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One-Year Evolution of Macrovascular and Microvascular Parameters After Endovascular Revascularization in Diabetic Foot Ulcers: A Prospective Multicenter Study

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Background



Diabetic foot ulcers (DFUs) with peripheral arterial disease have a high risk of non-healing and amputation. **Endovascular revascularization** improves limb prognosis, but the temporal evolution of macrovascular and microvascular parameters after the procedure and their relationship with wound healing remains unclear

Aim



To characterize the one-year evolution of macrovascular and microvascular parameters following endovascular revascularization in patients with ischemic or neuroischemic DFUs. Associations between early post-revascularization vascular parameters and wound-healing outcomes were evaluated as exploratory analyses

Methods



Prospective
multicenter study



27 ischemic or
neuroischemic DFUs



12 months
follow-up

Vascular parameters assessed:
✓ Ankle systolic pressure (AP)
✓ Toe systolic pressure (TP)
✓ Ankle-brachial pressure index (ABPI)
✓ Toe-brachial pressure index (TBPI)
✓ Transcutaneous oxygen pressure (TcPO₂)
✓ Skin perfusion pressure (SPP)



Results



26/27
DFUs healed
(96.3%)



0
major amputations

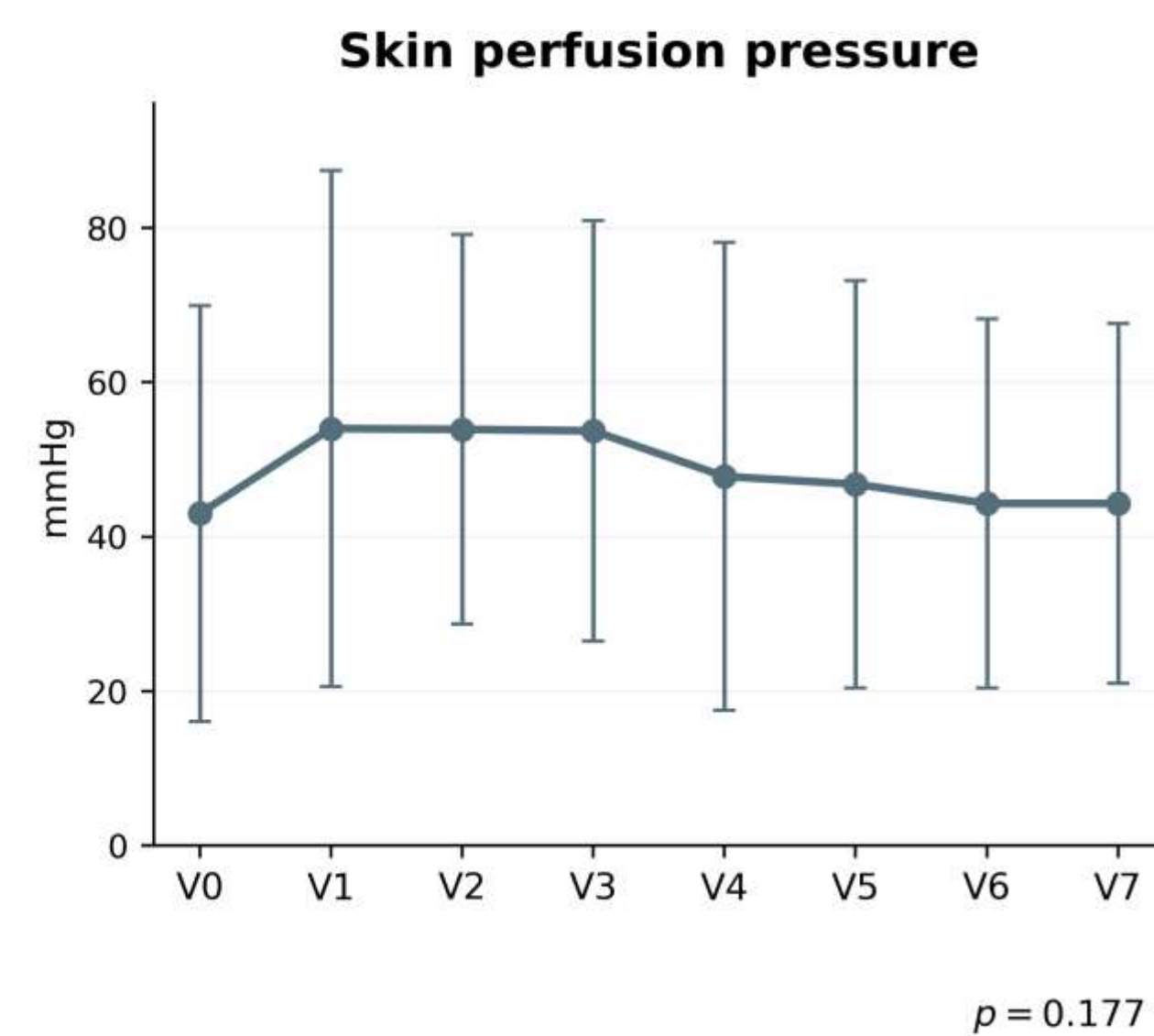
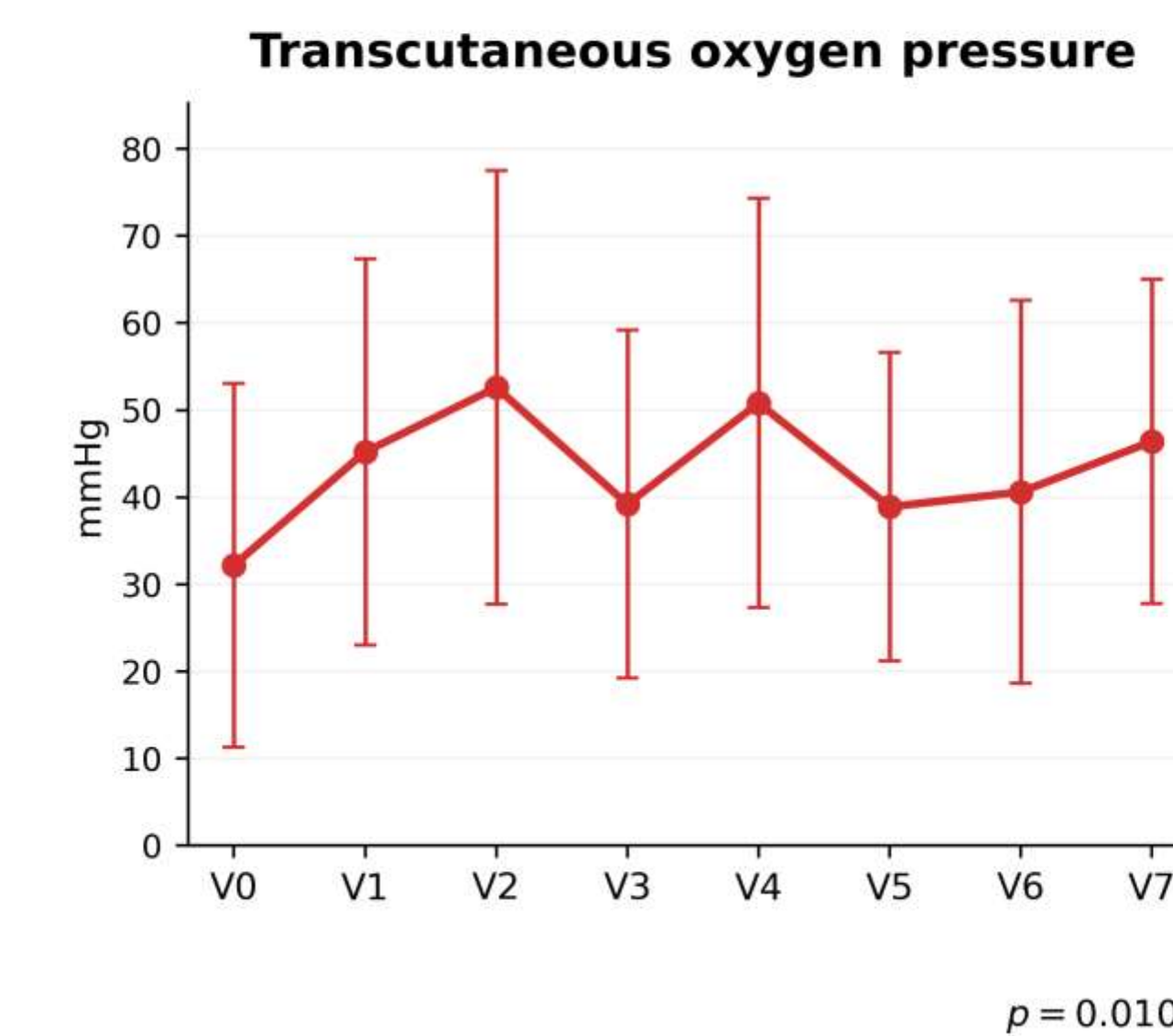
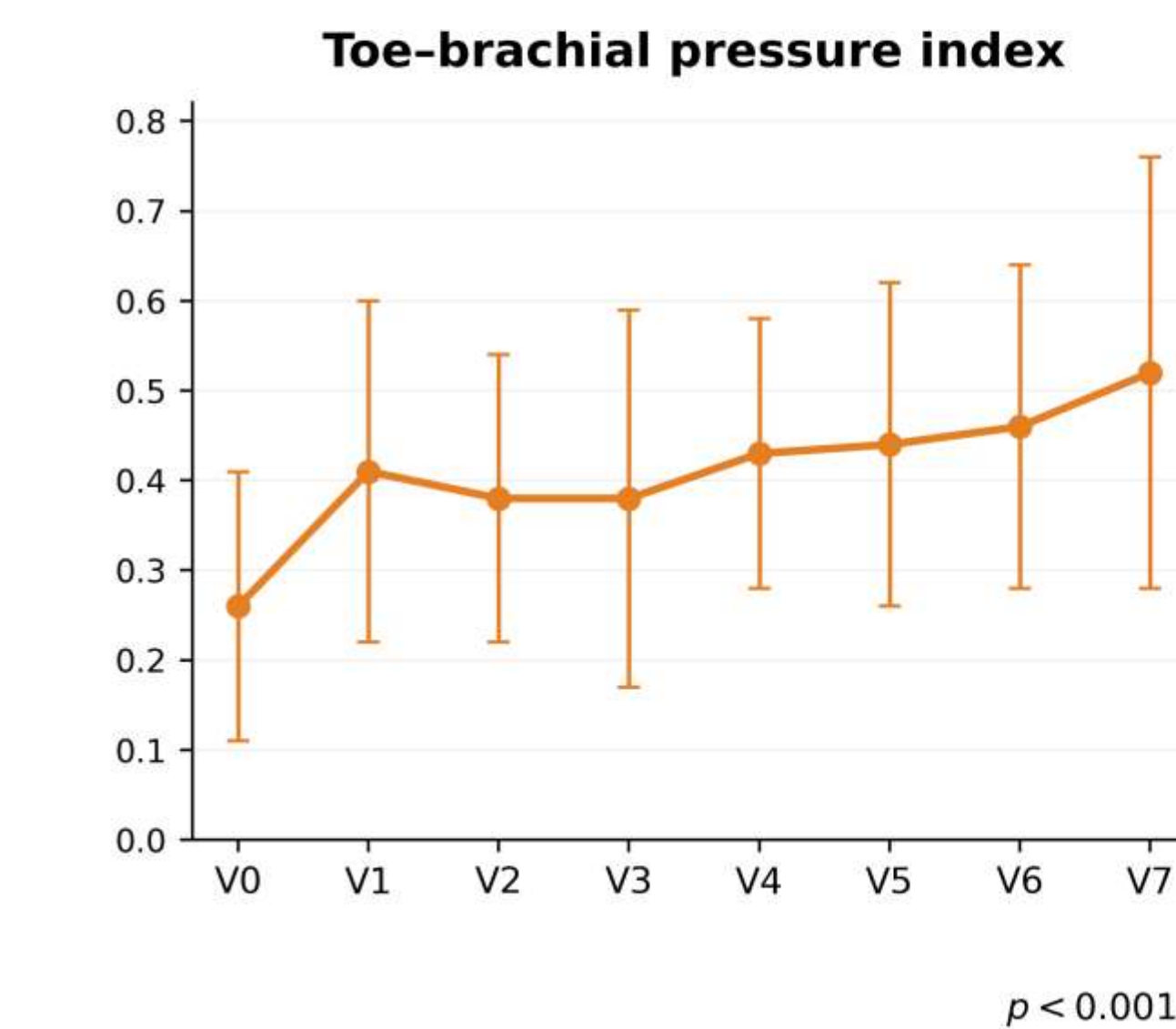
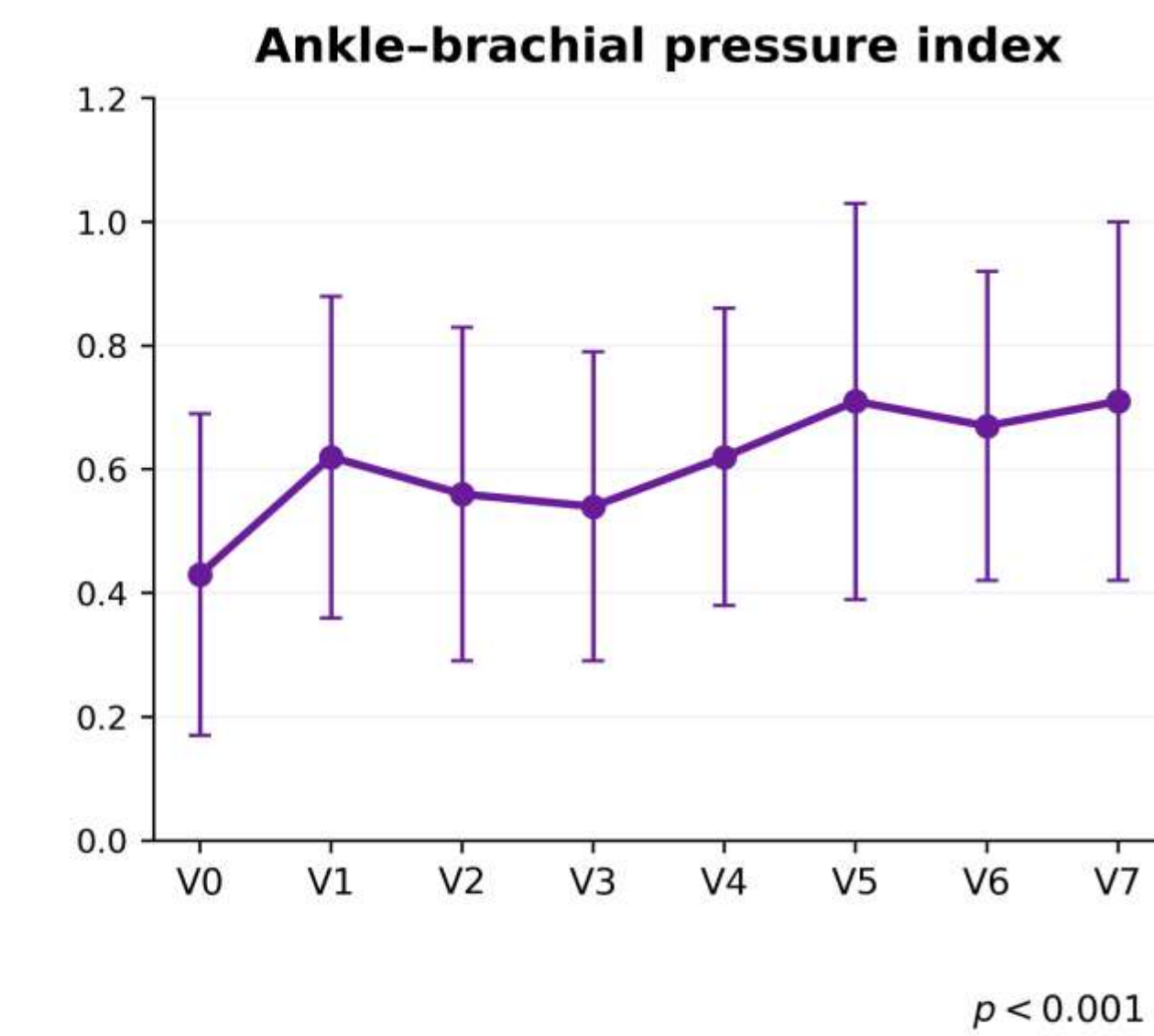
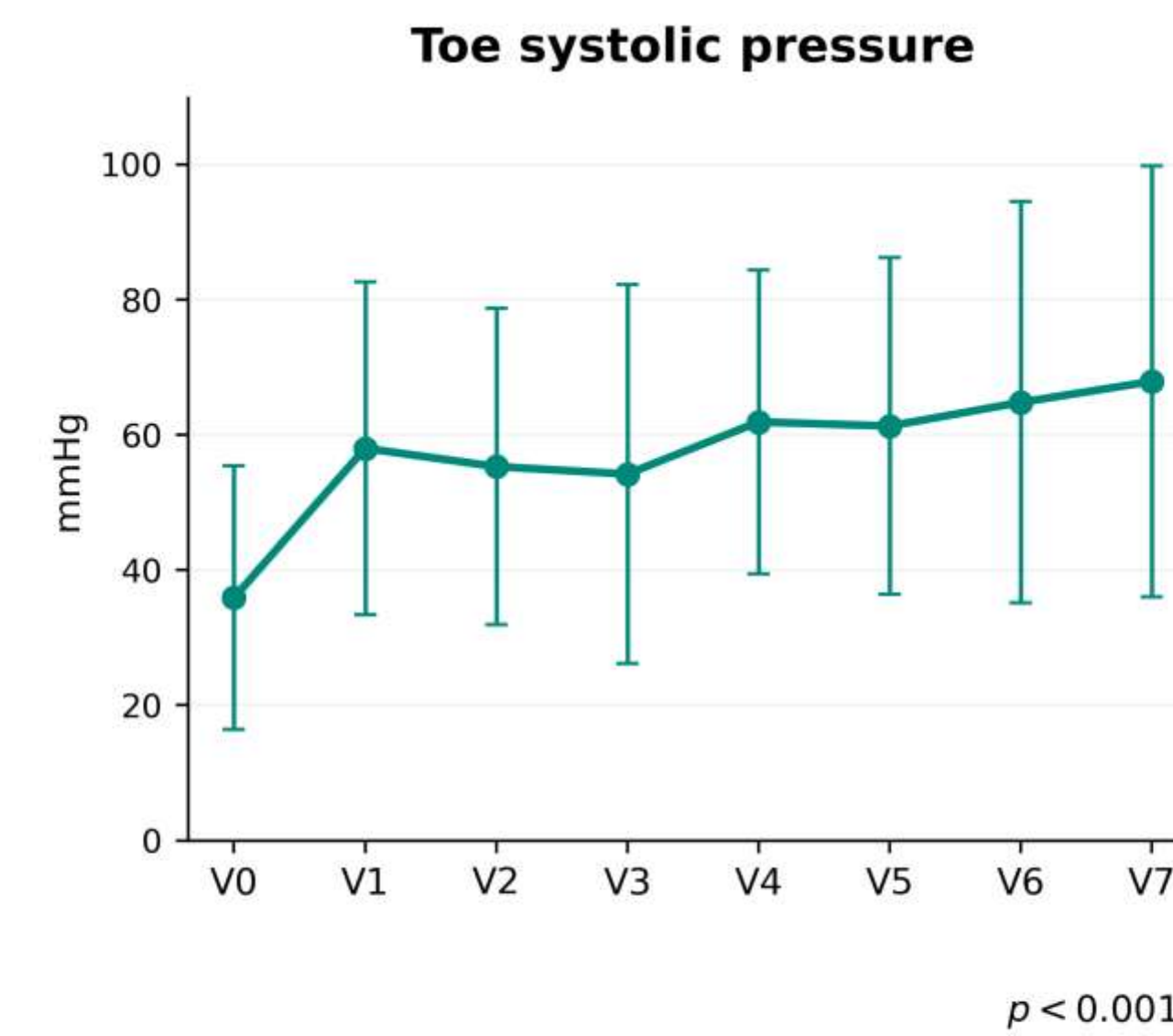
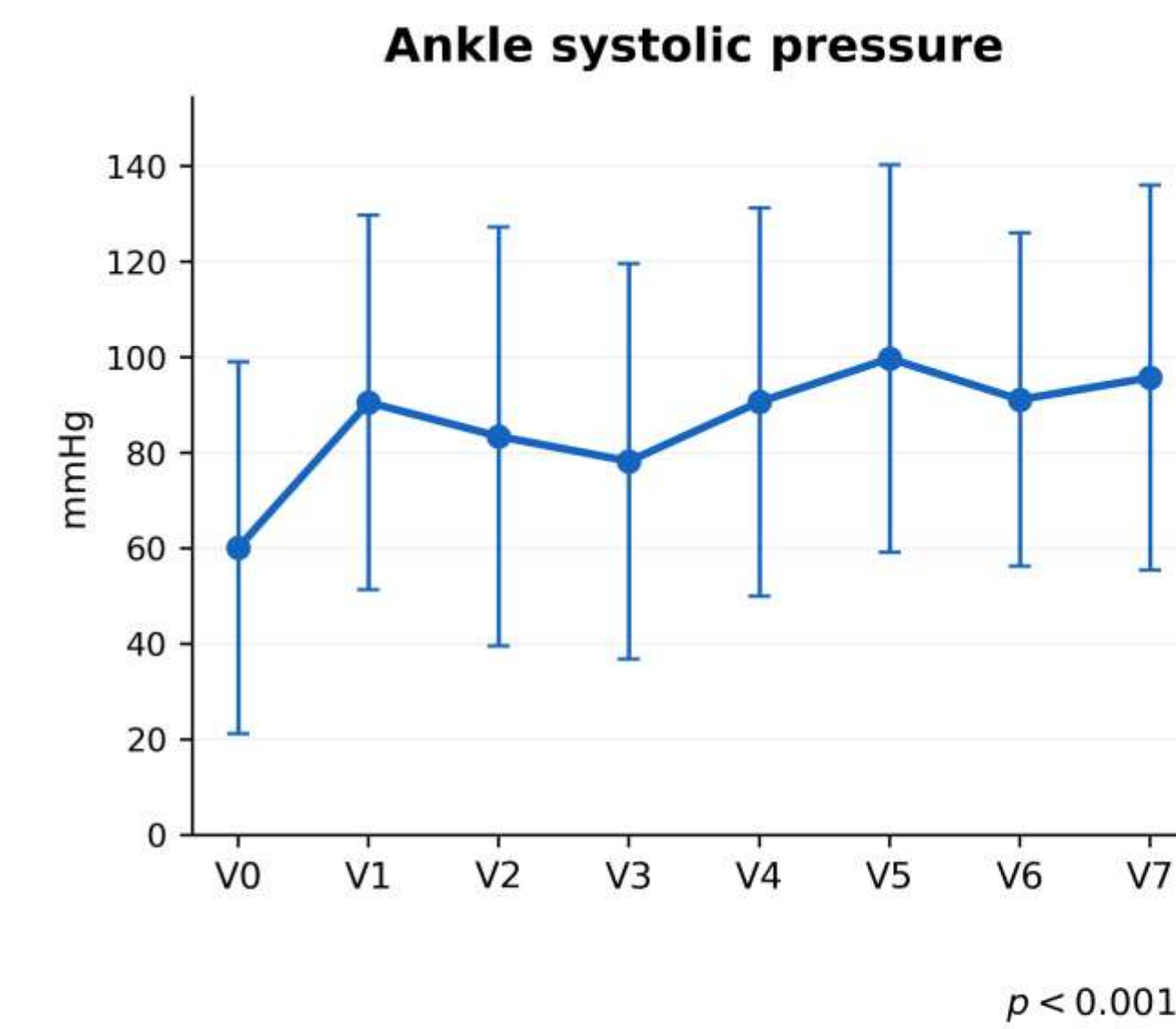


0
deaths



12 month
Follow-up

Longitudinal evolution of macrovascular and microvascular parameters



✓ **Significant improvements in AP** (60.1 ± 38.9 vs. 95.7 ± 40.3 mmHg; $p < 0.001$), **TP** (35.9 ± 19.5 vs. 67.9 ± 31.9 mmHg; $p < 0.001$), **ABPI** (0.43 ± 0.26 vs. 0.71 ± 0.29 ; $p < 0.001$), and **TBPI** (0.26 ± 0.15 vs. 0.52 ± 0.24 ; $p < 0.001$)

✓ **TcPO₂ showed a significant longitudinal effect** increasing from 32.2 ± 20.9 to 46.4 ± 18.6 mmHg over 12 months ($p = 0.010$)

✓ **SPP remained unchanged** ($p = 0.177$)

Association with wound healing



Higher AP at four weeks after revascularization was associated with shorter healing time ($\rho = -0.451$, $p = 0.024$)



TcPO₂ at four weeks was higher in DFUs with early healing (≤ 10 weeks) than in those with delayed healing (> 10 weeks) (42.5 ± 19.4 vs. 25.0 ± 20.5 mmHg; $p = 0.040$).



Conclusion

Macrovascular and microvascular parameters exhibit distinct recovery patterns following endovascular revascularization. Longitudinal assessment of both vascular compartments may provide complementary information for monitoring vascular recovery. Exploratory associations between early vascular parameters and wound-healing outcomes warrant confirmation in larger, adequately powered studies