

Normal Ultrasonographic Parameters of the Posterior Tibial, Peroneal, and Achilles Tendons

Christopher Chu, BS, J. Benjamin Jackson, MD, Kevin Williams, MD

Category: Ankle,Hindfoot,Imaging- Ultrasound

Keywords: ankle, tendinopathy, achilles, ultrasound, posterior tibial tendon, peroneal tendons

Introduction/Purpose: Tendinopathy of the foot and ankle is common and can progress to become incapacitating. The most frequently affected tendons in the foot and ankle are the posterior tibial, peroneal, and Achilles. Studies have found a lifetime incidence of 5.9% in sedentary people and as high as 52% in athletes for Achilles tendinopathy.

Previous studies demonstrated that ultrasound (US) of the soft tissues of the foot and ankle is a highly effective tool that can evaluate nearly every anatomical structure. Its lack of ionizing radiation, low cost, and painless nature make it a viable tool for foot and ankle evaluation.

We sought to utilize US to determine normal values for the Achilles, peroneal, and posterior tibial tendons in patients presenting to the foot and ankle clinic.

Methods: Patients were evaluated prospectively via a standardized US examination protocol from 2015-2016. Subjects who agreed to participate received a bilateral lower extremity ultrasound performed by a musculoskeletal ultrasonographer of the posterior tibial, peroneus longus, peroneus brevis, and Achilles tendons. Images were obtained in both the transverse and longitudinal axes above and below the malleoli and saved for analysis and measurement calculations. When indicated, color flow Doppler was utilized to assess for hyperemia and recorded. The imaging for each tendon was acquired with the patients in standardized positions on the examining table.

Results: A total of 200 patients with 400 extremities were identified, consented, and participated in the study. Measurements for each patient were recorded above and below the malleoli for each tendon. Most tendons demonstrated a normal distribution as illustrated in the representative Figure 1 of the peroneus brevis above the lateral malleolus. Values and distributions curves were similarly calculated for each tendon at each point of measurement. Patients with suspected tendinopathy frequently had an increase of two standard deviations above the mean.

Conclusion: This is the largest studies to characterize the measurements of the posterior tibial tendon, Achilles, and peroneal tendons in patients that present to a foot and ankle clinic. This baseline data can assist clinicians in their diagnostic ability with US. Given its low cost, lack of ionizing radiation and dynamic ability along with an improved understanding of normative data it will likely become an increasingly utilized diagnostic modality.

