Update on the Diagnosis and Treatment of Popliteal Entrapment: Doppelgangers and other Misleading Diagnoses

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Disclosures

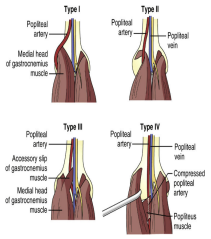
- None

Popliteal Entrapment Syndrome – Anatomic/Functional/Confounders

- **Diagnosis should be considered in the young athletic population without atherosclerotic risk factors**
- **CRECS looks very similar**
  - **Closer diagnostically to CRECS than anatomic popliteal entrapment**
- **Often associated with delay in diagnosis**
  - **can result in arterial damage due to extrinsic compression**
- **Has become more common in females**
  - **Younger athletes, more posterior calf symptoms**

Anatomic versus Functional Popliteal Entrapment

Type	Description
I	Popliteal artery displaced medially around normal medial head of gastrocnemius
II	Medial head of gastrocnemius is lateral to popliteal artery
III	Popliteal artery is compressed by an accessory slip of muscle from medial head of gastrocnemius
IV	Entrapment by a deeper popliteus muscle
V	Popliteal vein entrapment
VI	Functional entrapment

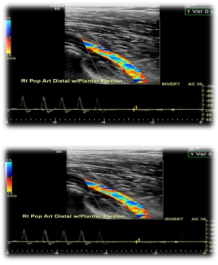


Functional Popliteal Entrapment : How is it Diagnosed?

- **Diagnostic tests can be positive in a percentage of normal patients, so symptoms consistent with this diagnosis must be present**
  - **No role for treatment of asymptomatic disease**
- **FPAES versus CRECS is important**
  - **CRECS most common**
  - **Parasthesia more common with FPAES**

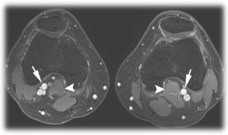
Work-up/Diagnosis

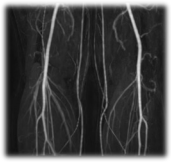
- **Usually resting compartment pressures, ABI with exercise, stress plethysmography (PVR) or duplex with provocative maneuvers as first line tests**
- **If normal compartment pressures and abnormal plethysmography/duplex, proceed with additional imaging – MRA with maneuvers**
- **If no anatomic cause on MRA, can often see compression of neurovascular bundle with plantar flexion, hypertrophy of medial gastroc/soleus**
- **If equivocal, consider angio/IVUS with maneuvers**
- **Remember to think of other causes – Cystic adventitial disease, endofibrosis, venous compression**



Work-up/Diagnosis: MRA

- Performed at baseline with active plantar flexion, but this can be difficult to hold for extended periods of time
- Often non-diagnostic, high false negative rate
- Type III/IV can be easily missed and functional PAES (Type VI) can be easily missed





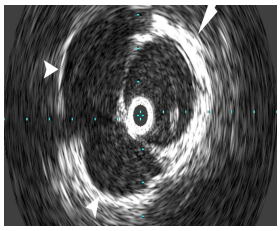
Kim et al., *Skeletal Radiology*, 2006.
Bonilakowski et al., *JVS* 2017

Work-up/Diagnosis: Provocative Angiography with IVUS

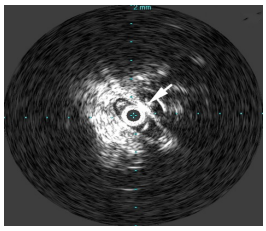
- Provocative angiography can be useful with adjuncts (vasodilators)
- Long segment areas of compression on angiography often do not identify the exact location of compression, but IVUS can help
- Long segment lateral displacement and compression of neurovascular bundle seen with forced plantar flexion

Neutral position | Active plantar flexion

Work-up/Diagnosis: IVUS



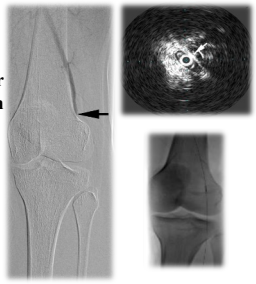
Neutral position



Active plantar flexion

Treatment CRECS vs FPAES vs Anatomic PAES

- CRECS – fasciotomy
- FPAES – medial BK pop incision, incise attachments of gastroc/soleus to medial tibia, remove fascia/plantaris/anterior soleus fascia that is compression point in distal outlet
  - IVUS used intra-operatively to confirm that compression is relieved
- Anatomic PAES – posterior approach, resection medial gastroc/bands



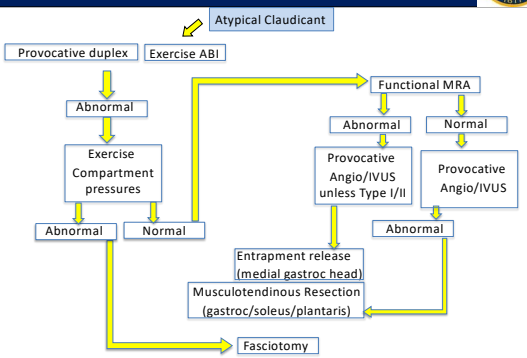
The Doppelgangers

- Anterior Tibial artery compression
  - –Pain in anterior ankle/dorsum of foot
  - –High take-off
  - –Near ankle/retinaculum

Doppelganger Diagnosis

- Symptoms related to angiosome
- Treatment is release of compressive structure – interosseus, retinaculum, etc.

Algorithm for anatomic PAES versus FPAES versus CRECS versus other Work-up/Treatment



Summary

- **Distinguish CRECS versus FPAES versus other/doppelganger**
- **Clinical relevance based on symptoms**
- **IVUS and other new imaging technologies, multidisciplinary care can aid in the diagnosis and treatment**