E-ISSN:2319-3050

Research Article

Fitness and Sports Training

International Journal of Research Padagogy and Technology in Education and Movement Sciences

2023 Volume 12 Number 02 APR-JUN

Publisher

www.theuniversityacademics.com

EFFECT OF PLYOMETRIC EXERCISES ON PHYSICAL FITNESS PREPARATION OF ELITE BALL BADMINTON PLAYER

Sawant P.[1]

DOI: https://doi.org/10.55968/ijems.v12i02.338

[1] Prashant Chandrakant Sawant, Head & Director of Physical Education and Sports, , Shreemant Shivajiraje College of Hoticulture Phaltan, Satara, , India.

The objective of this research study was to find out the effect of plyometric exercises on physical fitness preparation of elite ball badminton players in the city of Satara. A total of 20 elite male players (aged 17-19) participated in this research study. The samples were selected randomly from a population of collegiate male students and they participated in two tests (the vertical jump and medicine ball throw). After making them homogeneous, the participants samples were randomly divided into two groups, i.e. an experimental group (plyometric exercises) and a control group (only ball badminton exercises). They part of the exercises for 6 weeks with 4 sessions each week and duration of each session for 90 minutes. After implemented of the training plan, both groups conducted of post-test. The ball badminton player's score were collected in two pre- and post-tests and compared them. The results of the study revealed that 6 weeks of plyometric exercise have a significant effect on the ball badminton players score in two tests (the vertical jump and medicine ball throw) and have caused improvements in the results of these tests. Therefore, it seems that plyometric exercises had an effect on the physical fitness preparation of ball badminton players of experimental group compared to the control group and it's improve the ball badminton players performance in this field.

Keywords: plyometric exercise, physical fitness, ball badminton players.

Corresponding Author	How to Cite this Article	To Browse
	Prashant Chandrakant Sawant, EFFECT OF PLYOMETRIC EXERCISES ON PHYSICAL FITNESS PREPARATION OF ELITE BALL BADMINTON PLAYER. IJEMS. 2023;12(02):188-192. Available From https://ijems.net/index.php/ijem/article/view/338	

Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2023-03-15	2023-03-29	2023-05-23	2023-05-31	2023-06-20

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
NIL	NO	YES	14	

Introduction

The game of Ball badminton is beautiful racket sports are played usually outdoors during the day session. Ball badminton is fast paced game demands and requires players vital elements are agility, eye-hand coordination, striking and quick movements and change of direction in quick reflexes of the racquet. Ball badminton is also the requiring quick and good judgment movements and ball sense to all directions to return the ball to the opponent's side of the court. Ball badminton is an extremely popular sport. At an intercollegiate and elite level, players are often achieved level in performance for required top form at their limits of muscular strength, endurance, flexibility, speed, agility. On top of all of this, players must maintain a high state of concentration in order to meet the technical & tactical as well as mental demands of deal with their opponents. It is essential that everyone involved with the change modern game ought to be familiar with the physical and motor fitness needs of the sports and must know how Ball badminton fitness can be enhanced.

In the past few years, athletic performance has improved considerably. The number of athletes who are able to get prominent results has increased (Boumpa, 2010). However, in the 21st century, it is difficult to break sports records unless novel exercises replace previous methods. Athletes have tried different methods of improving their abilities of running faster and throwing an object higher and farther to the maximum possible extent. Perhaps one of the most successful methods is the one that involves plyometric exercises (Boumpa, 2005). In plyometric exercises, the sudden lengthening and shortening of muscle length by the contraction and stretching of muscles result in a rapid release of energy stored in the muscles, as a result of which these exercises simultaneously enhance three important abilities, i.e. power, speed, and endurance (Khorrami, 1997).

Related Literature

Some past research showed that plyometric exercises have been effective on shuttle briskness (Faigenbaum et al., 2007; Martin, and Lue-Chin, 2010; Thomas, French, and Hayes, 2009). Moreover, some research revealed the positive effect of these exercises on throwing a medicine ball and increasing its distance (Marques, Tillaar, Vescovi, and GonzalezBadillo, 2008; Santos, and Janeira, 2011; Schult-Edelmann, Davies, Kernozek, and Gerberding, 2005; Sedano, Matheu, Redondo, and Cuadrado, 2011, Sedano, Vaeyens, Philippaerts, Redondo, De Benito, and Cuadrado, 2009). French, & Hayes (2009); Zahediasl (2009) came to the conclusion that plyometric exercises do not have a significant effect on the athletes' speed and do not decreased their time. However, other studies have drawn different conclusions regarding the effect of these exercises (Chelly et al., 2010).

Miller, et al (2006), wanted to know if six weeks of plyometric training can improve an athlete's agility. Subjects were divided into two groups, plyometric training and a control group. The plyometric training group performed in a six week plyometric training program and the control group did not perform any plyometric training techniques. All subjects participated in two agility tests: T-test and Illinois Agility Test, and a force plate test for ground reaction times both pre and post testing. Univariate ANCOVAs were conducted to analyze the change scores (post-pre) in the independent variables by group (training or control) with pre scores as covariates. The plyometric training group reduced time on the ground on the post-test compared to the control group. The results of this study showed that plyometric training could be an effective training technique to improve an athlete's agility.

Milicl et al (2008) determined the effects of plyometric training on the explosive strength of cadet volleyball players. The effects of a six week plyometric training program during the second half of the preliminary period of the annual training cycle were studied. The sample consisted of 46 subjects aged 16 (± 6 months). The experimental group consisted of 23 volleyball players. The control group consisted of 23 high school students, with an average height of 177.35 ± 4.80 and body weight of 68.91 ± 6.48, who had not been exposed to the plyometric method as part of their physical education classes. The sample of measuring instruments consisted of eight tests of explosive leg strength: the two-foot takeoff block jump, the right foot takeoff block jump, the left foot takeoff block jump, the two-foot takeoff spike jump, the right foot takeoff spike jump, the left foot takeoff spike jump, the standing depth jump and the standing triple jump. Using a multivariate and univariate statistical method, researchers were

Able to determine a statistically significant difference in explosive strength in favor of the experimental group. They determined an increase in explosive strength for the two-foot and single foot takeoff jumps.

Methodology

In this study, an experimental research method used on a pre-test and post-test non-equalent group design used. The experimental and control groups were selected randomly and before implement plyometric exercise program on experimental group only and control groups doing regular exercise, before training pre-test was conducted on both groups and post-test was also conducted at the end of the program. In this regard, plyometric exercises were applied, as the independent variable, to find out effect on the physical fitness preparation of elite ball badminton players, as the dependant variable. The sample population of this study included all of the young ball badminton players at collegiate students in Satara city. Overall population, 20 players were randomly selected as samples, and they were equally divided into two groups of 10 players. In order to analyze the collected data, Independent sample 't' test were used. They participated in the exercises for 6 weeks, with 4 sessions per week, duration 90 minutes in session (Lateral cone line bounding, Box jump, Power hopes, One leg power hopes, Squat jump, Tuck jump Zig-Zag hopes). In the first three weeks, the training program was carried out with a low and medium intensity and after the third week, adding moderate to high intensity was applied to the number of sets and repetitions.

Results

The results of this study revealed that plyometric exercises program for a period of six weeks had a significant effect on the vertical jump and medicine ball throw The other results from the study are as follows:

Table no-1: Physical fitness preparation test results of two groups in pre-post test experimental and control group

Enclosed as Annexure 01

As seen in Table 1, with a significant difference between elite ball badminton

Players from the experimental & control group regarding to the vertical jump and medicine ball throw.

Finding and Discussion

The findings of study mentioned that plyometric exercises program had significantly effect on the vertical jump and medicine ball throw of male ball badminton players and also increased the player's performance. The results of research are consistent with Robinson et al. (2004), Milicl et al (2008), Miller et al (2006) Faigenbaum, et al. (2007), Thomas, French, and Hayes (2009), Potach et al. (2009), Sedano et al. (2009), Meylen and Malatesta (2009), Martin and Lue-Chin (2010), Chelly et al. (2010), Santos and Janeira (2011), Sedano et al. (2011), Rubley et al. (2001), Shahdadi (1999), Mohsenzade (2000), Behdari (2004), Haghighi Najafabadi (2007), Eslami (2008), and Zahediasl (2009). The probable reason for increase in the amount of the vertical jump and medicine ball throw is that in plyometric exercises program, the muscles first encounter outward contractions, followed immediately by inward contractions, which result in developing explosive movement (Gaeini, and Rajabi, 2003). When the muscles are stretched during plyometric exercise, they cause elastic potential energy which is similar to the contracted energy stored in a compressed spring or a drawn arc. Therefore, when this energy is released, the amount of created contraction by the muscle cords increases (Boumpa, 2005) and causes an increase in the vertical jump Whenever special kinds of sensory messages pass from several conseductive synapses, the next time the synapses can direct that messages more properly, and this process is called facilitation (Guyton, and Hall, 2006). It seems that it develops during the vertical jump, because in these exercises these jumps are done repeatedly. However, these results are not consistent with Conroy (1998) and Jensen and Ebben (2003). One of the probable reasons for this inconsistency can be the duration of the exercise, because Conroy (1998) used four-week exercises in her study, which should last longer, according to Robinson et al. (2004). On the other hand, Conroy's exercises were done twice a week, which seems that three sessions per week bring better results (Salehi Golsefidi, 2000). Jensen and Ebben (2003) also performed plyometric exercises immediately after squat exercises, and it is most likely that the muscles

Did not have enough time to return to their initial state. When the rest interval is short (1 to 2 minutes), the athlete experiences both the local tiredness and central nervous exhaustion. Due to the fact that doing plyometric exercise is the result of nerve impulses that the central nervous system sends to the active muscles, and these impulses have definite speed, power, and frequency, and the speed, power, and frequency of muscle contraction during exercise should be at the highest possible level so that the desired results are created (Boumpa, 2005), it seems that this matter has not been studied properly. Thus, perhaps the participants performed plyometric exercises with poor quality or without any effect on the stretch rate, because squat exercises put more emphasis on the stretching, while plyometric exercises emphasize the speed of the stretch more (Gaeini, and Rajabi, 2003). Therefore, this issue can be one of the other reasons for the inconsistency between the mentioned study and the current research.

Annexure

Annexure 01

Table no-1: Physical fitness preparation test results of two groups in pre-post test experimental and control group

Test	Group	N	Pre-test	Post-test	p-value
Vertical Jump (inch)	EG	10	19.02 ± 4.2	21.08 ± 4.6	0.02
	CG	10	18.07 ± 4.3	18.21 ± 3.9	0.09
Medicine Ball Throw (m)	EG	10	3.47 ± 0.6	4.15 ± 0.5	0.01
	CG	10	3.10 ± 0.4	3.09 ± 0.4	0.06

Reference

Alijani, A. (2008). Exercise science. Tehran: Chakameh Publications, p. *182. Amirtash, A.M. (2006). Psychological aspects of handball. Tehran: National Olympic Committee, p. 10 [Crossref] [Google Scholar]*

Behdari, R. (2004). Investigating and comparing the effect of one period of plyometric and compound exercises on the functional and structural variables of selected basketball players. Unpublished Master's Thesis. *Mazandaran University, Mazandaran, Iran [Crossref][Google Scholar]*

Boumpa, T. (2005). Power training in sport. Kh. *Ebrahim and H. Dashti Darbandi (Trans.). Tehran: Shahid Beheshti University Press [Crossref][Google Scholar]*

Boumpa, T. (2010). Theory and methodology of training. R. *Kordi and M.A. Faramarzi (Trans.). Tehran: Samt Publications, 1st ed. p.3 [Crossref] [Google Scholar]*

Conroy, T. R. (1998). Plyometric training and its effects on speed, strength, and power of intercollegiate athletes. *New Studies in Sport Magazine, 23-87 [Crossref][Google Scholar]*

Gaeini, A. , and Rajabi, H. (2003). Physical preparation. *Tehran: Samt Publications, p.150 [Crossref][Google Scholar]*

Kotzamanidis, C. (2006). Effect of plyometric training on running performance and vertical jumping in prepubertal boys. Journal of Strength and Conditioning Research, 20 (2), 441-445. *[Crossref][Google Scholar]*

Marques, M. C. , Tillaar, R. , Vescovi, J. *D., and Gonzalez-Badillo, J.J. (2008). Changes in strength and power performance in elite senior female professional volleyball players during the in-season: a case study. National institutes of health, 22 (4), 1147-1155 [Crossref][Google Scholar]*

Mandeep Singh Nathial, Analysis of set shot in basketball in relation with time to perform the course and displacement of center of gravity, American Journal of Sports Science, Vol. 2 Issue. 5 pp: 122-126 (2014). Retrieved from https://www. *sciencepublishinggroup.com/journal/paperinfo.aspx?journalid=155&doi=10.11648/j.ajss.20140205.13 [Crossref][Google Scholar]*

Mandeep Singh (2010). Evaluation And Improvement Of Sports Techniques Through Biomechanical Updated Analyzing Technology, University News, Journal of Higher Education Association of Indian Universities, Association of Indian Universities, Vol:48:Issue. 05;2010 Pp45-57, 2010. *sciencepublishinggroup.com/journal/paperinfo.aspx?journalid=155&doi=10.11648/j.ajss.20140205.13 [Crossref][Google Scholar] [Crossref][Google Scholar]*

. . 05;2010 Pp45-57, 2010. *Sciencepublishinggroup.com/journal/paperinfo.aspx?journalid=155&doi=10.11648/j.ajss.20140205.13 [Crossref][Google Scholar] [Crossref][Google Scholar] [Crossref][Google Scholar]*

Robinson, L. E. , Devor, S. T. *, Merric, M.A., and Buckworth, J. (2004). The effect of land vs. aquatic plyometrics on power, torque, velocity, and muscle soreness in women. Journal of Strength and Conditioning Research, 18 (1), 84-91 [Crossref] [Google Scholar]*

Salehi Golsefidi, A. (2000). Investigating the effect of selected plyometric exercises on the briskness and explosive power of legs of 21 to 25 year old male karate players of physical education faculty. Unpublished Master's Thesis. *University of Tehran, Tehran, Iran [Crossref][Google Scholar]*

Singh, M. , Kadhim, M. M. , Turki Jalil, A. *et al. A systematic review of the protective effects of silymarin/silibinin against doxorubicin-induced cardiotoxicity. Cancer Cell Int 23, 88 (2023). https://doi.org/10.1186/s12935-023-02936-4 https://cancerci.biomedcentral.com/articles/10.1186/s12935-023-02936-4 [Article][Crossref][Google Scholar]*

Sedano Campo, S. , Matheu, A. , Redondo, J. C. *, and Cuadrado, G. (2011). Effect of plyometric training on explosive strength, acceleration capacity and kicking speed in young elite soccer players. National Institutes of Health, 51 (1), 50-58 [Crossref][Google Scholar]*

Singh, M. , Kour, R. , & Kour, A. ,. *A collaborative diversified investigation of respective responses of sports person coaches and organizations on criminalization of doping.International Journal of Health Sciences,6(S3), 11295–11310. [Article] [Crossref][Google Scholar]*

SINGH SIDHU, A. , & SINGH, M. (2022). KINEMATICAL ANALYSIS OF HURDLE CLEARANCE TECHNIQUE IN 110M HURDLE RACE. *International Journal of Behavioral Social and Movement Sciences, 4(2), 28–35. Retrieved from [Article] [Crossref][Google Scholar]*

Singh, A. , & Singh , D. M. (2013). *PROMOTION OF RESEARCH CULTURE –ENHANCING QUALITY IN HIGHER EDUCATION. International Journal of Behavioral Social and Movement Sciences, 2(2), 202–208. Retrieved from [Article][Crossref][Google Scholar]*

SINGH, M. , & SINGH SIDHU, A. (2016). A COMPARATIVE STUDY OF BODY COMPOSITION AND RELATIVE HEALTH STATUS AMONG RESIDENT AND NON-RESIDENT STUDENTS IN DIFFERENT SCHOOLS OF J&K. *International Journal of Behavioral Social and Movement Sciences, 5(3), 08–13. Retrieved from [Article][Crossref][Google Scholar]*

Singh Nathial, D. M. (2012). ANALYZING THE CREDIT BASED SYSTEM IN PHYSICAL EDUCATION. *International Journal of Behavioral Social and Movement Sciences, 1(3), 172–176. Retrieved from [Article][Crossref][Google Scholar]*

SHARMA, N. P. , & SINGH, M. (2014). *SENIOR AGE GROUP RELATIVE EXERCISES AND IMPACT ON THEIR LIFESTYLE. International Journal of Behavioral Social and Movement Sciences, 3(04), 78–82. Retrieved from [Article][Crossref][Google Scholar]*

CHAND PURI, P. , MISHRA, P. , JHAJHARIA, B. , & SINGH, M. *(2014). COORDINATIVE ABILITIES OF VOLLEYBALL IN DIFFERENT AGE GROUPS: A COMPARATIVE STUDY. International Journal of Behavioral Social and Movement Sciences, 3(3), 56–68. Retrieved from [Article][Crossref][Google Scholar]*

Thomas, K. , French, D. , & Hayes, P. R. *(2009). The effect of two plyometric training techniques on muscular power and agility in youth soccer players. National Institutes of Health, 23 (1), 332-335 [Crossref][Google Scholar]*

Zahediasl, E. (2009). Investigating and comparing the effect of eight week plyometric exercises in water and land on the vertical jump and 40 meters speed run of female volleyball players of Omidieh. Unpublished Master Thesis. *Islamic Azad University of Shooshtar, Shooshtar, Iran [Crossref][Google Scholar]*