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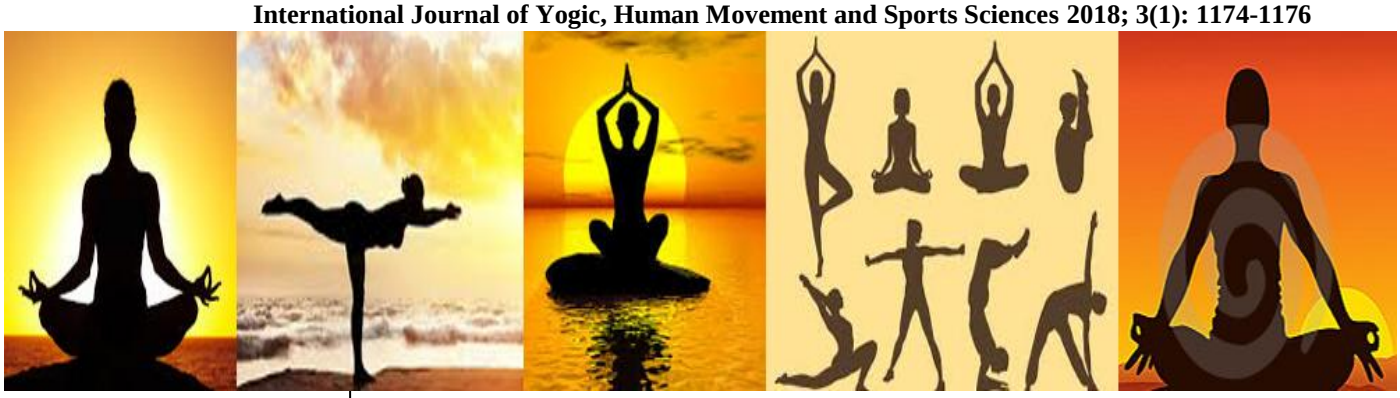

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Effects of plyometric training on speed and explosive power among teenage boys

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Abstract
The purpose of the study was to find out the effect of plyometric training on speed and explosive power among teenage boys. To achieve this purpose, 40 teenage boys were randomly selected from St. Francis Higher Secondary School, Vavarai, Tamil Nadu, India. The age of the subjects were ranged from 15 to 18 years. The subjects were further classified at random into two equal groups of 20 subjects each. Group I underwent plyometric training for 6 weeks three days per week and group II act as control group. The selected criterion variables namely speed, and explosive power were assessed before and after the training period. The collected data were statistically analyzed by using Dependent t test and Analysis of Covariance (ANCOVA). When the F ratio of the adjusted posttest mean was found to be significant, Scheffe's post hoc test was employed to find out the paired mean difference. All the data were analyzed using SPSS statistical package. From the results of the study it was found that there was a significant improvement on speed and explosive power, among the experimental group when compared with the control.

Keywords: Plyometric training, speed and explosive power

Introduction
Plyometric movements, in which a muscle is loaded and then contracted in rapid sequence, use the strength, elasticity and innervations of muscle and surrounding tissues to jump higher, run faster, throw farther, or hit harder, depending on the desired training goal. Plyometric is used to increase the speed or force of muscular contractions, providing explosiveness for a variety of sport-specific activities. Plyometric has been shown across the literature to be beneficial to a variety of athletes. Plyometric consists of a rapid stretching of a muscle (eccentric action) immediately followed by a concentric or shortening action of the same muscle and connective tissue (Baechle and Earle, 2000) [1].

Plyometric training bridges the gap between strength and speed. In children and adolescents, it is well-established that training-induced gains in strength and power are indeed possible following participation in a resistance training program (Faigenbaum *et al*., 1996). More recent observations suggest that plyometric training may also be safe and effective for children and adolescents provided that age appropriate training guidelines are followed (Chu *et al*., 2006) [3]. Lean body weight and fat weight are the two component systems of the muscle, bone, internal organs and connective tissues in the body. Fat weight usually is expressed relative to the total body weight of the individuals. Excessive body fat leads to obesity and enhances the risk of developing coronary heart diseases. It is important to realize that individuals may be overweight even though they do not appear to be overweight. This may be caused by a lack of physical activity (Heyward, 1984) [5].

Plyometric refers to exercise that enable a m. uscle to reach maximal strength in as short a time as possible. Such exercise usually involved some form of jumping, but other modes of exercise exist. Plyometric exercise utilizes the force of gravity to store energy in the muscles (potential energy). This energy is utilized immediately in an opposite reaction, so the natural elastic properties of the muscle will produce kinetic energy. Elastic strength is the ability of muscles and connective tissues to rapidly exert a force in order to produce maximal power with linear, vertical, or combination movements (Baechle, 1994) [2].

Purpose of the study

The purpose of this present study was to find out the effects of plyometric training on speed and explosive power among teenage boys.

Methodology

To achieve this purpose, forty teenage boys were selected from St. Francis. Higher Secondary School, Vavarai, Tamil Nadu, India and their age ranged 15-18 years. The selected subjects were divided into two groups of 20 each. Group I Experimental group and group II control group. The experimental group underwent the specific training for six weeks and the control group did not take part in any training. The pretest was taken before the training programme and posttest was taken after the six weeks of training period.

As per the availability literature of and the personal knowledge of the investigator following variables were be chosen for this study such as speed and explosive power and the selected variables were tested by using 50 M run and sergeant vertical jump test respectively.

The pre and posttest random group design was used as experimental design in which forty subjects were divided into two groups of twenty each at random. No attempt was made to equate the group in any manner. The subjects were tested on the selected criterion variables prior to and immediately after the treatment period. The collected data from the experimental and control group prior to and immediately after the training period on selected criterion variables were statistically analyzed with dependent "t" test to find out the significant improvement between pre and post-test means of experimental and control groups separately and analysis of covariance (Ancova) was used to find out the significant difference among experimental and control groups. In all the cases 0.05 level of significant was fixed to test the hypothesis.

Analysis of the data

The analysis of dependent 't'-test on the data obtained on speed and explosive power of the pre-test and post-test means of experimental and control groups have been analyzed and presented in table below.

Speed

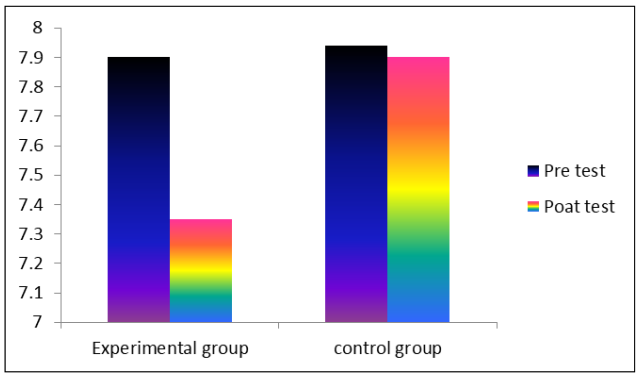
Table 1: Means, Standard Deviation and Dependent T- Test Values on Speed of Experimental and Control Groups

Tests	Experimental group		Control group	
	Mean	SD	Mean	SD
Pre test	7.90	0.26	7.94	0.28
Post test	7.35	0.20	7.90	0.29
T-Test	8.78		0.69	

*Significant at .05 level. The table value required at .05 level with df 19 is 2.09.

From the table I shows that the obtained dependent t-test values between pre-test and posttest means of plyometric training and control groups are 8.78 and 0.69 respectively. The table value required for significant difference with df 19 at .05 level is 2.09. Since, the obtained t-test value of plyometric training groups is greater than the table value, it is understood that plyometric training programme had significantly improved the performance on speed and the control group has not improved as the obtained t-test value lesser than the table value because they were not subjected to any specific training.

Pre and posttest means of plyometric training and control groups on Speed were graphically represented in figure I



Explosive Power

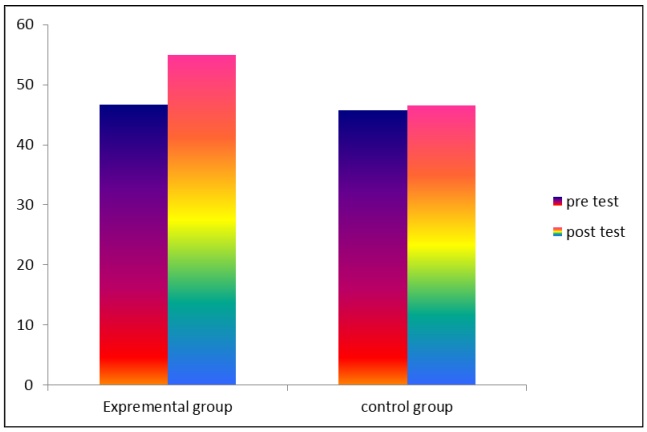
Table 2: Means, Standard Deviation and Dependent T- Test Values on Explosive power of Experimental and Control Groups.

Tests	Experimental group		Control group	
	Mean	SD	Mean	SD
Pre test	46.65	6.10	45.70	4.93
Post test	54.90	5.94	46.50	4.86
T-Test	9.90*		1.93	

*Significant at .05 level. The table value required at .05 level with df 19 is 2.09.

From the table II shows that the obtained dependent t-test values between pre-test and posttest means of plyometric training and control groups are 9.90 and 1.93 respectively. The table value required for significant difference with df 19 at .05 level is 2.09. Since, the obtained t-test value of plyometric training groups is greater than the table value, it is understood that plyometric training programme had significantly improved the performance of Explosive power and the control group has not improved as the obtained t-test value lesser than the table value because they were not subjected to any specific training.

Pre and posttest means of plyometric training and control groups on Explosive power were graphically represented in figure II



The analysis of covariance (ANCOVA) on premenstrual syndrome of experimental and control groups have been analyzed and presented in table III.

Table 3: Analysis of Covariance on speed and explosive power of Experimental and Control Groups

variables	Adjusted posttest means		Sources of variance	Sum of square	DF	Mean squares	F-ratio
	Experimental group	Control group					
Speed	7.36	7.89	Between	2.83	1	2.83	60.74*
			Within	1.73	37	0.05	
Explosive power	54.83	42.27	Between	573.78	1	573.78	71.18*
			Within	298.24	37	8.06	

*Significant at .05 level of confidence. The table value F (1, 37) is 4.11.

Table III shows that the adjusted posttest means of experimental and control groups on speed are 7.36 and 7.89 respectively. The obtained F-ratio value is 60.74 which are higher than the table value 4.11 with df 1 and 37 required for significance at .05 level and the adjusted posttest means of experimental and control groups on explosive power are 54.83 and 42.27 respectively. The obtained F-ratio value is 71.18 which are higher than the table value 4.11 with df 1 and 37 required for significance at .05 level Since, the value of F-ratio is higher than the table value it indicates that there is significant difference exists between the adjusted post-test means of experimental and control groups on speed and explosive power.

Discussions

The result of the study indicates that there was a significant improvement on speed and explosive power due to the effects of plyometric training among teenage boys. There is evidence that plyometric training helps to improvement on speed and explosive power. According to Rimmer (2000) [7] determined the effects of a sprint specific Plyometric program on sprint performance, an 8-week training study consisting of 15 training sessions was conducted. Luebbers *et al* (2003) [6] conducted a study on the effects of plyometric training and recovery on vertical jump performance and anaerobic power. They examined the effects of two plyometric training programmes, equalized for training volume, followed by a 4-week recovery period of no plyometric training on anaerobic power and vertical jump performance. In this study six week of plyometric training helps to improve the speed and explosive power among the teenage boys.

Conclusions

From the analysis of the data, the following results were drawn.

There was significant improvement on speed due to the effects of plyometric training among teenage boys.

There was significant improvement on explosive power due to the effects of plyometric training among teenage boys.

There was a significant difference between the experimental and control groups on speed among teenage boys.

There was a significant difference between the experimental and control groups on explosive power among teenage boys.

Recommendations

1. It is recommended that further research be designed to investigate the effects of plyometric training on different variable.
2. It is recommended that further research be designed to investigate with different age group.
3. It is recommended that further research be conducted using more subjects.
4. It is recommended that further research be conducted with different training methods.

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