

ISOLATED TRAUMATIC PROXIMAL TIBIOFIBULAR JOINT DISLOCATION: CLINICAL-RADIOLOGICAL CORRELATION AND LITERATURE REVIEW

Izolirana traumatska dislokacija proksimalnog tibiofibularnog zgloba: kliničko-radiološka korelacija i pregled literature

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Abstract

A disruption of the proximal tibiofibular joint has been considered a rare and uncommon condition with only few cases reported in literature. Four types of instability or disruption of the proximal tibiofibular joint are classified in literature as subluxation, anterolateral dislocation, posteromedial dislocation, and superior dislocation.

We report a case of a 26-year-old soccer player injured during a match. The diagnosis of the anterolateral proximal tibiofibular joint dislocation was established after clinical examination and was also confirmed radiologically.

The objective of this paper is to elaborate the mechanism of injury, nonoperative protocols, surgical techniques, rehabilitation schedules and sports guidelines after proximal tibiofibular joint dislocation.

Keywords

tibiofibular joint, proximal, dislocation, anterolateral

Sažetak

Disrupcija proksimalnog tibiofibularnog zgloba je rijetka i neuobičajena ozljeda uz do sada nekolicinu slučajeva opisanih u literaturi. Četiri tipa instabiliteta ili disrupcije proksimalnog tibiofibularnog zgloba klasificirana su u literaturi kao subluksacija, anterolateralna dislokacija, posteromedijalna dislokacija i proksimalna dislokacija.

Ovo je prikaz slučaja 26-godišnjeg nogometaša ozlijeđenog tijekom nogometne utakmice. Dijagnoza anterolateralne dislokacije proksimalnog tibiofibularnog zgloba postavljena je tijekom kliničkog pregleda i potvrđena radiološkom obradom.

Cilj ovoga rada je opisati mehanizam ozljede, konzervativno liječenje, kirurške tehnike, plan rehabilitacije i povratak sportu nakon dislokacije proksimalnog tibiofibularnog zgloba.

Ključne riječi

tibiofibularni zglob, proksimalni, dislokacija, anterolateralna

Introduction

Proximal tibiofibular joint (PTFJ) is a diarthrodial synovial joint of a planar type through which the medial fibular facet articulates with the posterolateral tibia [1–4]. It is an inherently stable joint due to its bony congruity, capsuloligamentous and muscular support, and protected position behind the tibia. Slight translations and rotations occur within the PTFJ during regular knee and ankle motions imparting some flexibility during ankle movements [2, 5–7]. This synovial articulation between the proximal tibia and fibula may communicate with the knee joint in 10% of adults [2, 3, 8].

First described by Lyle in 1925, the disruption of the PTFJ has been considered a rare and uncommon condition [9, 10]. In literature four types of instability or disruption of the PTFJ are classified as subluxation, anterolateral dislocation, posteromedial dislocation, and superior dislocation [11].

The etiology of subluxation or dislocation of the PTFJ may be traumatic or pathological. Usually it is an isolated injury. However, certain underlying pathological conditions may predispose the proximal end of the fibula to dislocation in a small number of patients such as rheumatoid arthritis, septic arthritis, osteomyelitis, a below-the-knee amputation, an osteochondroma, ligamentous hyperlaxity and muscular dystrophy [2, 11, 12–16]. Differential diagnosis of nontraumatic cases includes iliotibial band syndrome, lateral meniscal pathologic conditions (instability and cysts), tibiofemoral joint osteoarthritis, popliteus tendinopathy patellofemoral pain syndrome, snapping biceps femoris or popliteus tendons, and peroneal nerve compression syndrome or neuritis. All

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of these cause lateral knee pain, and in trauma cases lateral meniscal tear [17, 18].

Traumatic PTFJ dislocation is often unrecognized or misdiagnosed during the initial diagnosis although it is commonly present in athletic injuries, parachute landings and wide variety of sport activities such as football, soccer, rugby, wrestling, gymnastics, judo, board-jumping, water skiing and skiing [2, 19–24].

The traumatic conditions simultaneously present may include twisting injuries, injuries that tear the capsule and surrounding ligaments (posteromedial dislocation), injuries caused by direct blow or adduction of the lower leg with knee flexion (anterolateral dislocation), a slipping injury in which the knee is flexed under the body and the ankle inverted, multiple trauma of the ankle or tibial plateaus (superior dislocation). This type of injury is easily missed on plain radiography. Radiography of the normal PTFJ outlines a consistent relationship between the proximal portions of the tibia and fibula (Figure 1a, 1b). The disruption of this normal relationship is indicative of anterolateral or posteromedial subluxation or dislocation (Figure 2a, 2b). If there is a clinical suspicion and plain radiograms show no abnormality, computed tomography is the diagnostic method utilized [25]. Careful evaluation of the distal syndesmotic ligaments and the interosseous membrane is important because the mechanism of trauma can also cause a disruption of the distal tibiofibular syndesmosis [24]. Controversy exists whether early mobilisation or casting is the most appropriate course of action [26].

Case report

We report a case of a 26-year-old soccer player injured during a match. The patient was complaining of pain in the area of the fibular head and newly emerged paresthesias along the distribution of the superficial peroneal nerve. Clinical examination showed fibular head luxation and no pathologic findings of the knee and ankle joint, circulatory status likewise. Anteroposterior and laterolateral radiograms confirmed the diagnosis of anterolateral dislocation of the fibular head in the proximal tibiofibular joint (Figure 2a, 2b). Closed manual reduction was implemented in the short term by intravenous sedation. Control radiograms in two projections show normal position of the articular surfaces of the right PTFJ (Figure 1a, 1b). The patient was further advised to take painkillers if needed, to walk on crutches with no load on the right leg, mostly on bed rest with leg elevated. On early follow up, two days after, the patient informed about slight soreness in the area of the fibular head present during internal rotation of the knee. External rotation was painless. Ultrasound examination of the right knee showed barely discernible edema of the soft tissues surrounding PTFJ. Immobilization was removed and the patient was advised to wear an elastic bandage,

while there was edema of the soft tissues, and to use crutches if necessary along with strengthening exercises starting in seven days. Physical activity was restricted for the following three weeks.

Discussion

Anterolateral dislocation of the PTFJ is the most frequent among all traumatic PTFJ disruptions [2, 12, 27, 28]. Most of these isolated dislocations occurred during athletic activity (violent, twisting motion) while some are associated with another complex skeletal injury [12, 29, 30].

Usual mechanism of anterolateral dislocation is a combination of flexion of the knee and concomitant twisting of the tibia while the foot is fixed in inversion which pushes the proximal end of the fibula out laterally, when the violently contracting muscles pull the fibula forward [12]. The patient with this type of injury usually complains of severe pain and tenderness over the proximal part of the fibula. Some patients emphasize the pain in lateral popliteal fossa along the area of the stretched biceps tendon which can be accentuated by dorsiflexing and everting the foot [16, 27]. On physical examination there is a bony prominence laterally of the presumed fibular head position. Surrounding soft tissue shows little swelling or ecchymosis and there are no significant effusions or internal knee instability. There may be transient paresthesias along the distribution of the peroneal nerve [31–34].

Comparison of radiographic views is often necessary to confirm the diagnosis. In anterolateral dislocation on the anteroposterior view, the fibular head is displaced laterally and the proximal interosseous space is widened, the fibular head may no longer overlap the lateral margin of the lateral tibial condyl. The lateral view shows that the fibular head is displaced forward, while the majority of the fibular head is located anterior to the posterior margin of the tibia.

Acute anterolateral dislocation can usually be treated successfully by closed reduction under adequate muscle relaxation. In literature variations of manipulation have been described. The most satisfactory method appears to be eversion and dorsiflexion of the foot and flexion of the knee to at least 70 degrees. Direct pressure is then applied to the fibular head to move it to the apex of the lateral tibial ridge at which point it usually snaps back into place [11, 12]. Treatment after closed reduction consists of a short-term plaster cast followed by an elastic bandage while most of the authors allow the patients to mobilize with a support of a bandage for six weeks and sporting activities restriction for the following six weeks [16, 19, 27, 35]. If stable reduction and normal pain-free knee and ankle movements are present, immobilization is unnecessary [16].

Figure 1a. Control radiographs (through immobilization material) show normal position of articulation surfaces of tibia and fibula in the proximal tibiofibular joint where PTFJ is located inferior and slightly medial to the lateral aspect of the lateral tibial condyle

On an anteroposterior radiograph the medial aspect of the fibular head, the articulating surface, crosses the lateral border of the tibia.



If no improvement is noted, surgical intervention can be considered after six months of conservative treatment [35]. Open reduction and stabilization of the joint with repair of the injured capsule and ligaments is recommended using either the tendon of the biceps femoris muscle (Weinert and Giachino's technique) or a portion of the iliotibial tract [21], or temporary (three to six months) fixation using a screw together with release of the peroneal nerve [16, 17, 20, 21, 36–42]. As an alternative, if the closed reduction is not stable, a temporary Kirschner wire may be used [17, 19, 22, 43]. Two emerging methods for patients with recurrent post-traumatic instability of the PTFJ are repairs using gracilis autograft [44, 45] or autogenous semitendinosus tendon [46]. Fibular head resection or PTFJ arthrodesis is indicated in cases with chronic pain and instability [11, 27, 28]. In patients who have undergone arthrodesis of the PTFJ resection of the fibular head or resection of a segment of the proximal fibula below the arthrodesis can restore some rotatory function of PTFJ and avoid

ankle pain [12, 28]. The TightRope technique for fixation of PTFJ injuries also proved to be an effective percutaneous fixation technique [39, 47, 48].

Due to this case report as the treatment of acute anterolateral dislocation of PTFJ, we have chosen closed reduction with short term immobilisation with an elastic bandage while the local swelling was present and the patient was experiencing pain. He was restricted from all sports activities for two to three weeks after the injury.

We can conclude that this type of injury is easily missed on plain radiography. If there is a clinical suspicion and plain radiograms show no abnormality, computed tomography is the diagnostic method of choice [25]. When diagnosed, the injury should be promptly reduced in the emergency department. Missed injuries or late presentations are a potential source of chronic morbidity.

Figure 1b. Control radiographs (through immobilization material) show normal position of articulation surfaces of tibia and fibula in the proximal tibiofibular joint where PTFJ is located inferior and slightly medial to the lateral aspect of the lateral tibial condyle

On the lateral radiograph the fibular head overlies the posterior border of the tibia. Its proper position in this projection can be confirmed by identifying its relation to the lateral tibial condyle.



Figure 2a. Radiographic confirmation od PTFJ anterolateral dislocation.

On the anteroposterior radiograph fibular head is displaced laterally and no longer overlaps.



Figure 2b. Radiographic confirmation od PTFJ anterolateral dislocation.

On the lateral radiograph the majority of the fibular head is located anterior to the posterior margin of the tibia.



Conflict of interest: none

The patient gave the informed consent to the publication of the case study.

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