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**Body composition, cardiorespiratory fitness and neuromuscular adaptations induced by a home-based whole-body high intensity interval training.**

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## Abstract

Background/Objective: Home-based training could reduce barriers to physical activity and be a complementary approach to improve different components of health-related fitness. This study then investigated body composition, cardiorespiratory fitness and neuromuscular adaptations to a home-based, video-directed, high-intensity interval training using whole-body exercises (WB-HIIT).

Methods: Fourteen subjects participated to an 8-week WB-HIIT (6 females,  $23 \pm 1$  years) and fourteen were included in a non-exercise control group (CTL; 6 females,  $24 \pm 4$  years). All took part to pre- and post-intervention assessments of body composition, peak oxygen uptake ( $VO_{2peak}$ ) and first ventilatory threshold (VT1; index of aerobic capacity), dynamic (leg press 3-repetition maximum) and isometric strength (knee extensors maximal isometric contractions with assessment of voluntary activation) and muscle endurance during an isometric submaximal contraction maintained till exhaustion. WB-HIIT consisted in 30-s all-out whole-body exercises interspaced with 30-s of active recovery. Training sessions were performed at home by means of videos with demonstration of exercises. Heart rate was monitored during sessions.

Results: WB-HIIT increased  $VO_{2peak}$  (5%), VT1 (20%), leg lean mass (3%), dynamic (13%) and isometric strength (6%) and muscle endurance (28%;  $p < 0.05$ ) while they did not improve in CTL.  $VO_{2peak}$  increase was correlated ( $r = 0.56$ ;  $p < 0.05$ ) with the time spent above 80% of maximal heart rate during training sessions. Isometric strength increase was correlated with change in voluntary activation ( $r = 0.74$ ;  $p < 0.01$ ).

Conclusion: The home-based WB-HIIT induced concomitant cardiorespiratory fitness and neuromuscular improvements. The predominant effect was observed for aerobic capacity and muscle endurance which could improve exercise tolerance and reduce fatigability.

**Key words:**  $\text{VO}_2$ peak, first ventilatory threshold, muscle strength, muscle endurance, voluntary activation.