

# THE EFFECTS OF ACUTE FOAM ROLLING ON MUSCLE FASCICLE LENGTH, PENNATION ANGLE, AND THICKNESS



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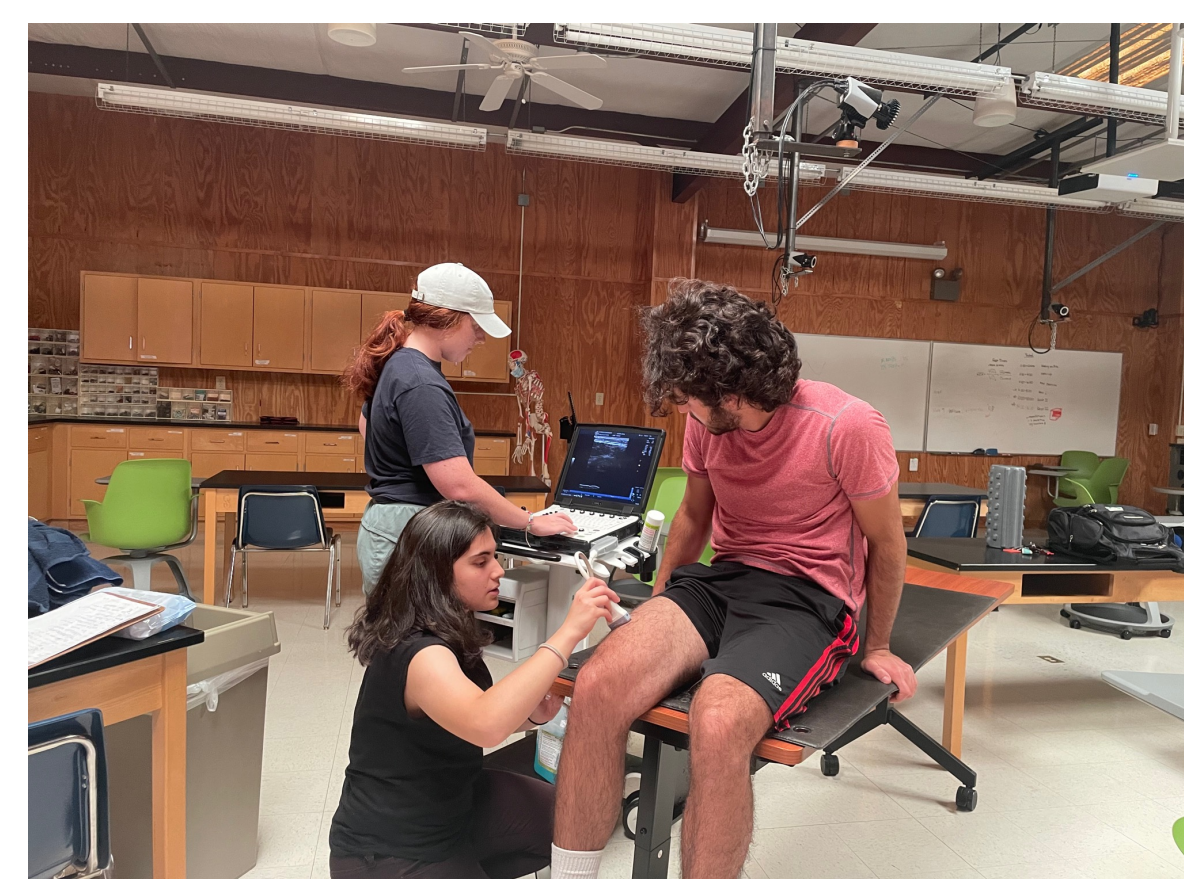
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## INTRODUCTION

Myofascial release is a common clinical practice used to reduce tension by releasing trigger points with the aim to increase tissue compliance. One common myofascial releaser technique is foam rolling. As foam rolling is now a popular practice in most training and clinical settings the underlying mechanism that may or may not lead to increase tissue compliance are still unknown.

## RESULTS

There was no significant difference for fascicle length ( $P=0.16$ ) with the mean and standard deviation changes score for the control:  $0.09 \pm 1.1$  vs foam rolling  $0.22 \pm 1.3$  cm. There was significant difference for pennation angle ( $p < 0.01$ ) with the mean and standard deviation changes score for the control:  $0.81 \pm 5.7$  vs foam rolling  $-2.2 \pm 3.3$  degrees, indicating that pennation angle went down following foam rolling. There was significant difference for muscle thickness ( $p = 0.01$ ) with the mean and standard deviation changes score for the control:  $0.0 \pm 0.2$  vs foam rolling  $-0.1 \pm 0.28$  cm, indicating that muscle thickness went down following foam rolling.



## PURPOSE

The purpose of this study was to determine if acute static stretching alters pennation angle, fascicle length and thickness of the Vastus Lateralis.

## CONCLUSION

After evaluating the effects of acute foam rolling on muscle fascicle length, pennation angle, and muscle thickness, there was no significant difference in fascicle length. However, a significant difference was found in pennation angle and muscle thickness. Pennation angle decreased from 18 to 16 degrees following foam rolling and subsequently muscle thickness decreased from 2.4 to 2.2 cm. This could be contributed to the pressure applied to the muscle during foam rolling having a compacting affect or the relaxing and elongation of the muscle due to myofascial release.

## PRACTICAL IMPLICATIONS

The results of this study indicate that there is no measurable benefit to foam rolling prior to a performance. A decrease in the pennation angle can lead to a decrease in the amount of force the muscle can generate. If an athlete prefers to use a foam roller, it would be best to use it after a performance to soothe muscle soreness.

## METHODS

Thirty participants ( $68.1 \pm 3.8$  cm,  $73.7 \pm 16.9$  kg, Age  $23.5 \pm 9.8$  years) had Three panoramic ultrasound images of the vastus lateralis were taken prior to and after static stretching. The transducer was positioned in the center of the muscle belly just inferior to the largest circumference of the muscle, it was then moved superior until the full length of a fascicle was captured. Static stretching was performed via a standing quad stretch where the participant reached back and grabbed their foot and pulled posteriorly and superiorly until a slight discomfort caused by the stretching muscle was felt. This was repeated for 5 sets of 60 seconds with 30 sec rest in-between for 5 total minutes of stretching. Images were analyzed for pennation angle, fascicle length, and thickness. Values were then averaged across all three images (pre and post) and compared using paired t-tests..

