CHAPTER **46**

MANAGEMENT OF PATHOLOGY ASSOCIATED WITH THE PRESENCE OF AN OS PERONEUM

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INTRODUCTION

Plantar lateral foot pain is a common presenting symptom to the foot and ankle surgeon. While there are many causes of lateral foot pain, pathology related to the os peroneum are often overlooked. The os peroneum is a sesamoid found in the peroneus longus tendon, typically adjacent to the lateral or plantar aspect of the cuboid. Anatomic and radiographic studies have identified an os peroneum in 5% to 26% of the population (1). This accessory bone is often unilateral and radiographically has rounded edges in uninjured patients. The purpose of the os peroneum is to protect the tendon from injury and stress. In certain cases the sesamoid might actually be responsible for tendon damage and fatigue. In addition, the os peroneum can become the focal point of mechanical stresses leading to fracture.

CLINICAL PRESENTATION

Plantar lateral foot pain may be caused by various entities and painful os peroneum syndrome should be included in the differential diagnosis. Painful os peroneum syndrome results from a spectrum of conditions that includes one or more of the following: (1) an acute os peroneum fracture or a diastases of a multipartite os peroneum, either of which may result in a discontinuity of the peroneus longus tendon; (2) chronic (healing or healed) os peroneum fracture or diastasis of a multipartite os peroneum with callus formation, either of which results in a stenosing peroneus longus tenosynovitis; (3) attrition or partial rupture of the peroneus longus tendon, proximal or distal to the os peroneum; (4) frank rupture of the peroneus longus tendon with discontinuity proximal or distal to the os peroneum; and/or (5) the presence of a gigantic peroneal tubercle on the lateral aspect of the calcaneus, which entraps the peroneus longus tendon and/or the os peroneum during tendon excursion (2-5).

DIAGNOSIS

Familiarity with the various clinical and radiographic findings and the spectrum of conditions represented by the painful os peroneum syndrome can prevent prolonged undiagnosed plantar lateral foot pain. Clinical diagnosis of the painful os peroneum syndrome can be facilitated by the single stance heel rise and varus inversion stress test as well as by resisted plantarflexion of the first ray, which can localize tenderness along the distal course of the peroneus longus tendon at the cuboid tunnel (1).

Radiographic studies can be very helpful for initial evaluation. The presence of a fractured or a bipartite sesamoid can be identified on routine radiographs. In addition, the position and amount of separation of the fragments should be determined. Os peroneum fragment separation of 6 mm or more or displacement of the proximal fragment by 10 mm or more on a lateral radiograph or 20 mm or more on an oblique radiograph was associated with full-thickness peroneus longus tendon tear in seven of seven patients (100%) (6-8). Os peroneum fragment separation of 2 mm or less or proximal displacement of 8 mm or less was associated with normal tendons, partial-thickness tears, or tendinosis (7, 8). In the control subjects, os peroneum location ranged from 7 mm proximal to 8 mm distal to the calcaneocuboid joint on lateral radiographs and from 9 mm proximal to 8 mm distal to the joint on oblique radiographs. Bipartite os peroneum fragment separation was 2 mm or less (5, 8).

Ultrasound can be of great help in separating out specific etiologies for pain associated os peroneum pathology, as well as serving as a guide for targeted diagnostic and therapeutic injections. Ultrasound may result in higher detection rates than that of conventional radiographs because of its ability to detect structures with differing acoustic impedance properties. Ultrasound can follow a tendon's course in real time because it is cross-sectional. In combination with radiographs both soft tissue and osseous pathology can be defined (9).

Scintigraphy can be helpful in determining the presence of os peroneum syndrome. Increased up-take can be seen in instances where fracture and increased stress in the bone are present thus increasing the level of suspicion for pathology.

Magnetic resonance imaging (MRI) can be extremely helpful in determining the location of the os peroneum and its relationship to the peroneous longus tendon. Many times

it is difficult to determine if the sesamoid or its fragments lie within or above or under the tendon. This can be helpful when surgically removing the bone in sparing the tendons. Determining a presence of fracture versus a bipartite os peroneum is also possible when utilizing MRI

MRI specificity was reported by Steel and De Orio (12) to be 80% for the detection of peroneus brevis tears, 100% for the detection of peroneus longus (PL) tears, and 60% for the detection of both tendons (Figure 1). DiGiovanni et al (13) found the accuracy of MRI to be 80% (12 of 15) for diagnosing peroneus brevis tears, but there were 2 correct and 3 false-positive diagnoses of PL tears. The over- and under- estimation of peroneal tendon pathologic features on MRI, compared with the intraoperative findings, has been discussed by some investigators (12, 13). In both case studies, the MRI findings of complete PL tendon disruption were confirmed intraoperatively. Although MRI might be the standard method of peroneal tendon evaluation, the definitive diagnosis and treatment should be determined primarily from the history and physical examination finding.

Figure 1. MRI showing position of the os peroneum and inflamation of the peroneal tendons.

Figure 2B.

TREATMENT

Once the pathology has been clearly identified then a treatment plan can be established. Treatment plans will differ depending on the involvement of the peroneal longus tendon and the presence of a fracture of the os peroneum. In cases where the pathology is limited to an intact os peroneum, such as painful os peroneum syndrome with minimal tendon involvement simple excision can be performed (Figure 2). A small curvo-linear incision is placed over the lateral aspect of the cuboid (Figure 3). Once the peroneal tendons are identified they are released together and retracted down. The os peroneum can then be visualized either within the tendon dorsal or within the cuboid groove. Rarely is it necessary to sacrifice the tendon in order to retrieve the bone.

In situations where there is a minimally displaced os perineum fracture non-operative treatment is appropriate since operative repair can pose technical challenges. Obtaining adequate exposure can be problematic and may require an extensive plantar exposure, which can

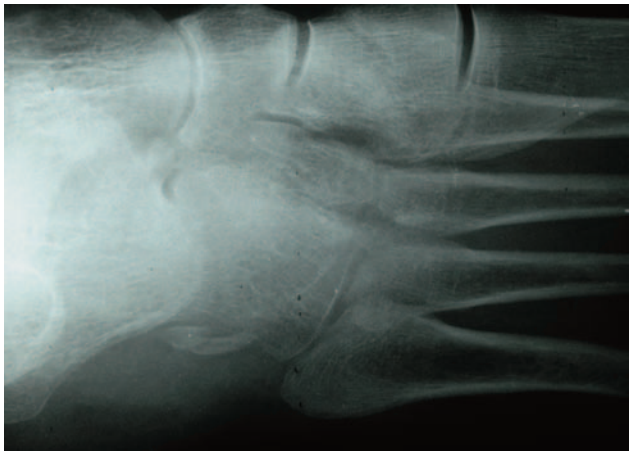

Figure 2A. Preoperative and postoperative radiographs of simple os peroneum excision.

Figure 3. Incision placement for simple excision of os peroneum.

compromise the ligaments providing structural stability to the plantar lateral midfoot and lead to lateral column instability (5). Additionally, the lateral plantar artery and nerve, as well as the lateral plantar cutaneous nerve, are in the surgical field and are at risk of injury (5).

Fracture with moderate separation will require surgical intervention to prevent possible tendon damage. Depending on the clinical situation, the surgeon may have to remove some or all of the fracture fragments. In rare instances the os peroneum can be repaired. Several techniques have been described in the literature.

The treatment options for peroneous longus tendon ruptures with or without os peroneum fracture include fixation of the fracture, excision of the bone with direct repair of the tendon, and tenodesis of the peroneous longus to the peroneus brevis tendon with anchoring of the proximal peroneous longus tendon segment to the cuboid or calcaneus (5, 12-15). Smith et al (5) were able to show long-term success with non-operative treatment of a minimally displaced (<2 mm) os peroneum fracture in a 41-year-old male professional tennis coach who was able to return to tennis 8 weeks after the injury.

Krause and Brodsky (14) classified peroneal tendon tears according to the percentage of viable tendon remaining after debridement, indicating that primary repair was preferred if at least 50% of the tendon remained after debridement, and tendon transfer if <50% of the tendon remained after debridement. Squires et al (15) recommended performing proximal tenodesis of the PL to brevis tendon at least 3 to 4 cm above the tip of the lateral malleolus and the distal tenodesis at least 5 to 6 cm below the tip of the lateral malleolus. Performing this repair near the fibular groove can result in stenosis or subluxation. In both cases, proximal tenodesis was performed using the Pulvertaft weave technique.

SUMMARY

In conclusion, pathology associated with the os peroneum can be quite debilitating. Determining the extent of the pathology associated with os peroneal syndrome can be difficult to distinguish from differential diagnoses, including lateral chronic tendinopathy or tenosynovitis, peroneal subluxation, calcaneal fracture involving the peroneal tubercle and painful or peroneus brevis tendon injuries. A thorough history and physical examination, along with plain film radiography, can provide much initial data. A cavovarus foot type and the presence of an os peroneum on the radiographs should alert the physician to the possibility of PL tendon pathologic features. A contralateral view of an unaffected foot can aid in distinguishing an abnormal position or partition. More in-depth studies may be required to determine the extent of the pathology. Once the amount of pathology is identified the clinician can initiate non-operative and surgical treatments depending on the repair required.

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