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Hypoxia increases muscle hypertrophy induced by resistance training.

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Abstract

PURPOSE:

Recent studies have shown that low-intensity resistance training with vascular occlusion (kaatsu training) induces muscle hypertrophy. A local hypoxic environment facilitates muscle hypertrophy during kaatsu training. We postulated that muscle hypertrophy can be more efficiently induced by placing the entire body in a hypoxic environment to induce muscle hypoxia followed by resistance training.

METHODS:

Fourteen male university students were randomly assigned to hypoxia (Hyp) and normoxia (Norm) groups (n = 7 per group). Each training session proceeded at an exercise intensity of 70% of 1 repetition maximum (RM), and comprised four sets of 10 repetitions of elbow extension and flexion. Students exercised twice weekly for 6 wk and then muscle hypertrophy was assessed by magnetic resonance imaging and muscle strength was evaluated based on 1RM.

RESULTS:

Muscle hypertrophy was significantly greater for the Hyp-Ex (exercised flexor of the hypoxia group) than for the Hyp-N (nonexercised flexor of the hypoxia group) or Norm-Ex flexor ($P < .05$, Bonferroni correction). Muscle hypertrophy was significantly greater for the Hyp-Ex than the Hyp-N extensor. Muscle strength was significantly increased early (by week 3) in the Hyp-Ex, but not in the Norm-Ex group.

CONCLUSION:

This study suggests that resistance training under hypoxic conditions improves muscle strength and induces muscle hypertrophy faster than under normoxic conditions, thus representing a promising new training technique.

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