

A new technique of reduction for isolated proximal tibiofibular joint dislocation: a case report

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Abstract. – We describe a case of isolated proximal tibiofibular joint dislocation in a 20 years old girl following trauma. Dislocation was reduced through a new and simple reduction technique after failure of classic reduction maneuver. This technique by using isokinetic movements lead to relax the fibular collateral ligament and allow the biceps tendon to snap the proximal end of the fibula back into the anatomical position. This technique propose simple maneuver to reduce isolated proximal tibiofibular joint dislocation.

Key Words:

Isolated proximal tibiofibular joint dislocation.

Introduction

Isolated proximal tibiofibular joint dislocation (PTFD) is associated with a severe twisting, inversion and plantar flexion of the foot, simultaneously with knee flexion and external rotation of the leg^{1,2}; it may also occur following direct high energy trauma to the knee^{1,3,4}.

Dislocation of the proximal end of the fibula is not always an isolated injury, as it is usually described. According to the literature, it may be associated with tibial fractures, femoral-shaft or head fracture, dislocation of the knee, fibular fracture and anterior fracture-dislocation of the distal femoral epiphysis.

The patient usually present with pain along the lateral side of the knee and leg. This could be elicited by direct pressure over the fibular head (pushing it either forward or medially).

Antero-posterior radiographs of the knee usually show the proximal fibula and tibia overlain⁵. In the majority of the cases, comparison between anterior and lateral radiographs on the two knees helps to confirm the diagnosis of fibular head dislocation⁶. Computed Tomography scan (CT scan) is indicated for better assessment of the joint and in case of diagnostic doubts⁷⁻⁹.

Classification

Understanding the mechanism of dislocation and classifying it, are critical for diagnosis, manage-

ment and treatment of this disorder. Because the proximal joint disruptions are really bidirectional, Ogden⁴ proposed the following classification:

Type I – Subluxation: Characterized by excessive joint mobility, with multidirectional subluxation without frank dislocation; frequently found in young patients with hypermobility (muscular dystrophy, Ehlers-Danlos syndrome or ligamentous hyperlaxity).

Type II – Anterolateral: Characterized by anteroposterior dislocation; this is the commonest type, occurring in up to 85% of the cases^{4,8,10,11}.

Type III – Posteromedial; this occurs in 10% of the cases and is frequently associated with direct trauma to the fibular head^{8,12}. It is generally more unstable after the initial closed reduction, which makes it difficult to implement conservative treatment^{2,4}.

Type IV – Superior: upwards dislocation of the fibular head, in association with fracturing of the fibular neck or high-energy trauma to the ankle, with severe injury to the tibiofibular syndesmosis^{1,2,11}.

Lyle¹² described four types of proximal fibular resection: anterior, posterior, upward, and double. The “double” category is redundant, because all the cases in it had anterior or upward proximal dislocation in conjunction with dislocation of the distal tibiofibular joint.

Most of these anterolateral dislocations occurred during athletic activity (especially violent, twisting motion). Several were associated with other skeletal injury: type-IV fracture-dislocation of the hip, crush injury of the proximal and distal ends of the tibia, fracture-dislocation of the ankle, proximal tibial fracture and fracture-dislocation of the distal femoral epiphysis.

Case Report

Here we report a case of 20 years old girl, arrived to our attention for right knee pain following the breaking of the heel tip of her high heel shoes. The mechanism of trauma was inversion and plantar flexion of the foot with simultaneous knee flexion and external rotation of the leg. She presented a



Figure 1. *A*, Anteroposterior radiograph of right and left knees before reduction. *B*, Posterior CT-3D view better shows the dislocation of fibular head.

protruding fibular head with slight local edema and pain on palpation but the knee could be reach to complete range of motion passively.

Anterior and lateral radiographs of both knees were perform bilaterally. Because of some doubts on plain x-rays, CT scan was requested to confirm the diagnosis of isolated anterolateral dislocation of the proximal fibula (Figure 1 a-b). The patient was prepared for the close reduction in emergency room facility. With the knee flexed at 70 degrees, under local anesthesia with 10 cc of lidocaine, an external rotatory torque to the fibula was applied to relax the anterolateral compartment muscles; the foot was placed in eversion and dorsal flexion, then a direct pressure was applied to the fibular head to move it to the apex of the lateral tibial ridge. After an unsuccessful attempt of reduction, another try with different technique was programmed before deciding for surgical reduction.

Patient was placed in supine position; she was asked to flex her knee more than 90 degree while the surgeon was applying a counterforce to the heel using his palm (Figure 2). Simultaneously, a gentle direct pressure was applied to the fibular head to move it to the apex of the lateral tibial ridge. Complete range of motion and pain relief was observed immediately following this maneuver. CT scan confirmed the correct repositioning of the fibular head (Figure 3); the knee was immobilized in slight flexion position for three weeks.

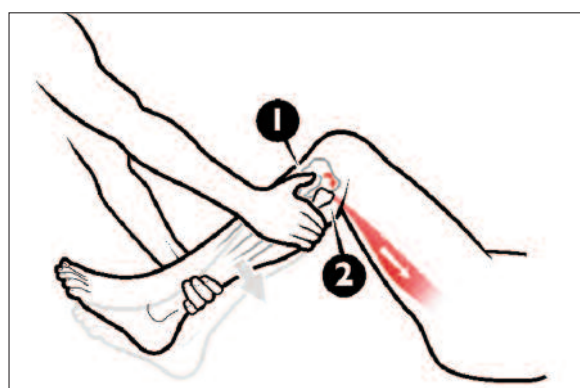


Figure 2. Reduction maneuver that was performed.

Discussion

The etiology of subluxation or dislocation of the proximal end of fibula may be traumatic or pathologic. The traumatic conditions may be twisting athletic injuries, a slipping injury in which the patient lands with his knee flexed under his body, multiple trauma (particularly to the ankle or tibial plateaus), or parachute landings.

Anterolateral dislocation is the most frequent subtype, however the isolated form remains a rare entity and few cases was reported in the literature^{3,4,16-21}. The patient usually complains of severe pain and tenderness over the proximal part of the fibula. However, in many patients the major symptoms are in the lateral popliteal fossa along the

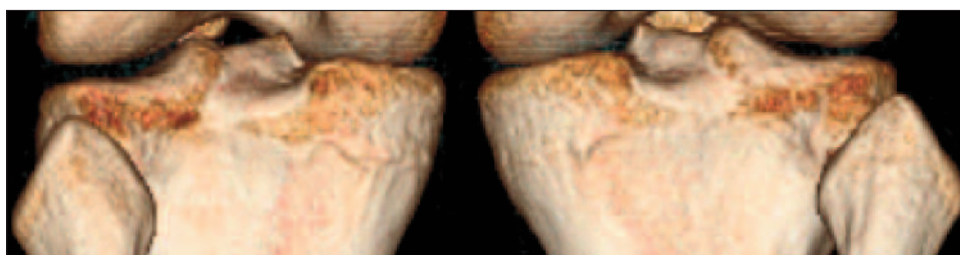


Figure 3. Posterior CT-3D scan after reduction shows the correct positioning of fibular head.

course of the stretched biceps tendon, and the pain usually can be accentuated by dorsiflexion and eversion of the foot. There may be transient paresthesia along the distribution of the peroneal nerve. Palsy with foot drop is rare. The diagnosis is often missed initially when it's associated with other skeletal injuries. An isolated proximal fibular dislocation was best discerned by clinical examination, which revealed a prominent mass over the lower anterolateral part of the knee joint. Early diagnosis and treatment are important to prevent chronic knee pain and instability. Furthermore, a structured post-reduction rehabilitation process helps to regain the knee functionality and should be considered for all patients.

Different techniques of close reduction with local, intravenous or general anesthesia are actually applied as the first option to reduce isolated PTFD. Open reduction and temporary joint fixation with one or more Kirschner wires, screws or absorbable pins are considered as the second step when close reduction fails^{1,3,6,15,16,22,23}. The close reduction techniques nearly in all methods, are based on ligamentotaxis and counteraction between muscles and ligaments. In our proposed technique the isokinetic movement, including active knee flexion by patient and the knee extension from the other part applying by surgeon, contribute to relax the fibular collateral ligament and allow the biceps tendon to snap the proximal end of the fibula back into the anatomical position. This technique propose a new, simple and safe technique of reduction for isolated dislocation of the proximal fibula that can be applied in all types of isolated PTFD as the primary technique or in case of failure of the traditional closed reduction in patients otherwise subjects of surgical treatment. We believe that larger number of cases are needed to demonstrate the efficacy of this new technique, however due to a few number of isolated PTFD the later seems to be difficult to be achieved. This simplicity of this technique may provide safe reduction maneuver, particularly for young and less skilled surgeons when they encounter such a cases in the emergency department.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

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