

研究業績 英文表記

和文	
表題	ホールドリラックスストレッチングとスタティックストレッチングが腓腹筋筋腱複合体の他動的性質に及ぼす影響の検討
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英文	
Title	Acute effects of stretching on passive properties of human gastrocnemius muscle–tendon unit: Analysis of differences between hold–relax and static stretching
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Abstract	<p>Context: Hold-relax stretching (HRS) and static stretching (SS) are commonly used to increase joint range of motion (ROM) and decrease muscle stiffness. However, whether there are differences between acute effects of HRS and SS on end ROM, passive torque, and muscle stiffness is unclear. In addition, any differences between the mechanisms by which HRS and SS lead to an increase in end ROM are unclear.</p> <p>Objective: To compare the acute effects of HRS and SS on the passive properties of the gastrocnemius muscle-tendon unit (MTU), end ROM, passive torque, and muscle stiffness in vivo and to investigate the factors involved in increasing end ROM.</p> <p>Design: Crossover experimental design.</p> <p>Participants: 30 healthy men (21.7 ± 1.2 y) with no history of neuromuscular disease or musculoskeletal injury involving the lower limbs.</p> <p>Intervention: Both HRS and SS of 30 s were repeated 4 times, lasting a total of 2 min.</p> <p>Main outcome measures: End ROM, passive torque, and muscle stiffness were measured during passive ankle dorsiflexion using a dynamometer and ultrasonography before and immediately after HRS and SS.</p> <p>Results: The results showed that end ROM and passive torque at end ROM significantly increased immediately after both HRS and SS, whereas muscle stiffness significantly decreased. In addition, the percentage change in passive torque at end ROM on use of the HRS technique was significantly higher than that after use of the SS technique. However, the percentage change in muscle stiffness after SS was significantly higher than that with HRS.</p> <p>Conclusion: These results suggest that both HRS and SS can effectively decrease muscle stiffness of the gastrocnemius MTU and that HRS induces a change in the passive torque at end ROM--i.e., sensory perception--rather than changing muscle stiffness.</p>

keyword	muscle stiffness; ultrasonography; proprioceptive neuromuscular facilitation stretching; passive torque; stretch tolerance
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