Acute effects of foam rolling with different pressure loads on viscosity of myofascial tissue and joint flexibility – a randomized controlled trial

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BACKGROUND Exerting pressure on myofascial tissue using a foam roll (FR) is assumed to reduce viscosity of myofascial tissue. However, empirical evidence is lacking [1]. We study the effect of different pressure loads exerted to the calf on the change of tissue viscosity (Δvisc) and its interrelations with changes in joint flexibility (Δflex).

METHODS The study was conducted in accordance with the declaration of Helsinki. 60 Participants (29 female, age 23.5 ± 3.34 years) were randomly assigned to a low pressure (Glow, 7.5 % of body weight), a high pressure (Ghigh, self-selected and still comfortable, M = 18.8 ± 4.03 % of body weight), and a resting group (Gcontrol). During treatment, participants lay in a prone position while an experimenter rolled the FR using a device (Figure 1) for 3 minutes (2.5 s for one direction) over the calf. Pre- and post-measures: (1) Viscosity of the myofascial tissue was quantified by the penetration depth of the FR into the tissue based on kinematic data recorded with a motion capturing device (MCU Move, LaiTronic). FR was rolled over the calf four times with a 5 kg load and the average maximum penetration depth was used. (2) Ankle joint flexibility using a modified weight bearing lunge test. (3) Since possible fluid shifts (Δfluid) caused by horizontal position and the FR-treatment might influence Δvisc, we determined the maximum circumference of the lower leg.

RESULTS We found a correlation of the Δfluid and the Δvisc measures (r = -.30, p = .03) and, therefore, performed a residual analysis for the Δvisc measures. A one-way ANOVA of the residual Δvisc measures missed statistical significance (F(2,52) = 1.8, p = .18, η² = .06, Figure 2). There is, however, a small but significant correlation between residual Δvisc and Δflex (r = .27, p = .04).

CONCLUSION Results indicate the validity of the new method to quantify tissue viscosity and confirm the assumed correlation of tissue viscosity and joint flexibility. Furthermore, results show a tendency for larger effects on tissue viscosity when foam rolling with higher pressure loads.

REFERENCES