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## Muscle hypertrophy and strength gains after resistance training with different volume-matched loads: a systematic review and meta-analysis

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### Abstract

The purpose of this paper was to conduct a systematic review and meta-analysis of studies that compared muscle hypertrophy and strength gains between resistance training protocols employing very low (VLL < 30% of 1-repetition maximum (RM) or >35RM), low (LL30%-59% of 1RM, or 16-35RM), moderate (ML60%-79% of 1RM, or 8-15RM), and high (HL ≥ 80% of 1RM, or ≤7RM) loads with matched volume loads (sets × repetitions × weight). A pooled analysis of the standardized mean difference for 1RM strength outcomes across the studies showed a benefit favoring HL vs. LL and vs. ML and favoring ML vs. LL. The LL and VLL results showed little difference. A pooled analysis of the standardized mean difference for hypertrophy outcomes across all studies showed no differences between training loads. Our findings indicate that when the volume load is equal between conditions, the highest loads induce superior dynamic strength gains. Alternatively, hypertrophic adaptations were similar irrespective of the load magnitude. **Novelty:** Training with higher loads elicits greater gains in 1RM muscle strength when compared to lower loads, even when the volume load is equal between conditions. Muscle hypertrophy is similar irrespective of the magnitude of the load, even when the volume load is equal between conditions.

**Keywords:** entraînement; force; musculoskeletal; musculosquelettique; strength; training.[PubMed Disclaimer](#)

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