

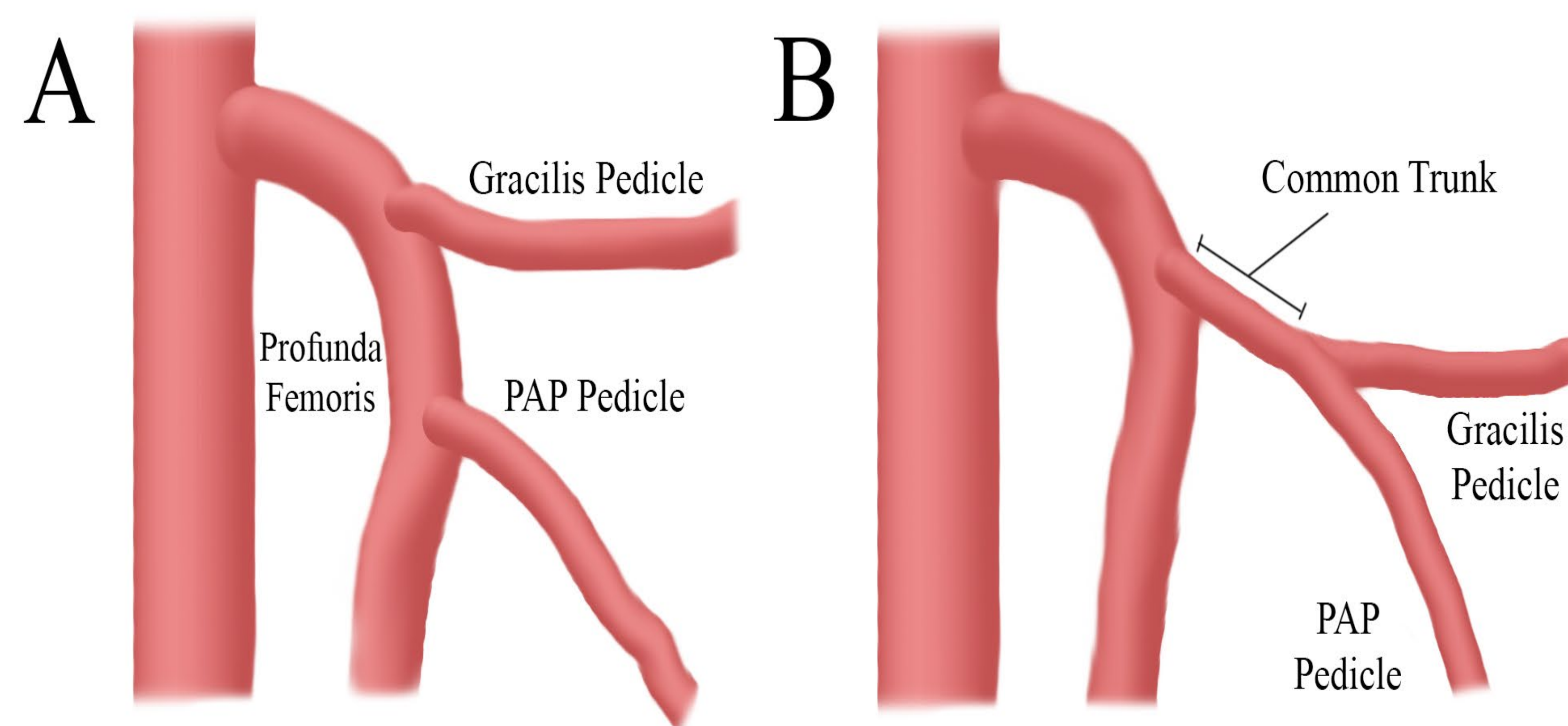
Three-dimensional Tissue Rendering And Volume Analysis Of A Novel Medial Thigh Flap Using CT Angiography: The Chimeric Gracilis And PAP Flap

Jacob B. Hammond MD, Lyndsay Kandi BS, Chad M. Teven MD, Clint E. Jokerst MD, Jonathan A. Flug MD, Max A. Shrout MD, Marko A. Laitinen MD, Erwin A. Kruger MD, William J. Casey III MD, Alanna M. Rebecca MD MBA
Mayo Clinic, Phoenix, AZ

Background

- A common arterial pedicle supplying both gracilis and profunda artery perforator (PAP) flap perforasomes is a recently described anatomical variation, favoring the potential harvest of a chimeric gracilis and PAP flap (**Figure 1**).
- We sought to further characterize this novel flap configuration with three-dimensional (3D) angiography.

Figure 1



A.) Traditional anatomical orientation of gracilis myocutaneous flap and profunda artery perforator (PAP) flap pedicles branching off the profunda femoris.

B.) Variant anatomy with both gracilis and PAP flap pedicles originating from a common trunk.

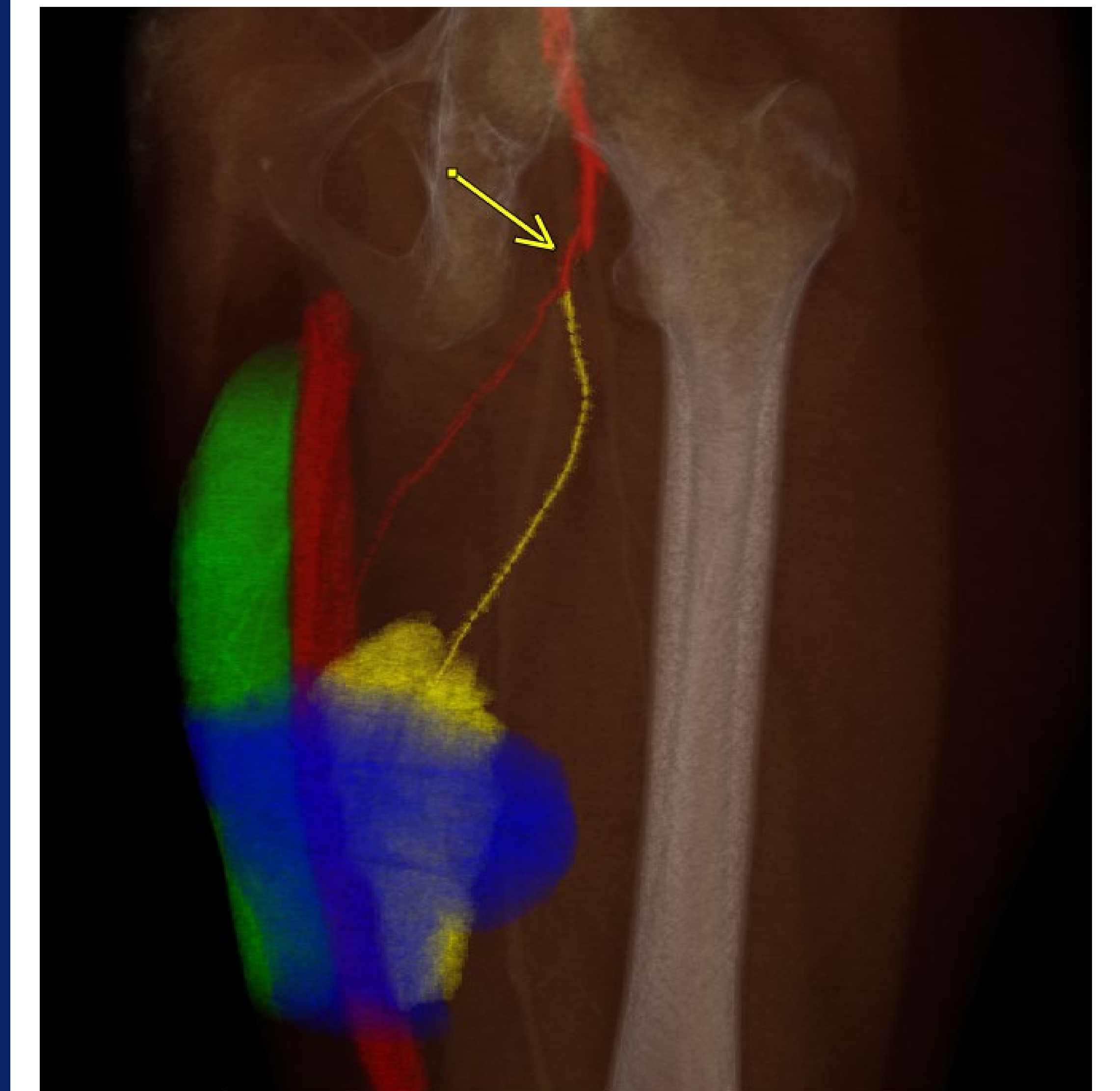
Methods

- Retrospective review of all lower-extremity CTA studies performed at our institution from 2011-2018 was conducted.
- All studies demonstrating a chimerically configured gracilis and PAP flap were evaluated using Visage© Version 7.1 (Visage Imaging Inc., San Diego, CA).
- Tissues supplied by source vessels were identified by tracing perforator branches, tagging supplied muscle and overlying tissues using semiautomated volume selection.

Results

- A total of 974 CT angiograms were reviewed, yielding a total of 1,940 lower extremities (RLE= 970, LLE= 970) for evaluation.
- A chimeric gracilis and PAP flap was found in 51% of patients (N=494/974).
- Tissues supplied by source vessels were identified by tracing perforator branches, tagging supplied muscle and overlying tissues using semiautomated volume selection.
- 3D rendering yielded an overview of chimeric flap anatomy (**Figure 2**), allowing for comprehensive volumetric assessment.
- Average Total Flap Tissue Volume = $389.5 \text{ cm}^3 \pm 153.5$
 - Gracilis Cutaneous Portion = $180.0 \text{ cm}^3 \pm 34.7$
 - Gracilis Muscle Portion = $50.9 \text{ cm}^3 \pm 37.7$
 - PAP Portion = $214.6 \text{ cm}^3 \pm 85.9$

Figure 2



3D Rendering of a Chimeric Gracilis and PAP Flap

Conclusion

- 3D rendering of a chimerically configured gracilis and PAP flap with CT provides an objective assessment of arterial anatomy, flap configuration, and tissue volume for potential use in a clinical setting.