ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

An Evaluation of Six-Week Ballistic Power Training Influence on Specific Power Variables among Soccer Players

1. Sivakumar, R.,
Ph.D. Research Scholar (Full-Time) (Reg.No. 19214012121060) Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India. risi1985@gmail.com
2. Arumugam, S.
Assistant Professor, Department of Physical Education and Sports, Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India.
draru1975@gmail.com

Abstract

The purpose of this study was to determine the effect of six weeks of ballistic power training on chosen power characteristics among soccer players. Twenty (20) male soccer players ranging in age from 21 to 24 years were chosen at random from the Inter-department soccer players at Manonmaniam Sundaranar University in Tirunelveli, Tamil Nadu, India. They randomly separated the subjects into two equal groups, Ballistic Power Training Group (BPTG) (N=10) and Control Group (CG) (N=10). A six-week ballistic power training course has been designed to assess the effectiveness of the offered training regimen on soccer players' shoulder and leg explosive power. The selected power variables, such as shoulder explosive power and leg explosive power, were examined using the 'Overhead medicine ball throw test and Sargent vertical jump test' before and after the six-week ballistic power training programme. Significant positive changes in shoulder explosive power and leg explosive power were discovered by assessing and comparing pre-test and post-test scores using the paired sample 't' test and ANCOVA among BPTG and CG football players. As a result of this study, it was established that a six-week ballistic power training regimen was helpful in improving shoulder explosive power and leg explosive power among soccer players. However, the control group did not show any significant positive changes in shoulder and leg explosive power because they were not engaged in any specific training programme aside from their routine work.

Keywords: Ballistic power training, Shoulder Explosive Power, Leg Explosive Power, Soccer players

Introduction

Sports are a type of activity that involves long-standing administration, organisation, and regulations that define the purpose and create boundaries for human action. Sports also include competition or challenges with a defined outcome based mostly on physical prowess [1]. Training is defined as a structured process of repeated, progressive exercise or activity that includes learning and acclimatization [2].

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

Sport training is recognized for its strict management and regulation. The fact that various means and methods, load dynamics, training tasks, and so on are all planned to achieve short- or long-term goals, while keeping in mind the interdependence of various training elements, the cyclical nature of performance development, and the long-term goal of sports training, adequately reflects the systematic nature of the training process [3].

The word "ballistic" comes from the Greek term ballein, which means "to throw." Ballistic power workouts often involve a throwing or jumping motion, with no halting intervals, as opposed to more traditional resistance training techniques [4]. Ballistic training, often known as power training, is a sort of exercise that entails jumping while carrying weights and throwing weights in order to increase explosive power [5]. Ballistic exercises are designed to maximize an object's acceleration phase while decreasing its deceleration phase [6]. Shoulder explosive power is the ability to use the muscles of the upper extremities to generate the largest amount of muscular force quickly and explosively [8]. Leg explosive power is the ability to use the muscles in the lower extremities to produce the largest amount of muscular force quickly and explosively [9].

Methods and Materials

This study was quantitative even though it uses a quasi-experimental methodology. Based on data analysis utilising quantitative analysis, the intervention group was assessed by giving them a form of exercise called ballistic strength training to improve the soccer players' shoulder and leg explosive power capacities. All male soccer players between the ages of 21 and 24 who participated in interdepartmental play in the Manonmaniam Sundaranar University in Tirunelveli district, Tamil Nadu state, India, served as the study's samples. The chosen participants were randomly assigned to one of two equal groups: The Control Group (CG; N=10) and the Ballistic Power Training Group (BPTG; N=10). To assess the impact of the offered training schedule on soccer players' shoulders and legs, a six-week ballistic power training programme has been developed.

Ballistic Power Training Protocol

The researcher of this study developed a special six-week ballistic power training plan, which the BPTG followed. According to earlier studies, ballistic power training, which lasts 6 to 8 weeks, has a positive impact on both physical and mental health (Bavli & Koybasi, 2016; Pourvaghar, Bahram, Sharif, & Sayyah, 2014; Rogers & Gibson, 2009). Therefore, in order to demonstrate efficacy as soon as possible in this study, we chose the 6-week training programme. Training sessions were held three days a week on alternate weeks, lasting 40 to 50 minutes in total, including 5 minutes for warming up and 5 minutes for cooling down. Exercises were carried out in a group setting under the supervision of an investigator with assistance from his coach and supervisor. The jump squat, tuck jump, lunge leap, push press, kettle bell swing, standing rotational swing, and overhead throw were the main exercises in the routine. In order to facilitate the proper stance and movement throughout each activity, the trainer showed each one prior to the training programme.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

Statistical Analysis

Significant positive changes 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 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 22.0 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	

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

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.

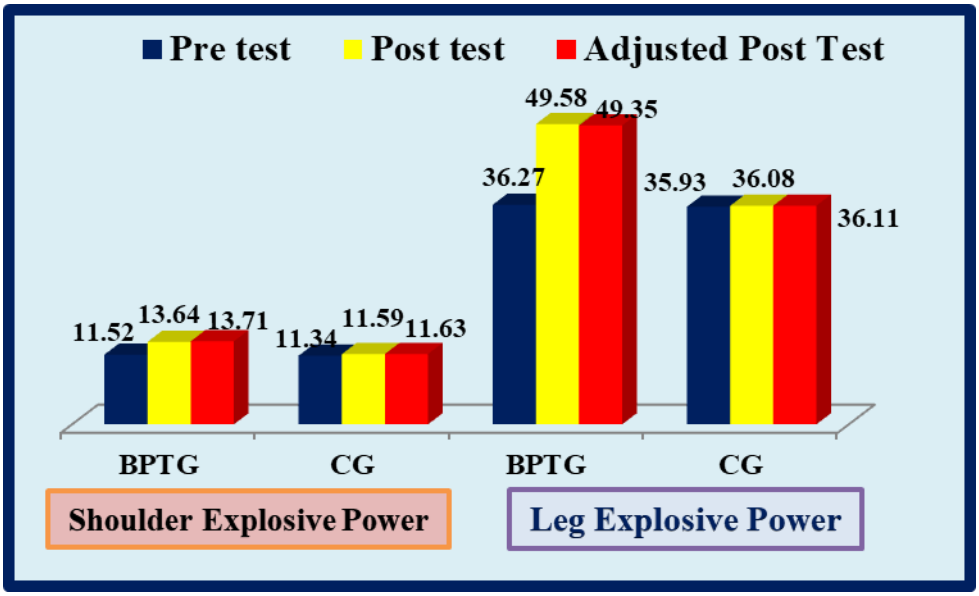

Figure-1 shows that the mean values of pre, post and adjusted post tests on shoulder explosive power and leg explosive power of BPTG and CG.

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.

.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

Conclusions

This study reveals that ballistic power training involves the use of jumps, throws, or punches with continuous acceleration during concentric movements and should not be confused with plyometric training. This form of training can be used with light, medium or heavy loads. The intention to move faster, rather than the actual speed of the load, appears to be the driving force behind neural adaptations such as motor unit recruitment, increased speed. Power development and coordination within and between muscles can be developed through this training programme. From the results of this study, it concluded that there was a significant effect of ballistic power training in soccer players has significantly improved shoulder explosive power and leg explosive power. There was a significant difference in shoulder explosive power and leg explosive power between BPTG and CG. However, the control group did not show significant improvement in any of the selected variables.

Reference

1. Singh, H. (1991). Sports Training General Theory and Education Method. New Delhi: DVS Publication.
2. Dietrich, et. al. (1982). Principles of Sports Training, Berlin: Sports Verlag, 10.
3. Antony, B., & Palanisamy, A. (2016). Impact of battle rope high intensity training on selected biochemical and physiological variables among athletes. International Journal of Advanced Scientific Research, 1(5), 27-30.
4. Newton, R. U., Kraemer, W. J., & Haekkinen, K. E. I. J. O. (1999). Effects of ballistic training on preseason preparation of elite volleyball players. *Medicine and science in sports and exercise*, *31*, 323-330.
5. Olsen, P. D., & Hopkins, W. G. (2003). The effect of attempted ballistic training on the force and speed of movements. *Journal of Strength and Conditioning research*, *17*(2), 291-298.
6. Bouagina, R., Padulo, J., Fray, A., Larion, A., Abidi, H., Chtara, M., ... & Khalifa, R. (2021). Short-term in-season ballistic training improves power, muscle volume and throwing velocity in junior handball players. A randomized control trial. *Biology of sport*, *39*(2), 415-427.
7. Zaras, N., Spengos, K., Methenitis, S., Papadopoulos, C., Karampatsos, G., Georgiadis, G., ... & Terzis, G. (2013). Effects of strength vs. ballistic-power training on throwing performance. *Journal of sports science & medicine*, *12*(1), 130.
8. Singh, T. (2018). Construction and standardization of specific physical fitness test battery for Circle Style Kabaddi players. Published Thesis, Sodhganga Inflibnet.com.
9. Arumugam, S., & Sangma Balmu, (2019). Effect of trampoline training on explosive power and dynamic balance among college students. Journal of emerging technologies and innovative research, 6 (4), Pp: 587-590.
10. Amidian, M., Haghighi, A. H., & Hosseini Kakhk, S. A. (2018). The Effects of General Resistance Training and Ballistic Resistance Training on Some of Physical Fitness Factors in Soccer Players. *Journal of Applied Exercise Physiology*, *14*(27), 123-137.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 11, Iss 10, Oct 2022

11. Mariscal, S. L., Garcia, V. S., Fernández-García, J. C., & de Villarreal, E. S. (2021). Acute Effects of Ballistic vs. Passive Static Stretching Involved in a Prematch Warm-up on Vertical Jump and Linear Sprint Performance in Soccer Players. The Journal of Strength & Conditioning Research, 35(1), 147-153.
12. Krawczyk, M., & Pociecha, M. (2019, May). Influence of a 6-week mixed ballistic-plyometric training on the level of selected strength and speed indices of the lower limbs in young football players. In SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference (Vol. 4, pp. 198-206).
13. Sciberras, C. (2017). The effect of weight and ballistic training on speed, agility, vertical jump height and skill performance in soccer players (Doctoral dissertation, St Mary's University, Twickenham).