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CASE REPORT

Dislocation of the proximal tibiofibular joint A new method of fixation

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Case report

A 25-year-old female presented to our institution complaining of right knee pain of 6 months duration associated with a popping sensation laterally. She gave no history of trauma. Climbing stairs and deep knee bending aggravated symptoms.

On examination she was 155 cm tall and of normal body habitus. She had a normal gait. Examination of her right knee revealed tenderness over the fibular head. No meniscal or ligamental pathology was identified. With the knee flexed to 90° translation of the fibular head in an antero-posterior direction reproduces the symptoms with significant apprehension. Radulescu sign was positive.

With the patient standing a deep knee bend, i.e. a squat the symptoms with an audible pop. The fibular head lay dislocated anteriorly and reduced spontaneously in full extension. Examination of the hips and ankle were normal.

Plain radiographs of the right knee showed a horizontal variant of the proximal tibiofibular joint (PTFJ) with early degenerative changes (Fig. 1). CT scanning revealed good congruity of the joint (Fig. 2).

A trial of conservative management with supportive strapping and lower extremity hamstring and gastocnemius muscle strengthening was of no benefit.

The patient underwent elective stabilisation of the proximal tibiofibular joint using the TightRope™ Syndesmosis Device. She was immobilised in a Don-Joy™ Knee Brace in extension for 6 weeks. A 12-month follow she is entirely asymptomatic and has had no episodes of recurrent dislocation.

Technical note

The TightRope™ Syndesmosis Device is designed as two differentially sized metal buttons, both titanium and FibreWire™ suture. The buttons are pre-threaded with FibreWire suture, looped twice through the buttonholes. A long straight needle with pull-through FibreWire suture is also looped through the leading button. As the joint is reduced in the extension, the extremity was painted and dapped in this position. Image intensifier guidance was utilised. As is the case with a syndesmosis screw distally all four cortices were drilled using a 4.0 mm drill bit at the level of the centre of the fibular head through a percutaneous stab incision. The pull-through suture was advanced through the lateral drill hole and out the medial intact skin. The TightRope Device was pulled through and engaged on the medial and lateral cortices and secured tightly in

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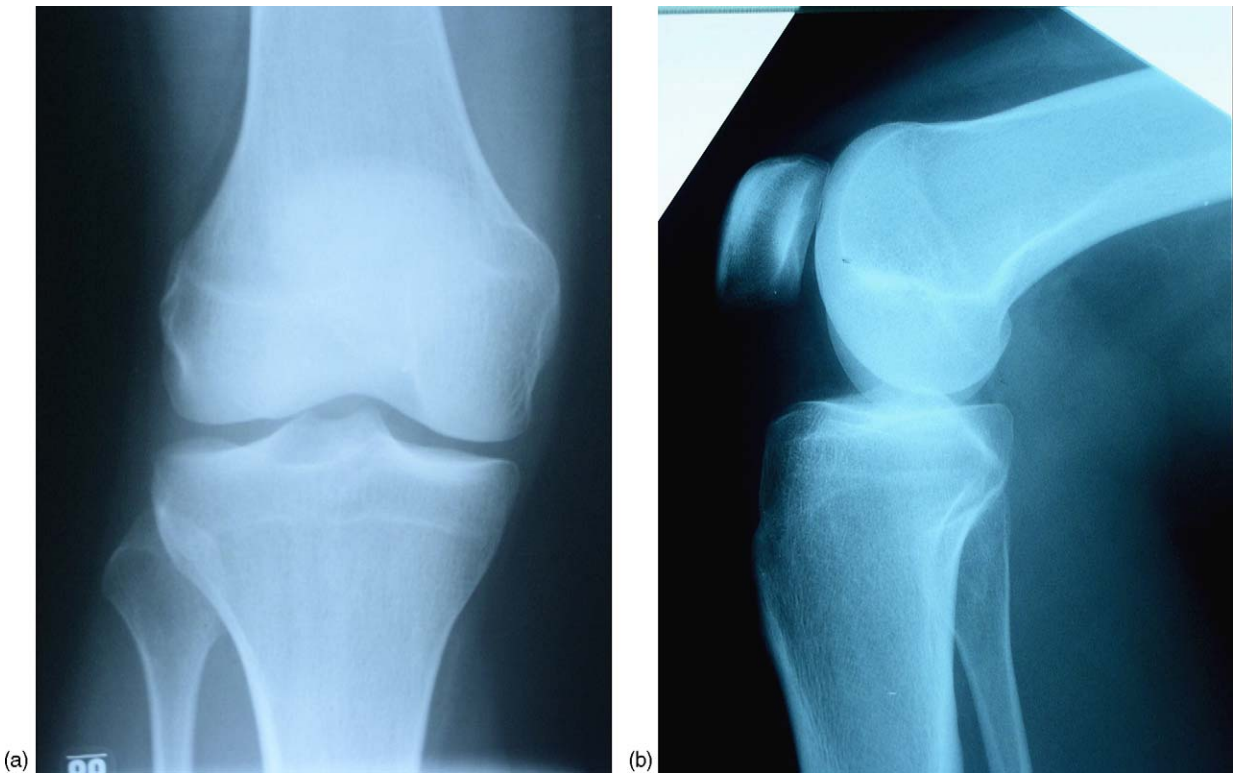

Figure 1

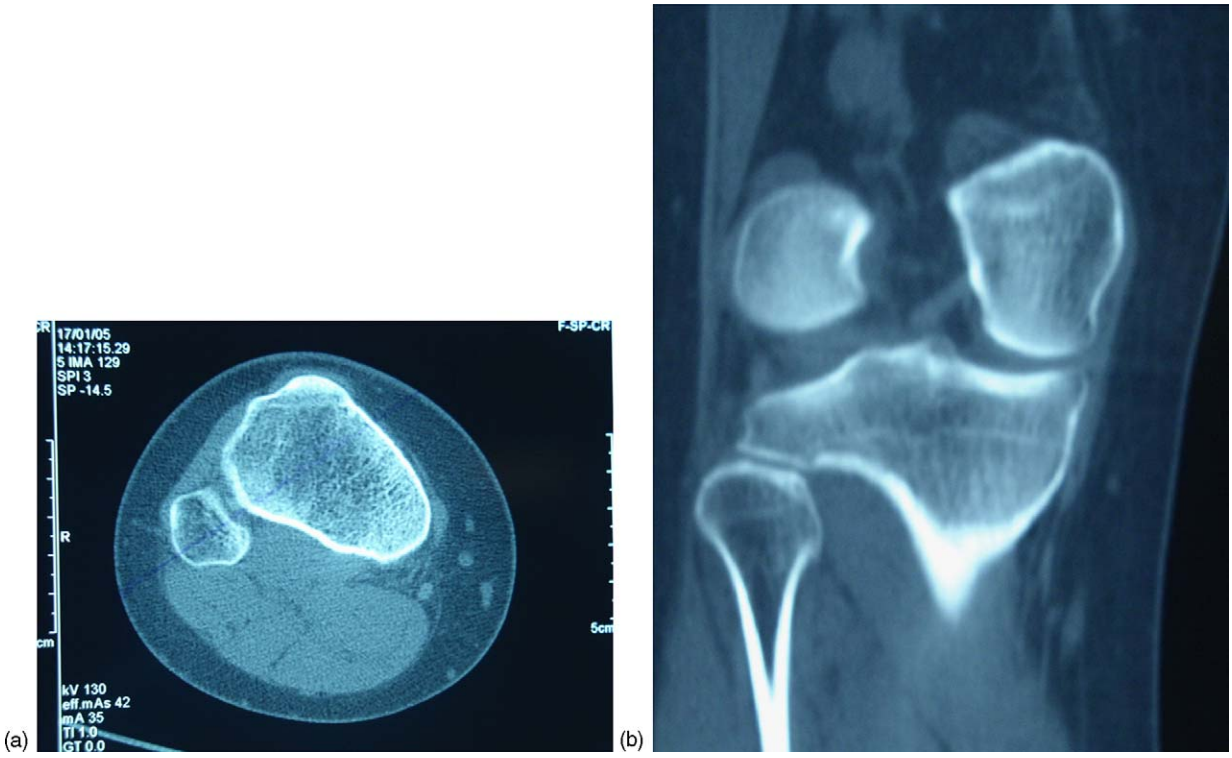

Figure 2

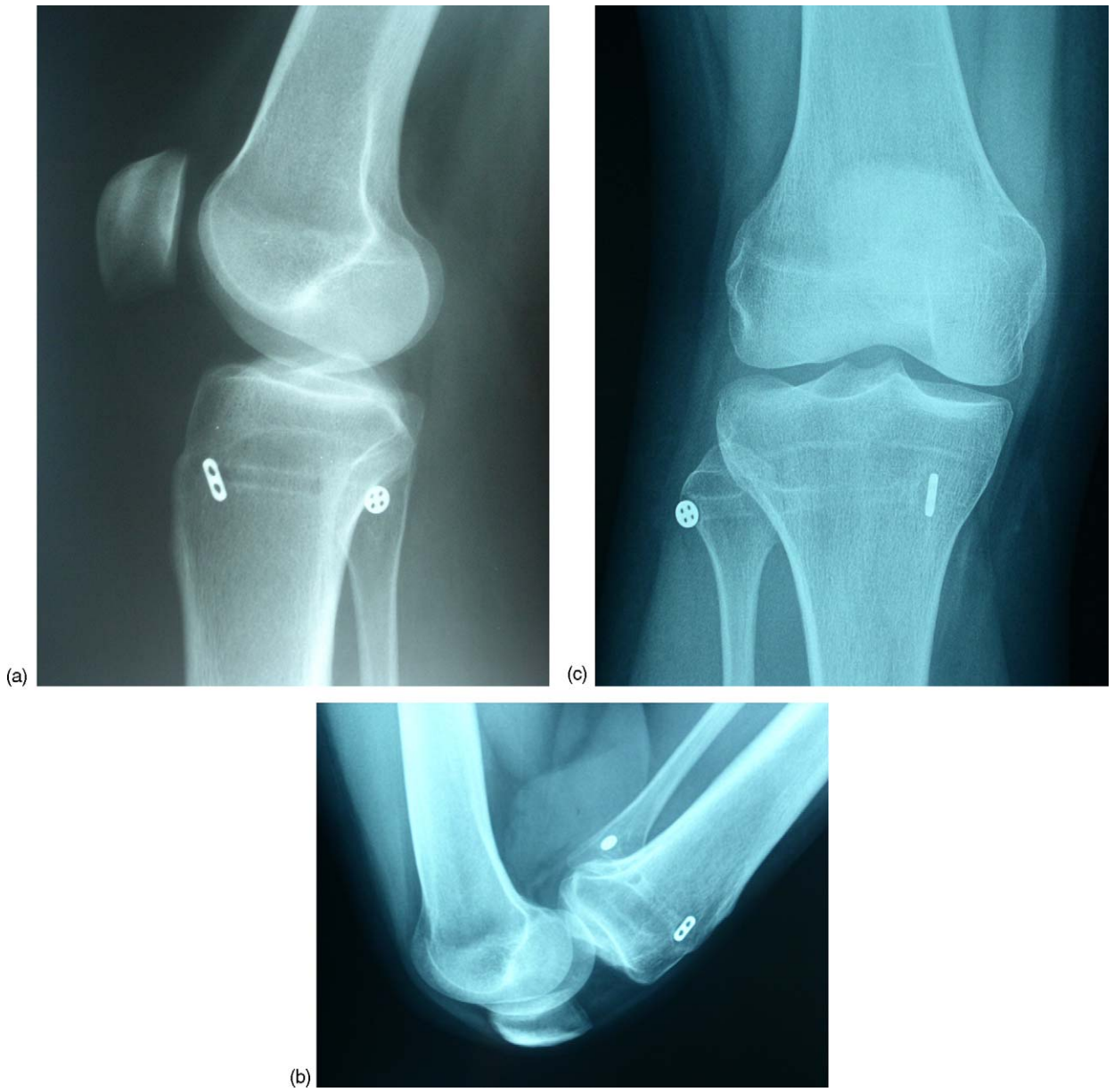

Figure 3

situ (Fig. 3). The duration of the procedure was 10 min.

Discussion

First described in 1925 by Lyle, recurrent dislocation of the proximal tibiofibular joint is rare.[4] It is most commonly reported in athletes whose sports result in severe sudden twisting motions of the flexed knee.[9,14]

The PTFJ joint is a complex joint. It is synovial lined joint, with a thick anterior and posterior capsule reinforced with the anterior and posterior tibiofibular ligaments. The fibular head is further stabilised anteriorly by biceps femoris tendon and posteriorly by the popliteus tendon. The lateral collateral ligament also acts as a fibular head stabiliser. Ten percent of PTFJs communicate with the knee joint.[8,12]

Two anatomical variants of PTFJs have been described.[8] A horizontal variant with a joint inclination of $<20^{\circ}$ and an oblique variant with an angle of inclination of $>20^{\circ}$ relative to the horizontal plane.

Four instability patterns exist as described by Ogden.[9]

1. Atraumatic subluxation.
2. Anterolateral dislocations.
3. Posteromedial dislocations.
4. Superior dislocations.

Clinical presentations vary with each instability pattern.

Patients presenting with atraumatic subluxations often complain of non-specific lateral knee pain, tenderness over the fibular head, and may have associated generalised ligamentous laxity. Anterolateral and posteromedial dislocations may be acute or chronic. Acute dislocations usually involve a violent twisting injury. Patients complain of pain and a prominent hard lump on the lateral aspect of the knee. Weight bearing is usually possible though partial. Range of motion exacerbates the pain. Posteromedial dislocations may be complicated by peroneal nerve symptoms.

Recurrent dislocations have a less dramatic presentation. As with this case most complain of lateral knee pain associated with a sensation of clicking or popping. Climbing stairs or squatting may aggravate symptoms.

Superior dislocations of the PTFJ are usually not isolated injuries being associated with a fracture of the tibia or ankle. These require surgical intervention.

Differential diagnoses include, meniscal pathology, lateral collateral ligament injury, iliotibial band syndrome, biceps femoris tendonitis, extoses.

Treatment varies depending on the pattern of instability.

Patients presenting with atraumatic subluxation can for the most part be managed non-surgically with supportive strapping and lower extremity hamstring and gastrocnemius muscle strengthening.[3,6] Temporary bracing is indicated for those with substantial pain.[13]

Acute dislocations should be managed as their name suggests. A closed reduction should be attempted with the knee flexed to approximately 90°.[6] Following successful reduction stability should be assessed including the lateral collateral ligament.[9,11]

Open reduction is reserved for failed closed reductions and stabilisation can be achieved using syndesmosis type screw or Kirschner wires combined with capsuloligamentous repair.[13,14] A significant percentage of successful closed reductions require surgical intervention for ongoing symptoms.[9]

There are several treatment options available for the treatment of recurrent dislocations of the PTFJ. These include:

- Arthrodesis[9,10]
- Fibular head resection[5]
- Weinert and Giachino reconstruction.[1,2,7]

Despite definitively addressing the instability pattern both arthrodesis and fibular head resection can cause significant long term morbidity.[9,10] Arthrodesis transfers the rotational stresses distally frequently culminating in pain and instability in the ankle joint. Fibular head resection may result in knee instability and chronic ankle pain.

Weinert and Giachino's technique for stabilisation of the PTFJ involves harvesting one half of a posterior strip of biceps femoris tendon attached to the fibular head. The free end is passed posterior to anterior through a tibial tunnel and sutured to the anterior tibial periosteum under tension with the fibular head reduced.

The TightRope technique described by Thornes et al.[15,16] for fixation of syndesmosis injuries has the advantage in the situation of PTFJ instability of offering a percutaneous, safe, strong and reproducible fixation technique. Stability is achieved and normal anatomical relations retained.

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