MRI diagnosis of accessory soleus muscle strain

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An accessory soleus muscle is a rare anatomical variant. Clinical awareness of this entity and the appropriate use of magnetic resonance imaging (MRI) can yield a definitive diagnosis in those patients with symptomatic accessory muscles. A case is presented in which the unique sensitivity of MRI in the evaluation of exertional muscle injuries proved useful in the detection of an accessory soleus muscle strain.

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A 27 year old professional footballer presented to the club doctor complaining of pain and swelling in the right ankle joint after exercise. Radiographs showed evidence of an old avulsion injury at the anterior aspect of the distal tibia but no significant degenerative changes in the ankle joint. On examination, some thickening of the joint was detectable but otherwise no abnormality was found and he had full range of movement.

A magnetic resonance imaging (MRI) scan was subsequently arranged which showed bilateral accessory soleus muscles (left side larger than the right) situated anterior to the Achilles tendons (*Figure 1*). In addition, the sagittal STIR sequence showed increased signal within the right accessory soleus indicative of muscle oedema, and was consistent with delayed onset muscle soreness syndrome (DOMS) or strain (*Figure 2*).

The right foot is predominantly used by this footballer for beginning a jump before heading the ball,

Figure 1. Axial T1—weighted image just above the level of both ankle joints showing bilateral accessory soleus muscles anterior to the Achilles tendons

Figure 2. Sagittal STIR (fat suppression technique) image of the right ankle shows high signal within the accessory soleus muscle (see arrow)

and the symptoms may indicate ischaemia due to a tenuous blood supply to the smaller muscle on the right.

Since the MRI scan the patient has responded well to conservative measures. Reassured, and somewhat gratified to learn of his unusual anatomical variant and its benignity, he has declined surgical intervention since symptoms are absent, except for a few hours after a football game.

Discussion

In a large series of Achilles tendon dissections, not one accessory soleus muscle was reported.¹ However, one of the earliest references to this anomalous muscle is found in the Guy's Hospital Reports.² The accessory soleus muscle arises from either the anterior surface of the soleus or from the fibular and soleal line of the tibia. The accessory muscle may insert either into the Achilles tendon or into the calcaneum medial, anterior and inferior to the normal Achilles tendon insertion.³

The anomaly may be unilateral or bilateral and, if

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bilateral, one muscle may be larger on one side and smaller on the other, as in this case.⁴

The swelling and the onset of symptoms may be due to the increase in muscle mass during adolescence or to vigorous physical training, which may also explain the higher incidence reported in male patients.⁵ The most common symptom is pain but no patient reported pain when resting. Most people experience an aching pain after strenuous activity.

These symptoms have been attributed to close compartment ischaemia since the accessory muscle is invested in a separate fascial sheath with a tenuous blood supply from the posterior tibial artery.⁵ Certain cases have been treated successfully by fasciotomy of the muscle sheath.

When an MRI scan is performed in these cases a muscle shaped mass which is isointense with normal muscle on all imaging sequences is found, thereby avoiding confusion with a soft tissue tumour and obviating the need for biopsy.³ MRI is sensitive to acute and chronic alterations in muscle water content and thus the highly sensitive STIR (short tau inversion recovery) sequence can demonstrate muscle oedema in strains, DOMS, and other exertional muscle injuries.⁶

Thus an accessory soleus muscle may be a cause of exertional pain and swelling in active young individuals and this case shows the useful role of MRI in making a definitive diagnosis.

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