the growth of the fibula in the child.<sup>4</sup>

Arthrodesis is not advocated because it prevents fibular rotation. With this a concern arises regarding increased rotational stress at the ipsilateral ankle which may lead to pain and arthritic changes of the ankle joint.<sup>5</sup> However, there is insufficient data to support/refute this theory.<sup>5</sup> Dynamic fixation as used in our patient allows for micro-motion of the proximal tibiofibular joint and therefore may be preferable to arthrodesis. This approach would theoretically prevent the ankle problems that characteristically develop with arthrodesis of the proximal tibiofibular joint. With some limited motion at the proximal tibiofibular joint, the fibula is able to migrate inferiorly and increase ankle stability. At present no articles exist in the literature that discuss dynamic fixation of the proximal tibiofibular joint, however, we propose it offers a potential benefit over other currently used surgical treatment methods. The Tight-Rope™ device was utilized with these principles in mind to allow for the best patient outcome.

**Figure 3**

Figure 3- Schematic drawing showing fixation technique.



**References**

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**Author Information**

**Christopher D. Main, DO**

Midwest Bone & Joint PC Kirksville College of Osteopathic Medicine

**Bradley P. Norris, PharmD**

Midwest Bone & Joint PC Kirksville College of Osteopathic Medicine

**Ray B. Jensen, B.S.**

Midwest Bone & Joint PC Kirksville College of Osteopathic Medicine