TACSM Abstract

Hemodynamic Responses to Blood Flow Restriction Exercise with Different Types of Cuffs

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ABSTRACT

While blood flow restriction (BFR) training has gained popularity, the original narrow elastic (NE) design featured in the Kaatsu bands has been gradually replaced by wide-rigid (WR) nylon blood pressure cuffs that are cheaper and easily available. We demonstrated that using WR cuffs resulted in marked increases in blood pressure and myocardial oxygen demand during BFR walking exercise compared with NE bands. Currently, the hemodynamic responses to BFR resistance exercise using different types of cuffs are unknown. **PURPOSE**: To compare blood pressure and physiological responses before and after BFR resistance exercise with WR cuffs and NE bands. **METHODS**: Twenty-four apparently healthy young adults (9 females, 25±5 years) completed 3 testing visits. In the first visit, 1-repetition maximum (1-RM) and maximal voluntary contraction (MVC) tests were performed. In the second and third training sessions conducted in a randomized order, the participants completed single-arm BFR training sessions with WR and NE. Cuff pressure was inflated to 80 mmHg in WR cuffs and 220 mmHg in NE bands. In each training session, the participants performed 3 sets of biceps curls (40% 1-RM), triceps extensions (40% 1-RM), and handgrip exercise (60% MVC). Heart rate, blood pressure (measured on the contralateral arm), perceived exertion, and pain level were measured at rest and immediately after each type of exercise. **RESULTS**: Compared with BFR with NE bands, mean arterial pressure was significantly and consistently greater during BFR with WR cuff when the participants were performing biceps curls (97±11 vs. 89±9 mmHg), triceps extension (97±11 vs. 92±7 mmHg), and handgrip exercise (96±10 vs. 88±9 mmHg). Perceived exertion was significantly greater in the WR cuff compared with the NE bands (15±3 vs. 13±2). Pain levels were significantly greater in the WR cuff than in the NE band condition. Heart rate and blood lactate concentration were not different between the conditions. **CONCLUSION**: BFR exercise with WR cuff elicited a greater blood pressure response as well as higher perceived exertion and pain levels compared with the same BFR exercise with NE band. Our results indicate that the type of cuff is an important consideration when prescribing BFR resistance exercise.