Peer Reviewed Refereed Journal ISSN : 2278 – 5639
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
{Bi-Monthly} Volume – XIII Issue – IV July – August 2024

A STUDY OF PLYOMETRIC EXERCISE AND ITS EFFECT ON THE IMPROVEMENT OF JUMPING ABILITY OF VOLLEYBALL PLAYERS

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Abstract.

With the aim to investigate the plyometric training model used for the increase of explosive type of strength (the vertical jump), an experimental research was carried out, drawing a sample of 34 volleyball players at the junior and sub junior level. Guided by the general principles of plyometric training, individual training plans were devised. In order to evaluate the effect of the sport training on the development of the vertical jump, four variables were applied. The experiment was carried out in the second part of the preliminary period, and it lasted for eight weeks, during which, two to three training sessions per week were held. The control group was trained using technically tactical contents. The data was processed using univariate and multivariate analyses as well as a covariance analysis. Based on the findings of the research and the discussion, one could unfailingly conclude that the exercise model for the development of the vertical jump that had been used, as the fundamental factor of the experimental group, has contributed to the statistically relevant difference in the increase of the vertical jump in comparison to the control group, which had used technically tactical contents to develop the vertical jump.

Key words: volleyball players, the vertical jump, experiment, sport training

I. INTRODUCTION: -

This is the age of technology. Every movement is witnessing the rise of novel technologies. In physical education and various competitions also modern technology is being used extensively.

At present the players are trying to cope up with the forceful technologies to develop their capacity and uplift the quality of games.

In this research this is stated that plyometric exercise can be useful to increase jumping ability. It is thought that plyometric exercise was initiated in 1970 by soviet block and eastern European coaches. But it is not true because at that time the word Plyometric was not that much popular. This exercise was started by coaches of Track and Field by keeping in mind the future prospects. In this field Fred Wilt played very important role.

At present research in this field is in a boom. Plyometric is used from basic to advanced level. Plyometric is used to develop motor ability of the players. Every player, coach and country wants to perform well in the games and win medals.

While playing volleyball, jumping of the players plays a significant role to attack, block and to do related specific skills. That's why scientific coaching was started to increase jumping ability. For this purpose motor ability is required and consequently plyometric exercise was being started.

The study has been conducted to determine the contribution of plyometric exercise on the performance of volleyball players and development of there jumping ability.

In volleyball many skills are mainly used like attack, block, upper and under pass, services. A volleyball match can be played for five sets, which means that the match can last about ninety minutes, during this time a player can perform 250-300 actions dominated by the explosive type strength of the leg muscles. Of the total number of actions, jumps take up around 50-60%, high-speed movements and changes of direction in space about 30% and falls about 15%.

For all the skills motor ability and motor fitness of the players should be developed well. For these skills explosive strength is required. By plyometric exercise this strength can be developed. In recent years, this distinct method of training for power or explosiveness has been termed Plyometric.

Comprehensive research in this field hasn't taken place yet. Therefore this it totally a new area of research. The marathwada region has its ows popularity in volleyball. Resultantly the inevitability of plyometric at the national level for the players is quite lucid.

METHODS OF RESEARCH: -

The researcher intends to undertake this project through experimental research, which provides a systematic and logical method for answering the questions. Such method of research can be carried out under the careful conditions.

a) Procedure: -

The research sample numbered 34 examinees; it is drawn from the Junior and Sub junior age

level. The basic criteria for selection: all the examinees were experienced form ± 5 Years. They were all members of SAI West Zone volleyball Center, Aurangabad. They had all been training volleyball for a period of four to six years; they all Participated as competitors in the various competitions; They all had five training sessions a week during the preliminary period, and the sessions lasted from 90 to 120 minutes; They were tested at the start and at the end of the experiment; All the volleyball players were physically healthy and the data on the injured players was not used in the statistical analyses.

By means, the examinees were divided into an experimental group (E), numbering 17 volleyball players, and a control group numbering 17 players (C).

b) The Variable Sample: -

The process of developing and of establishing the state of the vertical jumping at the initial and final measuring was carried out with the use of three measuring instruments which cover the area of explosive type strength. These instruments were labeled in the following manner:

Block jump (BJ), Spike jump (SJ), Vertical jump (VJ), Standing broad jump (SBJ).

RESEARCH DESCRIPTION:-

The preliminary period for the 2004-2005 season lasted for twelve weeks, staring with July 27, 2004. till the start of the season (October 19, 2004)

The first phase of the preliminary period lasted for three weeks. During each week five training sessions were held, lasting from 90 to 120 minutes. The basic goal during this period was to increase the basic abilities such as endurance and strength needed after takeoff. Within a week long micro-cycle, three training sessions were carried out with the aim of increasing endurance, and two sessions were used for exercising in a gym. After completing the first phase of the preliminary period, the initial measuring was carried out, and the final measuring took place three days after the completion of the experimental program, or more precisely, following the completion of the second phase of the preliminary period.

For eight weeks during the second part of the preliminary period, the experimental group had been using the plyometric sport-training model for the purpose of developing the vertical jump. Nineteen training sessions were held. The set of the models for the development of the vertical jump consisted of five exercises, and the exercising took place at the beginning of each training session, following a thirty-minute volleyball "warm-up".

The number of training sessions held, arranged by week, and beginning with the first week, was as follows: 2-2-3-2-2-3-3-2. During the same period, the control group completed the technically tactical training.

The Content of the Training Model for the Development of the Vertical Jump

For the purposes of this research, the set of the special model for the development of the vertical jump at the junior and sub junior age level consisted of five exercises which were to increase the explosive type strength by means of the plyometric (reversible-Zaciorski) method. In their choice of exercises, the authors were guided by the findings come by Chu (1991, 77).

Design of the Study :- These specific Plyometric exercises select for the research.

1. Split Squat Jump, 2. Double Leg Tuck Jump, 3. Double Leg Zigzag Hop, 4. Hurdle Hop, 5. Double Leg Vertical Power Jump

Determining the correct amount of strain to be put on each volleyball player was carried out on an individual basis. In designing individual programs, the principle used stated that the amount of strain during the first week should be 60% of the maximum, 19 during the second 70%, the third 80%, the fourth 90%, the fifth 70%, the sixth 80%, the seventh 90%

ANALYSIS OF DATA: -

The data will be collected through the experiments and the information received. This will provide the statistical treatment to analyze the data.

The Methods of Data Processing: -

Due to the nature of the experiment, it was necessary that the data for the experimental and control group be gathered at both the initial and final measuring. For the purpose of analyzing the changes in the results for the dependent variables in the period between the initial and final measuring, the dependent sample test was used, and the relevance of the conclusions drawn was determined at the $p<0.05$ levels For the data collected at the final measuring, the covariance analysis was used.

The data was processed with SPSS. (Statistical Package for Social Sciences) software.

The Results of the Research: -

CONTROL GROUP **Consolidated table of - "Paired t-test"**

Test		Mean	Std. Dev.	N	Diff. Of Means	Improvement in %	t	d.f	p
* BJ	Initial	.3900	.0520	17	0.0135	3.46	3.952	16	0.0011*
	Final	.4035	.0544						
* SJ	Initial	.5188	0.0627	17	0.0141	2.71	4.556	16	0.0003*
	Final	.5329	0.0605						
* VJ	Initial	.4847	.0564	17	0.0100	2.06	1.971	16	0.066NS
	Final	.4947	.0551						
* SBJ	Initial	2.6235	.1966	17	0.0100	0.38	2.432	16	0.0271*
	Final	2.6335	.1986						

* **p-value** < 0.05 implies that there is a significant difference between the means and greater mean value shows better improvement

NS-- implies that p-value.0.05 and there is no significant difference between the two means

EXPERIMENTAL GROUP ***Consolidated table of - "Paired t-test"***

Test	Jumps	Mean	Std. Dev.	N	Diff. Of Means	Improvement in %	t-Value	df	p
* BJ	Initial	0.4012	0.0693	17	0.0806	9.15	12.392	16	**0.0000***
	Final	0.4818	0.0706						
* SJ	Initial	0.5206	0.0762	17	0.1182	7.22	16.453	16	**0.0000***
	Final	0.6388	0.0808						
* VJ	Initial	0.5241	0.0702	17	0.0635	6.37	7.198	16	**0.0000***
	Final	0.5876	0.0885						
* SBJ	Initial	2.5294	0.1630	17	0.0724	2.86	7.561	16	**0.0000***
	Final	2.6018	0.1684						

* **p-value** < 0.05 implies that there is a significant difference between the means and greater mean value shows better improvement

COMPARISION BETWEEN CONTROL & EXPERIMENTAL GROUP

Consolidated table of - t-test Analysis

(Improvement in all four types of Jumps)

Test	Experimental Group		Control Group		t-test analysis			
	Mean	Std.dev.	Mean	Std.dev.	Diff. Of Means	d.f.	t-Value	p-Value
	0.0806	0.0268	0.0135	0.0141	0.0671	32	9.127	**0.0000***
***** SJ	0.1182	0.0296	0.0141	0.0128	0.1041	32	13.304	**0.0000***
***** VJ	0.0635	0.0364	0.0100	0.0209	0.0535	32	5.258	**0.0000***
***** SBJ	0.0724	0.0395	0.0100	0.0170	0.0624	32	5.987	**0.0000***

* **p-value** < 0.05 implies that there is a significant difference between the means and greater mean value shows better improvement

***** **BJ** – Block Jump,***** **SJ** – Spike Jump,***** **VJ** – Vertical Jump,***** **SBJ** – Standing Broad Jump

The volleyball players of the control group at the final measuring also scored numerically (Improvement in percentage) better set of results in all the types of jumps, but these values were lower as compared to the Experimental group in case of all types of four jumps.

Table shows the results of the analysis of the differences between the initial and final measuring of the experimental group. We can note that the players of the experimental group had greatly improved their results in the block and spike jumps, as well as in the vertical and long jump during the eight-week period. The greatest growth increase of 9.15% was found in the block jump, then in the spike jump 7.22%, in vertical jump found 6.37% while the smallest in the sanding linear jump 2.86%. All the differences are statistically relevant at the p=0.000 level.

CONCLUSION: -

It has been proven experimentally that an eight-week training model using the plyometric method can have an effect on the statistically relevant increase in the explosive type strength of the leg muscles, which in turn leads to an increase in the vertical jump of a block, spike and the long jump.

The research will be summed up with a brief overview of the present study. In this context the necessity of plyometric will be reiterated and by coming at the conclusion the implication of such the study will be focused. The phenomena of plyometric exercise will be considered an important factor in mobilizing the jumping ability of volleyball players. In brief the discussion of the crux of the research will be completed at this point. Due to this, the individual use of the plyometric method is recommended as more effective in the development of the vertical jump at the junior and sub junior age level.

REFERENCE:

1) Colessi, D. (1999). *Super Volley*, (1), 79-82
2) Marullo, F. (1999). Plyometric training. *The Coach*, 4, 10-15.
3) Schmidtbleicher, D., & Gollhofer A. (1979). Relative effects of isokinetic and plyometric training on vertical jumping performance. *Research Quarterly*, 50(4), 583-588.
4) Kostic, Z.R. (2000). (The Theory and Methodology of the Training for the Sports Game-Volleyball). Vol. 10(2) pp.25-27
5) Bosco, C., & Weineck, J. (2000). Biomechanical analysis of a volleyball spike. Biomechanics of Volleyball. pp. 332-336
6) Blattner, S., & Noble, L. (1979). Relative effects of isokinetic and plyometric training on vertical jumping performance. Research Quarterly, 50(4), 583-588.
7) Siff, M.C. (2000). Leg power and Canadian female volleyball players. The Research Quarterly Vol.47(3) pp. 332-333
8) Chu, D.A. (1991). *Jumping into plyometrics*. Champaign, IL: "Leisure Press".
9) Chu, D. (1992). Jumping into Plyometrics. National Strength and Conditioning Joural. 11(3). pp 81.
10) Witzke, K. A., & Snow, C. M. (2000). Effects of plyometric jump training on bone mass in adolescent girls. *Med Sci Sports Exerc, 32*(6), 1051-1057.
11) Wilk, K. E. (1993). Stretch-shortening drills for the upper extremities: theory and clinical application. *JOSPT, 17*(5), 225-234.
12) Zanon, S. 1989. Plyometrics: past and present. New Studies In Athletics. 4. pp 7-17.
13) Chu, D 1983. Plyometrics: The link between strength and speed. National strength Coaches Association Journal, 5(2). pp 20-21.
14) Verhoshanski, V. 1967. Are depth jumps useful? Track and Field, 12(9). pp 75-78.