研究業績　英文表記

和文	
表題	高強度ストレッチング前のホットパックが及ぼす影響の検討
著者名	中村雅俊 [1)], 佐藤成 [1)], 讃岐二葉 [1)], 村上優太 [1)], 清野涼介 [1)], 八幡薫 [1)], 吉田麗玖 [1)], 武内孝祐 [2)]
所属	1) 新潟医療福祉大学 2) 神戸国際大学 3) Londrina State University
英文	
Title	Effects of hot pack application prior to high-intensity stretching on quadriceps muscle
Author	Nakamura M[1)], Sato S[1)], Sanuki F[1)], Murakami Y[1)], Kiyono R[1)], Yahata K[1)], Yoshida R[1)], Fukaya T[1)], Takeuchi K[2)]
Affiliation	1) Niigata University of Health and Welfare 2) Kobe International University
Abstract	Aim: High-intensity static stretching is assumed to increase the range of motion (ROM) and/or decrease muscle stiffness; however, the effects of high-intensity static stretching on the quadriceps muscle have been debated. Hot pack application prior to high-intensity static stretching was assumed to decrease stretching pain, which is the main problem in high-intensity static stretching, and decrease quadriceps muscle stiffness. This study aimed to examine hot pack application prior to high-intensity static stretching on stretching pain, knee flexion ROM, and quadriceps muscle stiffness. Methods: In total, 21 healthy sedentary male participants randomly performed two conditions: high-intensity static stretching and hot pack application prior to stretching. Static stretching was performed at three 60-s stretching interventions with a 30-s interval were performed. Then, a 20-min hot pack application was done before high-intensity static stretching. The knee flexion ROM and shear elastic modulus of the quadriceps muscle were measured by ultrasonic shear-wave elastography before and after the static stretching intervention. Results: The results showed that stretching pain after hot pack application prior to stretching was lower than that high-intensity static stretching alone. Significant increases were also found in knee flexion ROM after both stretching interventions, but no significant difference was noted in the increase in the knee flexion ROM with or without hot pack application. No significant change was found in quadriceps muscle stiffness under both conditions. Conclusion: Our results suggest that hot pack application prior to high-intensity static stretching could decrease stretching pain, but no significant difference in knee flexion ROM increase was found.
keyword	ultrasound, shear elastic modulus, stretch tolerance, visual analog scale, static stretching

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