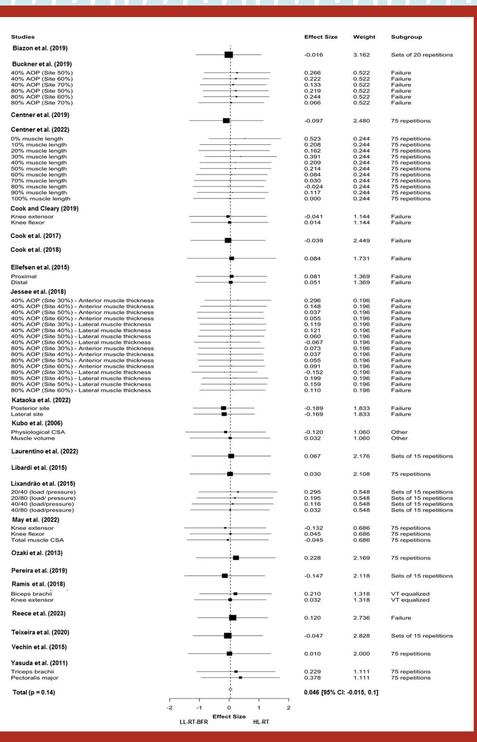
Hypertrophic effects of low-load blood flow restriction training with different repetition schemes: a systematic review and meta-analysis

OBJECTIVE

This systematic review and meta-analysis analyzed the effect of low-load resistance training (LL-RT) with blood flow restriction (BFR) versus high-load resistance training (HL-RT) on muscle hypertrophy focusing on the repetition scheme adopted.

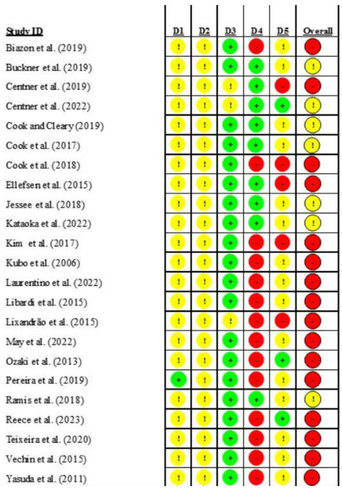
METHODS



Forest plot demonstrating the effects of LL-RT with BFR versus HL-RT on muscle hypertrophy. AOP, arterial occlusion pressure; HL-RT, high-load resistance training; LL-RT-BFR, low-load resistance training with blood flow restriction.

We searched four databases to retrieve studies involving trained or untrained participants (18 years or older) that have reported on muscle hypertrophy following low-load blood flow restriction exercise (≤50% 1RM) compared to high-load (≥70% 1RM). We performed a meta-analysis on 23 studies with a total of 495 participants and showed that regardless of the repetition scheme adopted in the training protocol, the resultant muscle growth following low-intensity resistance exercise with blood flow restriction is similar to high-load strength training. However, there does appear to be a small beneficial effect of high-load exercise on upper-body exercise.

RESULTS



Graph of risk of bias for the studies included in the in the review.

Our results support that contrary to the current recommendations of a 4 set routine of 30-15-15-15 or sets to volitional failure, low-intensity BFR resistance exercise can induce similar magnitudes of muscle hypertrophy as high-load exercise using 3-4 sets of 15 repetitions between 20-30% 1RM. As perceptual demands increase with proximity to failure during resistance exercise with or without the addition of blood flow restriction, reducing the total number of repetitions in the prescription of BFR may have the added benefit of reducing the overall perceptual demands of the exercise session, enhancing long-term compliance to the training modality.

LL-RT with BFR elicits muscle hypertrophy similar to HL-RT regardless of the employed repetition scheme, although there appears to be a small beneficial effect in favor of HL-RT in upper-limb exercise.

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