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Effect of plyometric training on muscular power among school football players

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Abstract
The purpose of the study was to find out the effect of plyometric training on muscular power among school football players. To achieve this purpose of the study, thirty school students were selected as subjects who were from the Government Junior College, Jangar Eddygudem, West Godavari (Dist.), Andhra Pradesh. The selected subjects were aged between 16 to 18 years. They were divided into two equal groups of fifteen each, Group I underwent plyometric training programme and Group II acted as control that did not participate in any special training apart from their regular curricular activities. The subjects were tested on selected criterion variable such as muscular power prior to and immediately after the training period. The selected criterion variable such as muscular power was measuring by Standing Broad Jump Test. The analysis of covariance (ANCOVA) was used to find out the significant differences if any, between the experimental group and control group on selected criterion variable. In the cases, 0.05 level of confidence was fixed to test the significance, which was considered as an appropriate. The result of the present study has revealed that there was a significant difference among the experimental and control group on muscular power.

Keywords: plyometric training-physical-muscular power-football players

1. Introduction
The primary objective of sports training is to stress various bodily systems to bring about positive adaptation in order to enhance sporting performance. To achieve this objective, coaches and athletes systematically apply a number of training principles including overload, specificity and progression, organized through what is commonly termed periodisation. The application of these principles involves the manipulation of various programme design variables including choice of exercise, order of training activities/exercises, training intensity (load and repetition), rest periods between sets and activities/exercises and training frequency and volume in order to provide periods of stimulus and recovery, with the successful balance of these factors resulting in positive adaptation.

Plyometrics refers to a type of intense training that maybe undertaken by an athlete who wants to improve speed power. This type of training also refers to very fast, explosive excision (normally performed with body weight) to improve power out-put and neural activation of the mussels (the ability for a muscle to contract quickly). Basically phonetics relies on an element of physiology call the stretch-shorten cycle (s&c). This stretch-shorten cycle means that the muscle is rapidly stretched and then contracted which increases the force applied on the muscle. Receptors within the muscle called muscle spindles react to this sudden stretching by sending a signal to the brain saying this stretching is potentially dangerous than the train contracts the muscle to stop the stretching this serves to protect the stretch and prefect against any possible injury. The pre-stretch is the sac must be used by 0.2 of a second or otherwise same type of bounce or any possible advantage gained by sac is lost. So recapping, the sac is initiated by the muscle spindles which defects a stretch and responds by causing the muscle to contract.

Throughout this century and no doubt long before, jumping, bounding and hopping exercises have been used in various ways to enhance athletic performance on recent years. This distinct method of training for power or explosiveness has been termed as plyometrics. Whatever the origins of the word the term is used to describe the method of training which seeks to enhance the explosive reaction of the individual through powerful muscular contraction as a result of rapid eccentric contractions.

2. Methodology
The purpose of the study was to find out the effect of plyometric training on muscular power among school football players. To achieve this purpose of the study, thirty school football players were selected as subjects who were from the Government Junior College, Jangar Eddygudem, West Godavari (Dist.), Andhra Pradesh. The selected subjects were aged between 16 to 18 years. They were divided into two equal groups of fifteen each, Group I underwent plyometric training programme and Group II acted as control that did not participate in any special training apart from their regular curricular activities. The experimental group underwent the training programme for three days per week for eight weeks. Among the physiological variable such as muscular power was measuring by Standing Broad Jump Test.

2.1 Muscular Power (Standing Broad Jump Test)
The subject stands with the feet several inches apart and the toes just behind the takeoff line. In preparation for jumping the subjects were swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging the arms forward. Measure from the takeoff line to the heel or the other part of the body touches the floor nearest the takeoff line.

Scoring: Each subject was given 3 trials and recorded the beat of 3 trials in feet and inches to the nearest inch.

3. Results

Findings: The mean and standard deviation scores of pretest, posttest and adjusted posttest of muscular power on plyometric training and control group are given in table.

'F'ratio test computed in regards to the muscular power on plyometric training and control group in the pretest, posttest and adjusted posttest are also presented in table.

Table 1: Mean Standard Deviation and 'F' Ratio of Plyometric Training and Control Group on Muscular Power

	Exp Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squared	'F' ratio
Agility							
Pretest Mean	2.45	2.33	Between	0.032	1	0.032	1.78
S D	0.15	0.12	Within	0.504	28	0.018	
Posttest Mean	2.79	2.40	Between	0.096	1	0.096	6.40*
S D	0.15	0.12	Within	0.419	28	0.015	
Adjusted posttest Mean	2.78	2.39	Between	0.081	1	0.081	21.89*
			Within	0.0999	27	0.0037	

The muscular power pre means were 2.45 for the plyometric training group and 2.33 for the control group. The resultant 'F' ratio of 1.78 was not significant at .05 levels indicating that the two groups were no significant variation. The posttest means were 2.79 for the plyometric training group and 2.40 for the control group. The resultant 'F' ratio of 6.40 at .05 level indicating that it was significant. The difference between the adjusted post-test means of 2.78 for the plyometric training group and 2.39 for the control group yield on 'F' ratio 21.89 which was significant at.05 level.

The result of this study showed that there was a significant difference between plyometric training and control group on muscular power.

3. Discussion/Conclusions

The findings of the study showed that there was no significant difference between the pretest of muscular power.

The findings of the study showed that there was a significant difference between the posttest and adjusted posttest of muscular power.

The results of the study have shown there was a significant difference among plyometric training group and control group on muscular power reference to the past studies on selected physical fitness variable such as agility in accordance with Brown and others (2007)[5], Johnson, Salzberg and Stevenson (2011)[6] and Sedano Campo and others (2009)[7].

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