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The Effect of Hypertrophy Strength Training Using Traditional Set vs. Cluster Set on Maximum Strength and Sprinting Speed

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Abstract : The aim of this study was to investigate the effect of strength training Cluster set-method compared to traditional set-method 30 m sprinting time and maximum strength in squats and bench-press. Thirteen Physical Education students, 7 males and 6 females between the age of 19-28 years old were recruited. The students were random divided in three groups. Traditional set group (TSG) consist of 2 males and 2 females aged (±SD) (22.3 ± 1.5 years), body mass (79.2 ± 15.4 kg) and height (177.5 ± 11.3 cm). Cluster set group (CSG) consist of 3 males and 2 females aged (22.4 ± 3.29 years), body mass (81.0 ± 24.0 kg) and height (179.2 ± 11.8 cm) and a control group (CG) consist of 2 males and 2 females aged (21.5 ± 2.4 years), body mass (82.1 ± 17.4 kg) and height (175.5 ± 6.7 cm). The intervention consisted of performing squat and bench press at 70% of 1RM (twice a week) for 8 weeks using 10 repetition and 4 sets. Two types of strength-training methods were used , cluster set (CS) where the participants (CSG) performed 2 reps 5 times with a 10 s recovery in between reps and 50 s recovery between sets, and traditional set (TS) where the participants (TSG) performed 10 reps each set with 90 s recovery in between sets. The pre-tests and post-tests conducted were 1 RM in both squats and bench press, and 10 and 30 m sprint time. The 1RM test were performed with Eleiko XF barbell (20 kg), Eleiko weight plates, rack and bench from Hammerstrength. The speed test was measured with the Brower speed trap II testing system (Brower Timing Systems, Utah, USA). The participants received an individualized training program based on the pre-test of the 1RM. In addition, a mid-term test of 1RM was carried out to adjust training intensity. Each training session were supervised by the researchers. Beast sensors (Milano, Italy) were also used to monitor and quantify the training load for the participants. All groups had a statistical significant improvement in bench press 1RM (TSG 1RM from 56.3 ± 28.9 to 66 ± 28.5 kg; CSG 1RM from 69.8 ± 33.5 to 77.2 ± 34.1 kg and CG 1RM from 67.8 ± 26.6 to 72.2 ± 29.1 kg), whereas only the TSG (1RM from 84.3 ± 26.8 to 114.3 ± 26.5 kg) and CSG (1RM from 100.4 ± 33.9 to 129 ± 35.1 kg) had a statistical significant improvement in Squats 1RM ($P < 0.05$). However, a between groups examination reveals that there were no marked differences in 1RM squat performance between TSG and CSG ($P > 0.05$) and both groups had a marked improvements compared to the CG ($P < 0.05$). On the other hand, no differences between groups were observed in Bench press 1RM. The within groups results indicate that none of the groups had any marked improvement in the distances from 0-10 m and 10-30 m except the CSG which had a notable improvement in the distance from 10-30 m (-0.07 s; $P < 0.05$). Furthermore, no differences in sprinting abilities were observed between groups. The results from this investigation indicate that traditional set strength training at 70% of 1RM gave close results compared to Cluster set strength training at the same intensity. However, the results indicate that the cluster set had an effect on flying time (10-30 m) indicating that the velocity at which those repetitions were performed could be the explanation factor of this this improvement.

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