
**IMPACT OF FUNCTIONAL STRENGTH TRAINING ON SELECTED
STRENGTH PARAMETERS AND SKILL PERFORMANCE
VARIABLES OF MEN VOLLEYBALL PLAYERS**

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ABSTRACT

The objective of this study was to examine the impact of functional strength training on selected strength parameters and skill performance variables of men volleyball players. To achieve the purpose of the study, thirty volleyball players (N = 30) were selected from the Department of Physical Education, Bharathiar University, Coimbatore, Tamil Nadu, India. The age of the selected volleyball players ranged between 21 and 25 years. The selected subjects were divided into two groups: Group I, designated as the functional strength training Group (FSTG), and Group II, designated as the Control Group (CG). Each group consisted of fifteen volleyball players (n = 15). Prior to the intervention, a pre-test was administered to record the baseline values of the selected variables. The strength parameters selected were shoulder strength and core strength, and the selected skill performance variable was serving ability and spiking ability. Following the pre-test, the functional strength training Group (CTG) underwent a structured functional strength training programme for a period of eight weeks, while the Control Group (CG) continued with their regular physical activities without any exposure to the specific training protocol. Upon completion of the eight-week training period, a post-test was administered to both groups. Data collected from both groups before and after the training period were statistically examined for significant improvement using the dependent 't' test. The level of significance was set at $p \leq 0.05$. The results revealed that the functional strength training Group (SBTG) demonstrated statistically significant improvements in all selected strength parameters and skill performance variables when compared to the Control Group (CG) at the $p \leq 0.05$ level of significance. The findings of the

present study conclude that the eight-week functional strength training programme had a significant positive effect on the selected strength parameters and skill performance variables of men volleyball players.

KEYWORDS: *Strength parameters and skill performance variables and volleyball players.*

INTRODUCTION

Volleyball is one of the most popular team sports in the world, characterized by its dynamic nature, strategic complexity, and requirement for high levels of physical fitness and coordination. The game was invented in 1895 by William G. Morgan, a physical education director in Holyoke, Massachusetts, who initially designed it as a less physically demanding alternative to basketball. Originally called “Mintonette,” the game was later renamed volleyball due to the volleying nature of play (**Morgan, 1895**). Since its inception, volleyball has undergone significant transformations in rules, techniques, and playing styles, eventually becoming an Olympic sport in 1964. The sport is governed internationally by the Fédération Internationale de Volleyball (FIVB), which has played a crucial role in promoting and standardizing volleyball across the globe (**FIVB, 2016**).

Volleyball is played between two teams of six players each, separated by a net, with the primary objective of sending the ball over the net and grounding it on the opponent’s court while preventing the same from happening on one’s own side. The game requires a combination of technical skills such as serving, passing, setting, attacking, blocking, and digging, all of which must be executed with precision and timing (Dieter Beutelstahl, 2008). Modern volleyball emphasizes speed, agility, explosive power, and tactical awareness, making it a highly demanding sport both physically and mentally. According to Tudor **O. Bompa (1999)**, volleyball players must develop specific biomotor abilities such as strength, endurance, flexibility, coordination, and reaction time to achieve optimal performance.

The evolution of volleyball has also led to the development of various formats, including indoor volleyball, beach volleyball, and modified versions suitable for different age groups and skill levels. Beach volleyball, introduced as an Olympic event in 1996, has gained immense popularity due to its fast-paced and entertaining format (**International Olympic Committee, 2020**). The adaptability of volleyball to different environments and populations has contributed significantly to its global appeal. Furthermore, advancements in sports science and training methodologies have enhanced players’ performance levels, with a focus

on periodization, strength and conditioning, and injury prevention strategies (Bompa & Buzzichelli, 2015).

METHODS AND MEASURES

To achieve the purpose of the study, thirty volleyball players (N = 30) were selected from the Department of Physical Education, Bharathiar University, Coimbatore, Tamil Nadu, India. The age of the selected volleyball players ranged between 21 and 25 years. The selected subjects were divided into two groups: Group I, designated as the functional strength training Group (FSTG), and Group II, designated as the Control Group (CG). Each group consisted of fifteen volleyball players (n = 15). Prior to the intervention, a pre-test was administered to record the baseline values of the selected variables. The strength parameters selected were shoulder strength and core strength, and the selected skill performance variable was serving ability and spiking ability. Following the pre-test, the functional strength training Group (CTG) underwent a structured functional strength training programme for a period of eight weeks, while the Control Group (CG) continued with their regular physical activities without any exposure to the specific training protocol. Upon completion of the eight-week training period, a post-test was administered to both groups. Data collected from both groups before and after the training period were statistically examined for significant improvement using the dependent 't' test. The level of significance was set at $p \leq 0.05$.

CRITERION MEASURES: It is evaluate shoulder strength, Core strength and Skill performance variables Serving ability and spiking ability variables where chosen as the criterion measures to this study for testing.

TABLE-I CRITERION MEASURES.

S.No	Criterion Variables	Test Items	Unit of Measurements
STRENGTH PARAMETERS			
1	Shoulder strength	Seated Medicine ball throw test	In Meters
2	Core strength	Plank fitness test	In Seconds
SKILL PERFORMANCE VARIABLES			
4	Serving ability	Russell Lange volleyball test Serving test	In points
5.	Spiking ability	Wall spike Test	In counts

TABLE -II THE T- RATIO OF FUNCTIONAL STRENGTH TRAINING GROUP AND CONTROL GROUP ON SELECTED STRENGTH PARAMETERS AND SKILL PERFORMANCE VARIABLES OF VOLLEYBALL PLAYERS.

No	Variables	Groups	Pre-Mean	Post-Mean	SD	t-Ratio
1.	Shoulder strength	FSTG	3.57	3.76	0.03	20.42*
		CG	3.57	3.58	0.01	1.34
2.	Core strength	FSTG	2.27	2.32	0.03	4.68*
		CG	2.21	2.22	0.02	1.42
3.	Serving ability	FSTG	23.00	26.26	1.62	7.78*
		CG	20.80	21.00	0.41	1.87
4.	Spiking ability	FSTG	12.66	15.73	1.16	10.21*
		CG	11.53	11.73	0.28	1.47

(* Significant at $p \leq 0.05$ | CTG = Functional strength training Group ($n = 15$) | CG = Control Group ($n = 15$) | Table of t at 0.05 level ($df = 14$) = 2.145)

The mean, standard deviation, and t-values calculated for each outcome measure are presented in Table I. With regard to strength parameters, shoulder strength improved from a pre-test mean of 3.57 to a post-test mean of 3.76 ($t = 20.42^*$), and Core strength improved from 2.27 to 2.32 ($t = 4.68$) in the Functional strength training Group (CTG), both of which were statistically significant at the $p \leq 0.05$ level ($df = 14$) = 2.145). Furthermore, the skill performance variable of Serving ability also demonstrated significant improvement in the CTG, with the pre-test mean of 23.00 reducing to a post-test mean of 26.26 ($t = 7.78^*$), indicating a Spiking ability also demonstrated significant improvement in the CTG, with the pre-test mean of 12.66 increasing to a post-test mean of 15.73 ($t = 10.21^*$) following the eight-week functional strength training programme of which were statistically significant at the $p \leq 0.05$ level ($df = 14$) = 2.145).

In contrast, the Control Group (CG) showed no statistically significant changes in any of the selected variables during the same period, with shoulder strength recording pre- and post-test means of 3.47 and 3.49.20 ($t = 1.34$), core strength recording pre- and post-test means of 2.21 and 2.22 ($t = 1.42$), serving ability recording pre- and post-test means of 20.80 and 21.00 ($t = 1.05$), and Spiking ability recording pre- and post-test means of 11.53 and 11.73 ($t = 1.87$) none of which attained the required critical value at the $p \leq 0.05$ level ($df = 14$; critical $t = 2.145$) collectively indicating that the absence of a functional strength training protocol resulted in no meaningful improvement across any of the measured Strength parameters and Skill performance variables in the Control Group.

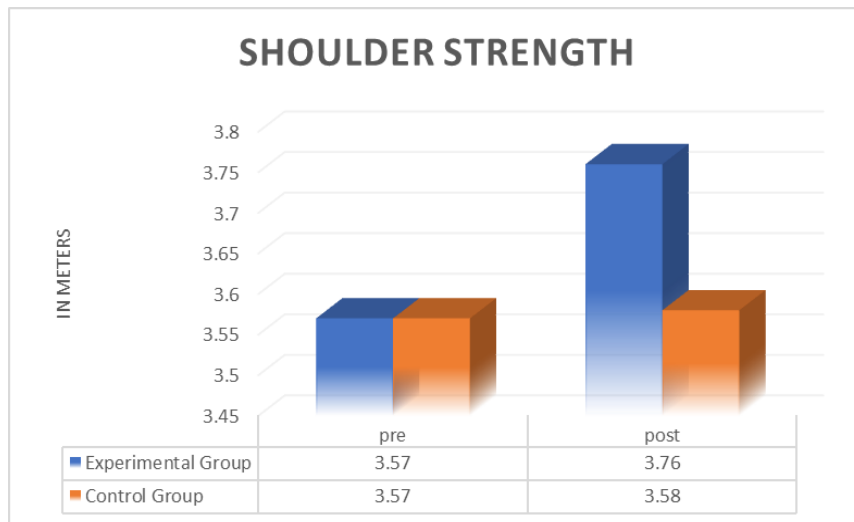


FIGURE: I SHOW THE PRE AND POST MEAN VALUES OF SHOULDER STRENGTH.

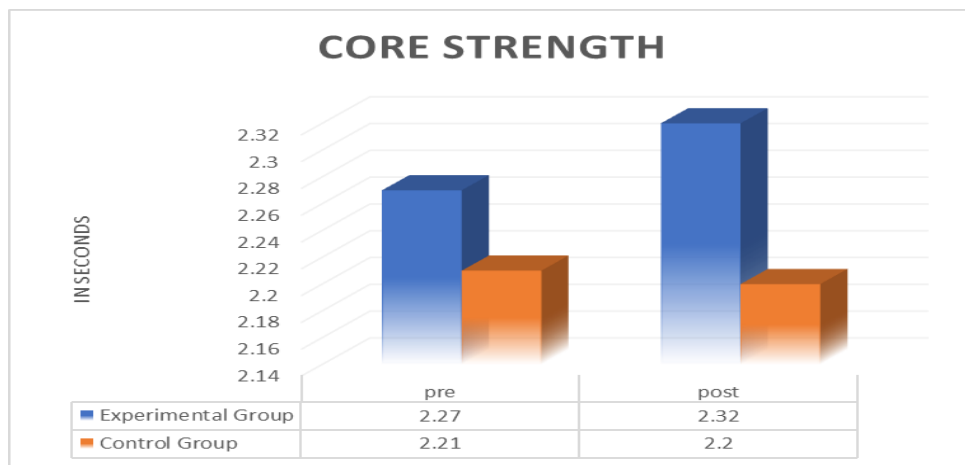


FIGURE: II SHOW THE PRE AND POST MEAN VALUES OF CORE STRENGTH.

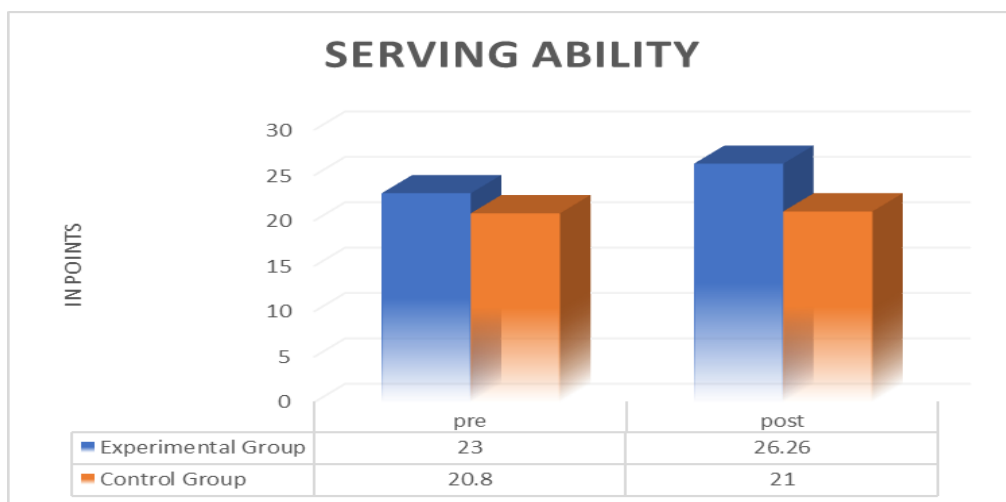


FIGURE: III SHOW THE PRE AND POST MEAN VALUES OF SERVING ABILITY.

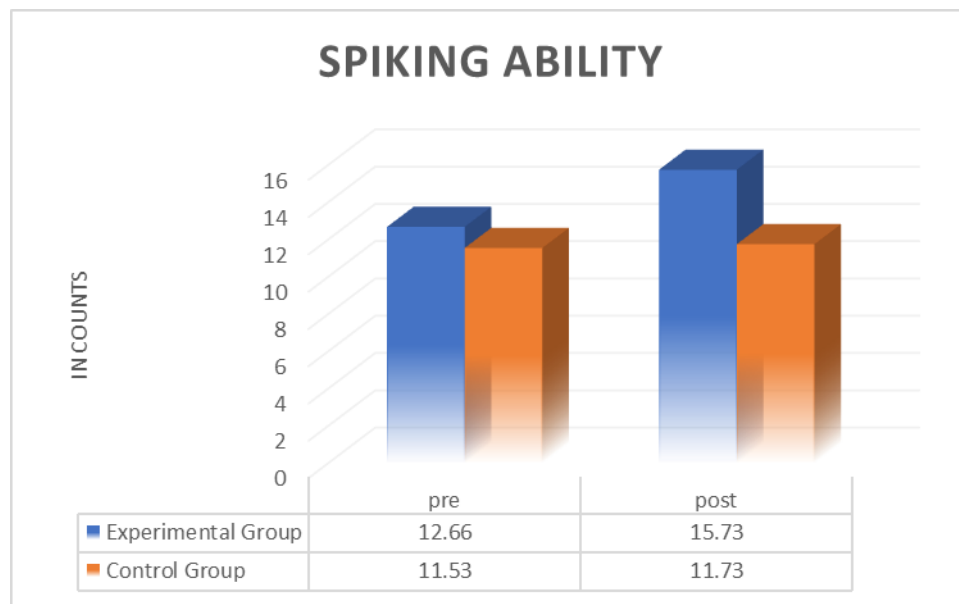


FIGURE: IV SHOW THE PRE AND POST MEAN VALUES OF SPIKING ABILITY.

DISCUSSION ON FINDINGS

The findings of the present study show that the Functional strength training group, which underwent Functional strength training, showed significant improvement in shoulder strength, core strength and skill performance variables serving ability and spiking ability when compared to the control group.

The present study examined the impact of functional strength training on selected strength parameters and skill performance variables among men volleyball players. The findings clearly indicate that the experimental group that underwent functional strength training demonstrated significant improvements in shoulder strength, core strength, serving ability, and spiking ability, whereas the control group showed no meaningful changes. These results highlight the effectiveness of functional strength training in enhancing both physical and technical aspects of volleyball performance.

Improvement in shoulder strength can be attributed to the nature of functional exercises, which emphasize multi-joint, sport-specific movements. Functional training typically involves dynamic and resistance-based activities that closely mimic volleyball actions such as serving and spiking. This leads to enhanced neuromuscular coordination and recruitment of stabilizing muscles around the shoulder joint. **According to Behm and Colado (2012)**, functional resistance training significantly improves muscular strength and joint stability by engaging multiple muscle groups simultaneously. **Similarly, Escamilla (2010)** emphasized that sport-specific resistance training enhances upper-body strength required for overhead movements in sports like volleyball.

The enhancement in core strength observed in the experimental group may be explained by the integration of balance, stability, and controlled movement patterns in functional training. Core muscles play a crucial role in force transmission between the upper and lower body, especially during explosive actions such as jumping and hitting. Functional training improves trunk stability and postural control, which are essential for efficient movement execution. **Kibler et al. (2006)** reported that a strong core enhances athletic performance by improving balance and reducing energy leaks during movement. According to this study, **Akuthota and Nadler (2004)** highlighted that core strengthening programs improve stability and functional performance in athletes.

With regard to serving ability, the observed improvement can be linked to increased strength, coordination, and power generated through functional training. Serving in volleyball requires a combination of upper-body strength, trunk rotation, and lower-body stability. Functional exercises enhance these components simultaneously, resulting in improved accuracy and force production. **Sheppard et al. (2008)** indicated that strength and conditioning programs focusing on integrated movement patterns significantly enhance volleyball-specific skills such as serving. **Furthermore, Marques et al. (2009)** found that resistance and functional training improve upper-body power, which directly contributes to better serving performance. The significant improvement in spiking ability can be explained by the combined development of strength, power, and coordination achieved through functional training. Spiking is a complex skill that involves approach speed, vertical jump, arm swing velocity, and timing. Functional training enhances these components by improving muscular power and inter-muscular coordination. **Newton et al. (2006)** reported that explosive strength training improves jumping and hitting performance in volleyball players. Additionally, **Bompa and Haff (2009)** emphasized that sport-specific strength training enhances power output and skill execution in competitive athletes.

CONCLUSION

Based on this study concludes that functional strength training has a significant and positive impact on selected strength parameters and skill performance variables among men volleyball players. The findings clearly demonstrate that the training programme effectively improved shoulder strength and core strength, which are essential for enhancing stability, balance, and force generation during volleyball movements. The study shows that improvements were observed in serving ability and spiking ability indicating that the gains in physical strength were successfully transferred into better execution of game-specific skills.

REFERENCE

1. Behm, D. G., & Colado, J. C. (2012). The effectiveness of resistance training using unstable surfaces and devices. *Journal of Strength and Conditioning Research*, 26(7), 1839–1845.
2. Bompa, T. O., & Haff, G. G. (2009). *Periodization: Theory and methodology of training* (5th ed.). Human Kinetics.
3. Fleck, S. J., & Kraemer, W. J. (2014). *Designing resistance training programs* (4th ed.). Human Kinetics.
4. Kibler, W. B., Press, J., & Sciascia, A. (2006). The role of core stability in athletic function. *Sports Medicine*, 36(3), 189–198.
5. Akuthota, V., & Nadler, S. F. (2004). Core strengthening. *Archives of Physical Medicine and Rehabilitation*, 85(3), S86–S92.
6. Sheppard, J. M., Gabbett, T., & Stanganelli, L. C. R. (2008). An analysis of playing positions in elite men's volleyball. *Journal of Strength and Conditioning Research*, 22(6), 1858–1866.
7. Marques, M. C., van den Tillaar, R., Vescovi, J. D., & González-Badillo, J. J. (2009). Changes in strength and power performance in elite volleyball players. *Journal of Strength and Conditioning Research*, 23(2), 444–451.
8. Newton, R. U., Rogers, R. A., Volek, J. S., Häkkinen, K., & Kraemer, W. J. (2006). Ballistic resistance training and jump performance in volleyball players. *Journal of Strength and Conditioning Research*, 20(4), 955–961.
9. Escamilla, R. F. (2010). Shoulder muscle activity and function in rehabilitation and training. *Sports Medicine*, 40(8), 663–685.
10. Stone, M. H., Stone, M. E., & Sands, W. A. (2007). *Principles and practice of resistance training*. Human Kinetics.
11. Willardson, J. M. (2007). Core stability training: Applications to sports conditioning. *Journal of Strength and Conditioning Research*, 21(3), 979–985.
12. Sato, K., & Mokha, M. (2009). Does core strength training influence running kinetics and stability? *Journal of Strength and Conditioning Research*, 23(1), 133–140.
13. Cissik, J. M. (2011). The role of functional training in sport performance. *Strength and Conditioning Journal*, 33(6), 52–56.
14. Myer, G. D., Ford, K. R., Brent, J. L., & Hewett, T. E. (2006). The effects of plyometric vs. dynamic stabilization training. *Journal of Strength and Conditioning Research*, 20(2), 345–353.
15. Zatsiorsky, V. M., & Kraemer, W. J. (2006). *Science and practice of strength training* (2nd ed.). Human Kinetics.