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The effect of temperature on eccentric contraction-induced isometric force loss in isolated perfused rat medial gastrocnemius muscle

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Abstract

***Background*:** The typical features of eccentric exercise-induced muscle damage are delayed-onset muscle soreness (DOMS) and prolonged loss of muscle strength. It has been shown that passive warmth is effective in reducing muscle injury. Due to the interaction of different systems in vivo, we used isolated perfused medial gastrocnemius skeletal muscle to study the direct effect of temperature on the eccentric contraction-induced force loss.

Methods: After femoral artery cannulation of a rat, the left medial gastrocnemius muscle was separated and then the entire lower limb was transferred into a prewarmed (35^{oC}) chamber. With the chamber temperature at 31, 35 and 39^{oC} before and during eccentric contraction. Isometric force loss was measured after 15 eccentric contractions (N=7-9).

Results: Maximum contraction force reduction has been used as an index for eccentric contraction-induced force loss. In this study eccentric contraction caused a significant reduction in maximum isometric tension ($p<0.01$), but no significant difference was seen in isometric force loss at 31^{oC} and 39^{oC} compared with that at 35^{oC}.

Conclusions: Our results suggest that temperature changes before or during eccentric contractions have no effect on eccentric contraction-induced force loss.

Keywords: Isolated perfused muscle, skeletal muscle, eccentric contractions, isometric force, gastrocnemius muscle, temperature.