Acute effects of Foam-Rolling on volume alterations of the lower limbs and perceived pain

Kühnemann, M., Praeger, A., Baumgart, C., Hoppe, M. W., Freiwald, J.

University of Wuppertal, Department of Movement and Training Science, Wuppertal, Germany

Introduction

Foam-Rolling (FR) is a popular intervention in sport and therapy and is used during warm-up and regeneration procedures [1] as well as in the treatment of myofascial disorders [2]. However, the high mechanical pressure inducted physiological effects of FR on the underlying tissue and associated potential risks are unknown [3]. Edema could indicate volume alterations caused by inflammation due to the application of FR. Additionally, the perceived pain as a physiological warning system is not well examined during FR exercises. However, substantial pressure pain after FR is perceived [1]. Therefore, this study aimed to investigate the acute effects of FR on volume alterations of the lower limbs and perceived pain.

Methods

27 males (27.6±4.3 yrs; 181.5±6.4 cm; 88.2±13.6 kg) executed 2x30 repetitions of FR on the calf and also at the anterior, posterior and lateral thigh of the treated leg. The non-treated leg acted as a control. Volume of the lower limbs were measured with an optoelectronic scanner (Perometer, Pero-System Messgeräte GmbH, Wuppertal, GER) 30 and 15 minutes before and after FR. To determine volume alterations, the lower limbs were divided into the thigh, knee, and calf. Perceived pain was measured via visual analog scale (VAS). Volume alterations were investigated by a repeated ANOVA and following-up T-Tests, perceived pain was examined by a Wilcoxon-Test. The significance level was defined as p<.05. The study design is shown in figure 1.

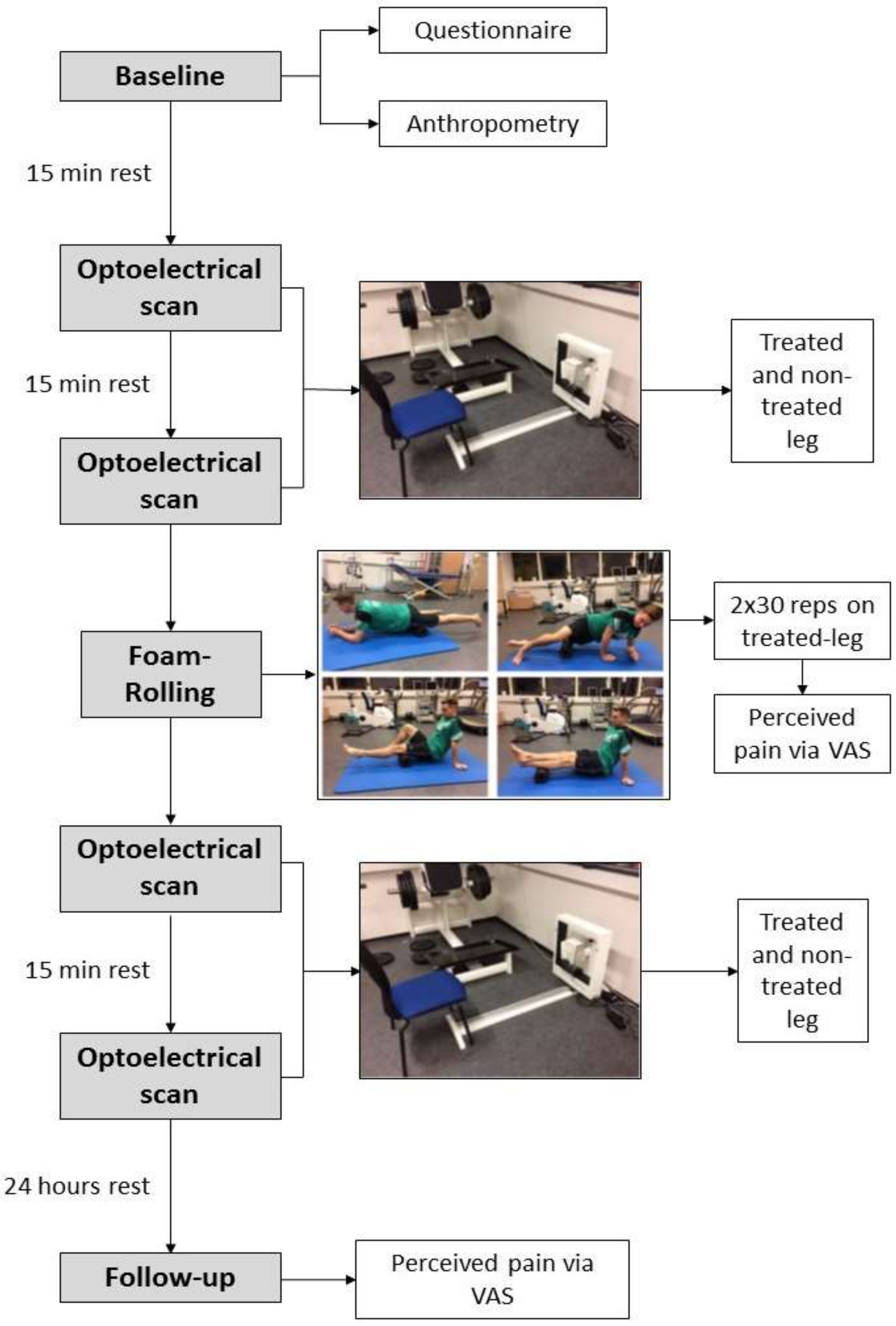

Figure 1. Study design

Results

A significant main effect was observed for the volume of the calves on the treated (p=.011) and non-treated leg (p=.001)(Figure 2). Thereby, the volume of the treated leg significantly decreased post (-0.9%, p=.026) and remained reduced 15 min after FR (-0.9%, p=.005). The volume of the non-treated leg also significantly decreased at both times of measurement (post: -1.0%, p<.001; post15: -1.05%, p<.001). No main effects were observed for the volume on thighs and knees.

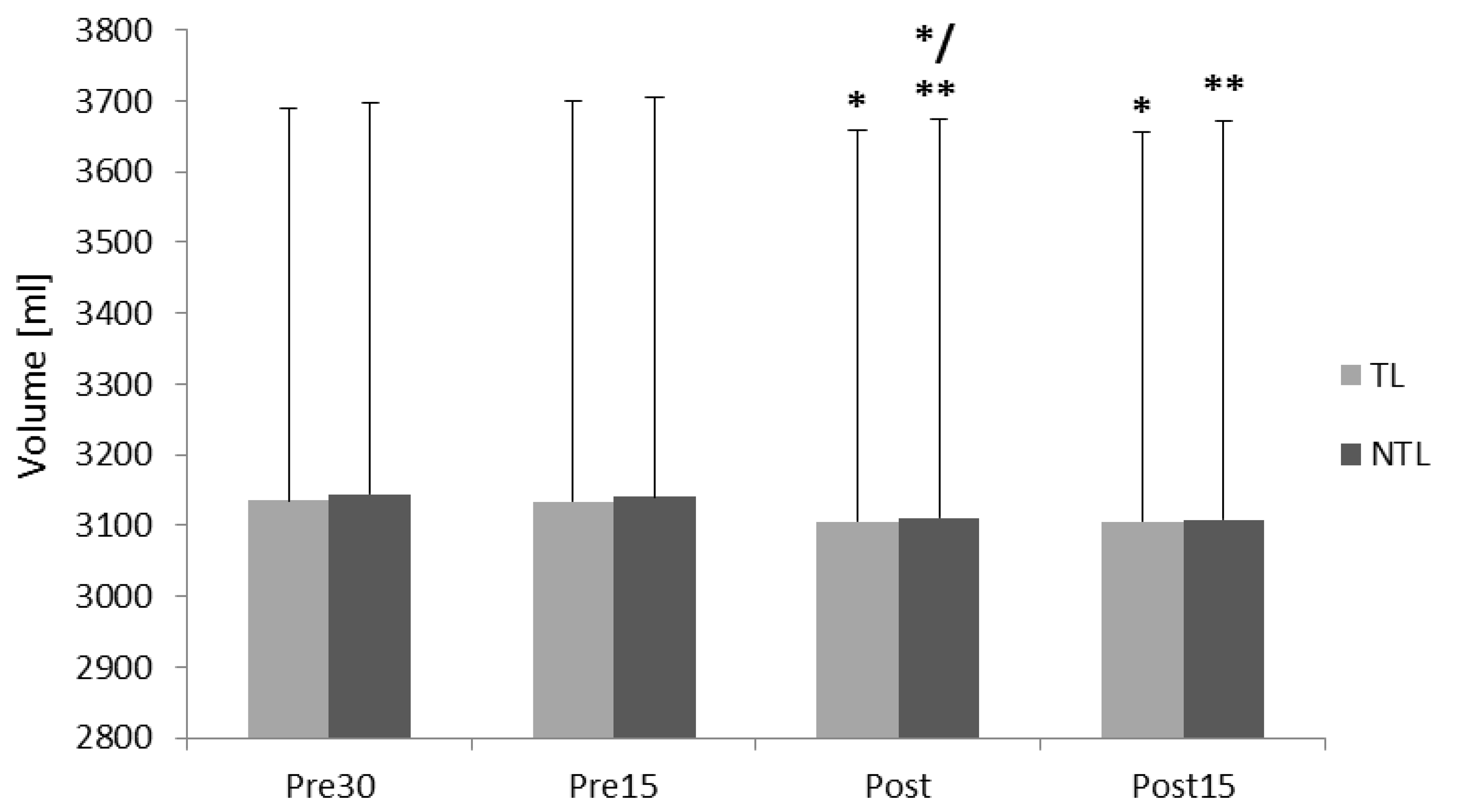

Figure 2. Volume alterations on the calves before and after Intervention. (* p <.05; ** p <.001; * on the TL for Pre30 to Post, Pre30 to Post15, Pre15 to Post, Pre15 to Post15; * for the NTL on Pre30 to Post; ** on the NTL for Pre15 to Post, Pre30 to Post15, Pre15 to Post15; TL = Treated leg; NTL = Non-treated leg)

Finally, there was also a significant decrease for the perceived pain between the first and second set of FR for the anterior, posterior, lateral thigh, and calf (p<.001). 10 participants still reported pain 24 hours after intervention.

Discussion

The volume of the calves were influenced by FR. Interestingly, the volume of the non-treated calf also significantly decreased. The reduced volume on the treated calf may be explainable by the compression effect applied during FR. Since our findings show that FR does also influence the volume of the non-treated leg, it can be speculated that this observation is caused by central nervous mechanisms (e.g., vasoconstriction via sympathetic activation), for example, according to the perceived pain. Future studies are warranted to clarify this hypothesis. Furthermore, alterations of the perceived pain between the first and second set of FR could result from an habituation process of the nociceptors. The high pressure applied to FR might be more tolerated so that potential risks due to FR get ignored.

References

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Contact

Matthias Kühnemann M.A.
Fuhlrottstr. 10, 42119 Wuppertal, Germany
m.kuehnemann@outlook.de
www.bewegungswissenschaft.uni-wuppertal.de

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