

Normal Variants

Accessory Muscles About the Ankle



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KEYWORDS

- Accessory muscles • Ankle • Peroneus quartus • Accessory soleus
- Flexor digitorum accessorius longus • Peroneocalcaneus internus • Tibiocalcaneus internus

KEY POINTS

- Accessory muscles are commonly presented as incidental findings on cross-sectional imaging.
- Although most often asymptomatic, accessory muscles sometimes mimic mass lesions, and have been implicated as the cause of tarsal tunnel syndrome, impingement of surrounding structures, and pain related to muscle ischemia. Unless specifically injured, accessory muscles appear isointense to other muscles on all imaging sequences.
- Based on the location of the accessory muscles, including their origins, insertions, and relationships to the aponeurosis of the lower leg, an imaging algorithm is proposed to aid in their identification.

INTRODUCTION

Anatomic variations of muscles around the ankle consist predominantly of extra or accessory muscles. Generally asymptomatic, these supernumerary muscles are discovered incidentally on imaging studies. Accurate diagnosis of the infrequent symptomatic cases, presenting as mass lesions, tarsal tunnel syndromes, chronic ankle pain, or impingement, is important for management. However, distinguishing between these muscles can be challenging, because some travel along a similar path, and others have either similar origins or similar insertions. This article reviews each accessory muscle in detail, including those located lateral and posteromedial to the ankle. Each muscle's origin, insertion, imaging features, and clinical presentations, along with its relationship with the aponeurosis of the lower leg, are described (**Table 1**). In an effort to improve diagnostic accuracy, an imaging algorithm that can be readily applied in daily practice is proposed.

IMAGING OF ACCESSORY MUSCLES

Although the accessory muscles of the ankle can be detected on all cross-sectional imaging modalities, most published reports are of magnetic resonance (MR) imaging studies because of its superior soft tissue contrast. However, MR imaging does have limitations. First, the origins of these muscles may not be included in the field of view of a routine ankle examination. Second, if insertions are small, they can be difficult to separate from surrounding soft tissues. Lateral radiography captures only the accessory soleus and is therefore of limited use.

ACCESSORY MUSCLES IN THE LATERAL ANKLE

Peroneus Quartus

The peroneus quartus (PQ) (**Fig. 1**) refers to the fourth peroneal muscle, after peroneus longus, peroneus brevis, and peroneus tertius. It represents a group of accessory peroneal muscles

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Table 1
Summary of accessory muscles around the ankle

	Origin	Course	Insertion	Alternative Name	Relative to Deep Aponeurosis	Notes
Lateral Accessory Muscle						
PQ	Posterior surface of the fibula or peroneus longus or peroneus brevis	Travels medial and posterior to the peroneal tendons	Retrotrochlear eminence (most common insertion) Cuboid Peroneus longus Inferior retinaculum	<i>Alternative Name of PQ Based on Insertion</i> Peroneocalcaneus externum Peroneocuboideus Peroneoperoneolongus		The insertion site is highly variable, which gives rise to subtypes and confusing terminology
Posteromedial Accessory Muscles						
Accessory soleus	Fibula, or soleal line of the tibia, or the anterior surface of the soleus muscle	Descends posterior to the neurovascular bundle	Upper or medial, calcaneal surface		Superficial	
FDAL	Variable origin, can arise from any structures of the posterior compartment	Descends with the posterior tibial neurovascular bundle in the tarsal tunnel	Quadratus plantae, or the FDL before its division	Long accessory of the quadratus plantae Long accessory of the long flexors Accessorius of the accessorius of Turner Second accessorius of Humphrey	Deep	Compare with other accessory muscles in or near the tarsal tunnel, such as the TCI or PCI; the FDAL does not insert onto the calcaneus
PCI	Lower third of the fibula	Travels parallel to but remains lateral to the FHL	Base of the sustentaculum		Deep	Not directly related to the neurovascular bundle, because it travels lateral to the FHL
TCI	Medial crest of the tibia	Travels posterior to the FHL, within the tarsal tunnel and superficial to the neurovascular bundle	Medial calcaneus		Deep	Has features of both the FDAL and the accessory soleus

Abbreviations: FDAL, flexor digitorum accessorius longus; FDL, flexor digitorum longus; FHL, flexor hallucis longus; PCI, peroneocalcaneus internus; PQ, peroneus quartus; TCI, tibio-calcaneus internus.

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