# Tibial osteochondroma inducing popliteal artery compression

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**Compression of the neurovascular contents of the popliteal fossa is a rare condition that leads to exercise-induced pain and paresthesias in young athletes. Most frequently, it is caused by musculotendinous abnormalities resulting in popliteal entrapment syndrome. Bony abnormalities rarely are implicated but can produce symptoms that mimic popliteal entrapment syndrome. We present a patient with a tibial metaphysis osteochondroma inducing popliteal artery compression that was relieved after resection. (J Vasc Surg 2015;61:1595-8.)**

When young athletes present with exertional leg pain, the differential includes chronic exertional compartment syndrome, nerve entrapment, or vascular compression such as with popliteal entrapment syndrome (PES).[1] Vascular surgeons often are consulted on these patients when the workup reveals compression of the popliteal artery, and the diagnosis of PES is often already attached to the patient. PES is a constellation of symptoms that result from mechanical compression of the popliteal artery, vein, or tibial nerve within the popliteal fossa.[2] This condition is predominantly found in young, active patients, classically in male athletes.[2-4] Symptomatic PES is rare, with a reported incidence as low as 4 per 1 million.[5,6]

PES is caused by an abnormal relation of the popliteal artery to the surrounding musculotendinous structures.[2] Bony abnormalities of the popliteal space have not been categorized as a cause of PES, although they can result in arterial compression. Here we describe a case of an osteochondroma of the posterior tibia that caused popliteal artery compression in a young woman who presented with symptoms mimicking PES. Removal of the bony lesion resulted in clinical and ultrasound-documented improvement.

## CASE REPORT

A 23-year-old woman presented with 9 months of right foot numbness precipitated by running and eventually evolving to paresthesias with walking and calf claudication. Her medical history was unremarkable, and she had no personal or family history of hypercoagulable state. Her only medication was the hormonal contraceptive drospirenone/ethinyl estradiol.

On examination, she had palpable bilateral pedal pulses at rest. There were no lower extremity sensorimotor deficits. The right pedal pulses ablated with passive dorsiflexion but not with active plantarflexion.

A catheter angiography before referral demonstrated occlusion of the anterior tibial origin and stenosis of the popliteal artery with the right foot in the neutral position (Fig 1, *A*). With passive dorsiflexion, there was worsened popliteal stenosis and persistent anterior tibial occlusion (Fig 1, *B*). We obtained a magnetic resonance image (MRI) to examine the musculotendinous structures. These were normal, but the MRI demonstrated a 1.2-cm × 0.8-cm lesion arising from the posterolateral proximal tibial metaphysis that was noninvasive and compatible with an osteochondroma (Fig 1, *C*).

She underwent a surgical intervention, which began with a below-knee medial leg incision. Once the neurovascular bundle was retracted posteriorly, a sharp bony spur arising from the posterolateral proximal tibial metaphysis was easily identified. The popliteal artery was grossly normal. Intraoperative duplex ultrasound imaging demonstrated a peak systolic velocity of 56 cm/s with a clear spectral window in the popliteal artery in neutral position (Fig 2, *A*). The peak systolic velocity increased to 158 cm/s with spectral broadening with passive dorsiflexion (Fig 2, *B*).

To access the osteochondroma, the soleus muscle was detached from the posterior tibia. It did appear grossly that with passive dorsiflexion, the soleus exacerbated the compression of the vascular bundle by the osteochondroma, and consideration was given to terminating the operation after soleal arch takedown. However, given the uncertain effectiveness of that maneuver and because it appeared safe and easy to resect the osteochondroma, which appeared to be directly impinging on the popliteal artery at the anterior tibial takeoff, we proceeded in an effort to completely decompress the fossa. We believe the impingement of the osteochondroma at the anterior tibial origin was the cause of the static anterior tibial occlusion, with dynamic popliteal

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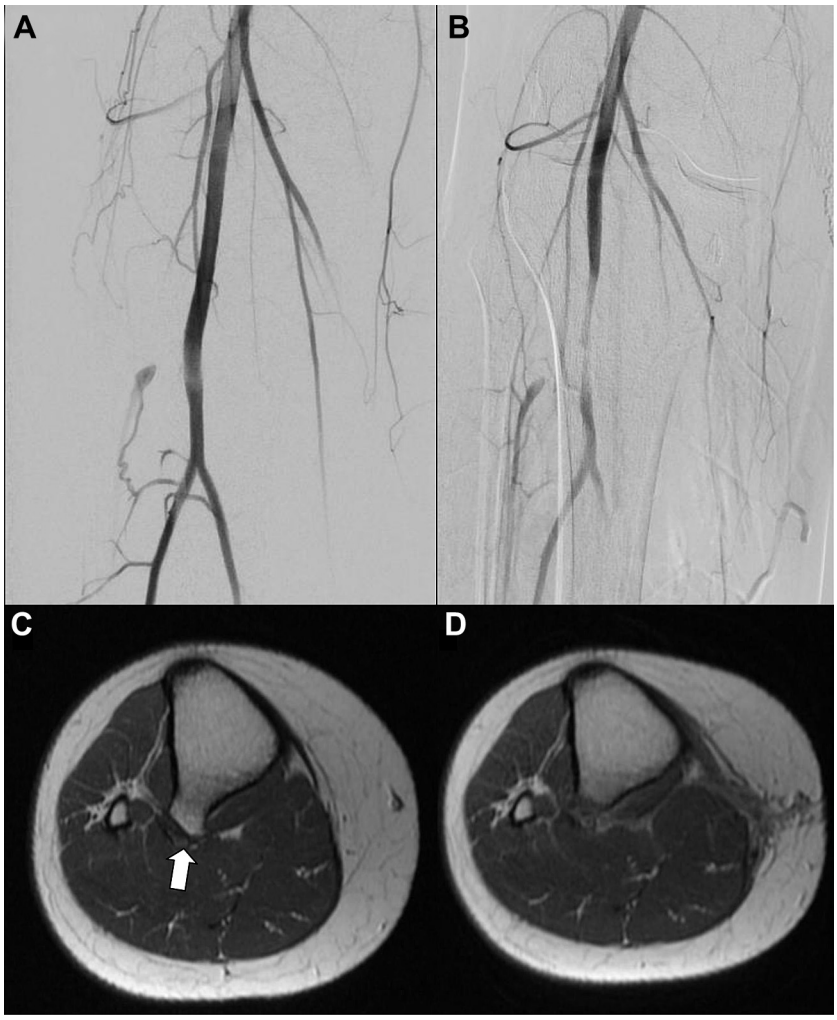


**Fig 1.** Angiograms of the distal popliteal artery and trifurcation show **(A)** obstruction of the anterior tibial artery with the foot in a neutral position and **(B)** complete obstruction of the anterior tibial and popliteal arteries in the stress position of passive dorsiflexion. **C,** A cross-sectional magnetic resonance image (MRI) of the right knee shows the tibial osteochondroma (*white arrow*). **D,** A cross-sectional MRI shows the right knee after resection of the osteochondroma.

occlusion exacerbated by muscular activation in the presence of the space occupying osteochondroma.

The osteochondroma was resected with an osteotome in four fragments, with the largest being 2.3 cm (Fig 3). Postresection duplex imaging demonstrated a decreased peak systolic velocity in the popliteal artery even in passive dorsiflexion (Fig 2, *C*). An MRI demonstrated resolution of the bony abnormality (Fig 1, *D*) and impingement of the anterior tibial origin. The postoperative dorsalis pedis/brachial index was 1.17.

At the 2-month follow-up, the patient's paresthesias and claudication had resolved, although she noted some general fatigue and aching of her calf with prolonged exercise. Her pedal pulses remained easily palpable even in stress positions.

## DISCUSSION

The normal popliteal neurovascular bundle courses between the medial and lateral heads of the gastrocnemius muscle just posterior to the tibia. The bundle may be entrapped by neighboring muscles or tendons as a result of aberrant embryologic development, which results in PES,[7] but even more rare are osseous abnormalities found that mimic PES.

The Popliteal Vascular Entrapment Forum designates six types of PES that are based on the location of the popliteal artery and vein in regards to the gastrocnemius or popliteus muscle attachments and a separate class that is termed functional but has no true anatomic abnormality. The Popliteal Vascular Entrapment Forum does not describe osseous abnormalities as a cause, but bony abnormalities, especially osteochondromas, have been described to cause vascular complications in numerous case reports.[8-17]

Although arteries can be compromised by osteochondromas in areas above the inguinal ligament,[11] the lower