Peroneal Tendon Pathology - MRI

Peroneal tendon pathology is often found in patients complaining of lateral ankle pain and instability. Conditions encountered include tendinosis; tendinopathy; tenosynovitis; tears of the peroneus brevis, peroneus longus, and both tendons; subluxation and dislocation; and painful os peroneum syndrome. Injuries can be acute as the result of trauma or present as chronic problems, often in patients with predisposing structural components such as hindfoot varus, lateral ligamentous instability, an enlarged peroneal tubercle, and a symptomatic os peroneum. Treatment begins with nonoperative care, but when surgery is required, reported results and return to activity are in general very good.

TAKE HOME POINTS
- Pathology of the peroneal tendons must be considered in the differential diagnosis of the patient with lateral ankle pain.
- Symptomatic peroneal tendon injuries can be the result of both acute and chronic processes.
- Peroneal tendon injuries can often be resolved with nonoperative treatment, but if that fails, surgical intervention is usually successful.
- Any surgical treatment of peroneal tendon pathology must address not only the peroneal tendons, but also any pre-disposing structural or anatomic abnormalities for the highest chance of success.

CLASSIFICATION
There are four grades used to classify peroneal tendon dislocations.
- Grade I, the superior peroneal retinaculum is lifted off the fibula sub-periosteally.
- Grade II, the fibrocartilaginous ridge is elevated off the fibula.
- Grade III, the SPR is avulsed off the fibula with a small cortical fragment attached
- Grade IV, the SPR ruptures off its posterior attachment on the calcaneus and/or Achilles tendon
- Additionally, cases of distal peroneus longus dislocations have been reported due to rupture of the inferior peroneal retinaculum, causing the peroneus longus tendon to dislocate superior to the peroneal tubercle

Imaging
- XRAYS: Imaging workup of a patient with lateral ankle pain and a suspected peroneal tendon injury should begin with radiographs.
Weightbearing radiographs of the symptomatic foot and ankle should be acquired. Abnormal findings specific to peroneal tendon pathology may include an avulsion of the base of the fifth metatarsal; a “fleck” avulsion off of the distal fibula (indicative of traumatic subluxation or dislocation of the peroneal tendons out of the fibular groove due to injury of the superior peroneal retinaculum, hypertrophy of the peroneal tubercle, or the presence of an os peroneum.

A Harris heel view helps with assessing hindfoot alignment and is best for evaluating peroneal tubercle hypertrophy as well as the retromalleolar groove.

Plain radiographs may also reveal a fractured os peroneum or distracted bipartite or multipartite os. It may be necessary to obtain contralateral foot and ankle imaging for comparison.

Ultrasound is another imaging modality that can be used to evaluate the peroneal tendons. Ultrasound is non-invasive and inexpensive, does not expose the patient to radiation, and can also be used in dynamic evaluation of the tendons.

It should be noted, however, that ultrasound is operator-dependent and can be time-consuming. Ultrasound can also be used for injection of the peroneal tendon sheath; accuracy of up to 100% has been reported.

MRI provides the most detailed evaluation of peroneal tendon pathology. MRI is useful in that it provides three-dimensional assessment of the anatomy, and allows one to evaluate the tendons, muscles, ligaments, and bone in the area of interest. Several MRI studies specifically aimed at the peroneal tendons have been published. Normal tendons typically have homogenous signal intensity on T1- and T2-weighted and short tau inversion recovery (STIR) images; tenosynovitis, tendinosis, or tendon tear may be associated with increased T2-weighted or STIR or loss of signal homogeneity, as well as thickening of the tendons.

A thin area of high signal intensity surrounding the peroneal tendons within the tendon sheath on T2 and STIR is normal, but a large amount of fluid may indicate tenosynovitis.

Findings associated with longitudinal split tears of the peroneus brevis include a “chevron-shaped” peroneus brevis, partial enveloping of the peroneus longus increased signal in the tendon on T2-weighted images, increased signal intensity in the fibular groove, a flat peroneal groove, a lateral fibular spur, and abnormal lateral ligaments; findings that may be seen but have not been statistically correlated on MRI to be associated with brevis tears include flattening of the peroneus brevis, subluxation of the tendons, abnormal SPR, and the presence of a peroneus quartus.

Peroneus longus tears can be associated with loss of homogeneity on MRI, discontinuity of the tendon, increased signal along the lateral calcaneal wall, and a hypertrophied peroneal tubercle, as well as fracture of or increased signal within an os peroneum.

MRI can also reveal injuries to the superior peroneal retinaculum, intrasheath subluxation of the tendons (a reversal of their normal position relative to one another), and ganglion cysts.

While MRI is a powerful imaging tool, it should be noted that its findings are not always correlated with clinically-relevant pathology. A study by Giza et al. comparing clinical examination of patients with positive findings of peroneal tendon pathology on MRI reported a positive predictive value of MRI of only 48%; that is,
incidental findings of peroneal pathology on MRI is not uncommon, and clinical correlation is required.

- Conversely, studies have been published that suggest that MRI underestimates the extent of the pathology. Finally, one must consider the “magic angle” effect of MRI imaging of tendons; this is a phenomenon that causes increased intratendinous T1-signal as a tendon curves obliquely into the plane of imaging, and if not recognized, can lead to false-positive interpretation of the MRI.

SELECTED REFERENCES