51M Pain in left knee 2 years
Clinical

- Injury most recently in June 2014
- History of previous meniscectomy in 2005
Impression

4. **Anomalous popliteal artery branch** extending anterior to the popliteus muscle adjacent to the posterior capsule and posterior tibial border which should be protected at surgery
Popliteal Artery

- Normal bifurcation: at inferior margin of popliteus muscle
- **High division**: above the middle of posterior surface of popliteus muscle
- **Aberrant course** ventral to popliteus muscle is important because the artery is fixed against posterior cortex of tibia by popliteus muscle

ATA = anterior tibial artery

Surgical Significance of Popliteal Arterial Variants
A Unified Angiographic Classification

Ducksoo Kim, M.D.,* Dan E. Orron, M.D.,* and John J. Skillman, M.D.†

Ann. Surg. • December 1989

Type I

I-A 92.2%
I-B 2.0%
I-C 1.2%

Type II

II-A1 3.0%
II-A2 0.7%
II-B 0.8%
II-C <0.2%

Type III

III-A 3.8%
III-B 1.6%
III-C 0.2%
• Review literature: 4 studies of anatomic dissections and 11 radiologic series

<table>
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<th>Year</th>
<th>Extremities (n)</th>
<th>Method</th>
<th>IA (%)</th>
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• The 3 most frequent variations:
  1. **High origin of ATA** (type IIA; 2.9%)
  2. **Hypoplastic or aplastic PTA** (type IIIA; 2.4%)
  3. **Trifurcation of ATA, peroneal artery, and PTA** (type IB; 2.0%)

• The rarest reported variations: high division of peroneal artery (type IIC), hypoplastic/aplastic PTA and ATA (type IIIC)

**PR** = peroneal artery
• Retrospectively review 1242 arteriograms (621 patients)
• Variant branching in 134 extremities (10.8%) in 105 patients: 7 patterns
• High origin of AT (n = 15, 1.2%)
• **Normal** branching pattern of popliteal artery in one extremity → **13% probability** of variant in the other side
• **Variant** branching in one extremity → **28% probability** the opposite side will also contain a variation
The Aberrant Anterior Tibial Artery

Magnetic Resonance Appearance, Prevalence, and Surgical Implications

Rosemary J. Klecker,* MD, Carl S. Winalsksi,*† MD, Piran Aliabadi,‡ MD, and Tom Minas,§ MD, MS

AJSM PreView, published on January 11, 2008

Methods: Retrospective review of 1116 consecutive knee MRI

Results:

- **Prevalence 2.1%** (23 of 1116 extremities)
- Anterior tibial artery most easily identified on **axial & sagittal**
- 34 pts who had both knees imaged, the aberrant anterior tibial artery 3 pts (unilateral in 2 and bilateral in 1)
Aberrant Anterior Tibial Artery

Clinical Relevance:

• Aberrant anterior tibial artery may be at greater risk of injury in procedures such as high tibial osteotomy, revision TKA, lateral meniscal repair, PCL reconstruction, and screw fixation for tibial tubercle osteotomy

Embryological development

6 mm embryo: primitive sciatic artery on dorsal side of umbilical artery
8.5 mm embryo: external iliac artery upstream of primitive sciatic artery
14 mm embryo: sciatic primitive and femoral arteries junction
22 mm embryo: primitive sciatic artery involution
ATA : Embryological development

Developmental at this stage → aberrant anterior tibial artery

Relation between levels of surgical procedures and anatomy of aberrant ATA

Surgical technique to avoid injury to aberrant ATA during high tibial osteotomy
References


