ABSTRACT

The purpose of this study was to evaluate the change in muscle swelling (via muscle cross-sectional area) and contraction velocity during compression exercise. Eight male subjects performed control (no cuff) and compression exercise (5 cm inflation cuff, 140 mmHg) sessions. Both sessions consisted of 4 sets (30/15/15/15) with 30 seconds rest in between each set. Muscle cross-sectional area was evaluated pre-exercise, between sets 1, 2, 3, 4, and 5 min post exercise by panoramic ultrasound. Contraction velocity was determined via Biodex software. Muscle swelling increased 12% and 10% in control and compression exercise, respectively. Contraction velocity declined from set 1-4 in both compression and control, however, there were no significant differences between the groups.

INTRODUCTION

Compression exercise (also known as blood flow restriction exercise) is a relatively new and upcoming concept for exercise training and rehabilitation. Compression exercise involves occluding venous blood flow to a active limb via a cuff inflation device (example- Hokanson , Rapid Cuff Inflator and Cuff, Figure 1), and exercising the limb with low weight, ~20% of maximum strength. This method has surprisingly shown similar results to regular heavy resistance training at ≥ 70% of 1RM in regards to hypertrophy and strength.1,2

The purpose of this study was to evaluate muscle swelling (via muscle cross-sectional area) and contraction velocity during compression exercise.

METHODS

• 8 male, resistance trained subjects completed a control and compression exercise sessions.
• 4 sets, 30/15/15/15 repetitions, at 20% maximum isometric strength, 30 sec rest between sets on the Biodex System 4 Pro (Figure 2).
• External inflation cuff on the proximal thigh was inflated to 140mmHg
• Muscle size obtained pre-exercise, after set 1, 2, 3, 4, and 5 min post-exercise via panoramic ultrasound (Figure 3)
• Contraction velocity was obtained from Biodex software.

RESULTS

Muscle swelling may be a mechanism to trigger pathways involved in muscle growth. Currently, our sample size (N=8) is too low to justify any conclusions. Our preliminary statistics suggest muscle swelling is elevated from pre-exercise at the 5 min post-exercise measurement time point, however, compression exercise induced muscle swelling does not appear to be different from control exercise. Our data also shows muscle contraction velocity decreases from set 1-4 in both control and compression exercise, which suggests muscular fatigue is similar.

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REFERENCES