Study of Six Weeks Ballistic Power Training on Shoulder Explosive Power and Leg Explosive Power among Soccer players

Sivakumar, R., & Arumugam, S.
Ph.D., Research Scholars & Assistant Professor
Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamilnadu, India, Pin Code: 627012
risi1985@gmail.com, & draru1975@gmail.com

Abstract

The intention of the present study was to find out the upshot of six weeks ballistic power training on shoulder explosive power and leg explosive power among soccer players. Twenty (20) male soccer players were randomly selected from affiliated colleges of Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India and their age was ranged between 21 to 24 years only. The selected subjects have been randomly divided into two equal groups namely Ballistic Power Training Group (BPTG) (N=10) and Control Group (CG) (N=10). Six weeks ballistic power training programme has been formulated to see the effectiveness of given training programme on shoulder explosive power and leg explosive power among soccer players. The shoulder explosive power and leg explosive power has been tested by 'Overhead medicine ball throw test and Sargent vertical jump test' on before the training starts and after completion of six weeks ballistic power training programme. Significant improvement occur in shoulder explosive power and leg explosive power has been found by analysing and comparing the pre-test and post-test score through paired sample 't' test and ANCOVA among the soccer players of BPTG and CG. So this study was concluded that six weeks of ballistic power training programme was shown effective in the improvement of shoulder explosive power and leg explosive power among soccer players. However, the control group had not shown any significant improvement on shoulder explosive power and leg explosive power while because they were not engaged to participated in to any specific training programme apart from their routine works.

Keywords: Ballistic Power Training, Shoulder Explosive Power, Leg Explosive Power, Soccer players

Introduction

Sports is a human activity that involves specific administration, organization and an historical background of rules which define the object and limit the pattern of human behavior; it involves competition or challenge and a definite outcome primarily determined by physical skill [1]. "Training is a systematic process of repetitive, progressive exercise or work involving learning process and acclimatization" [2].

Sports training are characterized by a continuous control and regulation. Systematic nature of the training process is reflected adequately by the fact that the various means and methods, load dynamics, training tasks etcetera are all planned in order to achieve short- or long-term goals, keeping in view the interrelations of various training elements, cyclic nature of performance developments and long-term goal of sports training [3].

The word ballistic comes from the Greek word ballein, which means "to throw". Ballistic power exercises generally involve either a jumping action or a throwing action, hence removing any braking phases involved in more common resistance training methods [4]. Ballistic training, also called power training, is a form of training which involves throwing weights, and jumping with weights, in order to increase explosive power [5]. The intention in ballistic exercises is to maximize the acceleration phase of

an object's movement and minimize the deceleration phase [6]. Among the numerous types of available exercises, ballistic training assist in the development of power, a foundation from which the athlete can refine the skills of their sport [7].

Shoulder explosive power is the ability to release the maximum muscular force in on explosive manner, in the shortest possible time with use of upper extremity muscles [8]. Leg explosive power is the ability to release the maximum muscular force in on explosive manner, in the shortest possible time with use of lower extremity muscles [9].

Methods and Materials

This research stays in quantitative research, although in terms of the method used in this research, it is a quasi-experimental research. Based on data analysis using quantitative analysis, the intervention group was assessed by providing the kind of exercise in the form of ballistic power training to raise the ability of the shoulder explosive power and leg explosive power among soccer players. The samples in this study were all male soccer players were ranged from aged 21 to 24 years were randomly selected from affiliated colleges of Manonmaniam Sundaranar University, Tirunelveli, Tamilnadu, India. The selected subjects have been randomly divided into two equal groups namely Ballistic power training Group (BPTG) (N=10) and Control Group (CG) (N=10). Six weeks ballistic power training programme has been formulated to see the effectiveness of given training programme on shoulder explosive power and leg explosive power of soccer players.

Ballistic Power Training Protocol

The BPTG followed a unique six-week ballistic power training protocol formed by the investigator of this study. Conferring to previous reports, 6 to 8 weeks of Ballistic power training has positive effects on physical and psychological health (Bavli & Koybasi, 2016; Pourvaghar, Bahram, Sharif, & Sayyah, 2014; Rogers & Gibson, 2009). So we chose the 6-week training programme to prove efficacy as soon as possible in this study. Training sessions were conducted three alternative days a week and period of each session was 40-50 minutes in regular together with 5 minutes of warming up and 5 minutes of cooling down. Exercises were executed as group training and supervised by an investigator with the help of his supervisor and coach. The protocol was primarily composed of training for the jump squats, tuck jump, lunge jump, push press, kettlebell swing, standing rotational swing, overhead throw. Before the training programme the trainer demonstrated each activity using verbal and visual instructions to facilitate the correct position and movement.

Statistical Analysis

Significant improvement occurs in shoulder explosive power and leg explosive power has been found by analysing and comparing the pre-test and post-test score through paired sample ‘t’ test and to find out the difference exists between both groups were analysed through one way ANCOVA at the level of significance at 0.05. The collected data were statistically analysing with use of SPSS 17.1 trail version.

Analysis of Data

Table-1

Means and Paired Sample-'t' Test for the Pre and Post Tests on Shoulder explosive power and leg explosive power of BPTG and CG

Criterion variables	Test	BPTG	CG
Shoulder Explosive Power	Pre test	11.52	11.34
	Post test	13.64	11.59
	't'-test	**9.34***	0.86
Leg Explosive Power	Pre test	36.27	35.93
	Post test	49.58	36.08
	't'-test	**12.09***	1.42

***Significant at .05 level. (Table value required for significance at .05 level for 't'-test with df 9 is 2.26)

The table-1 shows that the pre-test mean value of BPTG and CG on shoulder explosive power and leg explosive power were 11.52 & 11.34 and 36.27 & 35.93 respectively. The post test mean value of BPTG and CG on shoulder explosive power and leg explosive power were 13.64 & 11.59 and 49.58 & 36.08 respectively. The obtained paired sample t-ratio values between the pre and post-test means of BPTG and CG were 9.34 & 0.86 and 12.09 & 1.42 respectively. The required table value for significant difference with df 9 at 0.05 level is 2.26. From the above table the paired sample t-test value of shoulder explosive power and leg explosive power between pre and post-tests means of BPTG was greater than the table value 2.26 with df 9 at .05 level of confidence, it was concluded that the BPTG had significant improvement in the shoulder explosive power and leg explosive power when compared to CG.

Table-2

Computation of Mean and Analysis of Covariance Shoulder Explosive Power and Leg Explosive Power of BPTG and CG

Adjusted Post Mean	BPTG	CG	Source of Variance	Sum of Squares	Df	Mean Square	F
Shoulder Explosive Power	13.71	11.63	BG	61.02	1	61.02	25.32*
			WG	40.97	17	2.41	
Leg Explosive Power	49.35	36.11	BG	210.02	1	210.02	31.87*
			WG	112.03	17	6.59	

* Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table-2 shows that the adjusted post-test means values on shoulder explosive power and leg explosive power of BPTG and CG are 13.71 & 11.63 and 49.35 & 36.11. The obtained f- ratio of adjusted post-test mean value was 25.32 & 31.87 which was greater than the required table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicated that there was a significant mean difference exist between the adjusted post-test means of BPTG and CG on shoulder explosive power and leg explosive power.

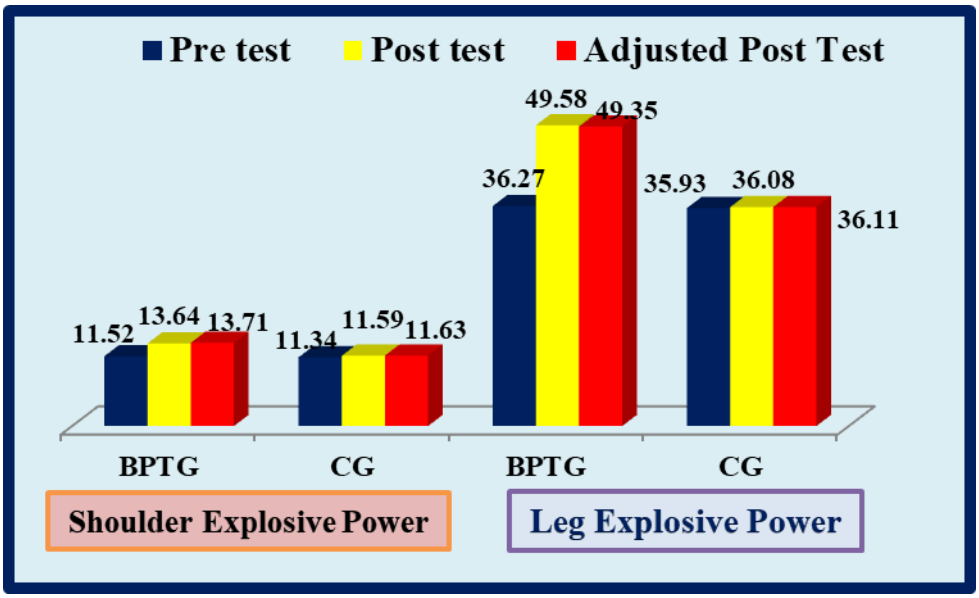

Figure-1 shows that the mean values of pre, post and adjusted post tests on shoulder explosive power and leg explosive power of BPTG and CG.

Discussion on Findings

The present study was to found statistically significant improvement on shoulder explosive power and leg explosive power, which showed that positive impact of ballistic power training among soccer players. The following studies were Amidian, (2018) conducted the study in the effects of general resistance training and ballistic resistance training on some of physical fitness factors in soccer players. Mariscal, et al., (2021) analysed the acute effects of ballistic vs. passive static stretching involved in a prematch warm-up on vertical jump and linear sprint performance in soccer players. Krawczy & Pociecha, (2019) evaluated the influence of 6-week mixed ballistic-plyometric training on the level of selected strength and speed indices of the lower limbs in young football players. Sciberras, (2017) conducted the effect of weight and ballistic training on speed, agility, and vertical jump height and skill performance in soccer players.

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Conclusions

There was significant improvement on shoulder explosive power and leg explosive power due to the impact of ballistic power training practices among soccer players. There were significant differences exist between BPTG and CG on shoulder explosive power and leg explosive power. However, the control group had not shown any significant improvement on any of the selected variables. From this study we clearly noted that Ballistic power training includes the use of jumps, throws, or strikes to continually accelerate throughout the concentric action and should not be confused with plyometrics. This form of training can be used with light, moderate or heavy loads and it seems that it is the intent to move quickly, rather than the actual velocity of the load, that is the driving force behind neural adaptations such as increased motor-unit recruitment, rate of force development, and intra- and inter-muscular coordination.

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