

Enhancing muscular qualities in untrained women: linear versus undulating periodization

ABSTRACT

Purpose: This study compared linear (LP) and undulating periodization (UP) on strength changes in untrained women when total workload and average training intensity were matched by the end of training. **Methods:** Twenty females (20 ± 2 yr) were conditioned (3 wk) and assessed for one-repetition maximum squat (1RMSQ) and bench press (1RMBP) before being assigned to LP or UP training (9 wk), with training performed at 3 d·wk⁻¹. Maximal strength, average power output during squat jumps with countermovement (SQJpwr) and bench press throws (BPTpwr), body mass, limb girth, and muscle cross-sectional area (CSA) were assessed at baseline (T1) and after every 3 wk (T2, T3, and T4) to differentiate the efficacy of LP and UP training. **Results:** Both groups improved significantly ($P < 0.05$) in 1RMSQ (LP 34.8%, UP 41.2%), 1RMBP (LP 21.8%, UP 28.3%), SQJpwr (LP 10.4%, UP 9.5%), BPTpwr (LP 11.1%, UP 13.8%), arm girth (LP 1.14%, UP 1.73%), and thigh girth (LP 1.58%, UP 1.99%), with no significant difference between them. Muscle CSA for the LP group increased significantly at T2 before maintaining similar hypertrophic responses until T4, whereas the UP group recorded significant increments from T1 to T2 and T2 to T3, before stabilizing between T3 and T4. Pooled CSA increase was higher than previously found (6.8% at T2, 11.3% at T3, and 11.8% at T4). **Conclusions:** The comparison of LP and UP training with matched volume load and intensity suggests that both programs were equally adept in improving different strength qualities in active but untrained women. In addition, muscle hypertrophic responses were larger and occurred earlier than previously reported.

Keyword: Training program; Resistance training; Strength characteristics; Hypertrophy