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Peripheral Revascularization Reverses the Decline in Active Muscle Oxygen Saturation in Peripheral Artery Disease

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Peripheral artery disease (PAD) is a progressive atherosclerotic disease that limits blood flow to the skeletal muscles in the lower extremity. Reductions in blood flow may be more pronounced during ambulation or exercise and produce leg cramping or pain known as intermittent claudication. Recent studies have shown an exaggerated blood pressure response with lower muscle oxygen saturation (SmO₂) during foot exercise in patients with PAD. However, it is unclear whether surgical and/or endovascular interventions normalize this response. **PURPOSE:** To examine whether revascularization procedures improve calf muscle SmO₂ and reduce blood pressure responses during dynamic foot exercise in patients with PAD. We hypothesized that revascularization would improve SmO₂ responses (indicating greater tissue perfusion) and that the blood pressure response would be attenuated during exercise. **METHODS:** Patients with symptomatic PAD (n = 6) performed incremental supine plantar flexion exercise, starting at 0.5 kg and increased by 0.5 kg every minute for up to 6 minutes, pre- and one-month post peripheral revascularization procedure. SmO₂ was measured continuously from the gastrocnemius muscle, while heart rate and blood pressure were measured beat-by-beat. **RESULTS:** Reductions in SmO₂ from baseline to end-exercise were attenuated post-revascularization when compared to pre-intervention ($-6.5 \pm 6.2\%$ vs. $-39.8 \pm 22.5\%$, $P < .05$). The change in mean arterial blood pressure was reduced post-revascularization (4 ± 4 mmHg vs. 16 ± 12 mmHg $P < .05$). PAD patients exercised longer post-revascularization (5.8 ± 0.4 min vs. 4.0 ± 1.5 min $P < .05$). **CONCLUSION:** These data suggest that revascularization lessens the degree and rapidity of decline in SmO₂ during exercise, and lowers the exaggerated blood pressure response in patients with PAD.

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