CHAPTER 26

PERONEAL TENDON ENDOSCOPY

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INTRODUCTION

Endoscopic procedures involving the hindfoot and ankle have increased in popularity over the past decade, although this technique is still not often performed in our profession. The technique represents a novel approach to peroneal tendon pathology and can be invaluable for certain patients. There is evidence that supports good patient satisfaction, while at the same time allowing for early weightbearing and mobilization in comparison to open surgical techniques. Only certain tendon pathology is amenable to endoscopic repair at this time, but the technique can also allow for diagnostic and adjunctive procedures, which are more beneficial than noninvasive imaging modalities.

Pathology of the peroneal tendons is common as both an isolated problem and in conjunction with other injuries. It includes complete or incomplete tendon rupture, tendon subluxation, painful os peroneum, hypertrophic peroneal tubercle (trochlea), tenosynovitis, painful low-lying muscle belly, and tendon retinacula damage. When this injury is isolated, it may present as a routine diagnosis for the podiatric surgeon; however, in conjunction with other injuries, this diagnosis is often overlooked. Failure to recognize this condition can lead to significant long-term disability, and leads to a higher potential for surgical intervention. As an example, severe ankle sprains represent a common cause of concomitant peroneal tendon injury and the tendon injury is often overlooked during initial treatment (1).

Obtaining a magnetic resonance image (MRI) does not guarantee an accurate diagnosis of peroneal tendon injury. A recent study that reviewed accuracy in the diagnosis of peroneal tendon damage on MRI in comparison with surgical findings showed 83% sensitivity and 75% specificity. Four false-positives and two false-negatives were identified in this study. MRI was able to identify the presence of a low lying muscle belly in 44% of surgically-confirmed cases, flattening or hypertrophy of peroneus longus in 56%, decreased retromalleolar groove in 78%, and increased signal uptake (signifying internal tendon damage) of peroneus longus in 53% of cases (2). This lack of diagnostic accuracy is one of the strongest reasons to consider peroneal tendon endoscopy. The diagnostic ability of tendonoscopy reliably shows superiority when compared to noninvasive imaging studies (3). Similar to ankle arthroscopy as a diagnostic technique, patients may have the ability to return to immediate or early weightbearing and range of motion.

ANATOMY

Thorough knowledge of the regional anatomy should precede consideration for tendonoscopy of peroneal tendon damage. The tendons of the peroneus longus and peroneus brevis pass from the leg into the foot by contouring around the lateral malleolus. As they wrap around this pulley, they lie in a fibro-osseous tunnel formed by the bone and the superior peroneal retinaculum (SPR), which functions to keep the tendons in proper position. The peroneus brevis tendon is usually located anteromedial to the peroneus longus tendon within the retromalleolar groove. The SPR stabilizes the peroneal tendons along with the calcaneofibular ligament. More inferiorly, the tendons are stabilized by the inferior peroneal retinaculum and divide along the peroneal tubercle. The SPR forms the posterolateral border of the retromalleolar groove and is formed from a fibrous band originating off the posterior ridge of the distal fibular malleolus. The SPR extends posteroinferiorly to insert on the lateral wall of the calcaneus. The SPR is often associated with a small triangular fibrous ridge that is presumed to deepen the retromalleolar groove. Numerous anatomic variants have been reported for the SPR, including conjoined insertion onto the Achilles tendon aponeurosis (4). The peroneal tendons regularly sit within separate sheaths distal to the fibular malleolus after passing the peroneal tubercle, which must be considered during endoscopy.

SURGICAL TECHNIQUE

The patient is placed supine with the ipsilateral hip elevated to place the limb in a position of more internal rotation. A thigh tourniquet is applied and inflated before beginning the procedure to optimize the field of view. An assistant holds the limb in internal rotation and is also available to manipulate into eversion, dorsiflexion, or plantarflexion as needed. Avoidance of neurovascular structures is critical for this endoscopic technique, therefore we recommend beginning with the most superior portal so that vital structures are furthest from the incision. All other portals are made under direct visualization and trans-illumination, which allows for neurovascular structure identification.

The superior portal is established about 6 cm proximal to the tip of the lateral malleolus, along the course of the peroneal tendons. Careful blunt dissection should be carried through subcutaneous tissue to avoid neurovascular structures. A small incision is then created along the peroneal tendon sheath and a blunt trochar is then introduced into the sheath, followed by a 30 degree arthroscope.

The inferior portals are then created under direct visualization (by introducing a spinal needle at the desired portal location) with trans-illumination to avoid neurovascular structures. The total number of portals created is case dependent, with the author averaging 4 portals (superior portal as described, two portals 1-2 cm proximal and distal to the fibular malleolus tip, and 1 portal 2-3 cm proximal to the peroneus brevis insertion overlying appropriate tendon sheath). Additional portals may be created as needed to better examine certain pathologic findings. Tendon examination is easily performed to the level of the peroneal tubercle. Extending the scope distal to this point requires careful evaluation to ensure the proper tendon sheath is accessed, as the tendons separate into distinct sheaths.

Dynamic testing can assess the presence of tendon subluxation/dislocation, while an evaluation of hypertrophic peroneal tubercle can also be readily performed. The presence of a low lying peroneal muscle belly may be easily evaluated, as is the degree of tenosynovitis. A shaver (nonaggressive or aggressive) can assist in endoscopic removal of tenosynovitis. Superior peroneal retinaculum or tendon injuries (lesions, tears) may also be assessed adequately through the endoscope. If amenable, the pathology may be corrected completely under endoscopic guidance, but small open incisions may be created overlying areas of tears or flattening, which require suture repair. A benefit of this endoscopic procedure is that open incision lengths are significantly minimized, since the endoscope allows the surgeon to determine the extent of damage before creating an incision. Figure 1 shows examples of peroneal tendon endoscopic findings.

Postoperative management for endoscopic procedures is dependent on the degree of repair. In limited procedures, a non-weightbearing period of 5 days followed by partial weightbearing in a walking boot for 1-2 weeks has been shown to be effective. More invasive or open repair may necessitate a non-weightbearing period of up to 4-6 weeks. Recent literature suggests a full return to sports at about 3 months postoperatively, which is similar to open peroneal tendon surgical procedures (1). The author has had all recent cases return to full activity by 2 months postoperatively.

DISCUSSION

Tendonoscopy of the peroneal tendons can provide more sensitive detection of pathology when compared to other imaging modalities. Although ultrasound and MRI reveal acceptable diagnostic rates, endoscopic procedures allow for improved detection of multiple pathologies as well as better injury grading and superior dynamic testing (2, 3). We are currently seeing an expansion of indications, as authors have reported on techniques for resection of hypertrophic peroneal tubercle and retinaculum repair using only endoscopic methods (5).

Prospective studies have shown promising results, with the literature showing good results among many different peroneal tendon pathology findings. Patients should expect approximately 3 months recovery before resuming sports asymptomatically. However, much earlier weightbearing can be implemented with the endoscopic technique and anecdotal evidence has supported overall quicker recovery, in the authors' experience.

Additional benefits reported include smaller scars, better cosmesis, less postoperative pain, shorter hospitalization periods, higher outpatient surgery rates, and higher patient satisfaction scores when compared to open procedures (6). This literature is by no means conclusive and additional research will be required before comparisons can be effectively made. Tendonoscopy seems to present an effective, minimally invasive technique by which multiple peroneal tendon pathologies may be addressed. Even if an open procedure is indicated, this technique helps to minimize the incision length, which helps reduce potential postoperative complications, such as tendon adhesions and painful scars (7). The technique also represents an improvement in our diagnostic ability, when compared to noninvasive imaging studies (8).

This technique can be technically difficult to perform, especially in examining all sides of the tendons and when progressing distal to the peroneal tubercle, where the tendons split into distinct sheaths. Adequate training on cadaveric limbs is recommended before attempting to perform this procedure. The author has found the results satisfying with both endoscopic procedures and when converting to an open technique.

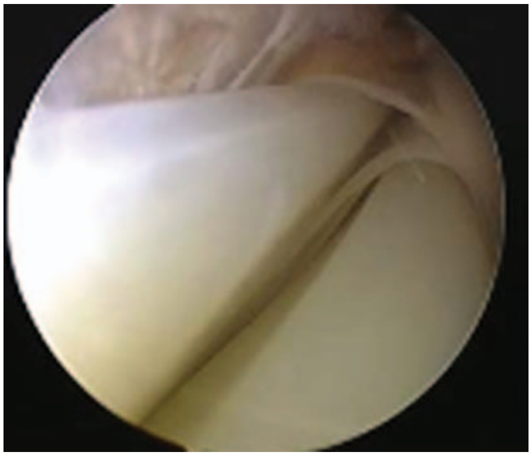

Figure 1A. Endoscopic views of the peroneal tendons. Normal peroneal tendons.

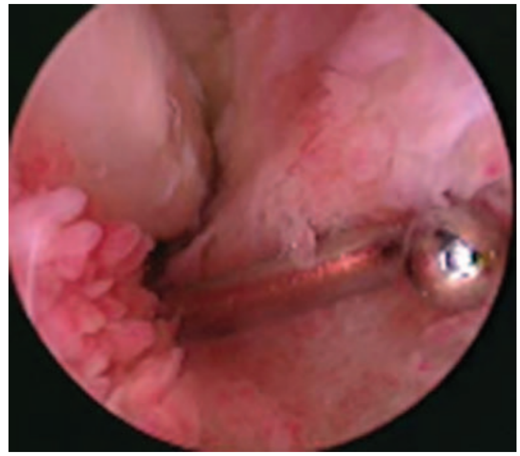

Figure 1B. Peroneal tenosynovitis.

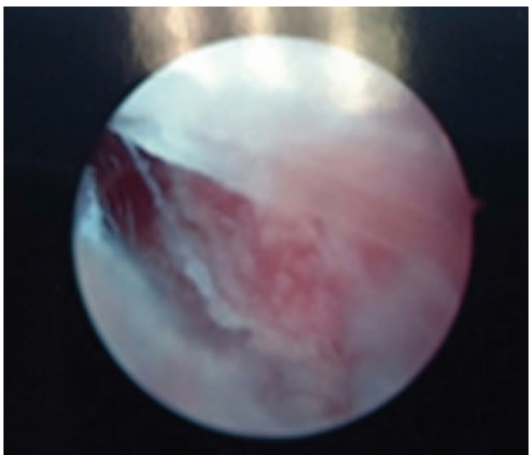

Figure 1C. Low-lying peroneal muscle belly.

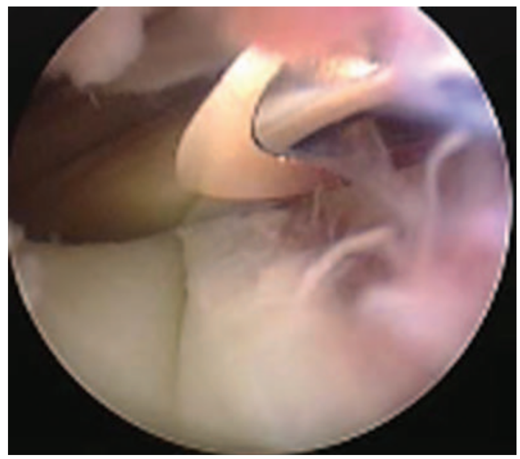

Figure 1D. Resection of low-lying muscle belly.

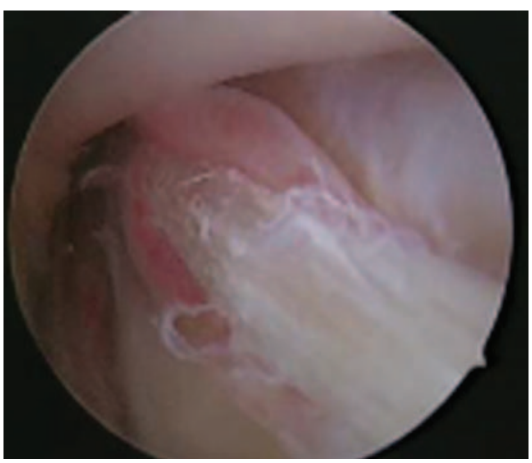

Figure 1E. Longitudinal peroneal tendon tearing.

Figure 1F. Resection of peroneal tendon lesion.

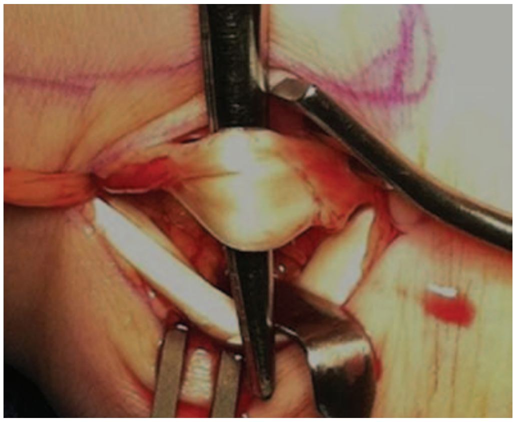

Figure 1G. Conversion to a limited open procedure for tendon retubularization.

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