Skeletal muscle size and circulating IGF-1 are increased after two weeks of twice daily “KAATSU” resistance training

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This study investigated the effects of twice daily sessions of low-intensity resistance training (LIT, 20% of 1-RM) with restriction of muscular venous blood flow (namely “LIT-Kaatsu” training) for two weeks on skeletal muscle size and circulating insulin-like growth factor-1 (IGF-1). Nine young men performed LIT-Kaatsu and seven men performed LIT alone. Training was conducted two times / day, six days / week for 2 weeks using 3 sets of two dynamic exercises (squat and leg curl). Muscle cross-sectional area (CSA) and volume were measured by magnetic resonance imaging at baseline and 3 days after the last training session (post-testing). Mid-thigh muscle-bone CSA was calculated from thigh girth and adipose tissue thickness, which were measured every morning prior to the training session. Serum IGF-1 concentration was measured at baseline, mid-point of the training and post-testing. Increases in squat (17%) and leg curl (23%) one-RM strength in the LIT-Kaatsu were higher (p<0.05) than those of the LIT (9% and 2%). There was a gradual increase in circulating IGF-1 and muscle-bone CSA (both p<0.01) in the LIT-Kaatsu, but not in the LIT. Increases in quadriceps, biceps femoris and gluteus maximus muscle volume were, respectively, 7.7%, 10.1% and 9.1% for LIT-Kaatsu (p<0.01) and 1.4%, 1.9% and -0.6% for LIT (p>0.05). There was no difference (p>0.05) in relative strength (1-RM / muscle CSA) between baseline and post-testing in both groups. We concluded that skeletal muscle hypertrophy and strength gain occurred after two weeks of twice daily LIT-Kaatsu training.
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Conclusion: The results indicate that low-intensity resistance training increases muscular size and strength when combined with resistance exercise with blood flow restriction for other muscle groups. It was suggested that any circulating factor(s) was involved in this remote effect of exercise on muscular size. 1 Department of Life Sciences, Graduate School of Arts and Sciences, The University of Tokyo, Tokyo, JAPAN; 2 Graduate School of Health and Sport Science, Nippon Sport Science University, Tokyo, JAPAN; and 3 Sato Institute for Rehabilitation and Fitness, Tokyo, JAPAN. Skeletal muscle size and circulating IGF-1 are increased after two weeks of twice daily Kaatsu resistance training. Int J KAATSU Training Res . 2005;1:6-12.