Peripheral Vascular Device Core

Trisha Roy, MD, PhD

Vascular Surgeon Scientist

2026

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PVD Core Objectives

1. Accurately identify and differentiate tissue characteristics with MRI-Histology protocols in PAD.

2. Evaluate device efficacy.

3. Assess vessel wall impact of endovascular devices.

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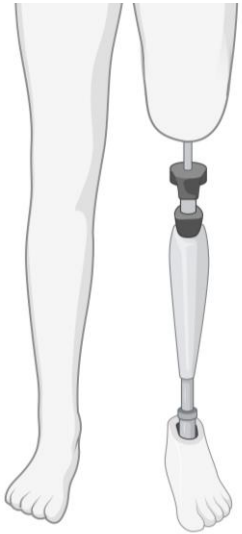
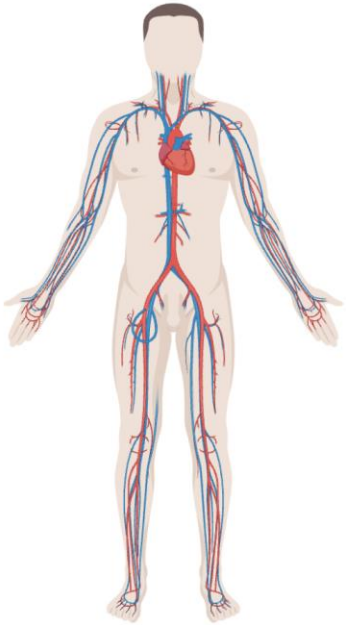
Options for Device Analysis

Amputated Limbs



Cadavers



Ex-vivo

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Amputated Limb Model

Home > Journal of Cardiovascular Translational Research > Article

Human Cadaveric Model for Vessel Preparation Device Testing in Calcified Tibial Arteries

Methods Paper | Open access | Published: 14 September 2022

Volume 16, pages 502–509, (2023) Cite this article

Journal of Cardiovascular Translational Research

EJVES Vascular Forum

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ORIGINAL RESEARCH · Volume 64, P105-112, 2025 · *Open Access* Download Full Issue

Developing a Scanning Electron Microscopy Approach to Evaluate Paclitaxel Deposition From Drug Coated Balloons in a Human Cadaveric Peripheral Artery Disease Model

Judit Csore [a,b] · Alexander B. Crichton [a] · Jianhua Gu [c] · ... · Stuart Corr [a] · Kelvin Boateng [a] · Trisha L. Roy [a] ... Show more

JVS Journal of Vascular Surgery

FULL LENGTH ARTICLE · Articles in Press, October 28, 2025 · *Open Access*

Clinical magnetic resonance imaging-defined plaque morphology predicts guidewire crossing failure in below-the-knee occlusions in a translational model using amputated lower limbs

Alexander B. Crichton, MBChB, MSc [a,b,c] · Judit Csore, MD, PhD [a,b,d] · Eniko Pomozi, MD [a,b,d] · ... · Christof Karmonik, PhD [b] · Alan B. Lumsden, MD [a,b] · Trisha Roy, MD, PhD [a,b] ... Show more

JVS-VS JVS-Vascular Science

ARTICLES FROM THE SPECIAL ISSUE ON NOVEL BIOMARKERS IN VASCULAR SURGERY; EDITED BY RAFFAELE SERRA · Volume 6, 100269, 2025 · *Open Access* Download Full Issue

Evaluation of sex-based differences in below-the-knee plaque histology in patients who underwent amputation for chronic limb-threatening ischemia

Fouzul Kansul [a] · Deborah Vela, MD [b] · Judit Csore, MD [c,d] · ... · Sasha Suarez, MD [e] · Anahita Dua, MD, MBA, MSC [e] · Trisha L. Roy, MD, PhD [c] ... Show more

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EJVES Vascular Forum

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Magnetic Resonance Imaging and Histological Insights Into Deep Venous Arterialisation

Bright Benfor [a] · Judit Csore [a] · Deborah C. Vela [b] · Miguel Montero-Baker [c] · Trisha L. Roy [a]

JVS Journal of Vascular Surgery

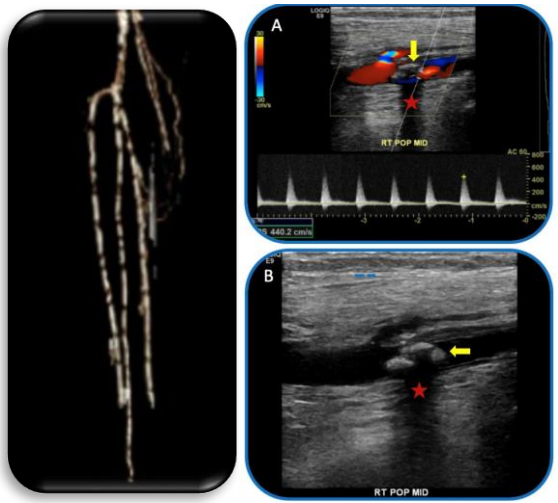
CLINICAL RESEARCH STUDIES | LOWER EXTREMITY ARTERIAL DISEASE · Volume 81, Issue 2, P351-363.E3, February 2025 · *Open Access* Download Full Issue

Employing magnetic resonance histology for precision chronic limb-threatening ischemia treatment planning

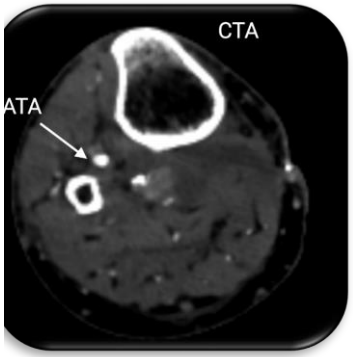
Judit Csore, MD, PhD [a,b] · Madeline Drake, MD [a] · Christof Karmonik, PhD [c] · ... · Peter Osztrogonacz, MD [a,b] · Alan B. Lumsden, MD [a] · Trisha L. Roy, MD, PhD [a] ... Show more

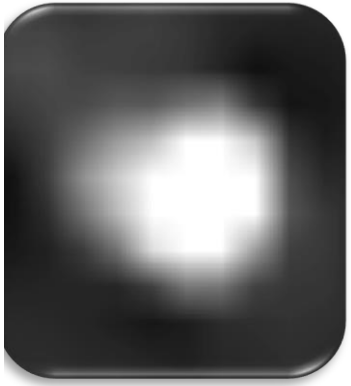
Pre-procedural Information/Imaging

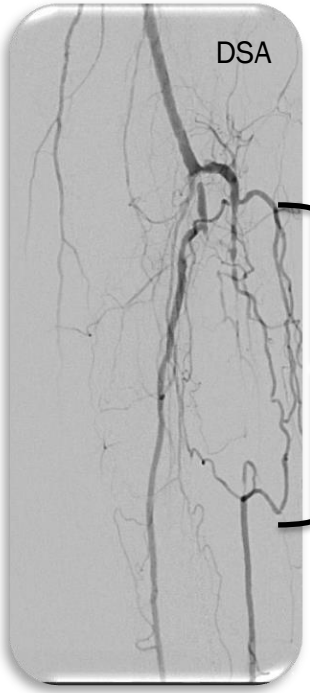
- Comprehensive evaluation of patients before enrollment
  - Assessing the patient's medical history, current health status, and any underlying conditions that may affect the study or image quality
- Review of relevant diagnostic tests (e.g. bloodworks, DSA, DUS, MRA, CTA)
  - Occlusion? Degree of stenosis? Type of calcification (concentric, eccentric, central)?



Clinical Imaging







Clinical Imaging fails to identify the pathology causing arterial disease.

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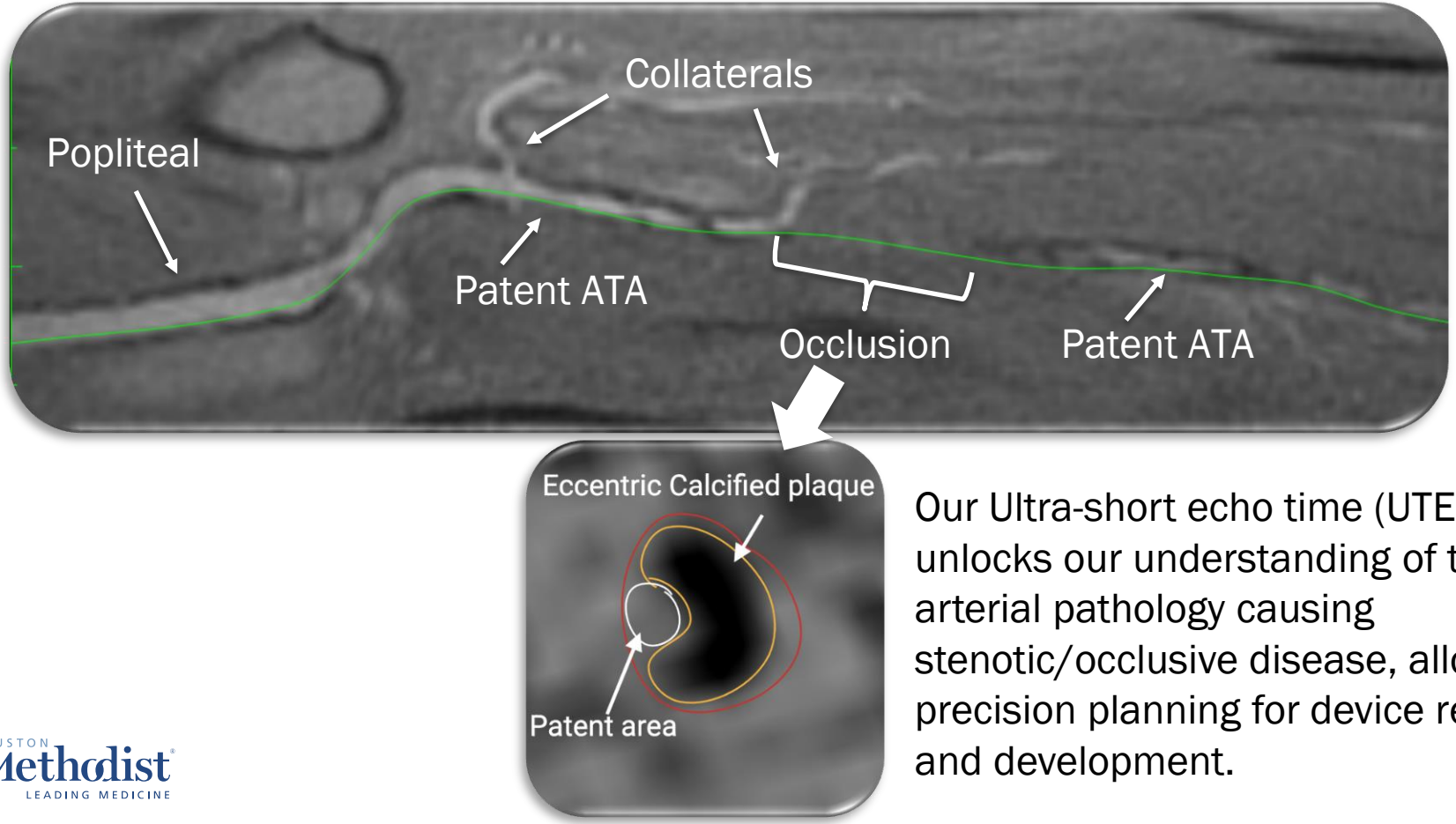
Non-contrast UTE MRI of Amputated Limbs



Our Ultra-short echo time (UTE) MRI unlocks our understanding of the arterial pathology causing stenotic/occlusive disease, allowing precision planning for device research and development.

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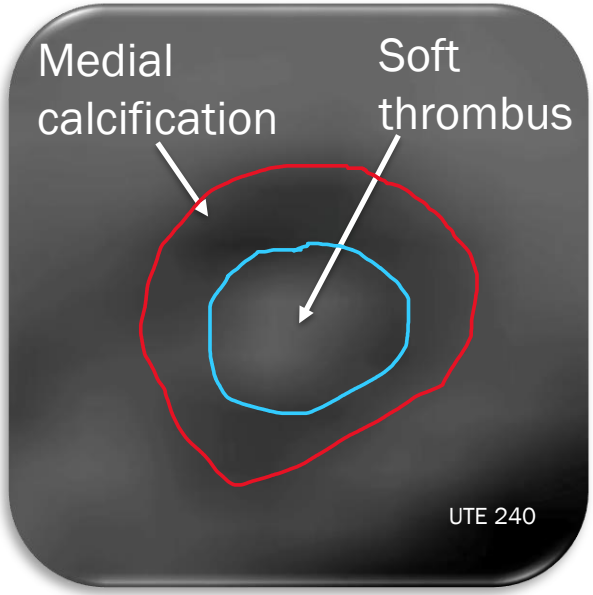
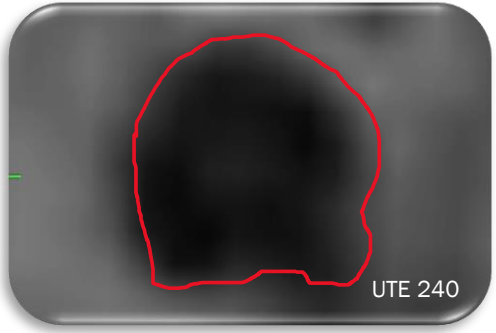
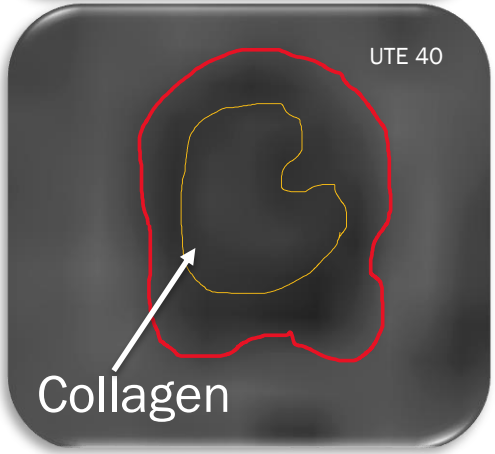
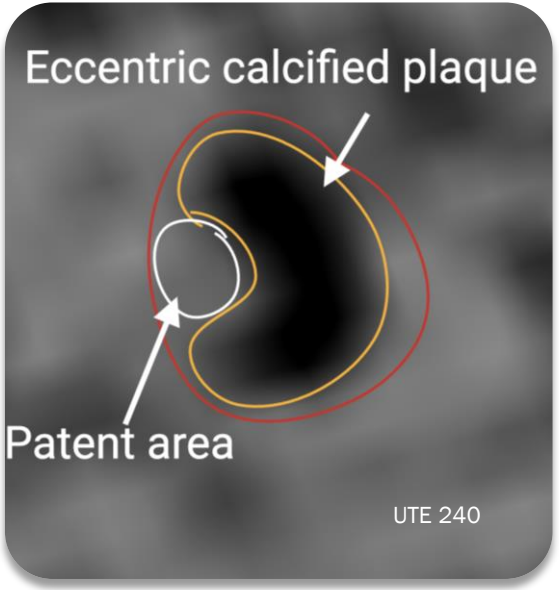
Differentiating Plaque Morphology, Tailoring Device Testing to Your Needs









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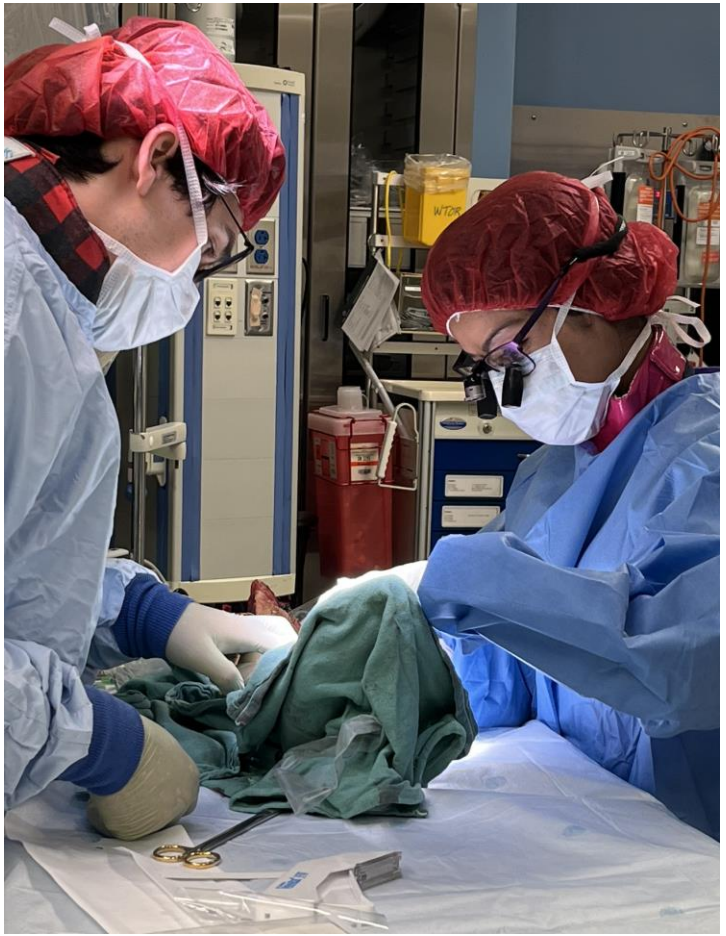
Device Testing in PVD Core/MITIE

- Photo documentation
- Video recording
- Cone beam CT
- DSA
- Device testing
- Intravascular imaging
- Harvesting vessels
- Histopathologic Analysis



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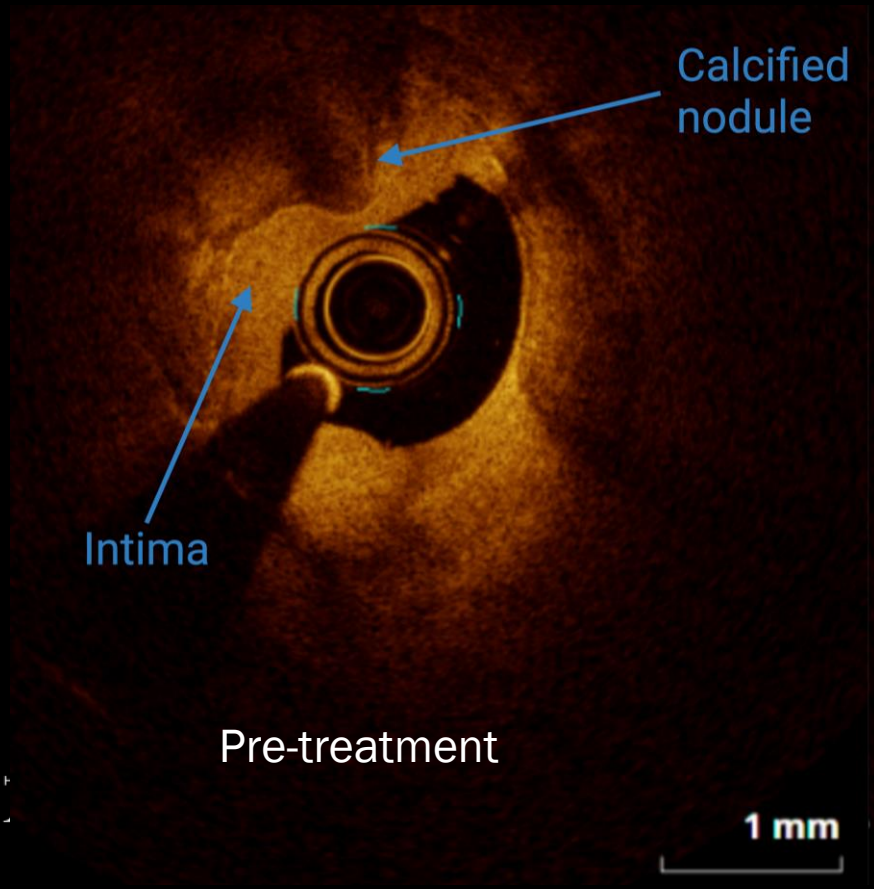
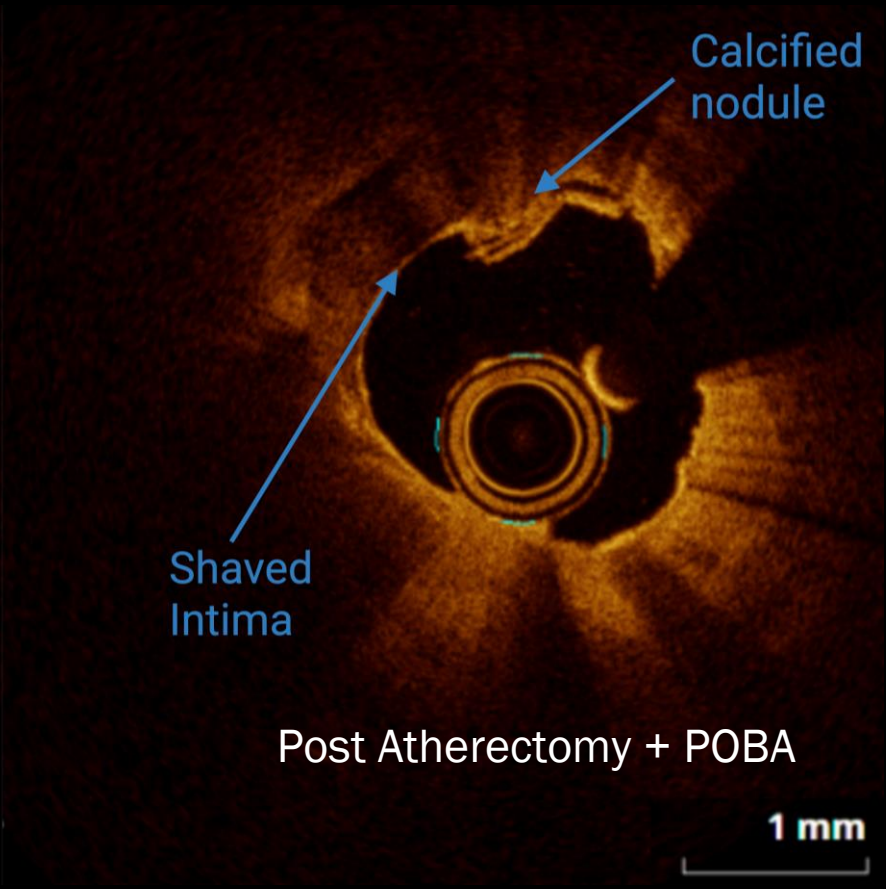
Atherectomy + POBA – Intravascular Imaging

Intra-vascular Imaging provides intra-procedural evaluation of device-vessel wall interaction.



Pre-treatment



Post Atherectomy + POBA

Ex-vivo Human Arterial Testing Thrombotic Disease

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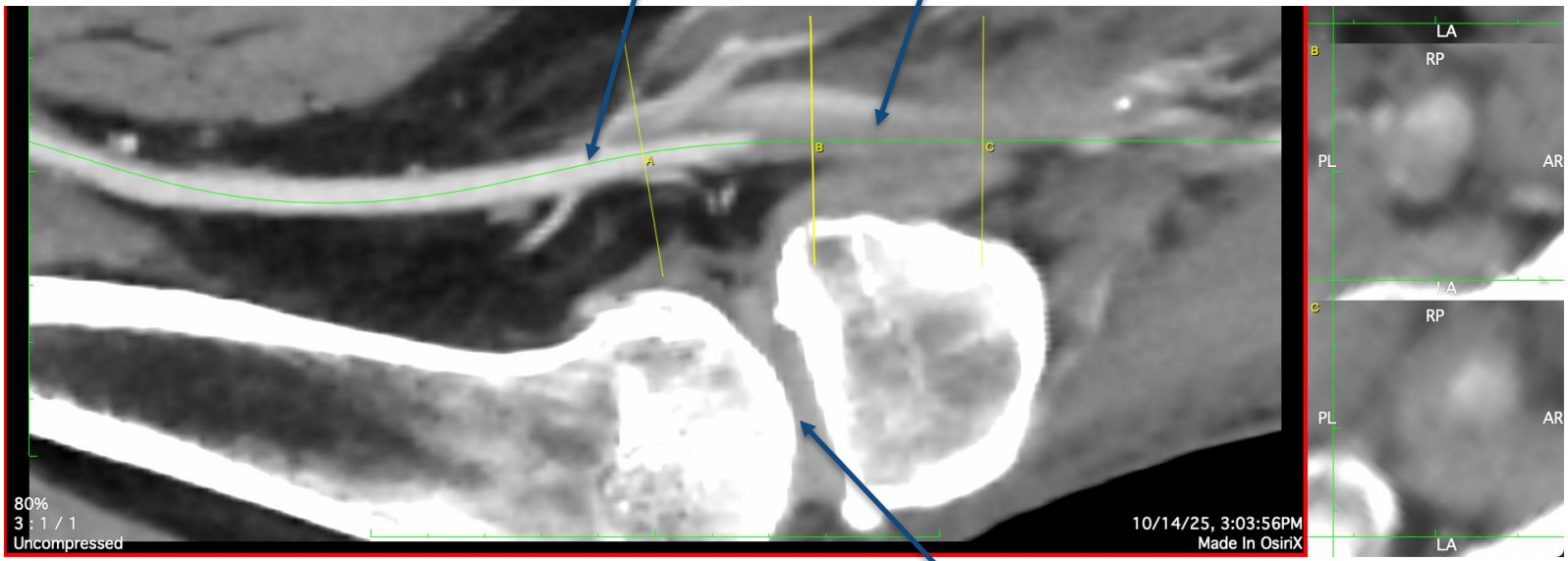
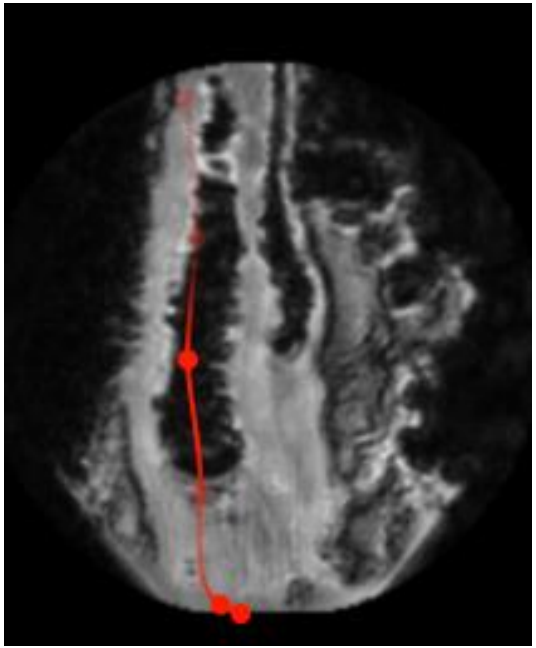
CTA – Clinical Imaging

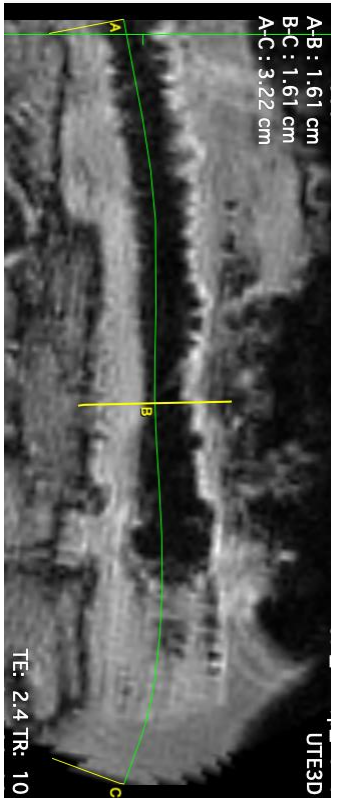
Mid Popliteal Thrombotic Occlusion



9.4T Ex-vivo MRI

- The MRI shows a short approximately 1cm section of total arterial occlusion in the distal portion of the artery.





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Ex-vivo Human Arterial Testing
Calcific Arterial Disease

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CTA

Clinical Imaging

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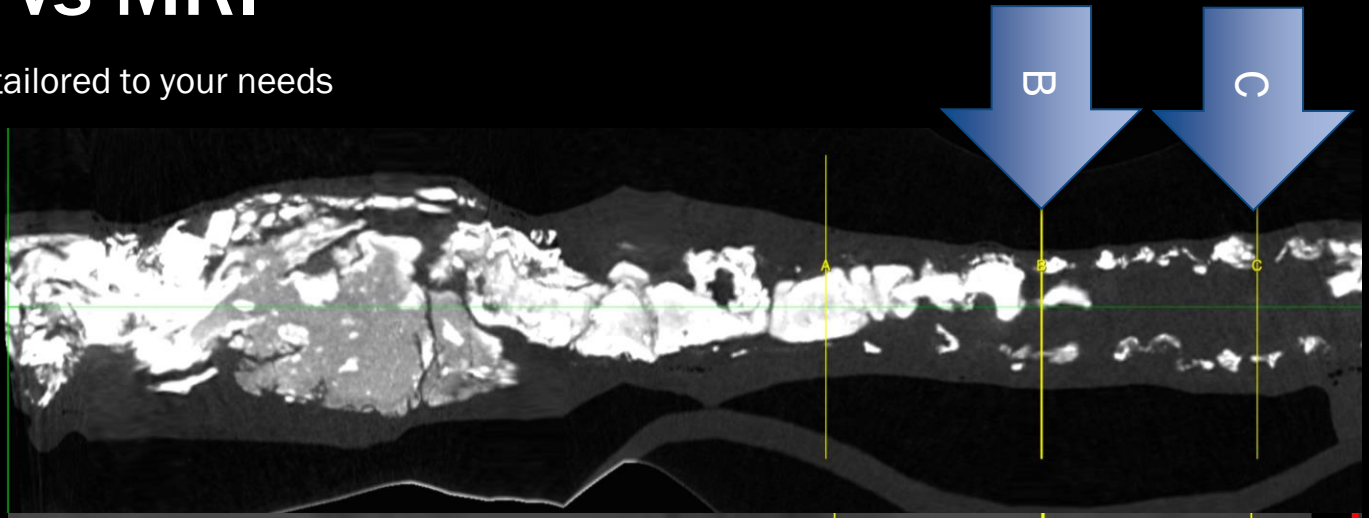
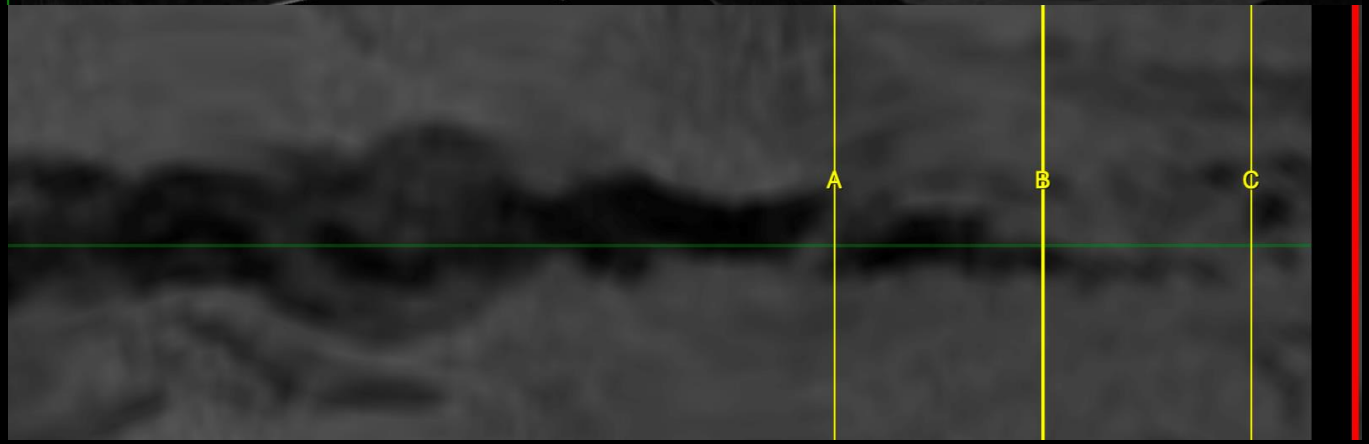
Micro CT vs MRI

Arterial Lesions are tailored to your needs

Micro CT



3T UTE MRI



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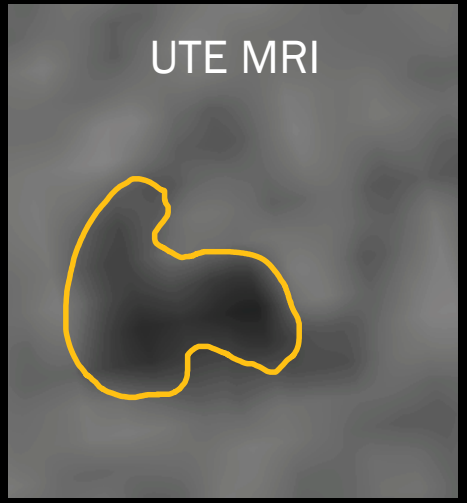
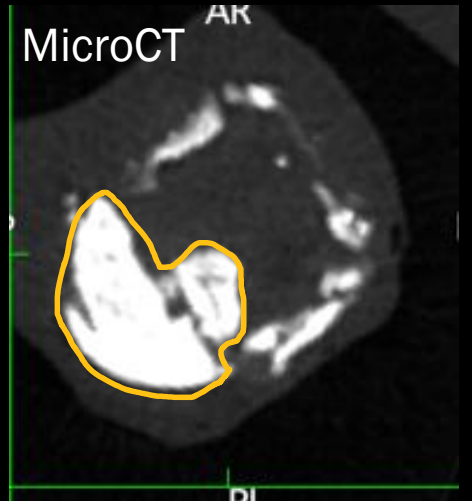
MicroCT vs MRI

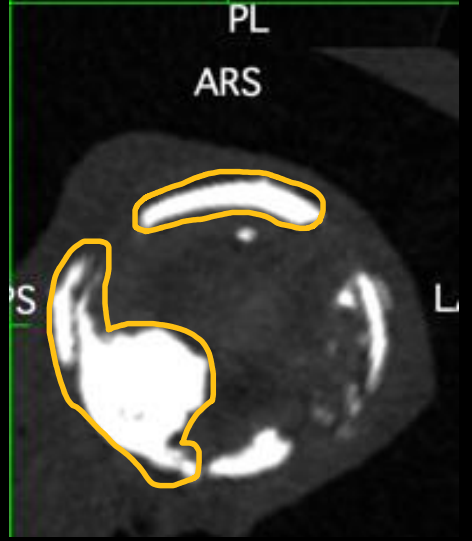
- UTE MRI of the artery within the limb identifies calcific artery disease with almost identical accuracy to ex-vivo MicroCT, optimizing device testing.

B

C







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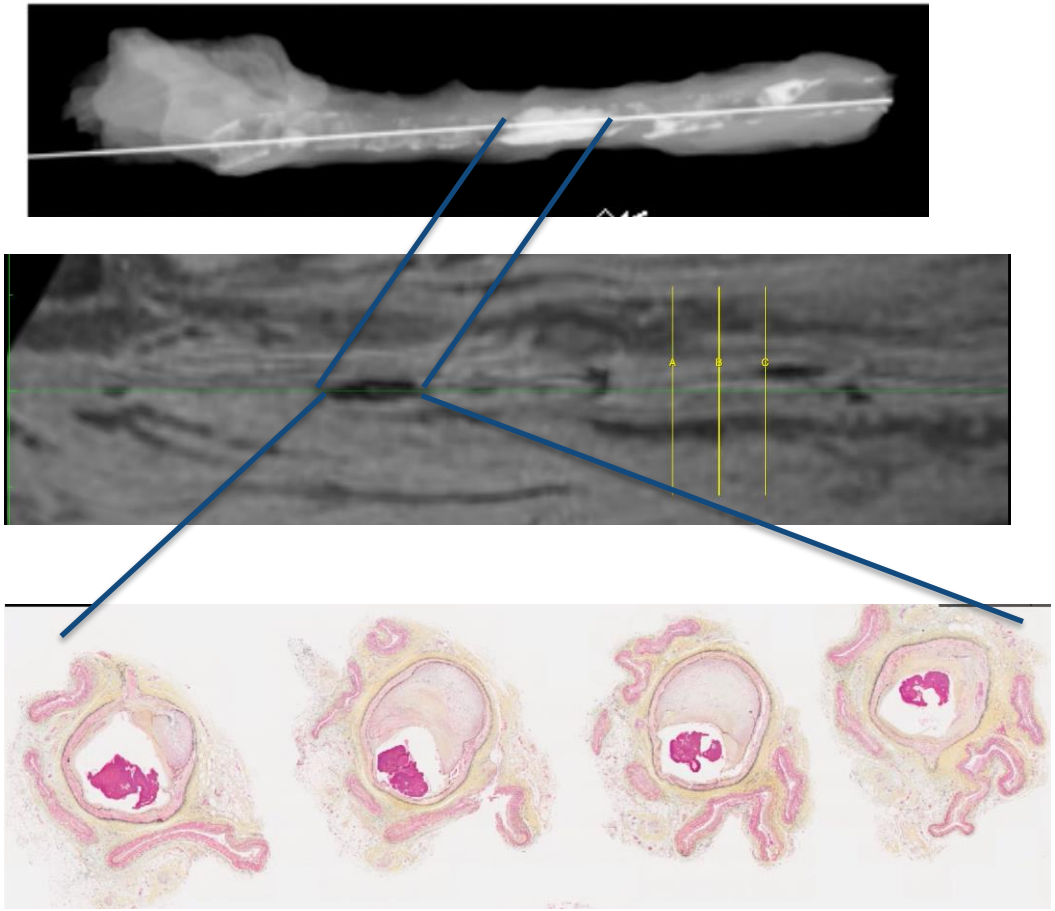
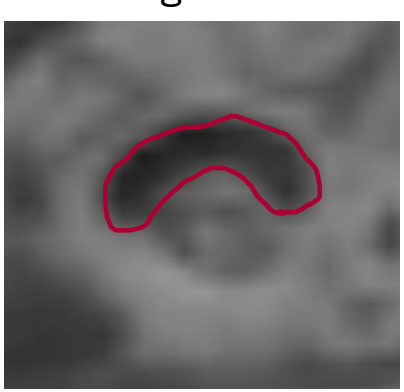
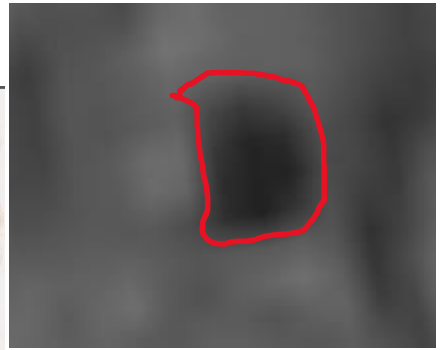
Histopathological Analysis

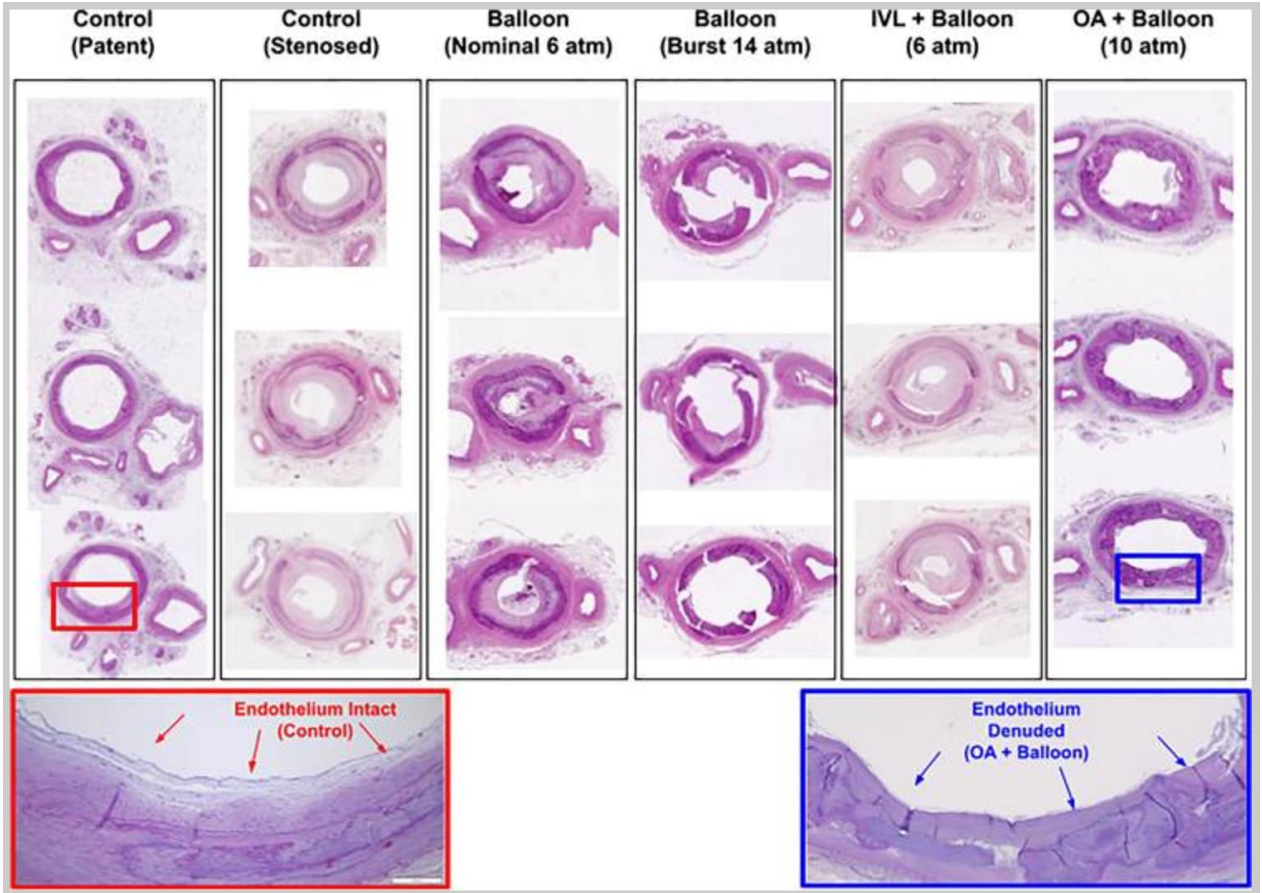


- UTE MRI of amputated limbs gives almost histopathological precision for planning your research and device testing.





Histopathological Device Comparison



- Expert Histopathologic analysis can evaluate device and vessel wall interaction in comparison to other endovascular treatments. https://pmc.ncbi.nlm.nih.gov/articles/PMC10151304/

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