

# You can never have too many accessories - a case of two accessory muscles of the ankle

Poh Lye Paul See, FRCR (UK)

Khoo Teck Puat Hospital, 90 Yishun Central, 768828, 120 Geylang East Central #11-66 Singapore 380120

## SUMMARY

**Accessory muscles are relatively rare anatomic duplications of muscles that may appear anywhere in the muscular system. Though a wide array of accessory and supernumerary muscles involving the ankle have been described in the literature, this is the first reported case we are aware of that features two accessory muscles. Accessory muscles are typically asymptomatic and often picked up as incidental findings but are important to be identified in the presence of chronic persistent ankle pain and the absence of other more common aetiologies.**

## KEY WORDS:

*Accessory muscle, ankle pain, peroneus quartus, flexor digitorum accessorius longus, FDAL*

## INTRODUCTION

Variant muscle anatomy is not uncommon and may present as absence of a muscle, the presence of supernumerary muscles, or a muscle having either an abnormal course, or an anomalous origin or insertion. When additional distinct muscles occur along with the normal complement of muscles, they are termed accessory muscles.

Accessory muscles of the ankle are typically asymptomatic. However they can be the cause of pain, compartment syndrome, compressive neuropathy or rigid hindfoot deformities. They may even mimic soft tissue tumours.

Therefore it is important that they be identified on imaging with MRI the modality of choice for accurate and noninvasive diagnosis.

## CASE REPORT

A 20-year-old Chinese male presented with right ankle pain for a year and a half after twisting it while trekking. Initial MRI then revealed bony contusions of the talus and lateral ligament tears for which he had a Bostrum-Gould reconstruction procedure performed six months later after continued ankle instability and pain over the lateral aspect. Now a year post surgery he still suffered from persistent posterior and lateral ankle pain.

Physical examination and radiographs of the right ankle were unremarkable.

Follow-up MRI of his right ankle subsequently revealed the presence of two accessory muscles not previously picked up – a flexor digitorum accessorius longus (FDAL) and a peroneus quartus (FIGURE 1). The other ankle tendons were normal. Post-operative changes related to Bostrum-Gould procedure were noted.

The patient declined further surgery and was subsequently treated conservatively

## DISCUSSION

Though a wide array of accessory and supernumerary muscles involving the ankle have been described in the anatomic, surgical and radiology literature, this is the first reported case we are aware of that features two accessory muscles. Accessory muscles are typically asymptomatic and often picked up as incidental findings<sup>1</sup> but should be considered in the presence of chronic persistent ankle pain in the absence of other more common etiologies.<sup>2</sup> As advanced cross sectional imaging becomes more widely available, accessory muscles can be identified accurately and noninvasively, with magnetic resonance (MR) imaging the modality of choice.<sup>2</sup>

Our patient benefited from such imaging with two accessory muscles being identified in his ankle. Firstly he has a peroneus quartus muscle, to which symptoms of posterolateral pain and swelling have occasionally been ascribed. The pain is thought to be due to crowding of the muscles in the peroneal compartment or tear/subluxation of the peroneus brevis. Peroneus brevis tenosynovitis has also been reported<sup>2</sup> though it was not observed in our patient.

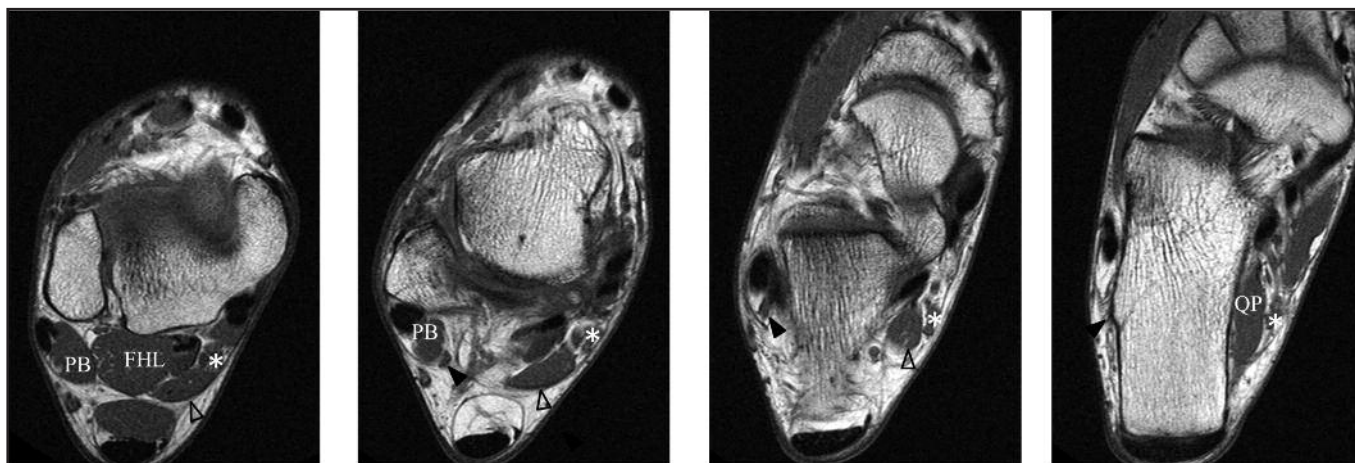
Peroneus quartus muscles have a prevalence that ranges from 13-26% and are seen more often in men.<sup>1</sup> They arise from the peroneus brevis in most cases and can be classified into three main types based on their insertion – into the calcaneus (peroneocalcaneus externum), the cuboid bone (peroneocuboideus), or the peroneus longus tendon (peroneoperoneolongus).<sup>3</sup> Classically the peroneocalcaneus variant is the most common, inserting on the retrotrochlear eminence of the calcaneus,<sup>1</sup> as in our patient.

The peroneus quartus muscle can be distinguished from a low lying peroneus brevis belly by its posteromedial relation to the peroneus brevis muscle with an intervening fat plane. While the low-lying belly stops abruptly, the peroneus

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*Corresponding Author: Poh Lye Paul See, Khoo Teck Puat Hospital, 90 Yishun Central, 768828, 120 Geylang East Central #11-66 Singapore 380120*

*Email: med50110@yahoo.com; see.paul.pl@alexandrahealth.com.sg*



**Fig. 1:** Sequential cranial-to-caudal axial T1-weighted images. The FDAL (open arrow head) courses posterior to the flexor hallucis longus (FHL), abuts the neurovascular bundle (\*) proximally, runs deep to the deep aponeurosis and flexor retinaculum, and inserts onto the quadratus plantae (QP). Meanwhile the fleshy accessory peroneus quartus muscle (arrow head) courses posterior to the peroneus longus and brevis (PB) tendons and inserts onto the retrotrochlear eminence of the calcaneus.



**Fig. 2:** Sagittal T1-weighted MR image showing the FDAL (arrow heads) remaining fleshy as it lies posterior to the flexor hallucis longus tendon (open arrow heads).

quartus muscle tapers into a long thin tendon.<sup>3</sup> In the retromalleolar region, the myotendinous unit may range from completely tendinous to completely muscular.

The FDAL was also a possible culprit for his symptoms having been implicated before as a cause for flexor hallucis tendon<sup>4</sup> and tarsal tunnel tenosynovitis<sup>5</sup> syndromes, though both conditions tend to present with ankle pain and swelling that is more posteromedially located.

Due to its course within the tarsal tunnel, the FDAL is intimately related to the neurovascular bundle and may abut or impinge upon the tibial nerve to cause the pain and/or paraesthesia associated with tarsal tunnel syndrome.<sup>5</sup> Its close relationship with the flexor hallucis longus tendon, which runs anterior to it, predisposes to flexor hallucis longus tenosynovitis.

The FDAL has a prevalence of 6-8% and is more common in males.<sup>2</sup> It is quite variable in its origin, arising from any of the many posterior compartment structures, and the tendon inserts distally into the quadratus plantae muscle or the flexor digitorum longus tendon.<sup>1</sup> In our patient, the FDAL tendon inserts into the quadratus plantae while the muscle origin could not be evaluated (FIGURE 2).

**CONCLUSION**

MRI is the modality of choice for the accurate and noninvasive diagnosis of accessory muscles. Though accessory muscles may be rare and typically asymptomatic, they must always be considered and actively excluded when examining a scan...sometimes more than once!

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