The Effects of an Acute Bout of Leg Extensions on Ultrasound Characteristics of the Vastus Lateralis

Patrick Agyabeng, Eric Sobolewski, Baseer Muqri, Olivia Shuff,

Health Science Department, Furman University

INTRODUCTION

Acute muscle swelling or transient hypertrophy is a common effect of resistance training and very often it is a goal to achieve a “muscle pump.” Ultrasound imaging, can allow for us to quantify these changes and help determine the size and effectiveness of exercise to achieve the muscle pump.

PURPOSE

To determine if an acute bout of leg extensions to failure affect ultrasound characteristics (Echo intensity and Cross Section Area).

METHODS

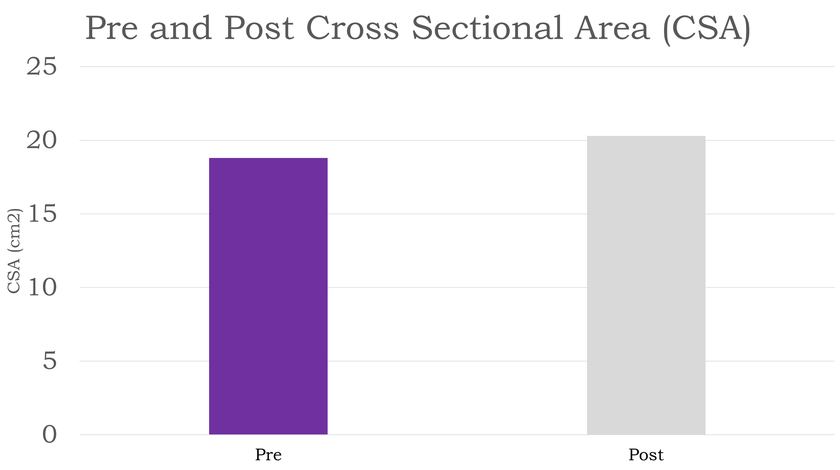
Thirty-two recreationally trained college students (age 19.79± 1.0 years, height 165.4 ± 12.1 cm, weight 69.7± 13.3 kg) volunteered for this study. Participants visited the lab on three days. The first day was a familiarization which max single leg strength and peak power output on an ergometer bike was determine. Location of ultrasound was measured and recorded. On a sperate visit they performed 4 sets to failure at 70% on the leg extension and 90 sec rest. Prior to and following the leg extensions three panoramic images of the vastus lateralis were taken using an ultrasound device. From the Images muscle Cross Sectional Area (CSA) and Echo Intensity (EI) were derived. Means of the three images were used and a paired t-test was used to compared pre and post leg extensions values.

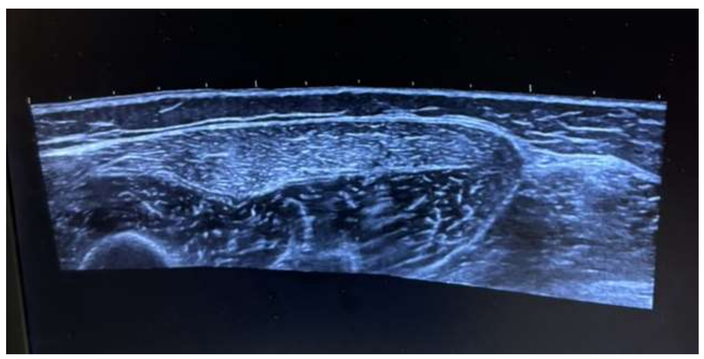
RESULTS

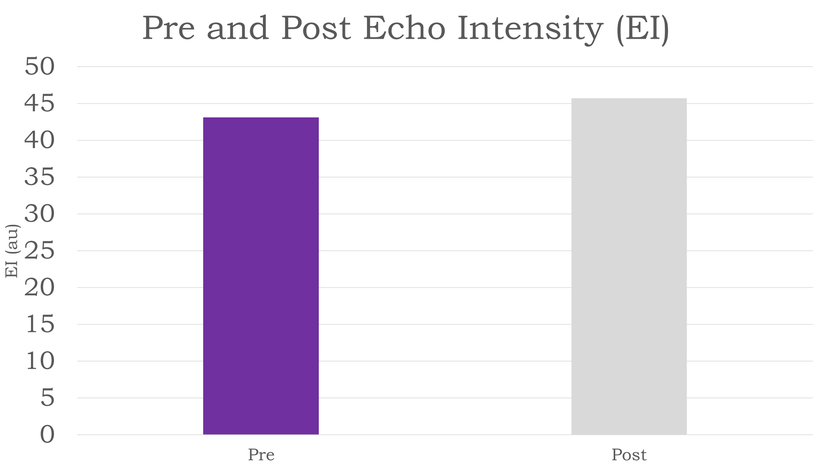
For CSA there was significant (p=0.002) difference between pre (18.8±6.5 cm2) and post (20.3±7.0 cm2) measurements. For EI there was significant (p=0.019) difference between pre (43.1±9.9 au) and post (45.7±10.4 au) measurements.

CONCLUSION

Transient hypotrophy can be observed and measured through ultrasound images. This indicates that 4 sets to failure is enough to elicit significant changes in the muscle. Overall CSA and EI increased following resistance exercises and further research can now help quantify and address the best way to maximize this response.







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