Longitudinal Split of the Peroneus Longus and Peroneus Brevis Tendons with Disruption of the Superior Peroneal Retinaculum

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Longitudinal split and subluxation of the peroneus brevis tendon have been reported in surgery literature, but few publications report on longitudinal tears of the peroneus longus tendon. The most likely proposed mechanism is a mechanical one. This report discusses the ultrasonographic appearance of peroneus longus and peroneus brevis tendon splits and the mechanism of injury.

CASE REPORT

A 56 year old man was referred with 2 weeks of progressive pain and swelling of his left ankle. He described the discomfort as a burning along the lateral aspect of his ankle, radiating up the back of his calf. He had no history of acute injury.

By physical examination, he was obese and walked with a shuffling gait, leaning somewhat to the left. Observation of foot alignment showed eversion of the left foot and ankle. He had swelling of the soft tissues around his lateral malleolus.

A radiograph of his left ankle showed a fragment of avulsed bone at the lateral aspect of the lateral malleolus (Fig. 1). The location of the fragment suggested avulsion of the superior peroneal retinaculum. Ultrasonography of the left ankle demonstrated significant swelling of the peroneus longus and peroneus brevis tendons (Fig. 2), which were three to four times normal size when compared to the asymptomatic side (Figs. 3, 4). All sonographic images were obtained with a 10 MHz compact linear probe.

Within each peroneal tendon sonograms showed abnormal central hypoechogenity on transverse images (Fig. 5) and hypoechoic clefts within the tendon axis longitudinally (Fig. 6). The split peroneus longus tendon showed a characteristic “C” shape, which Deely and associates described as “boomerang-shaped.” Beltran and coworkers described the tendon as partially wrapping around the peroneus longus tendon, which we were able to demonstrate. Similar to the cases reported by Beltran and coworkers, the tears were centered at the retromalleolar groove. Abnormal lateral subluxation of the tendons rela-
tive to the lateral malleolus was noted in ankle dorsiflex- 
ion and eversion (Fig. 2B). The avulsed fibular fragment 
was visualized by sonography in the expected location of 
the superior peroneal retinaculum (Fig. 6).

The patient underwent elective debridement and repair 
of longitudinal splits of the peroneus longus and peroneus brevis tendons 4½ months after his initial examination. His 
avulsed superior peroneal retinaculum was also re- 
atached. He was placed in a non–weight-bearing soft cast. 
The cast was removed 7 weeks later. No edema was pres- 
ent. The patient was very comfortable, walking with a 
mildly antalgic gait. He had fully recovered from his 
injury and surgery 1½ years after the injury.

**DISCUSSION**

Ultrasonography allowed us to diagnose peroneal 
tendon instability and longitudinal splitting of the 
peroneus longus and peroneus brevis tendons. The 
finding of an avulsion fracture at the insertion of the 
superior peroneal retinaculum suggested the mecha- 
nism for the pathology. This information was found valua-
ble for the surgical planning.³

Disruption of the superior peroneal retinaculum is 
a predisposing factor for peroneal tendon subluxa- 
tion.⁴ This lateral displacement positions the tendons 
over the sharp posterior edge of the fibula, resulting 
in a longitudinal tendon tear or split.⁵

Other proposed mechanisms for peroneal tendon 
subluxation predisposing to tear include anatomic 
factors, such as a shallow fibular groove, a promi-
nent calcaneofibular ligament, and congenital 
absence of the superior peroneal retinaculum. 
Hyperelasticity or laxity of the superior peroneal 
retinaculum secondary to chronic pronation of a 
paralyzed extremity is another cause, as well as 
mechanical crowding in the fibular malleolar 
groove due to a low lying muscle belly of the per- 
oneus brevis or the presence of a peroneus quartus 
muscle.² Similar to MR imaging, most of these fea-
tures can be seen with ultrasonography.

Ebraheim and colleagues state that an avulsion 
fracture of the posterior lateral portion of the fibula 
at the insertion of the superior peroneal retinaculum 
is pathognomonic for subluxation of the peroneal 
tendons.⁶ The bone fragment is easiest to identify on 
the anteroposterior or the internal oblique views on 
standard radiographs.⁷ It is also diagnosed on CT.⁵ 
However, this fracture is seen in only 15 to 50% of 
injuries to the superior peroneal retinaculum.⁴

Without a fracture, ultrasonography can still demon-
strate retinacular injury. The retinaculum can be torn, 
leaving an abnormal hypoechoic space anterior to 
the tendons on the transverse views.⁷

Many mechanisms of injury of the superior per-
oneal retinaculum have been proposed, including 
eversion,⁵,⁸ inversion,⁹,¹⁰ dorsiflexion, plantar flex-
ton,⁹ or a combination of these.⁴ Laxity of the supe-
rior peroneal retinaculum combined with forceful 
contraction of the peroneus longus tendon causes the 
peroneus brevis tendon to splay out and split from 
prolonged mechanical attrition.³ In our case, as well 
as in other reports, eversion and dorsiflexion were 
able to reproduce the abnormal subluxation of the 
tendons.⁵,¹¹

Longitudinal tears of peroneus longus tendons are 
rare in comparison with longitudinal tears of the per-
oneus brevis tendons.¹² However, Sobel and associ-
ates reported a peroneus longus tendon to have a 
frayed surface of its inner aspect that corresponded 
to the portion of the tendon which was in contact 
with the fibula through a split in the adjacent per-
oneus brevis tendon tear.¹²

Figure 1 Anteroposterior radiographic image showing frag-
ment of avulsed bone (arrow) at the lateral aspect of lateral 
malleolus is pathognomonic of avulsion at the attachment 
site of the superior peroneal retinaculum.
In summary, we propose ultrasonography as an effective means to affirm a suggestion or solidify the diagnosis of longitudinal tears of the peroneus longus and peroneus brevis tendons. Tendon size, shape, location, and integrity, as well as associated anatomic abnormality and variants, can be assessed with ultrasonography. Additionally, provocative maneuvers such as ankle dorsiflexion and eversion may demonstrate transient tendon subluxation only diagnosed with dynamic ultrasonography. Identification of the avulsed fibular fragment at the insertion of the superior peroneal retinaculum also aids in this diagnosis. These parameters allowed us to make a correct preoperative diagnosis of longitudinally split and unstable peroneus longus and peroneus brevis tendons.

Figure 2 Transverse sonograms, and corresponding linear diagrams, demonstrate swelling of the peroneus longus tendon (white arrowhead; thick arrow in diagram) and peroneal brevis tendon (white arrowhead; thin arrow in diagram). Note the hypoechoic “boomerang” shape of the peroneus brevis tendon. F, Fibula; T, talus. The tendons are displayed subluxed laterally during dorsiflexion and eversion in (B), as evidenced by the difference in contour of the fibular cortex when compared to the ankle as shown in a neutral position in (A).
Figure 3 Transverse sonogram and corresponding linear diagram of normal peroneus longus tendon (thick arrow) and peroneus brevis tendon (thin arrow). F, Fibula.

Figure 4 Longitudinal sonogram and corresponding linear diagram of normal peroneus longus tendon (thick arrow) and peroneus brevis tendon (thin arrow). F, Fibula.

Figure 5 Transverse sonogram shows thickened tendon sheath (curved open arrow); peroneus brevis tendon (long thin arrow), with hyperechoic region being a normal part of the tendon; avulsed bone (closed arrow); and hypoechoic peroneus longus tendon (short open arrow), consistent with a surgically proven tear.

Figure 6 Longitudinal sonogram of peroneus longus tendon (curved arrow) shows enlargement (three to four times normal size), with multiple hypoechoic clefts. The avulsed fibular fragment (solid arrow) is seen at the site of attachment of the superior peroneal retinaculum.
REFERENCES


ERRATUM

In the letter to the editor that appeared in the May 1998 issue of the Journal of Ultrasound in Medicine (J Ultrasound Med 17:340), a line of text was inadvertently omitted from the reply by Yang and Yuen.

The first three sentences of paragraph 2 should have read as follows:

We agree that malignancy and technical difficulty are indications for oophorectomy in premenopausal women. However, they are not the only indications. Clinical diagnosis or suspicion of malignancy is based on a combination of clinical history, menopausal state, tumor markers and sonographic appearance.2–5