

# PERONEAL TENDON PATHOLOGY AND THE SIGNIFICANCE OF MAGNETIC RESONANCE IMAGING

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## INTRODUCTION

When reviewing the literature on peroneal tendon pathology, most manuscripts introduce the condition as a relatively infrequent condition. I am of the opinion that peroneal tendon pathology is fairly common and most likely misunderstood. As a foot and ankle specialist, we are specifically trained to diagnose and treat this condition. The majority of patients who sustain ankle sprains or injure their foot and/or ankle most likely seek professional care from their primary care physician or an urgent care physician. When radiographs are interpreted as normal by the radiologist, then the treatment is typically an ACE wrap, ice, elevation, and rest. The vast majority of patients, however, are probably not seeking medical care because in their minds it is “just a sprain” and there is nothing that you can do for a sprain.

It is typical for patients to wait a number of months from their onset of symptoms or injury to have a specialist evaluate their ankle for pain, swelling, and/or instability. By the time these patients show up for evaluation, the condition is more of a chronic problem versus acute injury. Often times, these patients have had magnetic resonance imaging (MRI) ordered by their primary care physician and are referred to a specialist because of diagnoses interpreted and suggested by a radiologist based on MRI findings. These patients present with their MRI or report in hand and their chief complaint is a “tendon rupture.”

## ANATOMY

The peroneus brevis muscle originates in the middle third of the leg on the fibula and its tendon courses anterior to the peroneus longus tendon at the ankle. The tendon runs over the peroneal tubercle of the calcaneus and inserts into the styloid process of the fifth metatarsal base. Its function is to plantarflex and evert the foot.

The peroneus longus muscle originates at the lateral condyle of the tibia and fibular head. The peroneus longus tendon courses behind the peroneus brevis tendon at the ankle and inferior to the peroneal tubercle. The tendon then makes a sharp turn at the level of the cubital tunnel to course under the tarsal bones to attach to the plantar aspect of the

first metatarsal and medial cuneiform. The peroneus longus everts and plantarflexes the foot. In addition, the muscle will plantarflex the first ray.

## ANATOMIC CONSIDERATIONS

The following conditions have been described as contributing to peroneal tendon pathology: peroneus quartus accessory muscle; low riding peroneal muscle bellies; enlarged peroneal tubercle; shallow retromalleolar fibular groove; and Os peroneum.

## FUNCTIONAL/BIOMECHANICAL CONSIDERATIONS

Generally the underlying common denominator in peroneal tendon pathology is the pes cavus foot type especially with underlying metatarsus adductus. Unlike the pes valgus foot type, which typically suffers from medial arch and ankle conditions such as posterior tibial tendon dysfunction; the patient with the cavovarus foot will usually present with dorsolateral foot pain and lateral ankle pain. Lateral column overload is presumed to be the underlying cause of “wear and tear” to the lateral foot/ankle structures.

## EXAMINATION

Typically with peroneal tendon disorders, you will see focal edema along the tendon course in the lateral ankle and foot. Typically, there is loss of anatomic landmarks such as the tip of the fibula (Figures 1, 2). Tenderness can be elicited with



Figure 1. Clinical picture of a patient with peroneal tendinosis. Note the amount of swelling in the course of the peroneal tendons and lack of definition of anatomy.



Figure 2. Contralateral ankle of the patient in Figure 1. Note anatomic landmarks such as the black arrow pointing to the peroneal tubercle and the orange arrow pointing to the peroneus brevis tendon.

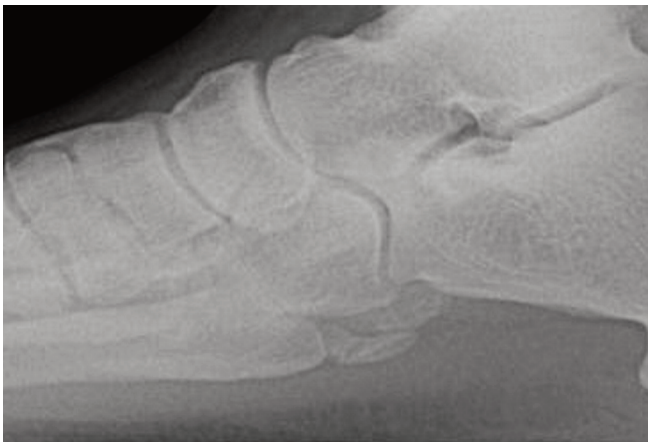


Figure 4. A large irregular bipartite os peroneum in a patient with pain in the cubital tunnel. This is suggestive of peroneus longus pathology.

palpation of the tendons in the retromalleolar position and along its course into the foot. A test for subluxation includes having the patient dorsiflex and evert the foot while your finger is palpating the tendons in the retromalleolar position. Pain and/or palpable subluxation are indicative of the condition of peroneal subluxation.

Pain and boggy swelling between the fibula and fifth metatarsal base should make you suspicious of a partial tendon tear and/or tendinosis. Palpation into the cubital tunnel can elicit pain with disorders of the peroneus longus tendon.

Manual muscle testing is performed to assess pain and/or dysfunction of the peroneal tendons. The peroneus longus tendon can be evaluated by having the patient plantarflex the first ray onto your thumb placed directly under the first metatarsal head. Resisting eversion of the foot can assess for pain in both tendons.



Figure 3. A well-rounded os peroneum. This was an incidental finding.

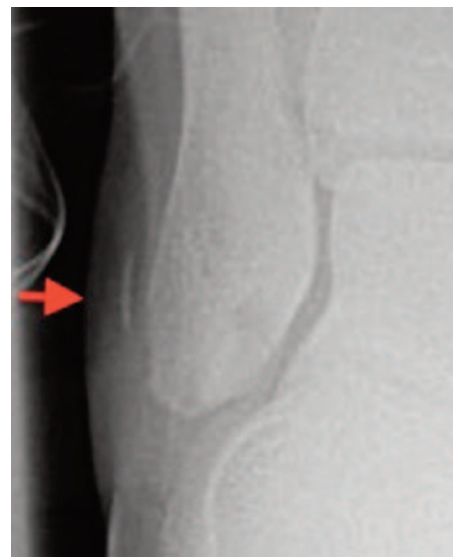


Figure 5. Note a linear ossification (arrow) next to fibula. This is a suggestive radiographic finding consistent with a peroneal tendon retinaculum tear, which can lead to subluxation of the tendon group over the fibula.

## IMAGING

Standard foot and ankle radiographs should be taken to rule out fracture. Pertinent anatomy to scrutinize includes presence of an os peroneum (Figures 3, 4), calcification in the course of the peroneal tendons, fleck fracture on the fibula (consistent with a retinaculum tear/subliming peroneals) (Figure 5), hypertrophy of the peroneal tubercle, triangulation of the styloid process (a degenerative finding) (Figure 6), and metatarsus adductus (Figure 7). Some of these subtle changes can give clues to chronic changes that can occur with peroneal tendon pathology.

MRI is typically the advanced imaging modality of choice for tendon pathology. Although musculoskeletal



Figure 6. An os peroneum with “triangulation” of the styloid process. This is seen with chronic peroneus brevis tendinitis/tendinosis.

ultrasound can assess for tendon pathology, more information and better detail is obtained with MRI. When assessing peroneal tendon pathology, split tears of the peroneus brevis tendon are most common. Tendinitis and tendinosis of both tendons are seen regularly as well.

I have observed over the years that the incidental finding of peroneal pathology with MRI is not uncommon. In fact, I routinely have patients referred to me for surgery of the peroneal tendons because of rupture seen on MRI, however often times it is not clinically relevant. Typically it is a patient with Achilles tendon pathology or lateral ankle ligament derangement that had an MRI and it showed both Achilles and peroneal pathology.

## RETROSPECTIVE REVIEW OF MRI

I decided to do a simple retrospective study to review the MRI of patients with the diagnosis of Achilles and posterior tibial disorders. Radiology reports were reviewed, which were all initially read by a board certified musculoskeletal radiologist. I reviewed their charts to confirm that they had no subjective complaints of lateral ankle/foot pain and no clinical findings to correlate with peroneal pathology. Any patients that had prior surgery in the lateral ankle were excluded as well.

## RESULTS

The results of the chart review are shown in Table 1. Thirteen of the 42 patients (30.95%) were noted to have pathology of the peroneal tendons noted with MRI without any clinical evidence/correlation. Of those patients, (6/13) 46% were isolated peroneus brevis conditions, (5/13) 38% were isolated peroneus longus disorders, and (2/13) 15% were disorders of both tendons.



Figure 7. Note the significant metatarsus adductus. Not only is there irregularity of the styloid process, there is severe cortical hypertrophy of the lateral metatarsals. This is the typical foot type that has lateral foot and ankle pain including peroneal tendon pathology.

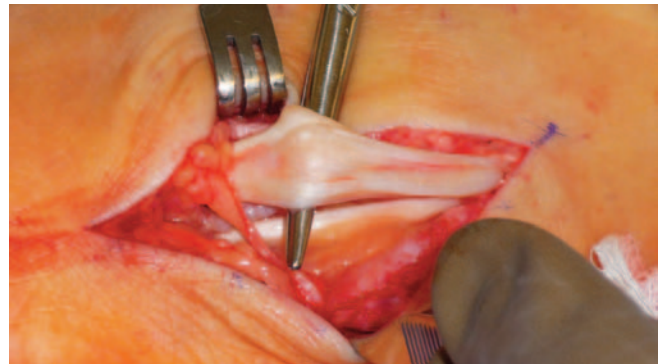


Figure 8. Intraoperative view of a split tear of the peroneus brevis tendon.

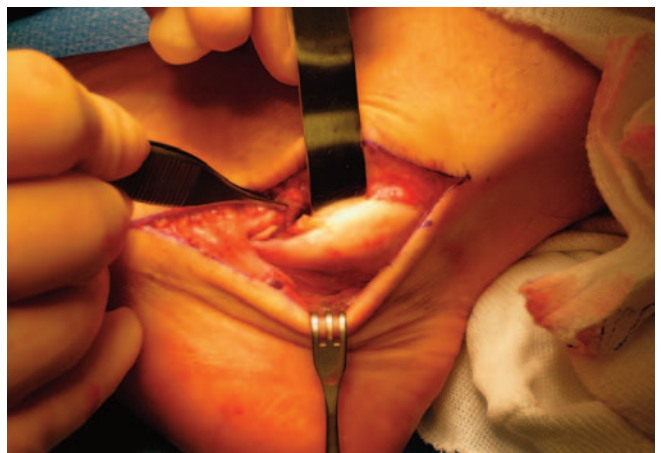


Figure 9. Intraoperative view of severe hypertrophy (tendinosis) of the peroneus longus tendon.

Table 1

## RESULTS OF THE CHART REVIEW

Patient	MRI Pathology	Peroneal Pathology	Age
JW	TP Tendinosis	NO	53
SW	Achilles Tendinosis	NO	51
MW	TP partial tear	NO	54
LT	None	NO	44
JS	TP tendinosis	NO	52
GS	TP and achilles tendinosis	NO	71
CS	TP tendinosis/partial tear	NO	65
LS	TP tendinitis	ES PB and PL partial tear	44
KR	Insertional TP tendinosis	NO	45
RR	TP tendinosis	YES Split tear PB	75
LR	TP tendon rupture	NO	58
AR	TP tendinosis/partial tear	YES Split tear PB	34
EO	TP partial tear	NO	46
KN	TP tendinitis	NO	50
BA	Old deltoid sprain	NO	53
SB	TP tendinosis/partial tear	YES Split tear PB	58
SB	TP and achilles tendinosis	YES PB tendinopathy	58
BB	TP partial tear	YES Split tear PB	73
AC	TA Tendinitis	NO	63
DC	TP tendinitis	NO	49
GC	TP partial tear	NO	49
DC	TP partial tear	NO	53
CE	OCL medial talus	NO	39
FE	TP tendinopathy	NO	56
MF	TP Tendinosis	NO	68
RG	TP tendinopathy	NO	70
RG	TP tendinosis	NO	66
LH	Achilles Tendinitis	NO	62
KH	Insertional TP tendinosis	YES PL tendinosis	41
KJ	TP tendinosis/partial tear	NO	52
LK	Insertional TP tendinosis	NO	61
MK	TP tendinopathy	NO	43
JK	TP tendinosis/partial tear	YES PL split tear	51
RL	TA tendinosis	NO	74
JM	TP tendinosis/partial tear	YES PB and PL partial tear	67
SM	Achilles partial tear	NO	58
SM	TP tendinitis	NO	66
CM	TP partial tear	YES PL tendinosis	46
CN	TP tendinitis	YES Split tear PB	55
SP	Achilles partial tear	NO	45
ML	Achilles Tendinosis	YES PL split tear	57
DC	TP tendon rupture	YES PL tendinosis	63

## DISCUSSION

Peroneal tendon disorders are probably more common than the literature suggests. It is my opinion that chronic asymptomatic conditions, such as partial tears and tendinosis of the peroneal tendons exist especially in the cavovarus foot type. In addition, I have been able to immobilize and rehabilitate patients with acute peroneal tendon injuries (including split tears) without surgical intervention. Therefore, peroneal tendon injuries have the potential to recover without surgery, and as a result, it is not surprising that many of the peroneal tendon pathologies are incidental findings on MRI. Surgical treatment for peroneal tendon pathologies should be reserved for symptomatic conditions.

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