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Recurrent subluxation of the peroneus longus tendon in a young adult: A case report and review of literature

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Abstract

Recurrent peroneal tendon subluxation is a relatively uncommon sports injury often seen in young adults and associated with skiing, ice-skating and soccer. Acute subluxations are often missed and leads to chronic recurrent subluxations. Pre-disposing anomalies include peroneus brevis defects, convex retro-fibular groove, weak superficial peroneal retinaculum and pre-existing tendinopathy. Chronic subluxations require operative management which includes groove deepening procedures, soft tissue repairs or bone block procedure. We report a young adult presenting with recurrent peroneal tendon subluxation with pre-existing anomalies. A combined surgical technique was used and results followed up at 2, 6 and 12 months. We also review previous literature of similar procedures to compare outcomes.

Keywords: Peroneal tendon, subluxation, recurrent, superficial peroneal retinaculum, retro-fibular groove

Introduction

Subluxation of the peroneal tendons is an uncommon sports injury. It is often seen in young adults associated with skiing, ice skating, soccer, basketball, rugby, and gymnastics. Trauma, preexisting tendinopathy, and repetitive micro-trauma predispose to this condition. It is usually associated with longitudinal splits in peroneus brevis, convex shape of retro-fibular groove, accessory peroneus quadratus muscle or low-lying peroneus brevis muscle belly [1]. Peroneal tendon instability symptoms are non-specific untreated acute peroneal tendon subluxations lead to chronic recurrent peroneal dislocation [2]. High-resolution point-of-care dynamic ultrasound and high-resolution magnetic resonance imaging are the preferred modalities of investigation instabilities [3]. Acute peroneal tendon instabilities can be treated by non-operative treatment in low demand patients but has high rate of recurrence. Recurrent dislocations and in patients with high demand, as athletes, it should be managed surgically. We present a young adult with a recurrent peroneal tendon subluxation following trauma and discuss the review of literature.

Materials and Methods

A 24-year-old male presented to us with a history of twisting injury to the right ankle 3 years ago. The pain and swelling following this resolved after 2 weeks. Two months following the incident, the patient started experiencing sudden popping/snapping sensation posterior to the lateral malleolus on cross-legged sitting and jumping associated with dull aching pain. On examination, tenderness was noted over the posterior aspect of the lateral malleolus. The peroneus longus tendon could be manually subluxated anteriorly. Positioning the patient prone with the knees at 90° flexion, with active dorsiflexion and/or plantar flexion with eversion against resistance, demonstrated the dynamic instability of the tendons. There was no clinical evidence of any bony injury. There were no features of generalized ligamentous laxity. Dynamic ultrasound showed thickening of the peroneus brevis and longus tendons with tendinitis and anterior subluxation of peroneus longus tendon during dorsiflexion and eversion.

Surgical Technique

Under spinal anesthesia, the patient was placed supine on the operating table with a sandbag under the buttock of the operating side. The procedure was performed under a tourniquet.

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A 5cm curvilinear incision was made along the course of the peroneal tendons. The incision started posterior to the tip of the lateral malleolus extended proximally, thus protecting the sural nerve. The incision was deepened to expose the peroneal tendon sheath, and it was incised along its length 2 mm posterior to the posterior border of the fibula.

1. The superficial peroneal retinaculum was found to be weak and deficient along the lateral malleolus.
2. Interstitial tear of the peroneus brevis tendon coursing along the lateral malleolus was noted.
3. The retro-malleolar canal was found to be flattened and narrow.

The peroneus brevis tendon was repaired by placing 4 sutures using 2,0vicryl, to avoid further subluxation the longus tendon through the defect. (Fig 1)

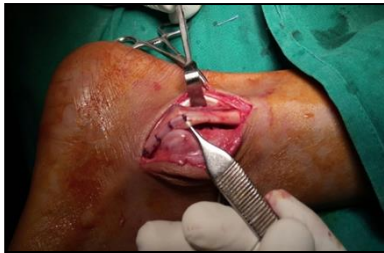


Fig 1: Peroneus brevis tendon defect repaired with absorbable sutures

The retro-malleolar canal was deepened using a burring technique through the fibro-cartilage gliding surface into the subchondral bone at the tip of the fibula, deep enough to contain the tendons within the canal. (Fig 2)



Fig 2: Retro-fibular groove post-deepening with burr

The superficial peroneal retinaculum along with the peroneal sheath was repaired using ethibond sutures (2,0) and passing them through drill holes passed along the cortices of the fibula, to re-inforce the retinaculum. (Fig 3)



Fig 3: Superficial peroneal retinaculum re-inforced by passing sutures through fibular drill holes

Dynamic stability of the tendons was confirmed post-operatively. The surgical wound was closed in layers using 2,0vicryl and 2.0 ethilon. Sterile dressing was done.

Post-operatively patient was given posterior splinting in the form of below knee plaster of paris slabs. The patient was discharged on post-op day 3, after wound inspection and after having been taught to use axillary crutches by an orthopedic physical therapist. No thrombo-prophylaxis was used. The patient was advised strict non weight bearing mobilization with axillary crutches and were instructed to keep the limb elevated as much as possible for the first 4 post-operative weeks. Patients were reviewed at the 10th postoperative day, and the sutures were removed. (Fig 4)



Fig 4: Wound healed at 10th day post-op

Follow-Up

At 10th day post-op, dynamic stability of peroneus longus tendon was tested and was found to be satisfactory. Splint was re-applied post suture removal. Immediately after removal of the slab, patient was allowed to only partially weight bear and commenced on gradual stretching and strengthening exercises by 8th to 10th week after surgery. This was to permit retinacular and bony healing, as well as for early mobilizations of tendons to prevent formation of adhesions. 2 weeks post slab removal, the patient was started on full weight bearing mobilization. The patient was allowed to return to his sport activities at 6 months post-operatively.

At 1 year follow up, patient did not show any signs of recurrence and did not have any operative site pain, limitation of movements or disability. Patient was able to carry out all day-to-day and sports activities without any difficulty.

Discussion

The peroneal tendons (longus and brevis) pass through the retro-fibular groove which is composed of the concavity of distal fibula combined with a thickened periosteal fibro cartilaginous ridge.⁴ The primary restraint to these tendons is the superficial peroneal retinaculum which formed by the deep fascia overlying the lateral malleolus.⁵

Recurrent peroneal tendon subluxation is a relatively uncommon sports injury. Acute dislocations tend to occur, following a traumatic episode, more commonly during sports activities leading to dorsiflexion along with a strong peroneal muscle contraction.⁶ Previous studies have shown a 50% cure rate with a line of conservative management with cast immobilization for acute injuries.⁷ Surgical management of acute peroneal tendon subluxation includes repair of the superficial peroneal retinaculum, and has shown superior results over cast immobilization.⁸

Recurrent subluxations are usually associated with one or several structural anomalies around the peroneal tunnel. These include a weak or thinned out superficial peroneal retinaculum, intra-substance tear of the peroneus brevis tendon, changes in shape and fibro cartilaginous surface of the retro fibular canal

being a few important ones. A misdiagnosed or poorly managed acute tendon subluxation can also cause recurrent subluxations. Eckert and Davis⁸ had classified tears in the superficial peroneal retinaculum, which was later modified by Oden⁹. In grade 1, there is a separation of retinaculum from its attachment to the lateral malleolus. In grade 2, the collagenous lip of the fibula is elevated in relation to the retinaculum. In grade 3, a thin piece of bone is avulsed with the retinaculum (only grade that can be identified radiologically). In grade 4, the retinaculum is torn away from its attachment on the calcaneum. The grade of injury cannot be differentiated clinically. In the case that we present, the superficial peroneal retinaculum was found to be inherently thinned out and deficient.

Several surgical techniques have been described in literature for recurrent peroneal tendon subluxations; the main categories being reinforcement of the superficial peroneal retinaculum, bone block procedures and groove deepening procedures. There is no clinical evidence to suggest superiority of one surgical technique over the other^[10].

Multiple authors have described a method of reinforcement of the retinaculum by passing drill holes through the distal fibula^[11, 12]. Karlsson *et al*^[13], used a similar method, but in conjunction with a groove deepening procedure which showed excellent results. Jones *et al*^[14], in a series of 15 patients with attenuated superficial peroneal retinaculum, first described a method of restraining the peroneal tendons with a strip of Achilles tendon anchored through a drill hole in the fibula, showing no recurrences in a long term follow up. Thomas *et al*^[15], used a similar method but equipped a thinner strip of Achilles tendon so as to reduce donor site complications.

The retro-fibular groove deepening procedures have been found to show increasing evidence of positive outcomes. In a study conducted by Clancy¹⁶ and associates, the technique employed included elevation of a posterior sub-periosteal flap and removal of cancellous bone, which showed excellent result with no recurrence. Hutchison *et al*^[17], used a similar technique combined with a retinacular repair, and found a recurrence rate of 3%. Mendicino¹⁸ described a method of groove deepening involving a combination of intramedullary drilling with cortical impaction with excellent results. DiGiovanni^[19] and colleagues recently described a newer technique for groove deepening which involves reaming of the distal fibular shaft through a guide wire followed by 1mm corticotomies in the sagittal plane and subsequent tamping which recesses the posterior fibular fibro cartilaginous flap. This study was significant in the fact that it preserves with fibro cartilaginous gliding surface of the retro-fibular groove and that there is minimal chance of iatrogenic damage. Results were excellent with no post-operative morbidity. Saragas *et al*^[20], in a study conducted on 23 patients, described another technique in which multiple drill holes were placed in distal fibula followed by periosteal flap elevation along with retinacular repair and peroneal tendon repair in selected patients. Long term follow up showed no evidence of recurrence.

We describe a surgical technique which involves a combination of the above mentioned studies. Our patient was found to have a longitudinal defect in the peroneus brevis tendon, which was repaired. The retro-fibular canal was found to be flattened and a groove deepening procedure involving a burring technique along the fibro-cartilaginous gliding surface. Lastly the superficial peroneal retinaculum was found to be thinned out and was hence reinforced along with the peroneal tendon sheath, by passing cortical drill holes through the lateral malleolus and passing absorbable sutures through the same. Although there has been

debate over the violation of the natural fibro cartilaginous surface of the fibular groove, we did not observe any post-operative pain or any evidence of recurrence following the same. We observed that combined technique of restoring normal anatomy have good post-operative result and excellent long term prognosis.

Although several techniques have been described in the past for recurrent peroneal tendon subluxations, it is difficult to assess the superiority of any procedure as most studies are conducted on a small series of patients. The fact that the condition itself is a rare entity, makes it difficult to assess the efficacy of individual procedures for the same.

Conclusion

We conclude that the described method of retinaculum reinforcement following groove deepening procedure and relocation of peroneal tendons is an effective method for the management of recurrent subluxation of peroneal tendons. Determining the most effective technique from previous small case series and literature is not practically possible.

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