



# Popliteal Artery Entrapment Syndrome (PAES)



# Introduction

- Uncommon but important cause of **intermittent claudication in healthy active young people**
- First reported in 1879
- Exact prevalence unknown (previous studies reports prevalence of 0.17-3.5%)
- Mean age is around **30 years**
- **Exercise related symptoms**
  - Calf pain
  - Cramping
  - Weakness
  - Sensation of tenseness
  - Associated paresthesia
- Symptoms arise due to **compression of the popliteal artery**
- Pulse of a. dorsalis pedis/a. tibialis posterior can be weakened or absent
- Can occur in a **single leg** or **bilateral**

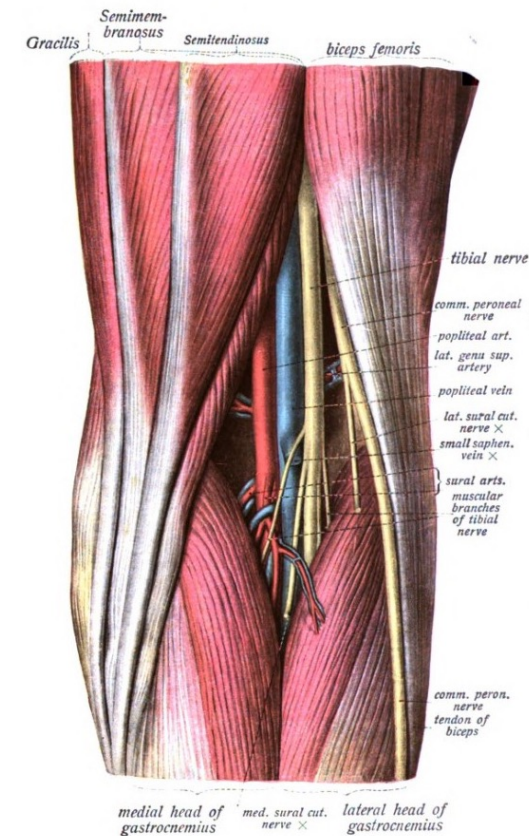
# Anatomy of the popliteal fossa

## Borders

- M. semimembranosus
- M. gastrocnemius medial head
- M. biceps femoris
- M. gastrocnemius lateral head

## Neurovascular structures

- A. poplitea
- V. poplitea
- N. tibialis
- N. fibularis communis



The artery normally divides into a. tibialis anterior and posterior after the lower border of m. popliteus (92% of cases)

Picture from Wikipedia

# Classification

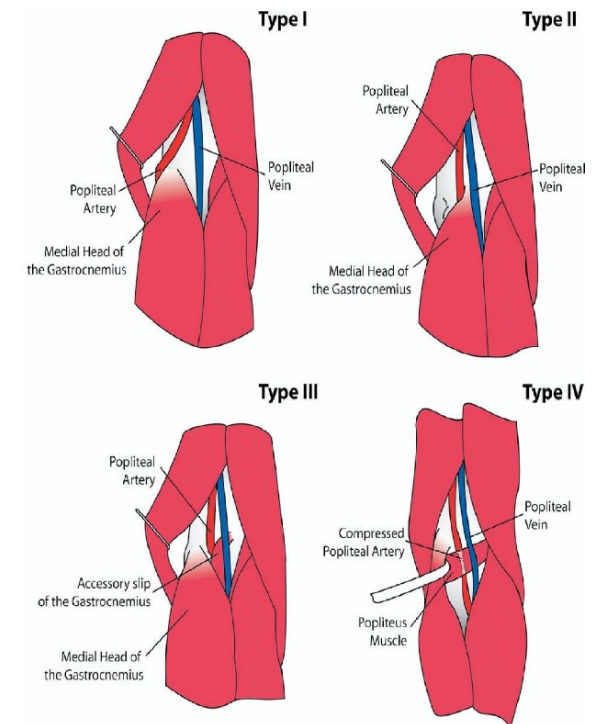
## Two general forms

- Congenital → embryological anatomical abnormalities
- Functional → normal anatomy, (most commonly due to muscular hypertrophy)

## Classification system based on anatomy

- 6 subtypes + type F

Type I	Popliteal artery running medial to the medial head of gastrocnemius
Type II	Medial head of gastrocnemius laterally attached
Type II	Accessory slip of gastrocnemius/fibrous bands arising from medial head of gastrocnemius
Type IV	Popliteal artery passing below popliteus muscle/fibrous bands arising from popliteus
Type V	Primarily venous entrapment
Type VI	Other variants
Type F	Functional entrapment



Sinha, S. et al. Popliteal entrapment syndrome. *J. Vasc. Surg.* 55, 252-262.e30 (2012).



# Complications

- Progressive disease due to **repetitive microtrauma to the artery**
- Can result in
  - Stenosis
  - Post-stenotic aneurism → distal embolization
  - Thrombosis → acute ischemia → necrosis
- In **advance stages** symptoms progress from being intermittent claudication to **rest pain**
- Early diagnosis and treatment are important to prevent **irreversible damage to the artery**

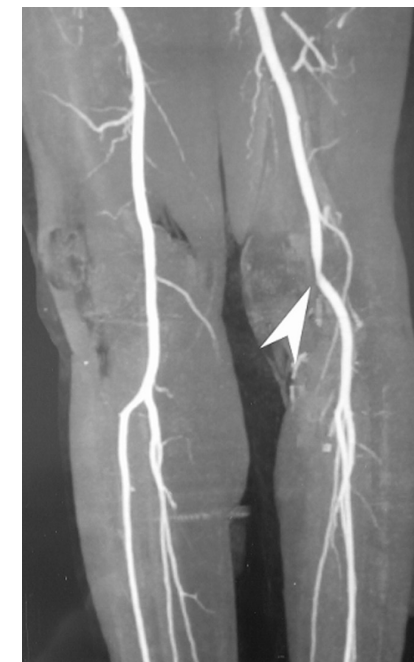
# Diagnosis and treatment

## Diagnosis

- Exclude other causes of leg pain
  - Blood test (sickle cell disease, rhabdomyolysis, low ferritin, low D-vit.)
  - Radiographs (fracture, stress reaction, neoplasm)
  - MRI (soft-tissue conditions)
  - Pressure measurement (chronic compartment syndrome)
- Doppler US
- CT/MR angiography

## Treatment

- Conservative
  - Experimental with drugs normally used to treat peripheral arterial disease
  - Botulinum toxin
- Surgery → recommend for all anatomical PAES even though symptoms are mild
  - Artery decompression
  - Arterial reconstruction



CT arteriography showing partial occlusion of a. poplitea

Ammar, A., Smida, M. & Daghfous, M. S. About a rare cause of calf pain in an athlete: the popliteal artery entrapment syndrome (a case report). *Pan Afr. Med. J.* **38**, 1–5 (2021).



# Differential diagnosis

## Non-vascular causes of leg pain

- Chronic Exertional Compartment Syndrome
- Soleal Sling Syndrome
- Medial tibial stress syndrome
- Stress fractures

## Vascular causes of leg pain

- Arterial endofibrosis
- Adductor canal compression syndrome
- Cystic adventitial disease