

Analyzing the impact of specific volleyball training in plyometrics on body composition indexes and fitness-related elements that male volleyball athletes

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ABSTRACT In this article, the procedure used for the selection of subjects, the selection of variables, the selection of tests and calibration of instruments, the reliability of tests and the test's orientation and the direction of the subjects, the design for the research, the collection of data, the training process as well as the administration of tests and the use of statistical methods has been explained. The statistical method that was used was used to perform the systematic and accurate analysis of the data collected of CG as well as VSPTG. The subjects were assessed on body composition indexes and fitness-related components that were assessed prior to and after 12 weeks of plyometrics specifically for volleyball. The impact of training on selected variables was determined and interpretable.

KEYWORDS: Volleyball, fitness, athletes and coaches

I. INTRODUCTION

In order to accomplish the objective of the research, the researchers surveyed thirty (30) men who played volleyball were recruited from Telangana State Social Welfare Residential Junior College, Armoor, Nizamabad, Telangana, India. They were divided into two separate groups, of fifteen each for the control group and the specifically plyometric group for volleyball each group was comprised of fifteen subjects. The present study focused on the body composition indexes (body mass percentage, body fat percentage, and lean body mass as well as fat mass) and fitness-related components (speed agility, flexibility as well as leg explosive power standing vertical jump and reach using both hands three stride vertical leap and reach with both hands abdominal strength endurance as well as arm explosive power as well as aerobic power) were chosen for the dependent variables. To determine the dependent variables, standardized tests were conducted. The dependent variable used in this study was a specific volleyball plyometric

training, which was conducted every day for 12 weeks. The VSPTG was trained while CONG remained inactive. The participants were all evaluated on body composition indicators as well as physical condition prior training and at the end of twelve weeks of practice. The test consisted of warm-ups and tests followed by relaxation. Each test was explained and presented. Prior to testing, the subjects were given practice tests to get familiar with the tests' methods. The tests were counterbalanced both pre and post-testing to ensure testing effects were not hampered. The test was conducted in accordance with the testing procedures along with the score of the top trials were used in this study. On the morning of test day,, measures like weight, height, and body composition speed-strength, agility as well as arm explosive power endurance of the abdominal muscles were evaluated. However, at night, standing at a vertical leap and reaching using both hands three strides vertical leap and reach using both hands, as well as aerobic capacity was assessed. The results by CONG and VSPTG CONG as well as the VSPTG on body composition and fitness-related components were statistically analyzed to determine the change. Analyzing Covariance (ANCOVA) is used to determine the differences between groups. A paired test was employed to examine the changes between groups, from pre-post. Because only two groups were included, post hoc tests were not used to test the paired mean differences between the groups. All the statistical tests were calculated using the statistical package for the social science (SPSS) for windows (Version 17). The level of statistical significance was set at $p < 0.05$.

II. Results of the study

1. It is observed from the results of the study that body composition indices (body mass, percent body fat, lean body mass and fat mass) remained unchanged after twelve weeks of volleyball specific plyometric training.
2. It is noted from the findings of this study that leg explosive power, standing vertical jump and reach with both hands and three stride vertical jump and reach with both hands improved significantly after twelve weeks as a result of volleyball specific plyometric training.
3. The research findings also establish a significant improvement in speed and agility among VSPTG but it failed to show impact on arm explosive power, abdominal strength endurance and aerobic capacity.

Selection of Subjects

To accomplish the purpose of the study, thirty (30) male volleyball players were selected randomly from Telangana State Social Welfare Residential Junior College, Armour, Nizamabad, Telangana. These subjects were classified into two groups namely Control group (CG: $n = 15$, 16.93 ± 0.45 years, 178.53 ± 2.21 cm and 68.56 ± 1.94 kg) and volleyball specific plyometric training group (VSPTG: $n = 15$, 16.86 ± 0.74 years, 177.88 ± 1.22 cm and 69.33 ± 2.13 kg), each group constituted of 15 subjects. The selected subjects gave their willingness to participate in this study. After getting the written informed consent, the thirty male volleyball players were medically examined by a medical practitioner and declared that the subjects were physical fit to undergo training and testing.

A written consent was obtained prior to initial data collection, which is given in Appendix A. This clearly explains the nature of the study, the training program for the training group and variables in which they will be tested. They were also informed that they were free to opt out of the study at any time if they felt any discomfort or any difficulty in continuing the training program. However, no dropouts were there in the present study.

The investigator referred to various literatures and consulted with volleyball coaches to identify ideal variables. In addition to this by using the investigator's personal knowledge and professional experience the following most appropriate dependent variables were selected for the present investigation and presented in Table 1.

Sl. No	Variable	Unit of measurement
Body composition indices		
1	Body mass	Kilogram (kg)
2	Percent body fat	Percentage (%)
3	Lean body mass	Kilogram (kg)
4	Fat mass	Kilogram (kg)
Physical fitness		
1	Speed	Seconds (sec)
2	Agility	Seconds (sec)

3	Leg explosive power	Centimetre (cm)
4	Standing VJ and reach with both hands	Centimetre (cm)
5	3 stride VJ and reach with both hands	Centimetre (cm)
6	Abdominal strength endurance	Number (No)
7	Arm explosive power	Metre (m)
8	Aerobic capacity	ml/kg/min

Independent variable

The independent variable selected in the present study was volleyball specific plyometric training which was administered three days a week for twelve weeks. The VSPTG underwent training and CG remained passive.

III. Selection of Tests

In the current exploration standardized tests and procedures were used to assess the body composition indices and physical fitness components are presented in Table 2.

Sl. No	Variable	Methods/Tests/ Equipments
Body composition indices		
1	Body mass	Weighing machine
2	Percent body fat	Skin fold Caliper
3	Lean body mass	Weighing machine
4	Fat mass	Weighing machine
Physical fitness		
1	Speed	30 metre dash
2	Agility	T test
3	Leg explosive power	Vertical jump test
4	Standing VJ and reach with both hands	
5	3 stride VJ and reach with both hands	

6	Abdominal strength endurance	Sit ups
7	Arm explosive power	Medicine ball throw for distance
8	Aerobic capacity	Multistage fitness test

Calibration of the Instruments

In this investigation and reach with both hands standard equipments bought from reputed companies were used. These instruments were calibrated for its accuracy.

Body composition indices

In this investigation standard equipments and test were used to assess the body composition indices. The stadiometer, weighing machine and skinfold caliper were used. These equipments were purchased from reputed firms, which ensure the reliability. Hence their calibrations were accepted as accurate enough to use for present research.

Physical fitness components

The physical fitness data were obtained at sports complex available in the Telangana State Social Welfare Residential Junior College, Armour, Nizamabad, Telangana. To measure speed, agility, leg explosive power, standing vertical jump and reach with both hands, three stride vertical jump and reach with both hands, abdominal strength endurance, arm explosive power and aerobic capacity were measured using reliable equipments like measuring tape, stop watch, medicine ball, multistage fitness test CD and cones for this study.

Reliability of Tests

For test administration was evolved with the reliability of tests. To establish the reliability of tests, test and retest method was followed. For this purpose, 15 male volleyball players were selected from the Telangana State Social Welfare Residential Junior College, Armour, Nizamabad, Telangana. All the criterion variables selected for the present investigation were tested twice for the same subjects under similar condition. The Pearson product moment correlation was computed separately for each variable and the coefficient of correlation thus computed is presented in Table 3.

Sl. No.	Variables	Coefficient of correlation
I	Body composition indices	
1	Body mass	0.91*
2	Percent body fat	0.87*
3	Lean body mass	0.87*
4	Fat mass	0.89*
II	Physical fitness	
1	Speed	0.82*
2	Agility	0.89*
3	Leg explosive power	0.91*
4	Standing VJ and reach with both hands	0.78*
5	3 stride VJ and reach with both hands	0.88*
6	Abdominal strength endurance	0.86*
7	Arm explosive power	0.88*
8	Aerobic capacity	0.79*

Table 3 reveals that all the criterion variables have a high correlation coefficient. It implies that the internal consistency of all the criterion variables ranged between acceptable and reveals that the reliability of data is established.

IV. Orientation of the Subjects

Prior to exploration, the investigator informed the rationale of the study and brief introduction about volleyball specific plyometric training and highlighted its impact on the selected body composition indices and physical fitness components. The method of executing each test was demonstrated and explained to the subjects by the researcher. Subjects were motivated to exhibit their maximum performance in the selected tests. All the subjects cooperated to their best during the course of experimentation.

Collection of Data

The subjects were all evaluated on body composition indicators and fitness-related elements prior to and after 12 weeks of practice. The test was

comprised of warm-up and tests, interspersed with breaks. The tests were explained and illustrated. Before the test, the students were given practice tests to familiarize themselves with the test procedures. The tests were balanced prior to and following tests to make sure that test results were reduced. Tests were administered in accordance with the testing procedures along with the score of the top trials were used in this study. On the morning of the day of testing tests such as height, weight, and body composition speed and strength, agility as well as arm explosive power, leg explosive power, and endurance to the abdominal region were measured. In the evening, however, standing vertical jump and reach using both hands three strides vertical leap and reach using both hands, and aerobic capacity was assessed.

CONCLUSION

Based on the results from the research, it has been concluded that plyometric volleyball-specific training programs could be effective enough to increase the explosive abilities of volleyball players over a 12 weeks. The improvements in fitness may contribute to better playing performance. The findings of this study indicate that plyometrics specifically designed for volleyball can be effective in helping improve the ability to block and spiking that volleyball players have. The inclusion of these drills with coaches in the training routine helps players learn to mimic the challenges that are encountered in actual game-play.

REFERENCES

1. Arazi H., Asadi A. (2011). *The effect of aquatic and land plyometric training on strength, sprint, and balance in young basketball players. Journal of Human Sport & Exercise. 6(1): 101-111.*
2. Bransford D.R., Howley E.T. (1977). *Oxygen cost of running in trained and untrained men and women. Med. Sci. Sports, 9: 41-44.*
3. Chaudhary C., Jhaharia B. (2010). *Effects of plyometric exercises on selected motor abilities of university level female basketball players. Br J Sports Med, 44: i23.*
4. Miller M.G., Herniman T.J., Ricard M.D., Cheatham C.C., Michael T.J. (2006). *The effects of a 6-week plyometric training program on agility. Journal of Sport Science & Medicine. 5: 459-465.*
5. Pramjeet S.G., Harbans L.G. (2013). *The analysis of plyometric training program on university handball players. IOSR Journal of Sports and Physical Education, 1(2): 37-41.*
6. Ramírez-Campillo R., Meylan C., Alvarez C., Henríquez-Olguín C., Martínez C., Cañas-Jamett R., Andrade D.C., Izquierdo M. (2014). *Effects of in-season low-volume high-intensity plyometric*



training on explosive actions and endurance of young soccer players. J Strength Cond Res., 28(5): 1335-42.

7. *Sanjeev K., Sujay B., Rajender S., Vijay C. (2014). Effect of selected plyometric and akhada exercises on body composition. International Journal of Movement Education and Social Science, 3(2): 8-11.*
8. *Samsan J., Roy B. (1976). Biomechanical analysis of a volleyball spike. Biomechanics of Volleyball, 332-336.*