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Different scientific sports training on speed and power performance of University Students

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Abstract
The purpose of this study was to investigate the Athletic performance variables of sprinting ability, speed endurance and maximum power to influence of Sprint training, and Resistance training of college men. 90 male students were selected from Central University of Tamil Nadu, Thiruvarur. Their age ranged between 17and 25 years. The subjects were divided into three equal groups. The group I was considered as sprint training group (STG=30), group II was considered as resistance training group (RTG=30) and group III was considered as control group (CG=30). Students were assessed before and after 12 weeks training period on sprint ability, speed endurance and maximum power. Sprint ability was measured by 40 meters test, speed endurance was measured by 150 meter run test and maximum power measured by IRM half squat jump test. The data statistically analyzed with 't ratio, ANCOVA and Scheffee's post hoc test to find out significant improvement of pre test and post test of each variables and difference existed between groups in the changes in each variables from the baseline to the post test at 0.05 level of confidence. The results reveal that the 12 weeks sprint training, resistance training was significantly improved the sprint ability, speed endurance and maximum power, Sprint training group is better improvement on sprinting ability and speed endurance than resistance training group and maximum power was high improvement due to the effect of 12 weeks resistance training compare than sprit training group of University students.

Keywords: Sprint training, resistance training, sprint ability, speed endurance and explosive power

Introduction
The faster the foot makes contact with the ground during jumping and running movements, the quicker the reaction will be. However, despite this, athlete and coach need to realize that certain jumping movements require more ground contact time than others. If a high jumper attempted to use the same amount of approach speed as long jumper, then optimum vertical lift would be sacrificed, as there would not be enough ground contact time to generate vertical lift. It is important that these take – off times are replicated in training, as well as the foot-strike position and that free limb movements are optimized for maximum jumping power. (Subhash K. Goyal 2008) [11].

The ability to generate maximum strength levels is the shortest period of time (muscular power) has been considered as essential to obtain high sport performance level (Hedric, A. 1993) [6]. Moreover, strength training is part of basketball preseason programs with a background of related benefits that improve sports performance, reduce injury rate and provider higher motivation level for the athletes (NBCCA 1997) [12]. Two methods, resistance and plyometric training are usually referred to in the literature as improving the most powerful strength characteristics (explosive strength) in basketball players.

Resistance is the ability to exert maximal force is commonly referred to as the strength of the muscles that control particular body movements. However, the muscles may perform maximal effort as either isometric, concentric, or eccentric actions and the two dynamic actions may be performed at a wide range of velocities. An infinite number of values for the strength of muscle may be obtained with an isolated muscle preparation or for a human movement as related to the type of action, the velocity of the action and the length of the muscle. (P.V.Komi, 1991) [8]

Speed and sprint is the ability to reach a high velocity of movement in whatever mode locomotion – running, cycling, skating, swimming etc.

Another element of fitness closely related to speed training is speed endurance. Many athletes must maintain a high velocity for longer than 6 seconds or produce repeated sprints wit6h minimal rest periods in between. The combination of speed, agility and speed endurance and athlete requires is dete5rmined by his or her sport. But regardless of the event, there are several modes of training that are integral to developing a fast athlete. (T.K. Narasimham, 2009) [7].

Methodology

To achieve the purpose of the study ninety University male students were selected from Central University of Tamil Nadu, Thiruvarur. Their age ranged between 17 and 25 years. The subjects were divided into three equal groups. The group I was considered as sprint training group (STG=30) group II was considered as resistance training group (RTG=30) and group III was considered as control group (CTG=3c0). Subjects were assessed before and after 12 weeks training period on sprint ability, speed endurance and maximum power. Sprint ability was measured by 40 meters, speed endurance was measured by 150 meter run test and maximum power measured I RM half squat test.

Training Protocols

The training protocols include general warm up and warm down was performed prior to each training session. All training group performed three days per week for the period of 12 weeks. Lower extremities training designed to leg muscles involved in the vertical jumping motion and explosive movement.

Resistance exercises selected to stress the major muscle group in the following order, leg extension, leg press half squard and seated calf raise. The training consisted of 2-4 sets of weigh training for 6 stations and at an intensity corresponding to 60 - 90 percentage of 1Rm in each station by 6-12 repetitions for 8 weeks. The sprint training group selected repeated sprint training consist of running 40 m with different intensities and duration from week to week. 4 set of 5x40 meters with 90 second recovery between repletion and 10 min recovery between sets. Combined training group performed combined resistance after sprint training program 2 times per week at least two days apart from each other. Each session consisted of 5 sets at 8Rm (Repetition Maximum) half squard during the second 5 weeks. A maximal 30 m sprint was performed in middle of the 3 minute interval between the resistance sets.

Statistical Technique

Students were assessed before and after 12 weeks training period on sprint ability, speed endurance and maximum power. The data statistically analyzed with‘t’ ratio to find out significant improvement of pretest and posttest of each variables, analyzed by the technique of analysis of covariance (ANCOVA) and ANCOVA tests the significance of ‘adjusted post test mean’ differences between the experimental and control groups for each variable ‘F’ ratio for adjusted post test was found to be significant, Scheffee’s post hoc test was applied to test the significant difference between the paired adjusted means.0.05 level of confidence.

Analysis of Data and Results of the Study

Table 1: Computation of‘t’ ratio between pretest and posttest means on sprint ability, speed endurance and maximum power in all groups of male students

S. No	Variables	Pre Mean	Pre S.D	Post Mean	Post S.D	‘t'ratio
Sprint Training Group						
1.	Sprint ability	6.26	0.26	5.44	0.33	12.19*
2.	Speed endurance	21.57	0.72	19.12	0.62	13.55*
3.	maximum power	90.85	11.58	115.75	17.44	7.41*
Resistance Training Group						
1.	Sprint ability	6.27	0.17	5.59	0.36	9.07*
2.	Speed endurance	21.56	1.15	19.58	0.68	8.77*
3.	maximum power	91.33	10.30	122.17	14.59	12.58*
Control Group						
1.	Sprint ability	6.26	0.23	6.28	0.16	0.35
2.	Speed endurance	21.44	0.99	21.53	1.07	0.41
3.	maximum power	90.37	10.15	92.37	11.48	1.90

*Significant at 0.05 level for the degrees of freedom (1 and 29), 2.045

Table shows that the‘t’ ratio on sprint ability, spend endurance and maximum power of sprint training group was found to be statistically significant and resistance training group was found to be statistically significant at 0.05 level of confidence for degrees of freedom 1 and 29. Control group was lesser than the required table value of 2.045, and it was found to be not statistically significant. From the results it was inferred that, SARTG and PARTG produced significant improvement in the maximum power of University male students.

The obtained ‘F’ ratio for the pre test means of SARTG, PARTG and CG on maximum speed was 0.02. Since, the ‘F’ value was less than the required table value of 3.10, it was found to be not significant. Further, the ‘F’ ratio for posttest means on maximum speed was 68.52. Since, the ‘F’ value was higher than the required table value of 3.10, it was found to be statistically significant at 0.05 level of confidence and the obtained ‘F’ ratio for the adjusted post test means of SARTG, PARTG and CG on maximum speed was 70.06. Since, the ‘F’ value was higher than the required table value of 3.10 for the degrees of freedom 2 and 86, it was found to be statistically significant at 0.05 level of confidence.

The results revealed that there was a significant difference in post-test means among SARTG, PARTG and CG on maximum speed of University students.

Analysis of covariance

The obtained ‘F’ ratio for the pretest means of STG, RTG and CG on speed endurance was 0.16. Since, the ‘F’ value was less than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be not significant. Further, the ‘F’ ratio for posttest means of STG, RTG and CG on speed endurance was 73.58. Since, the ‘F’ value was higher than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be statistically significant. The obtained ‘F’ ratio for the adjusted post test means of STG, RTG and CG on speed endurance was 76.34. Since, the ‘F’ value was higher

than the required table value of 3.10 for the degrees of freedom 2 and 86, it was found to be statistically significant at 0.05 level of confidence.

The results revealed that there was a significant difference in post-test means among STG, RTG and CG on speed endurance of the students.

The obtained 'F' ratio for the pre test means of STG, RTG and CG on maximum power was 0.06. Since, the 'F' value was less than the required table value of 3.10 for the degrees of freedom 2 and 87, it was found to be not significant at 0.05 level of confidence.

Scheffee's post hoc test

The mean difference of maximum speed between STG and CG, RTG and CG were 0.79 and 0.69 respectively. The values of mean difference of adjusted post test means were higher than that of the required confidence interval value of 0.21 and it was found to be significant. Thus, the mean differences of paired adjusted post test means between STG and RTG (0.10) was less than the required confidence interval value, it was found to be not significant at 0.05 level of confidence.

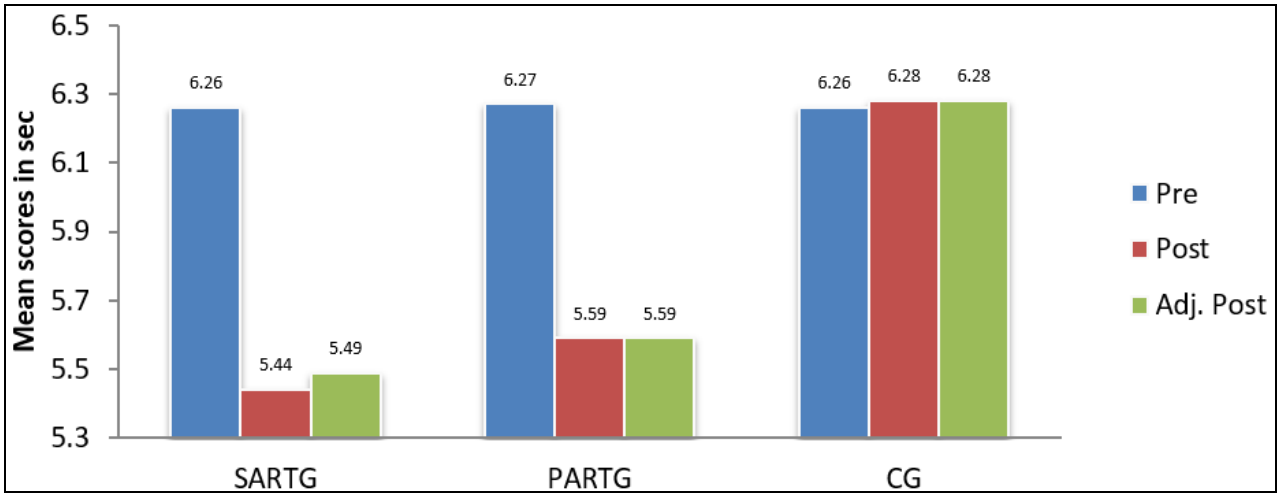

Fig 1

From these results it was inferred that twelve weeks of STG produced significant improvement in maximum speed than RTG training and CG groups.

The mean difference of speed endurance between STG and CG, RTG and CG were 2.43 and 1.97 respectively. The values of mean difference of adjusted post test means were higher than that of the required confidence interval value of 0.59 and it was found to be significant. Thus, the mean differences of paired adjusted post test means between STG and RTG (0.46) was less than the required confidence interval value, it was found to be not significant at 0.05 level of confidence.

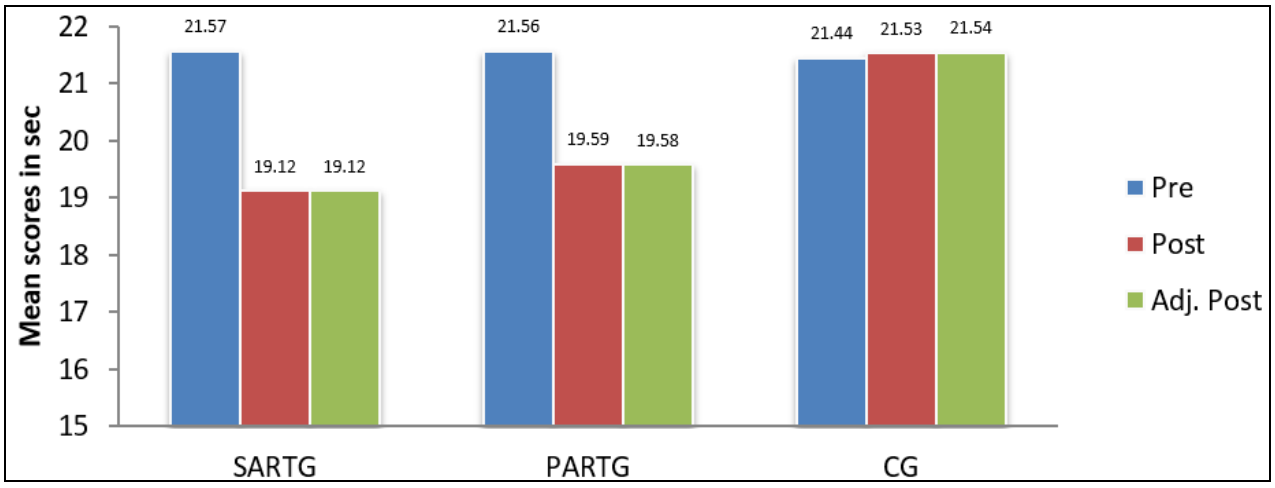

Fig 2

From these results it was inferred that twelve weeks of STG produced significant improvement in speed endurance than RTG training and CG groups.

The mean difference between STG and CG, RTG and CG were 23.13 and 29.23 respectively. The values of mean difference of adjusted post test means were higher than that of the required confidence interval value of 9.58 and it was found to be significant. Thus, the mean differences of paired adjusted post test means between STG and RTG (6.1) was less than the required confidence interval value, it was found to be not significant at 0.05 level of confidence.

Mean values of pre, post and adjusted post test of STG, RTG and CG on maximum power was presented in figure 1

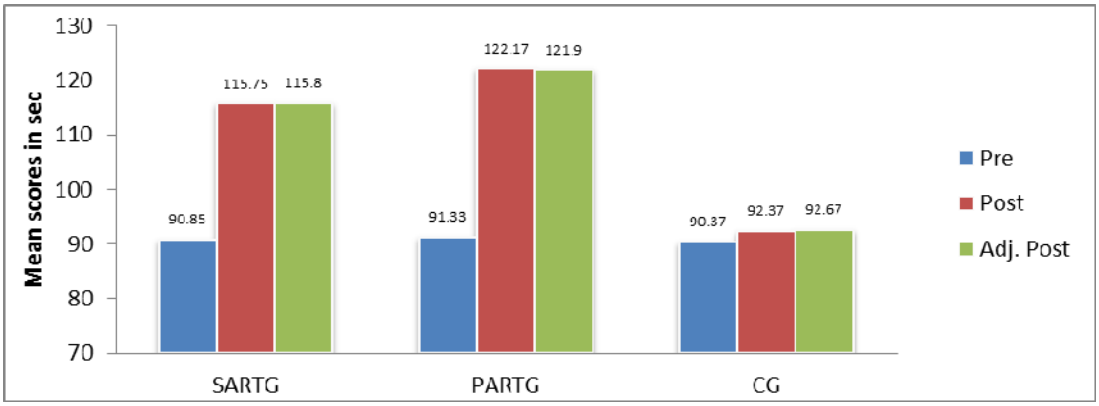

Fig 3

From these results it was inferred that twelve weeks of RTG produced significant improvement in maximum power of basketball players than SARTG training and CG groups.

Discussion on Findings

Sprinting ability, speed endurance and maximum power and their derivatives (acceleration sprinting and jumping) all make important contribution to the performance potential of all players. Two methods, resistance and sprinting are usually referred in the literature as the most powerful characteristics of power and speed in basketball players.

In the present study, the subjects who underwent a sprint training and resistance training were able to improve their performance of speed and power parameters on't' test. Therefore, it is found a positive relationship between sprint and resistance training and improvements of athletic performance related variable.

The results from the study are very encouraging and demonstrate the benefits of sprinting training and resistance training over athletic parameters in students. In addition, the result supports improvement in fitness can occur in a little as 12 weeks of sprinting training and resistance training which can be useful during the last preparatory phase before the competition session for all sports and games.

The result of the present study indicates that the sprinting training and resistance training programme are effective methods to improve speed ability, speed endurance and maximum power.

The finding of the study correlated with the study carried out by Ognijen Andrejic (2012) [16] Effect of a plyometric and strength training program on the fitness performance in young basketball players. The result of the study demonstrate that a short-term plyometric and strength training program significantly increases motor performance skill in young basketball players.

Tonnessen *et. al* (2011) [1] effect of 40-m repeated sprint training on maximum sprinting speed, repeated sprint speed endurance, vertical jump and aerobic capacity in young elite male soccer players. The result of this study indicate that the repeated sprint training program had a positive effect of the parameters.

Carlos Balsalobre-Fernández, *et al (*2013) [2] The Effects of a Maximal Power Training Cycle on the Strength, Maximum Power, Vertical Jump Height and Acceleration of High-Level 400-Meter Hurdlers. It concluded that strength training with a maximum power load is an effective means of increasing strength and acceleration in high-level hurdlers.

Ryan e. Ross *et al* (2009) [14] conducted the effects of treadmill sprint training and resistance training on maximal running velocity and power. All groups significantly increased treadmill sprint velocity. However, the SRT and ST groups increased significantly more than RT. Only the SRT group increased treadmill sprint peak power. All training groups increased 1R squat strength significantly by 6.6–8.4 kg, with no differences observed between groups. The results of this study showed that 7 weeks of sprint training on a newly designed treadmill.

Goran Markovic *et al*., (2007) [13] Effects of sprint and plyometric training on muscle function and athletic performance. This study provides support for the use of sprint training as an applicable training method of improving explosive performance of athletes in general.

Harrison Aj and Bourke G. (2009) [15] The effect of resisted sprint training on speed and strength performance in male rugby players. The results suggest that it may be beneficial to employ an RS training intervention with the aim of increasing initial acceleration from a static start for sprinting.

Tonnessen E, *et al* (2011) [1] The effect of 40-m repeated sprint training on maximum sprinting speed, repeated sprint speed endurance, vertical jump, and aerobic capacity in young elite male soccer players. The results of this study indicate that the repeated sprint program had a positive effect on several of the parameters tested

The results of the present study indicate that the resistance training and sprint training programme is effective method to improve sprinting ability, speed endurance and maximum power of all sports and games.

Conclusion and Recommendations

a. It was concluded that 12 week sprint training and resistance training improved sprinting ability, speed endurance and maximum power of University male students.
b. Sprint training group is better improvement on sprinting ability and speed endurance than resistance training group.
c. Maximum power was high improvement due to the effect of 12 weeks resistance training compare than sprit training group.
d. Further, it was recommended that the combined training programmes (Sprinting with resistance) that may be give better effect of various sports and games.

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