

Effectiveness of Blood Flow Restriction Training on Isokinetic Muscle Strength of the Quadriceps

BLAKE DOUGHTIE, GIAN CRUZ, DAVID CALDERON, NICOLE HOPPE, JASON WINCHESTER, AND ALEXIS ORTIZ, FACSM

Gait and Movement Analysis Laboratory; School of Physical Therapy; University of the Incarnate Word; San Antonio, TX

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Advisor / Mentor: Ortiz, Alexis (arortiz5@uiwtx.edu)

ABSTRACT

Blood flow restriction (BFR) training has proven to be an effective method of producing muscle hypertrophy and increased strength, but the most efficacious percentage of blood flow occlusion while performing aerobic training is unclear. **PURPOSE:** To examine the effectiveness of BFR training while using two different cuff pressures on the strength of the quadriceps muscle group after three weeks of cycling training for fifteen-minute sessions performed three times per week. **METHODS:** Ten healthy participants (4 female, 6 male, 26 ± 3 years) were randomly assigned to one of two groups: BFR with 60% occlusion applied to the right quadricep or BFR with 80% occlusion applied to the right quadricep. The training protocol consisted of cycling on a stationary ergometer for 15 minutes at 70 RPM with 25 watts of resistance, with the BFR cuff inflated to their assigned occlusion percentage, performed three times a week for three weeks. Muscle strength of the quadriceps was measured bilaterally at baseline and at three weeks using an isokinetic dynamometer at speeds of 60, 180, and 300 degrees per second using a standardized knee extension protocol. Given the normally distributed data for torque and work of the knee extensors, a 2×2 (group by time) ANOVA was used to perform between and within-group comparisons. Statistical significance was at an alpha of 0.05 for all analyses. **RESULTS:** The ANOVA revealed no between group differences but statistically significant changes within time for torque at 180 ($p < .001$) and 300 ($p = 0.01$) degrees per seconds. Work at 180 and 300 degrees per seconds were also statistically significant ($p < .001$ and $.013$, respectively) across time. **CONCLUSION:** It appears there are no differences between the two different BFR occlusion pressures between groups, indicating both occlusion pressures elicit similar gains in quadriceps strength over a three-week training period. However, it seems both groups displayed improved torque and work at higher speeds, indicating that BFR training in this manner and protocol provides more of a benefit in increasing muscular endurance, opposed to strength itself.