EFFECT OF VERTICAL, HORIZONTAL AND COMBINED PLYOMETRIC TRAINING ON EXPLOSIVE, BALANCE AND ENDURANCE PERFORMANCE OF YOUNG SOCCER PLAYERS.

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Abstract
Our aim was to compare the effects of 6-weeks of vertical, horizontal, or combined vertical and horizontal plyometric training on muscle explosive, endurance and balance performance. Forty young soccer players between 10 to 14 y of age were randomly divided into: control (CG; n = 10), vertical plyometric group (VG; n = 10), horizontal plyometric group (HG; n = 10) and combined vertical and horizontal plyometric group (VHG; n = 10). Players performance in the vertical (VCMJ) and horizontal (HCMJ) countermovement jump with arms, 5 multiple bounds test (MB5), 20 cm drop jump reactive strength index (RSI20), maximal kicking velocity (MKV), sprint, change of direction speed (CODS), Yo-Yo intermittent recovery level 1 test (Yo-Yo IR1) and balance was measured. No significant or meaningful changes in the CG, apart from small change in the Yo-Yo IR1, were observed while all training programs resulted in meaningful changes in explosive, endurance and balance performance. However, only VHG showed a statistically significant (p<0.05) increase in all performance test and most meaningful training effect difference with the CG across tests. Although no significant differences in performance changes were observed between experimental groups, the VHG program was more effective compared to VG (i.e. jumps, MKV, sprint, CODS and balance performance) and HG (i.e. sprint, CODS and balance performance) to small effect. The study demonstrated that vertical, horizontal and combined vertical and horizontal jumps induced meaningful improvement in explosive actions, balance and intermittent endurance capacity. However, combining vertical and horizontal drills seems more advantageous to induce greater performance improvements.

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EFFECT OF PROGRESSIVE VOLUME-BASED OVERLOAD DURING PLYOMETRIC TRAINING ON EXPLOSIVE AND ENDURANCE PERFORMANCE IN YOUNG SOCCER PLAYERS.

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Abstract
The purpose of the study was to compare the effects of progressive volume-based overload to constant volume-based overload on muscle explosive and endurance performance adaptations during a bi-weekly short-term (i.e. six weeks) plyometric training intervention in young soccer players. Three groups of young soccer players (age 13.0 +/- 2.3 y) were divided into: control (CG; n = 8), plyometric training with (PPT; n = 8) and without (NPPT; n = 8) a progressive increase in volume (i.e. 16 jumps per leg/week, with an initial volume of 80 jumps per leg each session). Bilateral and unilateral horizontal and vertical countermovement jump with arms (CMJA), 20 cm drop jump reactive strength index (RSI20), maximal kicking velocity (MKV), 10-m sprint, change of direction speed (CODS) and Yo-Yo intermittent recovery level 1 test (Yo-Yo IR1) were measured. Although both experimental groups significantly increased CMJA, RSI20, CODS and endurance performance, only PPT showed a significant improvement in MKV and 10-m sprint time. In addition, only PPT showed a significantly higher performance improvement in jumping, MKV and Yo-Yo IR1...
compared to CG. Also, PPT showed higher meaningful improvement compared to NPPT in all (except one) jump performance measures. Furthermore, although PPT involved a higher total volume compared to NPPT, training efficiency (i.e. percentage change in performance/total jump volume) was similar between groups. Our results show that PPT and NPPT ensured significant improvement in muscle explosive and endurance performance measures. However, a progressive increase in plyometric training volume seems more advantageous to induce soccer-specific performance improvements. 

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