

# Acute Impact of Foam Rolling and Tissue Flossing on Thigh Muscles: Effects on Jump Performance and Muscle Viscoelasticity

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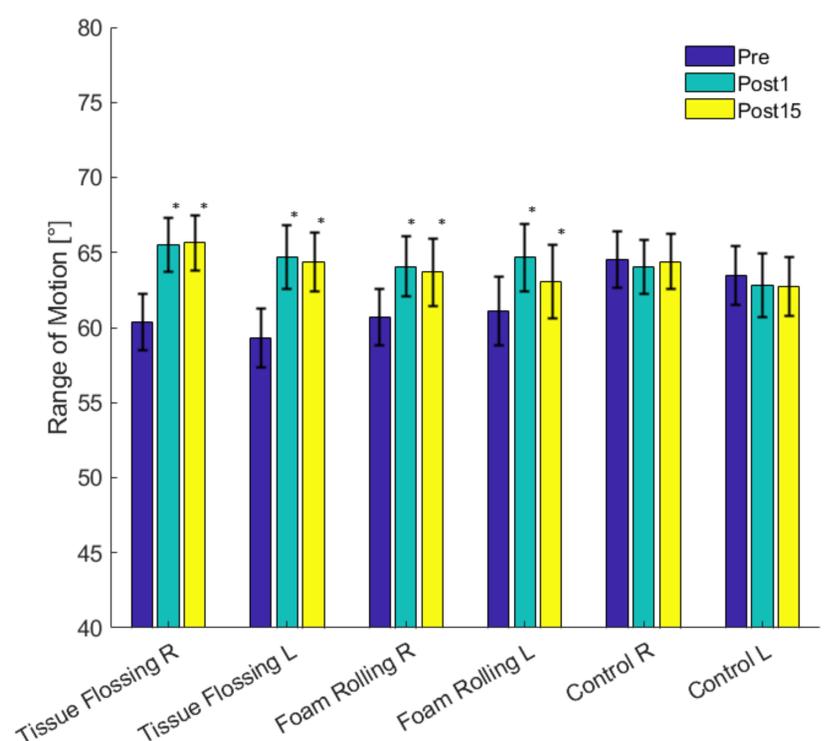
## Introduction:

This study investigates the effects of tissue flossing (TF) and foam rolling (FR) on athletic performance, focusing on range of motion, jump ability, and muscle properties. Despite TF's popularity, its impact remains unclear, partly due to limited comparative research with FR. (1). Thus, this study aims to evaluate and contrast the efficacy of TF and FR in terms of their effects on range of motion (ROM), jump performance, and the viscoelastic characteristics of the muscle.



**Methods:** Cross-over design of the study, where 30 male handball players underwent three types of conditioning: TF, FR or CON. The study used a comprehensive methodology that included an active knee extension test, jump performance evaluation - measured using force plates, and viscoelastic properties of Biceps Femoris (BF), Rectus Femoris (RF) and Vastus Lateralis (VL) of both legs. Participants were measured before conditioning and respectively in 2nd and 15th minute after conditioning activity. Two-way repeated measures ANOVA was used to evaluate the data.

## Comparison of pre and post ROM measurements for each condition and limb. R- right, L – left.



**Results:** TF and FR significantly improved ROM in both legs when compared to the CON, however no significant differences occurred between any of the conditions. Jump height experienced a significant drop post-intervention in the FR group, while no changes were observed for TF and the control group. Braking Rate of Force Development showed significant improvement in the TF group when compared pre and post max value. ANOVA analysis revealed no significant differences between the interventions in measurements of viscoelastic properties, and none of the interventions showed significant improvements when compared to the CON. However, TF had significantly decreased muscle stiffness in right VL and both RF, whereas FR significantly decreased muscle stiffness and muscle tone in all muscles.

## Jump performance timeline

Conditioning	Jump Height [m]			Braking Rate of Force Development [N/s]		
	Pre	Post1	Post15	Pre	Post1	Post15
Control	0.36 ± 0.06	0.36 ± 0.06	0.35 ± 0.06	5979 ± 3616	5866 ± 2603	5741 ± 2312
Tissue Flossing	0.34 ± 0.09	0.35 ± 0.06	0.34 ± 0.05	5215 ± 2475	5735 ± 2452	5909 ± 1988 *
Foam Rolling	0.37 ± 0.09	0.35 ± 0.05	0.34 ± 0.05	6051 ± 3350	5760 ± 3513	5849 ± 2772

**Conclusions:** Our findings indicate that tissue flossing did not demonstrate superior improvements in ROM, muscle tone and stiffness, or jump performance compared to foam rolling. However, both tissue flossing and foam rolling showed significant improvements in hamstring flexibility. Considering that FR had a negative impact on jump height performance, but both were effective in improving hamstring flexibility, it is reasonable to suggest that method which is going to be as a part of a warm-up routine should be carefully selected based on our exercise objective.