Proximal tibiofibular instability is a symptomatic hypermobility of this joint possibly associated with subluxation. It is a rare condition both in clinical practice and in literature. The treatment of choice for proximal tibiofibular instability remains conservative, using a brace 1 cm underneath the head of the fibula. If no improvement is noted after six months of conservative treatment, surgical intervention can be considered: there are several options, such as resection of the head of the fibula, permanent arthrodesis of the proximal tibiofibular joint, reconstruction using either the tendon of the biceps femoris or a portion of the iliotibial tract, or temporary (three to six months) fixation using a screw together with release of the peroneal nerve.

INTRODUCTION

The term proximal tibiofibular instability indicates symptomatic hypermobility of this joint, associated with subluxation and sometimes even dislocation. It is a rare condition both in clinical practice and in the literature. Some authors suggest that this condition is more prevalent than previously thought but that it is often missed (9, 14).

The diagnosis of instability of the proximal tibiofibular joint is usually based on the history and confirmed during physical examination: hypermobility can be reproduced with manual pressure. Radiology can help in establishing the diagnosis.

Anatomy, clinical presentation, physical examination and direction of instability or luxation have been dealt with extensively and will not be discussed here (9, 10, 13). The main purpose of this article is to describe a simple surgical technique, which offers satisfactory results.

TREATMENT OF INSTABILITY OF THE PROXIMAL TIBIOFIBULAR JOINT

The treatment of choice remains non-surgical. A supportive strap placed 1 cm below the fibular head can offer relief in many cases. Care should be taken not to apply the strap too tightly or for too long, as this could precipitate a peroneal nerve palsy. The strap should be worn during activities that cause the symptoms (14, 16, 17).

The strap can be combined with strengthening exercises.
1. Strengthening of lateral and rotational stability and coordination on a balancing disc or a trampoline.
2. Stretching exercises for m. biceps femoris, m. soleus and m. gastrocnemius.
3. Strengthening exercises of the peroneal muscles with a dynaband. The affected foot is moved in eversion against the resistance of the band.

It is important to avoid activities involving hyperflexion of the knee (6, 14).

If six months of non-surgical treatment do not result in improvement, then a surgical treatment can be considered. The different possibilities are: resection of the fibular head, arthrodesis of the proximal tibiofibular joint, reconstruction of the proximal tibiofibular joint and temporary fixation of the head of the fibula.

**Resection of the fibular head**

Resection of the head and neck of the fibula was the operative treatment of choice in Ogden’s studies. The fibular styloid and the lateral collateral ligament should be preserved (10, 17). Injury to the peroneal nerve has been described with this procedure (2, 4, 7). If scar tissue is seen around the peroneal nerve, neurolysis should be performed (10). Resection of the fibular head may cause lateral and posterolateral instability of the knee and is therefore not selected in athletes (5, 9, 11, 13). There is also a risk of developing ankle pain (3, 6). The procedure should not be used in children or adolescents because of the associated risk of damage to the growth plate (5). It is probably best indicated in the presence of chronic fibular nerve irritation due to the fibular head dislocation (13).

**Arthrodesis of the proximal tibiofibular joint**

An arthrodesis can be performed with or without osteotomy of the fibula. After dissection and protection of the peroneal nerve, the articular cartilage is removed to bleeding subchondral bone. The joint is then fixed in the reduced position with screws. This procedure requires immobilisation of the leg and delayed weight bearing (16). Arthrodesis of the proximal tibiofibular joint causes increased rotational forces in the ankle and often leads to pain and instability of the ankle joint (9, 11, 18). For this reason the operation is contraindicated in children and in athletes (13). The lag screws may break or become loose (16). Some authors recommend a simultaneous osteotomy at the junction of the proximal and the middle third of the fibula shaft and a 1.5-cm resection to prevent overloading the fibula and the arthrodesed joint (11).

**Reconstruction of the proximal tibiofibular joint**

Techniques using a portion of the biceps femoris tendon or iliotibial band have been described (1, 4, 19).

The biceps femoris tendon is divided and a strip of its posterior half is used, leaving the attachment on the head of the fibula intact (5) (fig 2). A strip of fascia from the anterolateral compartment of the leg can be used additionally for augmentation (13). Giachimo drills a hole in the tibia from posterior to
anterior and the tendinous and ligamentous strips are wrapped around the head of the fibula while the joint is held in a reduced position. The ligaments are then passed through the tibial hole from posterior to anterior and secured to the anterior fascia or the graft is fixed in the tibial tunnel with an interference screw. The knee has to be immobilised for six weeks and progressive weight bearing is then encouraged. Miettinen et al (8) drill a transverse hole in the proximal tibia from lateral to medial, starting at the anterior border of the fibular head. The graft is pulled through and fixed in the tibial tunnel with an interference screw.

Shapiro et al described a technique to stabilise the joint using a 20 x 2 cm strip of the iliotibial band (15). The distal attachment to Gerdy’s tubercle is preserved and the band is passed through a tibial tunnel from anterior to posterior and then passed through the posterior capsule and arcuate complex, and finally through a tunnel in the fibula head from posterior to anterior. It is then routed deep to the lateral collateral ligament in a posterior direction, tightened and sutured to itself and the posterior capsule, with the joint in a reduced position (fig 3).

**Temporary fixation of the head of the fibula**

Parkes et al (12) believe that when open reduction and stabilisation should be necessary, temporary stabilisation of the joint with two unthreaded Kirschner wires should be carried out, as well as repair of the torn joint capsule and ligaments. The wires are removed under local anaesthesia after six weeks. The smooth wires are simpler to remove then threaded ones and will not migrate if removed before weight bearing is allowed. If degenerative changes have occurred in the joint, resection of the fibular head would seem preferable to arthrodesis since it is easier technically and less likely to adversely affect the knee or ankle.

Post-operatively a short leg cast with the ankle in neutral position should be applied for six weeks to minimise motion at the superior joint. The cast and wires can both be removed at the same time.
In our centre we use a technique of temporary fixation of the fibula head combined with release of the common peroneal nerve.

A slightly curved incision from the posterior border of the iliotibial band proximally to the head of the fibula is made. The common peroneal nerve is identified and released and gently retracted proximally underneath the muscle to protect it from injury. The head of the fibula is approached ventrally and the capsule is loosened subperiosteally both ventrally and dorsally taking care to avoid the common peroneal nerve. The ankle is then dorsiflexed and the head of the fibula slightly externally rotated and reduced into the most stable position. Entering the posterior aspect of the fibula head, an anteromedially directed hole is drilled into the tibia. A non-tapped cortical screw is used to fix the fibula head in this stable reduced position (fig 4a, b). The capsule and skin are closed in layers and a pressure bandage is applied. We prefer not to immobilise the knee after the procedure.

The patients are allowed to bear weight immediately after the operation although the knee may not be flexed more than 90° for the first two weeks to allow good healing. Postoperative radiographs are obtained, but we do not use fluoroscopic guidance during the operation. The screw is removed after three to six months.

RESULTS

We have treated 8 patients using this technique. The operation resulted in alleviation of pain in seven of the eight patients. In the eighth patient a resection osteotomy of the fibula at the junction of the proximal and middle third was performed, which gave relief of the symptoms.

Complications

Until now there have been no injuries to the common peroneal nerve in our centre but this remains a possible risk of this procedure. The screw has broken before its planned removal in two patients. One of these patients was the patient who underwent the osteotomy due to lack of improvement of the symptoms. The other patient had relief of his symptoms despite the broken screw. In one case the scar was very broad and was surgically corrected by a plastic surgeon at the request of the patient.

CONCLUSION

Instability of the proximal tibiofibular joint is an uncommon cause of lateral knee pain. Some authors suggest that it is often missed due to lack of awareness about this condition. It can be identified with a good history and physical examination. Non-surgical therapy with modification of activity, supportive straps and a knee strengthening program usually alleviates symptoms. If non-surgical therapy is unsuccessful, surgery can be considered. Resection of the fibula head or arthrodesis is not recommended in athletes or adolescents because of the risk of developing ankle pain or knee instability. Techniques for reconstruction have been described using the biceps femoris tendon or the iliotibial band. These techniques seem to offer good results although the operations require fairly large incisions and extensive soft tissue dissection. They also require at least six weeks of postoperative immobilisation.

In our centre, we prefer to use a temporary fixation technique using one cancellous screw which is removed between three and six months after the
operation. We do not denude the joint surfaces and
the technique does not require immobilisation. This
procedure has resulted in alleviation of symptoms
in seven of eight patients, although the screw broke
in two cases.

Although the numbers are small and follow-up is
fairly short, this technique seems to offer good
results and warrants further assessment.

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