

Conclusions: AZA treatment attenuates aneurysm development and progression in the intra-aortic porcine pancreatic elastase infusion AAA model. Pharmacologic strategies effective at limiting or reducing DNA methylation may have translational applications in the medical management of AAA disease.

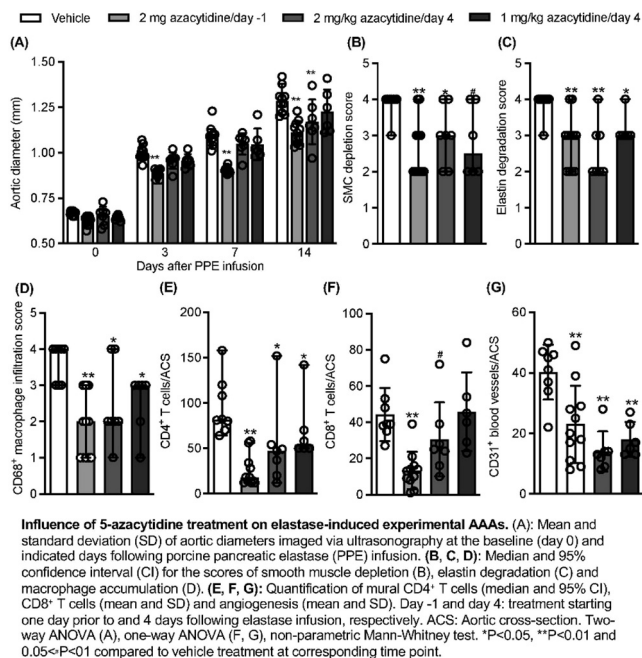


Fig.

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Monitoring Tissue Oxygen Dynamics with a Novel Implantable Hydrogel Sensor in Patients with Peripheral Arterial Disease

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Background: Tissue perfusion measurement remains a fundamental challenge in management of patients with peripheral arterial disease (PAD). Better measurement of baseline and dynamic changes after revascularization would aid clinical judgement. The Wireless Lumee Oxygen System represents a novel approach to tracking tissue oxygen via a subcutaneous hydrogel that provides noninvasive optical oxygen measurements. This study's objective was to assess the correlation of the Lumee sensor with transcutaneous oximetry (tcpO₂) in PAD patients.

Methods: The Lumee Oxygen System is a subcutaneously placed hydrogel (0.5 × 0.5 × 5.0 mm). Optical signals are captured with a skin surface reader sensing extravascular oxygenation. A pilot study assessed in vivo performance with inclusion criteria of peripheral arterial disease (Rutherford I-IV). Sensors were injected in the arm and foot and oxygenation measured before, during, and after proximal blood pressure cuff inflation (Figure) and Buerger's test modulation. The correlation (R) of oxygenation between tcpO₂ and Lumee was assessed following sensor placement at 2, 10, 90, 180, and 365 days.

Results: Eleven patients had 148 occlusion modulations over 199 days. Mean age was 67 years (range, 55-88 years); with 9% females; 45% White and 55% Black; Rutherford class I: 36%, II: 36%, and III: 27%. The median ankle-brachial index was 0.83 (interquartile range, 0.69-1.14). In the arm,

modulation was 56.9 ± 24.6% (Lumee) and 84.7 ± 9.2% (tcpO₂) (R = 0.81). In the foot, modulation was 63.4 ± 22.7% (Lumee) and 80.4 ± 15.5% (tcpO₂) (R = 0.79). No injection related adverse events occurred.

Conclusions: Occlusion-related changes in tissue oxygen can be detected by both tcpO₂ and the Lumee sensor, which strongly correlate in both the arm and foot. This pilot phase study supports expansion of the trial. The Lumee sensor shows promise for future evaluation of tissue oxygenation in PAD patients, which could be used to assess changes in tissue oxygenation over time and following revascularization.

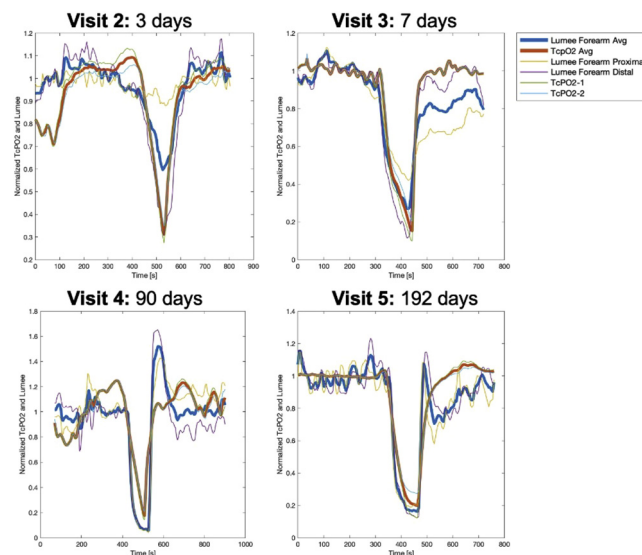


Fig.

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Comparative Assessment of Peripheral Stent Abrasiveness under Cyclic Deformations Experienced During Limb Flexion

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Background: Poor outcomes of peripheral arterial disease stenting are often attributed to the inability of stents to accommodate the complex biomechanical environment of the flexed lower limb that patients the femoropopliteal artery to bending, torsion, and axial compression. Abrasion damage to the endothelium caused by rubbing of the stent against the artery wall during limb flexion likely plays a significant role in reconstruction failure, but has been poorly characterized.

Methods: We subjected seven peripheral Nitinol stents (Misago, AbsolutePro, Innova, Zilver, SmartControl, SmartFlex, and Supera) with 6-, 7-, and 8-mm diameters to 345,600 cycles of axial compression (25%), bending (90°), and twisting (26°/cm) when deployed inside a 6-mm-diameter electrospun nanofibrillar tube with artery-mimicking mechanical properties. Abrasion was assessed semiquantitatively using a 1 (best) to 7 (worst) scoring system for each of the three deformation modes.

Results: When oversized by 1 mm, Misago had the least abrasion and no stent fractures under any deformation modes (overall score 4/21). Innova had small abrasion and no fractures under compression and torsion but fractured and penetrated the wall under bending (8/21). Supera had minimal abrasion and no fractures under bending and compression but fractured and tore through the wall under torsion (9/21). Zilver fractured under all three deformations, but had more abrasion under bending and compression than under torsion due to strut penetration (12/21).