Effect of a 16-Week Combined Strength and Plyometric Training Program Followed by a Detraining Period on Athletic Performance in Pubertal Volleyball Players

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Abstract

Introduction: Given the growing popularity of youth strength and conditioning programs, it is important to ascertain the most efficient method for enhancing motor performance and limiting detraining effects in adolescent volleyball players. Therefore, our purpose was to determine the effects of a 16-week combined strength and plyometric training or plyometric training alone and how a detraining program can modify adaptations in response to the training stimulus.

Methods: Sixty pubertal volleyball players (-1 to +1 year from peak height velocity [PHV]) were assigned to a combined training group (CTG) (n = 20), a plyometric training group (PTG) (n = 20), or a control group (n = 20). The CTG and PTG participated in training twice weekly for 16 weeks. Thigh muscle volume, body fat, flexibility, sprint, jump height, and medicine ball throw were measured at pre- and post-training; and detraining.

Results: Respectively, the CTG and PTG showed increases in thigh muscle volume (effect size: 0.71 and 0.42) and decreases in body fat (20.42 and 20.34), as well as improvements in 5-m sprint (20.69 and 20.46), 10-m sprint (20.31 and 20.3), lower-body muscle power (0.44 and 0.36), and upper-body muscle power (1.32 and 0.7). After the detraining period, all groups maintained previously attained muscle power (6.79–9.87%; $p<0.001$).

Conclusion: Combined strength and plyometric training provided better improvements than plyometric training only. It is a time-effective training modality that confers improvements in physical performance measures, muscle size, and body fat. A temporary detraining period may not undermine performance gains in pubertal volleyball players.

Keywords: Combined strength and plyometric training, Detraining, Pubertal players, Volleyball