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Justification: Foam rolling (FR) is a self-massage technique widely used in rehabilitation and physical training. Among the mechanisms that justify the functional changes of FR, muscle and skin temperature and tendon stiffness are discussed as physiological and biomechanical mechanisms for these effects. However, the effects of different methods of applying this technique on skin temperature and tendon stiffness are still little explored. Objective: To investigate the effects of different FR protocols on the skin temperature of plantar flexors (PF) and Achilles tendon (AT) stiffness. Methodology: 20 subjects of both sexes (26±5.2 years) participated in this crossover study and were randomized into three conditions: FR90 (3x30s), FR180 (3x60s) and control (CTRL). FR was applied to the PFs and AT. Skin temperature of the PF and AT were obtained using a thermographic camera. The AT stiffness was calculated from AT force and elongation assessed during ramp contractions on an isokinetic dynamometer synchronized with an ultrasound. Results: The skin temperature increased in PF after FR90 (1.4%), FR180 (2.4%) and CTRL (1.7%), as well as in the AT (FR90: 1.4%, FR180: 2.4%, CTRL: 2.5%). The AT stiffness decreased after all conditions (FR90: 10.3%, FR180: 31,5%, CTRL: 13.5%). There was no difference among the conditions for skin temperature and AT stiffness. In conclusion, although the application of FR altered skin temperature and tendon stiffness, changes also occurred in the CTRL group. Thus, it is possible that the observed changes could be attributed to other factors (e.g., assessment procedures) rather than the application of FR.