

## Research Paper

**IMPACT OF VOLLEYBALL SPECIFIC PLYOMETRIC TRAINING ON SPEED POWER AND AGILITY OF MALE VOLLEYBALL PLAYERS****Mr. Shaik Mannan <sup>1</sup>, Dr. P. Johnson <sup>2</sup>,**

1.PhD Scholar, University College of Physical Education and Sports Sciences, Acharya Nagarjuna University, Guntur, Andhra Pradesh

2.Assistant Professor, University College of Physical Education and Sports Sciences, Acharya Nagarjuna University, Guntur, Andhra Pradesh.

[shaikmannan2015@gmail.com](mailto:shaikmannan2015@gmail.com), [johnson\\_pala@yahoo.co.in](mailto:johnson_pala@yahoo.co.in)

**Abstract**

The purpose of the study was intended to improve the speed, power and agility of male volleyball players through volleyball specific plyometric training. To achieve the purpose, 30 male volleyball players were selected randomly from Telangana State Social Welfare Residential Junior College, Armour, Nizamabad, Telangana. The selected subjects were assigned into 2 groups: control group (n=15) and plyometric training group (n=15). The selected subjects were tested before and after twelve weeks of plyometric training on speed, power and agility. The results of the study showed significant improvement on speed, power and agility ( $p < 0.05$ ). It is concluded that twelve weeks of volleyball specific plyometric training showed improvement of 2.49% in speed, 13.51% on power and 1.93% in agility. This training clearly shows that vertical jump performance show greater improvement than speed and agility. This would significantly improve their spiking and blocking ability by jumping higher and ability to moves quickly in all direction while playing volleyball.

Keywords: Volleyball, plyometric training, speed, power, agility, male, players

**1. Introduction:**

Volleyball is an Olympic sport which is played at all levels in India. This game constitutes movements like sprinting for short distance, change of direction, jumping, diving and hitting (13). Sprinting, jumping and agility constitutes important fitness component required for a volleyball player. Therefore, increasing all the three entity through training is important for the

present requirement. Plyometric training possesses eccentric and concentric contraction of muscle while performing all motor actions (16). The stretching and shortening cycles are characteristic of plyometric training. The elastic characteristics of muscles and the reflex function have a significant influence on the stretching of muscles. The muscle stretching reflex is included in the SSC (stretch shortening cycle). For a high quality

eccentric-concentric contraction, three important conditions have to be satisfied: the timely activation of the musculature just prior to the eccentric contraction, the short duration of the eccentric contraction and the instant shift from the stretching phase to the shortening phase (10). Earlier studies have proved that plyometric training leads to better adaptations of the CNS and a greater increase in strength and jumping ability (8, 12). The scenario is to train the players more specific to game. The training which is designed today should possess movements and skills performed during the game. This has greater advantage by improving skill and fitness of the players. Earlier it has been proved that sports specific endurance circuit training displayed significant improvement in sprinting performance and leg explosive power of high school male basketball players during their competitive season (6). The endurance training had not affected sprinting performance and leg explosive power but earlier studies showed that either strength parameters get affected or remain unaltered. Earlier it has also been proved that sprinting performance show positive correlation with agility and negative correlation with explosive power among handball players (5). Therefore, the purpose of the study was intended to improve the speed, power and agility of volleyball players through volleyball specific plyometric training.

## 2. Methods:

### Subjects and Variables

In this study 30 male volleyball players were selected randomly from Telangana State Social Welfare Residential Junior College, Armoor, Nizamabad, Telangana. The selected subjects were assigned into 2 groups: control group (n=15) and plyometric training group (n=15). The selected subjects age range between 16 to 18 years. All subjects were instructed to refrain

from participation in any other form of training during the training period that might influence their speed and agility. The criterion variable selected in this study is speed measured by 30 metres dash, power through vertical jump test and agility through T - test.

### Plyometric training

The designed protocol of plyometric was performed three times in a week for twelve weeks with the training volume ranged from 80 foot contacts for first two weeks and subsequently 10 foot contacts were increased and finished with 140 foot contacts per session. The volume and intensity of the exercises increased for twelve weeks. The cone height is 40cm and bench height is 40cm was used in this study.

### Collection of data

Volleyball players were selected and tested at two occasions. The selected subjects were tested on speed, power and agility before and after twelve weeks of plyometric training.

### Statistical Technique

Pre and post test data were collected before and after 8 weeks of training. The collected data was analysed using analysis of covariance (ANCOVA). Paired t test was applied to know the difference between the pre and post test difference within the groups. All the statistical tests were calculated using the statistical package for the social science (SPSS) for windows (Version 17).

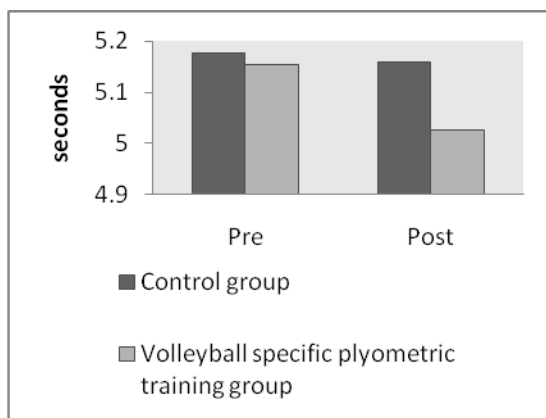
## 3. Results:

### Speed

It is clearly from the study that pre test ( $F = 0.091$ ,  $p = 0.765$ ) and post test ( $F = 2.323$ ,  $p = 0.139$ ) on speed showed no significant difference. However, adjusted post test ( $F = 9.375$ ,  $p = 0.005$ ) mean

showed significant difference among the groups on speed. The plyometric group displayed 2.49% of improvement in speed. This also clearly show that due to twelve weeks of volleyball specific plyometric training significantly improved speed ( $t = 5.839$ ,  $p < 0.05$ ) in male volleyball players. The changes in speed of volleyball players are presented in figure 1.

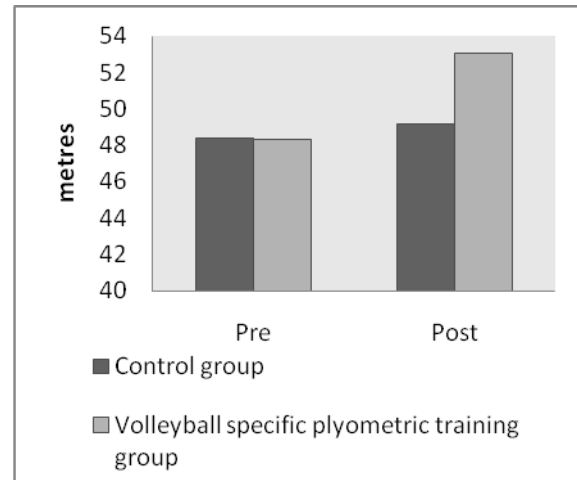
**Figure 1**  
Changes observed in speed



### Power

It is clearly from the study that pre test on arm explosive power showed no significant difference ( $F = 2.541$ ,  $p = 0.122$ ). However, post test ( $F = 28.78$ ,  $p = 0.000$ ) and adjusted post test ( $F = 38.89$ ,  $p = 0.000$ ) mean showed significant difference among the groups on arm explosive power. The plyometric group displayed 13.51% of improvement in arm explosive power. This also clearly show that due to twelve weeks of volleyball specific plyometric training significantly improved arm explosive power ( $t = 6.64$ ,  $p < 0.05$ ). The changes in power of volleyball players are presented in figure 2.

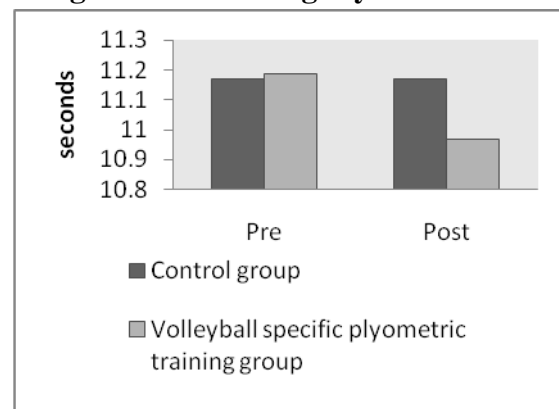
**Figure 2**  
Changes observed in power



### Agility

It is clearly from the study that pre test ( $F = 0.012$ ,  $p = 0.913$ ) and post test ( $F = 1.103$ ,  $p = 0.303$ ) on agility showed no significant difference. However, adjusted post test ( $F = 6.986$ ,  $p = 0.014$ ) mean showed significant difference among the groups on agility. The plyometric group displayed 1.93% of improvement in agility. This also clearly show that due to twelve weeks of volleyball specific plyometric training significantly improved agility ( $t = 6.486$ ,  $p < 0.05$ ) in male volleyball players. The changes in agility of volleyball players are presented in figure 3.

**Figure 3**  
Changes observed in agility



### Discussion on findings

The present study displayed significant improvement in speed, power and agility of male volleyball players through volleyball specific plyometric training. The volleyball specific plyometric training group showed 2.49% of improvement in speed. Few studies suggest that plyometric training can increase speed in adults (15, 17) which is also noticed in 16 to 18 years male volleyball players. It is noted that power also improved as a result of volleyball specific plyometric training. Increase in elastic strength had an effect on the increase in the ability for the high jump, as well as for the depth jump. Similar to our findings, the effects of plyometric training also have been studied and several researchers have found that jump height can be improved (2, 4, 9, 7, 1). But in this study sports specific plyometric training was administered which showed similar improvement in jump height of 4.73 cm. Similarly, agility showed significant improvement in volleyball specific plyometric training group. The twelve weeks of training elicited 1.93% of improvement in agility due to plyometric training. This finding is in accordance with RameshKannan and Chittibabu (14), Bal, Kaur, Singh (3), Lim, Wee, Chan and Ler (11). Therefore, the speed, power and agility had improved through volleyball specific plyometric training either because of better motor recruitment or neural adaptations.

### Conclusion

It is concluded that twelve weeks of volleyball specific plyometric training showed significant improvement in speed, power and agility. This clearly shows that this training would significantly improve their spiking and blocking ability by jumping higher and ability to moves quickly in all direction while playing volleyball.

### References

1. Asadi, A., and Arazi, H. Effects of high-intensity plyometric training on dynamic balance, agility, vertical jump and sprint performance in young male basketball players. *Journal of Sport and Health Research*, 2012, 4(1): 35-44.
2. Asmussen, E. & Bonde-Petersen, F. Storage of elastic energy in skeletal muscles in man. *Acta Physiologica Scandinavica*, 1974, 91: 385-392.
3. Bal, B.S., Kaur, P.J., Singh, D. Effects of a short term plyometric training program of agility in young basketball players. *Brazilian Journal of Biomotricity*, 2011, 5(4): 271-278.
4. Brown, M. E., Mayhew, J. L. & Boleach, L. Effect of plyometric training on vertical jump performance in high school basketball players. *Journal of Sports Medicine and Physical Fitness*, 1986, 26(1): 1-4.
5. Chittibabu, B. Estimation of relationship between sprinting performance with agility and explosive power of mal handball players. *International journal of current research in life science*, 2014, 3(8): 056-058.
6. Chittibabu, B., Akilan, N. Effect of sports specific endurance circuit training on sprinting performance and leg explosive power of high school male basketball players during competitive. *Global Journal for Research Analysis*, 2014, 3(12): 1-2.
7. Chu, D.A. (1991). *Jumping into plyometrics*. Champaign, IL: "Leisure Press".
8. Harris, G.R., Stone, M.H., O'Bryan, H., Proulx, C.M., & Johnson, R. Short term performance effects of high speed, high force and combined weight training. *Journal of Strength and Conditioning Research*, 1999, 13: 14-20.
9. Komi, P. V. & Bosco, C. Utilization of stored elastic energy in leg extensor muscles by men and women. *Medicine and Science in Sports*, 1978, 10: 261-265.
10. Komi, P.W., & Gollhofer, A. Stretch reflex can have an important role in force

- enhancement during SSC exercise. *Journal of Applied Biomechanics*, 1997, 13, 451-460.
11. Lim, J.H., Wee, E.H., Chan, K.Q., & Ler, H.Y. Effect of plyometric training on the agility of students enrolled in required college badminton programme. *International Journal of Applied Sports Sciences*, 2012, 24(1): 18-24.
  12. Paul, E.L., Jeffrey, A.P., Mathew, W.H., John, P.T., Michael, J.C., & Robert, H.L. Effect of Plyometric Training and Recovery on Vertical Jump Performance and Anaerobic Power. *Journal of Strength and Conditioning Research*, 2003, 17(4), 704-709.
  13. Piper, T. In-Season Strength/Power Mesocycle for Women's Collegiate Volleyball. *Strength and Conditioning*, June 1997, 21-23.
  14. Rameshkannan, S., and Chittibabu, B. Effect of plyometric training on agility performance of male handball players. *International Journal of Physical Education, Fitness and Sports*, 2014, 3(4): 72-76.
  15. Shaji, J. & Isha, S. Comparative analysis of plyometric training program and dynamic stretching on vertical jump and agility in male collegiate basketball player. *Al Ameen Journal of Medicine Sciences*, 2009, 2(1): 36-46.
  16. Stojanović, T., Kostić, R., & Nešić, G. (2005). *Odbojka (Volleyball)*. Banja Luka: The University of Banja Luka, Faculty of Sport and Physical Education.
  17. Turner, M. A., Owings, M., & Schwane, J. A. Improvement in running economy after 6 weeks of plyometric training. *The Journal of Strength and Conditioning Research*, 2003, 17(1): 60–67.