TACSM Abstract

Comparison of Skeletal Muscle Tissue Oxygen Saturation Responses between Genders

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ABSTRACT

Special attention should be given to subcutaneous thigh fat accrual and its impact on the amount of skeletal muscle blood flow and accumulation when using different initial restrictive pressure (IRP) during blood flow restriction (BFR) training. Due to different patterns of fat distribution and deposition in males and females, it is important to test the effects of subcutaneous fat on tissue oxygenation and lactate production during exercises with BFR. **PURPOSE**: The present study investigated the importance of thigh subcutaneous fat as a variable that may be associated with affecting the magnitude of initial pressure (tightness of cuffs before inflation with air) on skeletal muscle tissue oxygen saturation and lactate between males and females. **METHODS**: Twenty healthy volunteers, 10 males (25 ± 4.83 yr) and 10 females (20.7 ± 1.06 yr), performed exercises with an IRP of 40mmHg. The following procedures were performed in order: a) subcutaneous fat thickness, b) pre-maximal isometric force (MVC), c) 4 sets (1 × 30 reps and 3 × 15 reps) of dynamic knee extension exercises performed at 20% MVC, d) post-MVC. Skeletal muscle tissue oxygen saturation was continuously monitored before, during, and after exercises with near-infrared spectroscopy placed to a mark that was made at 50% on the line from the anterior superior iliac spine to the superior part of the patella. Plasma lactate levels were assessed prior to, in between the first and second set, immediately after post MVC, 5min-post, 10 min-post, and 20 min-post. **RESULTS**: Thigh subcutaneous fat thickness was significantly greater in females than males ($p<0.01$). Tissue oxygenation significantly decreased ($p<0.03$) throughout exercise in both genders with an observed significant time × gender interaction ($p<0.01$). Both male and females responded to the BFR similarly with a significant decrease ($p<0.01$) in peak force production from pre to post exercise, while plasma lactate levels significantly differed ($p<0.01$) throughout the exercise with no time × gender interaction ($p<0.3$). **CONCLUSION**: The observed gender difference in tissue oxygenation in response to BFR with an IRP of 40mmHg underline the necessity for future studies to consider subcutaneous fat as a variable to influence the magnitude of physiological adaptations between genders and adjust the IRP accordingly.