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Influence of series and parallel methods of circuit training and interval training on back strength of college men

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Abstract

The purpose of this investigation was to find out the influence of series and parallel methods of circuit training and interval training on the back strength of college men. To achieve this purpose, forty five (N= 45) men students studying in Government Degree College Kulgam, Jammu and Kashmir, were selected as subjects. The age ranged between 18 and 23 years. The selected subjects were randomly assigned into three equal groups of fifteen (n=15) subjects each such as series training group, parallel training group and control group. The Group I underwent series method of circuit training and interval training programme three days per week for twelve weeks. Group II underwent parallel method of circuit training and interval training programme for three days per week for twelve weeks and Group III acted as control group which did not participate in any special training programme apart from their regular activities. The back strength was taken as criterion variable for the present study and it was measured by back lift with dynamometer. All the subjects of the three groups were tested on the selected dependable variable at prior to and after the training programme. The analysis of covariance (ANCOVA) was used to analyse the significant difference, if any, between the groups. Level of confidence was fixed at .05 to find out the level of significance which was considered as an appropriate. The results revealed that there was a significant difference between series training group and parallel training group (58.46 ± 3.02 and 59.73 ± 3.73) on back strength and also the result of the study shows that the improvement of (1.51) on the back strength was significantly higher for parallel training group than series training group.

Keywords: Series training, parallel training, back strength, ANCOVA

Introduction

Physical fitness is very important issue for physical educationists and researchers to deal with. It is very important to everyone. For a common man physical fitness is the capability to carry out every day activities without feeling tiredness and for a sports person it is the ability to do training and exercises for a particular competition without fatigue. However physical fitness depends upon many factors i.e. genetic makeup, nutrition, sleep, sports training etc. Importance of sports training can't be denied as "sports training is the process by which an athlete or a go through series of exercises which are systematically planned and organised to improve performance. In fact physical fitness is the balanced development of muscular strength, speed, muscular endurance, muscular co-ordination, flexibility and agility which is outcome of planned training. So, proper training is needed to develop the components of physical fitness. Physical fitness is a set of attributes related to health or skill that people have or have achieved which is measured with specific tests (C.J. Caspersen, K.E. Powell and G. M. Christensen, 1985) [2].

Circuit training is an prepared way of exercising which helps to gain and improve muscular strength and endurance. Circuit training was introduced by R.E. Morgan and G.T. Adamson in 1953 in the University of Leeds (R.E. Morgan and G.T. Adamson, 1961). Researchers explore that how the increasing intensity of this type of training is beneficial for increasing strength-endurance and other health efficiency.

Interval training helps to improve the your performance Many best athletes believe that they achieve success in the modern days due to interval training. A tremendous amount of work can be accomplished that would not normally be completed in a workout in which the exercise was

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performed continuously. Continual exercise bouts can vary from a slight seconds to numerous minutes or extra depending on the required outcome. The interval training prescription can be customized in terms of intensity and time of the exercise interval, the length and the type of relief interval, the number of work intervals and the number of repetitions and sets per workout. Adjustment of any or all of these can easily be made to the specific requirement for different performance. One value of interval training is that it permits high intensity and intermittent exercise for a relatively long period (McArdle, Katch & Katch, 1985) [3].

Materials and Methods

The aim of this study was to find out the influence of series and parallel methods of circuit training and interval training on the back strength of college men. To achieve this purpose forty five men students studying Bachelors degree in Government degree college Kulgam, state Jammu and Kashmir were selected as subjects during the academic year 2018-19 were randomly selected. The age of the subjects were ranged from 18-22 years. The selected subjects were divided into three equal groups of fifteen subjects each at random. Group I(series training group) underwent circuit training for three days per week for first six weeks and interval training for three days per week for remaining six weeks. Group II (parallel training group) underwent circuit training and interval training for three days per week for twelve weeks in alternative sessions. Every day the work out is conducted about 45 to 60 minutes including warming up and cooling down exercises. Group III (control group) did not participate

in any specific activity The subjects underwent their respective training programme under the strict supervision of the convenor of sports and assistant physical instructor of the Government Degree College Kulgam, State Jammu and Kashmir, India. The data on back strength was collected by administering back lift with dynamometer. Pre-test data were collected prior to the training programme and post-test data were collected immediately after the twelve-weeks of training programme from both the experimental groups and control group.

Statistical procedure

The collected data from circuit training and interval training in series, circuit training and interval training in parallel and control groups during pre and post test on selected criterion variable such as, back strength, used for statistical treatment to find out the significant difference between the adjusted post means by computing the analysis of covariance (ANCOVA). The 0.05 level of confidence was fixed to test the significance which was considered to be appropriate measures. Since, three groups were compared, whenever obtained “F” ratio for the adjusted post test was found to be significant the Scheffe’s test was applied as post hoc test to find out paired mean differences if any.

Results and Discussion

Analysis of covariance for the pre-test, post-test and Adjusted post-test mean values for Series and Parallel methods of circuit and interval trainings and control groups on Back strength.

Analysis of covariance of circuit training and interval training in series, parallel and control groups on Back Strength

Tests	Series Group	Parallel Group	Control Group	SoV	SS	DF	MS	F
Pre test Mean SD (±)	52.93	52.66	52.86	BG	0.57	2	0.28	0.31
	2.76	3.15	3.20	WG	390.00	42	9.28	
Post-test Mean SD (±)	58.46	59.73	53.00	BG	384.13	2	19.26	18.81*
	3.02	3.73	2.75	WG	428.66	42	10.20	
Adjusted Post test Mean	58.36	59.87	52.95	BG	396.86	2	198.43	93.71*
				WG	86.81	41	2.11	

*Significant at 0.05 level of confidence

(The require table value for significance at 0.05 level of confidence with degrees of freedom 2 and 42 is 3.22 and degree of freedom 2 and 41 is 3.23) *Significant at 0.05 level of confidence. The above table shows that the pre-test means and Standard deviation on back strength of Series and Parallel methods of circuit and interval trainings, and control groups are 52.93±2.76, 52.66±3.15 and 52.86±3.20 respectively. The obtained F ratio value 0.31 of back strength less than the required table value of 3.22 for the degree of freedom 2 and 42 at 0.05 level of confidence, which proved that the scores in back strength before the training were equal and there was no significant differences. The post-test means and standard deviation on Back strength of Series and Parallel methods of circuit and interval trainings and control groups are 58.46±3.02, 59.73±3.73 and 53.00±2.75 respectively. The obtained ‘F’ ratio value 18.81 of Back strength is greater than

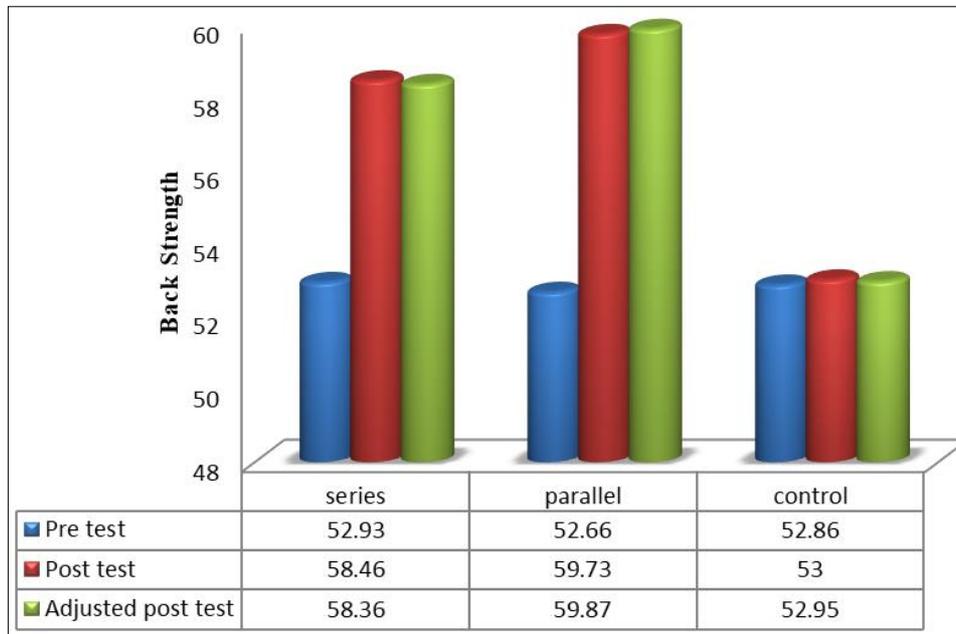
the required table value of 3.22 for the degree of freedom of 2 and 42 at 0.05 level of confidence. It implies the significant differences existed between three groups during the post test period on Back strength. The Adjusted post- test means on Back strength of Series and Parallel methods of circuit and interval trainings and control groups are 58.36, 59.87 and 52.95 respectively. The obtained F ratio value 93.71 of Back strength is greater than the required table value of 3.23 for the degree of freedom 2 and 41 at 0.05 level of confidence. Hence, it is concluded that significant differences exist between the adjusted post- test means of Series and Parallel methods of circuit and interval trainings and control groups on Back strength. Since, the obtained F ratio value in the adjusted post- test means is found to be significant, the Scheffe’s S test is applied as post hoc test to find out the paired mean differences, and it is presented below.

Scheffe’s Post Hoc Test for the Differences among Paired Means of Experimental and Control Groups on Back strength

Series Group	Parallel Group	Control Group	Mean Difference	CI
58.36	59.87		1.51*	1.34
58.36		52.95	5.41*	
	59.87	52.95	6.92*	

From the above table the Scheffe’s post hoc analysis proved that significant mean differences exist between Series and Parallel methods of circuit and interval trainings and control groups on Back strength. Since the mean differences 5.41 and 6.92 are higher than the confidence interval value of 1.34 at 0.05 level of significance. However, significant difference exist between Series and Parallel methods of circuit and interval training groups since, mean difference is 1.51 greater than the confident interval value of 1.34 at 0.05 level of confidence.

The result of the study shows that significant difference exists between series training group and parallel training group, series training group and control group and parallel training group and control group on back strength. However, the improvement of back strength was significantly higher for the parallel training group than series training group. It may be conclude that parallel training is better than series training in improving back strength. The adjusted post mean values of series training group, parallel training group, and control group are graphically represented in figure I.



Discussion

The result of the present study points out that the back strength of the subjects significantly improved due to series and parallel methods of circuit training and interval training. The findings are also in agreement with the findings of Rajeskaren (1999) [5] that maximum strength and speed training in series and parallel improve back strength. It is also similar with the findings of Sivakumar *et al.* (2014) [4] that plyometric training, circuit training and weight training improved leg strength, back strength and anaerobic power among volleyball players.

Conclusion

Hence, it is concluded that due to the effect of combined Series and Parallel methods of circuit and interval trainings the Back strength of subjects is significantly improved. It is also concluded that significant differences exist between Series and Parallel methods of circuit and interval trainings groups improved in Back strength. The pre, post and adjusted post- test mean values of experimental groups and control group on Back strength is graphically represented above.

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