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Evoking the Mechanoreflex Using Static and Dynamic Approaches: The Influence of Free Radicals and Sex

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Passive leg movement (PLM) and static stretching (SS) likely activate the mechanoreflex, eliciting cardiovascular responses, though comparative study is lacking. Hyperoxia elevates free radicals (FR), though it remains to be seen, if acute elevations in FR alters the mechanoreflex, and if sex may alter this response. **PURPOSE:** to directly compare the central and peripheral hemodynamic responses to SS and PLM, after normoxic (FiO_2 0.21) and hyperoxic (FiO_2 1.0) exposure in males and females. **METHODS:** In a single-blind design, 23 young healthy females (F, n=12) and males (M, n=11) inspired normoxic or hyperoxic gas for 10 min, prior to PLM (knee flexion-extension) or SS (ankle dorsiflexion). Central hemodynamics (cardiac output [CO], stroke volume [SV], and HR), were measured using a Finometer, while a near-infrared spectrometer (NIRS) assessed the microvascular response (tissue oxygen saturation, StO_2%) on the vastus lateralis. **RESULTS:** Baseline central or peripheral hemodynamics were not different for PLM and SS ($p<0.05$). Though both methods induced HR driven increases in CO, the PLM responses were greater (ΔHR: 15.0±9.5 vs 8.6±8.1 bpm, ΔCO: 1.3± 0.8 vs. 0.8±0.7 L/min, $p<0.05$). Peripherally, PLM increased StO_2 from baseline, while SS decreased StO_2 (ΔStO_2: 2.8±2.5 vs. -1.3±1.1%, $p<0.05$). Regarding sex, no differences were observed at baseline ($p>0.05$), but in response to PLM, males exhibited a greater CO response greater (ΔCO: 1.7±0.7 vs. 0.9±0.6 L/min, $p<0.05$). Peripherally, PLM increased StO_2 from baseline for both sexes ($p<0.05$), though there was a significant difference in the peripheral response to PLM between the sexes (M: 4.2±2.0 vs F: 2.3±2.7 ΔStO_2%, $p<0.05$). Hyperoxia had no effect on CO at baseline ($p>0.05$), or the response to PLM, though the sex difference persisted (ΔCO: 1.8 ± 1.0 vs 1.1 ± 0.6 L/min, M v. F, $p<0.05$). Hyperoxia increased StO_2, but the response to PLM was unaffected, though the sex specificity remained (M: 4.5±1.8 vs F: 2.1±2.7 ΔStO_2%, $p<0.05$). **CONCLUSION:** The present study directly compared two methods of evoking the mechanoreflex, which appear disparate, though unaffected by hyperoxia. Females exhibit an attenuated mechanoreflex, though, unlike the macrovascular responses to PLM which have been reported to be similar between sexes, the microvascular responses to PLM may differ.