Impact of Parcourse Work and Interval Training on Strength Endurance of Male Students

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Abstract

The present study effort was made to find out the impact of parcourse training and interval training on strength endurance of male students. For this purpose forty five (n = 45) male students were selected as subjects and their age group ranged between 17 and 21 years. They were divided into three equal groups, each group consisted of fifteen (n = 15)subjects. The group I underwent parcourse training (PTG), group II underwent interval training (ITG) and group III acted as a control (CG) who did not expose any special training apart from their regular activities. The training period for this study was three days in a week for twelve weeks. Strength endurance was selected as a criterion variable of this study and it was measured by using push ups. The analysis of covariance (ANCOVA) was applied as a statistical tool. Whenever the F value is found to be significant Scheffe's test was applied as a post hoc test to measure the paired mean differences. In all cases 0.05 level of confidence was fixed to test the significance, which was considered as an appropriate. It was concluded from the results of the study that there was a significant improvement ($p \leq 0.05$) of the parcourse training group and interval training group on strength endurance as compared to control group and there was insignificant ($p \geq 0.05$) difference between two experimental groups.

KEYWORDS: Parcourse work, interval training, strength endurance

Introduction

The parcourse features a number of stations (typically 18-20) set along a jogging path with basic equipment, instructions and illustrations to guide exercisers through a solid, full-body workout. They were the brainchild of a Swiss architect named Erwin Weckemann. He designed an exercise course with 20 wood and metal exercise stations scattered at varying intervals along a dirt jogging trail. The idea was that runners would jog along from station to station. They would pause at each station and perform the exercise described there from side way jumps to push ups to calf raises and chin ups. Herr Weckemann then enlisted the sponsorship of the Vita life insurance company to sponsor the building of the first parcourse. The stations would contain specific instructions to perform the exercise (Rex, 1985). The stations were also planned to keep the heart rate up and to provide an overall workout by the end of the course. By the 1970s, there were more than 200 parcourses in Switzerland. The first parcourse to be built in the United States was erected in San Francisco's Mountain Lake Park. By the

1980s there were more than 4500 of these parcourses were in existence in the United States. The par course was originally designed for outdoor interval training to accommodate broad scale community or group fitness. It is also an excellent decorative enhancement with its natural timber form construction. The individual exercise stations are usually installed at fixed intervals several hundred feet apart in a linear or looping circuit so that participants can walk or jog from one station to the next where they can perform a variety of designated exercises involving stretching, balance, agility, and strength (Astrand & Keare, 1970).

Interval training basically exercises which consists of activity at high intensity for a period of time, followed by low intensity exercise for a period of time. These 'sets' are repeated. Interval training has been the basis for athletic training routines for years (Evelyn, 1989). The first forms of interval training, called "fartlek" involved alternating short, fast bursts of intensive exercise with slow, easy activity. Interval training works both the aerobic and the anaerobic system (Gosselin *et al*., 2011). During the high intensity effort, the anaerobic system uses the energy stored in the muscles (glycogen) for short bursts of activity. Anaerobic metabolism works without oxygen. The by-product is lactic acid, which is related to the burning sensation felt in the muscles during high intensity efforts (Heath *et al*., 1981). During the high intensity interval, lactic acid builds and the athlete enters oxygen debt. During the recovery phase the heart and lungs work together to "pay back" this oxygen debt and break down the lactic acid. It is in this phase that the aerobic system is in control, using oxygen to convert stored carbohydrates into energy (James, 1988). This repetitive form of training leads to the adaptation response. The body begins to build new capillaries, and is better able to take in and deliver oxygen to the working muscles (Gibala, 2009). Muscles develop a higher tolerance to the build-up of lactate, and the heart muscle is strengthened.

Strength endurance is defined as the capacity of the whole organism to withstand fatigue under the long lasting expenditure of strength. Consequently, it is characterized by a relatively high ability to express strength together with a faculty of the preserve (Dick, 1978). Strength endurance is the specific form of strength displayed in activities which require a relatively long duration of muscle tension with minimal decrease in efficiency (Stiff 2000). Sports that involve strength endurance are numerous in nature from the rower to the swimmer to the wrestler on the mat. Even these examples are differentiated by the abilities expressed, dynamic or static, general or local strength endurance (Mueller, 1959). All forms of competition, however, necessitate maximal output over the duration of the event. It is not always the strongest athlete who wins in all cases, rather the one that can sustain the most power over the full term of the activity. Therefore, development of all the various types of muscle fibres benefits the athlete (Clarke & David, 1987). Predominantly the fast twitch muscle fibres create maximum power output in the explosive sports such as sprinting and weightlifting. Slow twitch fibres are the prime fibre cells used in long distance aerobic events. Combining, and training, these two types of fibres at all speeds and angles produces strength endurance. There are muscle fibres that are not what you would call exclusively fast twitch or exclusively slow twitch (Brunner & Tabachnik, 1990). They are a combination of the two not fully fast twitch or fully slow twitch. But, strengthening these muscle fibres will enable a greater expression of

strength endurance to occur. In all sports movement, whether fast or slow, movements have to be done under lesser or higher conditions of fatigue (Uppal & Alifereti, 1984). Even for sprints some amount of strength endurance is required in the last phase or in heats (Singh, 19991). Strength endurance, therefore, is important in most of the sports.

Materials and method

Forty five male students studying a bachelor degree in the Department of Physical Education and Sports Sciences, Annamalai University with age group of 17 to 21 years, were selected as subjects. They were divided into three equal groups, each group consisted of fifteen subjects, in which group I underwent parcourse training, group II underwent interval training and group III acted as control and they did not take part any special training apart from their daily activity. The training period for this study was three days in a week for twelve weeks. For every training programme there would be a change in various structures and systems in human a body. Strength endurance was selected as a criterion variable of this study and it was measured by using push ups. Parcourse training promoting muscular endurance, continuous training aids in caloric expenditure, a key to proper weight maintenance. The time was increased from forty-five seconds to fifty seconds per station after four weeks. Thorough warm up is very essential before beginning any interval session. Jog (easy) for a couple laps, stop to do some stretching for 5-10 minutes. Take a couple more laps at a bit faster pace, then remove warm-ups just before starting the speed work. After completing the session or that portion of it which you intend to do, run a very slow warm-down mile and stretch a bit more. This warm down procedure will reduce the sudden "decompression" with its resultant dizziness and drop in blood pressure immediately after stopping. It will also reduce the muscle soreness experienced the next morning. The subjects underwent the training programme alternatively three days per week for twelve weeks between 6.00 and 7.00 in the morning.

Data Analysis

Mean and standard deviation were calculated for strength endurance for each training group. And the data were analyzed by using analysis of covariance (ANCOVA). If the '*F*' value was found to be significant for adjusted post-test mean, Scheffe's test was applied as a post hoc test to determine the significant difference between the paired mean. Statistical significance was fixed at 0.05 levels.

Results and Discussion

Table - I

Analysis of Covariance on Strength Endurance of Parcourse Training Group, Interval Training Group and Control Group

	PTG	ITG	CG	SOV	SS	df	MS	*F*
Pre- test Mean	24	23.6	22.93	B	8.71	2	4.36	1.98
S.D.	1	1.59	1.75	W	92.53	42	2.20	
Post-test Mean	27.27	27.33	23.4	B	152.13	2	76.07	31.36*
S.D.	1.33	1.35	1.92	W	101.87	42	2.43	
Adjusted Post-test Mean	27.27	27.33	23.41	B	141.38	2	70.69	28.45*
				W	101.86	41	2.48	

*Significant F = (df 2, 42) (0.05) = 3.22; ($P \leq 0.05$) F = (df 2, 41) (0.05) = 3.225; ($P \leq 0.05$)

The table I showed that the pre test mean values on strength endurence for the parcourse training group, the interval training group and control group were 24, 23.6 and 22.93 respectively. And the obtained 'F' ratio of 1.98 for pre test which was lower than the required table value 3.22 with df 2 and 42 at 0.05 level of confidence on strength endurence. The post test mean values for restating pulse rate for parcourse training group, the interval training group and the control group were 27.27,27.33 and 23.4 respectively .And the obtained 'F' ratio of 31.36 for post test which was higher than the required table value 3.22 with df 2 and 42 at 0.05 level of confidence on strength endurence. The adjusted post test mean values on strength endurence for the parcourse training group, the interval training group and the control group were 27.27, 27.33 and 23.41 respectively. The obtained 'F' ratio of 28.45 for adjusted post test which was higher than the required table value 3.225 with df 2 and 41 for significance at the 0.05 level of confidence on strength endurence.

Hence, the results of the study showed that there was a significance difference exists between parcourse training group, the interval training group and control group on strength endurence. Further to determine which of the paired means has a significant improvement, Scheffĕ's test was applied as a post - hoc test. The result of the follow-up test was presented in Table II.

Table - II

Scheffe's Test for the difference between the Adjusted Post-Test Mean of Strength Endurance

Adjusted Post-test Mean				
PTG	**ITG**	**CG**	**MD**	**CI**
27.27		23.41	3.86*	
27.27	27.33		0.06	1.46
	27.33	23.41	3.92*	

*Significant at 0.05 level of Confidence

Table II shows that the adjusted post-test mean difference in strength endurence between parcourse training group and control group and the interval training group and the control group were 3.86 and 3.92 which were significant at0 .05 level of confidence. The adjusted post-test mean difference between parcourse training group and the interval training group was 0.06, which was insignificant at 0.05 level of confidence. Moreover, the result of the study shown that there was no significant difference was occurring between the training groups on strength endurance. It may also be concluded from the result of the study that the parcourse training and interval training groups have a significant improved the strength endurance after their respective training programmes.

The purpose of this study was to analyse the impact of parcource training and interval training on strength endurance of male students. Regular physical training, has sustained beneficial effects strength endurance (Carter et al., 2001 and Edge et al., 2006). No previous studies have attempted to find out the impact of parcourse training and interval training on strength endurance among young boys. Bartlett *et al*. (2011) pointed that interval training improves strength endurance. Many studies reported that parcourse training helps to improve strength endurance of human (Holloszy & Coyle, 1984) .Recent studies (Martin et al., 2006 and Burgomaster et al., 2006) showed that short term interval exercise is beneficial for strength endurance. Endurance training developed muscle strength and capacity (Gollinik et al., 1973 and Gawley, 2002). The pre. Post and adjusted post test mean values on strength endurence of the parcourse training group, the interval training group and the control group were graphically represented in figure 1.

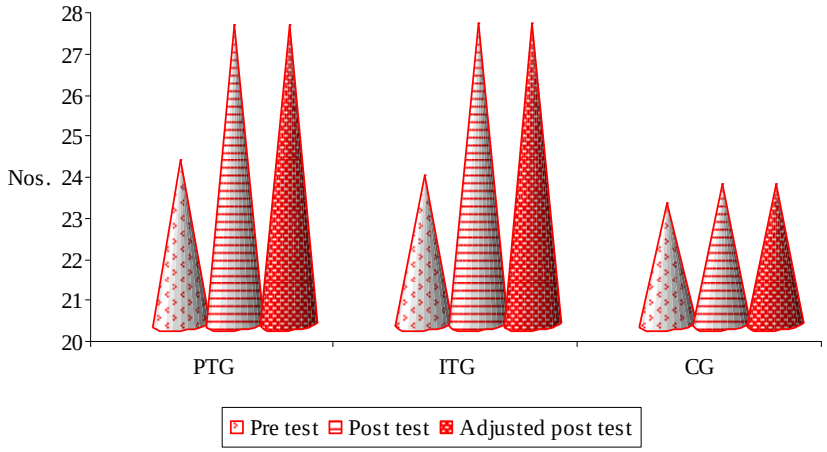

Figure 1: The pre, post and adjusted post test mean values of experimental groups and control group on strength endurance

Conclusion

From the results, both training such as parcourse and interval can be improved strength endurance during the age between 17 and 21 years of male students. Any practical application requires careful implementation and individual experimentation. The result of the study indicated that there was a significant improvement on strength endurance due to twelve weeks of parcourse training and interval training. From the results, we recommend that both training such as parcourse and interval are very suitable to improve strength endurance.

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