



Mid Atlantic Regional Chapter of the American College of Sports Medicine

46th Annual Scientific Meeting, November 3rd - 4th, 2023
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 12



Limb and Sex, but Not Dietary Capsaicin, Modulate the Near-Infrared Spectroscopy-Vascular Occlusion Test Estimated Metabolism

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Assessing muscle metabolism is essential for physiological understanding, as well as studying the effects of deteriorating factors (e.g. age, disease, etc.) and mitigating strategies (e.g. exercise training). Near-infrared spectroscopy (NIRS) is known to provide a valid estimate of muscle oxidative capacity. Recently, the NIRS-vascular occlusion test (NIRS-VOT) has been purported as a simplified estimate of both metabolism and vascular reactivity, but little is known about sex/limb specificity, or whether it may be acutely altered. **PURPOSE:** Thus, we investigated the effects of acute dietary capsaicin treatment on muscle metabolism using tissue deoxygenation rates (DeO₂) during a NIRS-VOT, and if there is limb- or sex-specificity in this assessment. **METHODS:** Forty-five young healthy men (n=25, 21±4yr) and women (n=20, 20±1yr) ingested either placebo or capsaicin, in a counterbalanced, blinded, placebo-controlled, crossover design after which a simplified NIRS-VOT was conducted to determine the DeO₂ (change in tissue oxygen saturation, StO₂, %/s), as an estimate of oxidative muscle metabolism, in both the forearm (FA) and quadriceps (Q, vastus lateralis). Slope was derived during the initial 10 s of rapid occlusion. Handgrip maximal voluntary contraction (MVC), site skinfold thickness, and body mass index (BMI) were measured to determine relation to DeO₂. **RESULTS:** There was a significant limb effect with the Q having a greater DeO₂ than the FA (-2.31±1.34 vs. -1.78±1.22%/s, p=0.01, η_p²=0.19). There was a significant effect of sex on DeO₂ (p=0.01, η_p²=0.20) with men exhibiting a lesser DeO₂ than women (-1.73±1.03 vs. -2.36±1.32%/s, respectively). This manifested in significant interactions of limb and capsaicin (p=0.00, η_p²=0.26) as well as limb, capsaicin, and sex on DeO₂ (p=0.01, η_p²=0.16) being observed. In the FA under placebo, modest positive relation between DeO₂ and MVC (r=0.37, p=0.02) but negative relations with skinfold thickness (r=-0.34, p=0.02). However, there were no significant relations between DeO₂ in both FA and Q with weight (p> 0.92, r<0.13), Skinfold Q (p=0.43, r=0.13) or BMI (p>0.89, r<-0.27). **CONCLUSION:** Capsaicin treatment does not induce favorable changes in O₂-dependent metabolism in muscle, but there are apparent limb and sex specificity in such NIRS-derived assessments. **SIGNIFICANCE/NOVELTY:** A simplified integrated vascular occlusion test, using near infrared spectroscopy has been suggested to provide estimate of oxidative muscle metabolism and vascular reactivity. If such a test is to be adopted, understanding how factors such as sex or limb may alter the results is paramount. Further, whether dietary capsaicin acutely impacts this estimate of metabolism is unknown. We demonstrate that sex and limb, but not acute capsaicin, significantly influence the deoxygenation slope, and needs to be considered in the design of studies using the NIRS-VOT.