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## Influence of SAQ training on selected corporeal functional and skill performance variables in intercollegiate volleyball players

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### Abstract

This study was designed to investigate the influence of SAQ (Speed, Agility, and Quickness) training on selected corporeal functional and skill performance variables in intercollegiate volleyball players. To achieve the purpose of the study, 40 male volleyball players were selected from affiliated colleges of Bharathiar University, Coimbatore District, Tamil Nadu. The range of the subjects ranged from 18 to 25 years. The subjects were randomly assigned to two equal groups ( $n=20$ ). Group I underwent SAQ Training (SAQT), and Group II served as the Control Group (CG). The training was administered to the experimental group three days per week (Monday, Wednesday, and Friday) for a period of twelve weeks, while the control group was not exposed to any specific training other than their regular activities. The corporeal variables such as speed, agility, and flexibility, the functional variable such as  $VO_2$  max, and the skill performance variable such as the service test were selected as criteria for evaluation. Standardized tests were employed to assess these variables at both the pre-test and post the results revealed that the experimental group showed a significant improvement in all selected corporeal functional variables and skill performance variables compared to the control group. The findings of this study are in agreement with previous research in the field of sports science, highlighting the positive impact of SAQ training on enhancing athletic performance test levels. The data collected from the subjects was statistically analysed with 't' ratio to find out significant improvement if any at 0.05 level of confidence.

**Keywords:** Volleyball, SAQ, speed, agility, flexibility,  $VO_2$ max, service test

### Introduction

Volleyball is a fast-paced and explosive game that requires players to repeatedly perform short, quick movements such as jumping, spiking, blocking, and rapid changes in direction. Success in the sport depends not only on technical skill but also on physical qualities such as speed, agility, and quickness, which enable players to react rapidly and execute movements efficiently during competitive play. In addition, functional fitness components such as body composition and cardiovascular efficiency are critical for sustaining performance, while skill-related performance measures, such as volley execution, reflect the effective transfer of physical ability into game situations. Hence, training methods that directly enhance speed, agility, and quickness are highly relevant for volleyball players. Speed, Agility, and Quickness (SAQ) training is a structured training method designed to improve an athlete's ability to accelerate, decelerate, change direction, and respond quickly to stimuli. SAQ drills incorporate sprinting, ladder work, cone drills, and multidirectional movements, all of which enhance neuromuscular coordination, reaction time, and explosive performance. This form of training not only improves corporeal variables such as leg and arm explosive power but also contributes to better functional efficiency by lowering resting pulse rate and improving Body Mass Index (BMI) through increased energy expenditure. Furthermore, the improved speed and agility from SAQ training transfer directly to skill-based performance, such as volleying, serving, and defensive movements in volleyball.

Previous research has highlighted the benefits of SAQ training across various sports, demonstrating significant improvements in explosive strength, agility, and reaction time, which are vital for team games involving frequent changes in direction and rapid decision-

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making (Miller, Herniman, Ricard, Cheatham, & Michael, 2006) [3]. Similarly, Little and Williams (2005) [2] noted that SAQ-based programs enhance both linear speed and agility performance, thereby improving overall game efficiency. These findings suggest that SAQ training has the potential to serve as an effective conditioning tool for volleyball athletes at the intercollegiate level. Given the increasing physical and technical demands of modern volleyball, it is important to examine the role of SAQ training in enhancing players' performance capacities. Therefore, the present study seeks to investigate the influence of SAQ training on selected corporeal, functional, and skill performance variables of intercollegiate volleyball players. The outcomes of this study are expected to provide valuable insights into sport-specific conditioning strategies, thereby aiding coaches and athletes in optimizing performance for competitive success.

### Methodology

To test the hypothesis of this study, 40 volleyball players from affiliated colleges of Bharathiar University, Coimbatore district, Tamil Nadu, were selected as subjects. The age of the subjects ranged from 18 to 25 years. They were randomly assigned into two equal groups a SAQ Training group (n = 20) and a Control group (n = 20). The experimental group underwent a complex training programme four days per week (Monday, Wednesday, and Friday) for a period of twelve weeks, while the control group did not receive any additional training apart from their regular routine. The collected data for all the selected variables, both pre-test and post-test, were statistically analyzed using the paired 't'-test to determine significant improvements due to complex training. In all analyses, the criterion for statistical significance was set at the 0.05 level of confidence ( $p < 0.05$ ).

### Criterion measures

It was evaluated corporeal functional and skill performance variables that were chosen as the criterion measures for this study for testing.

**Table 1:** Criterion measures: Corporal, functional, and skill performance variables with corresponding tests and units of measurement

S. No.	Variables	Tests	Unit of measurement
<b>Corporal variables</b>			
1.	Speed	50 mts dash	In Seconds
2.	Agility	4x10 Shuttle run	In Seconds
3.	Flexibility	Sit and reach	In Centimeters
<b>Functional variable</b>			
1.	Vo2 max	Beep test	In levels
<b>Skill performance variable</b>			
1.	Service test	Russel lange volleyball test	In points

### Training programme

The training program lasted 60 minutes per session, conducted 3 alternative days in a week for a total of 12 weeks. Each session consisted of a 10-minute warm-up, 40 minutes of SAQ training, and a 10-minute cool-down. The training intensity was progressively increased by 5% every four weeks, ranging from 65% to 80% of the workload. The volume of SAQ training was prescribed based on the number of sets and repetitions. Pre-tests and post-tests were

administered to the subjects, and the results were recorded as scores.

**Table 2:** Computation of the 't' ratio on selected corporeal, functional, and skill performance variables of intercollegiate volleyball players in the experimental group

Experimental group						
Variables		N	Mean	Std. deviation	Std error mean	‘T’ ratio
Corporeal variables						
Speed (in seconds)	Pre-test	20	7.19	0.10	0.14	9.28*
	Post-test	20	7.05	0.07		
Agility (in seconds)	Pre-test	20	10.63	0.14	0.51	8.28*
	Post-test	20	10.20	0.17		
Flexibility (in centimetres)	Pre-test	20	22.98	1.63	0.39	7.56*
	Post-test	20	26.41	1.35		
Functional variables						
VO <sub>2</sub> max (in levels)	Pre-test	20	38.36	0.48	0.23	8.52*
	Post-test	20	40.31	1.14		
Skill performance variable						
Service test (in Points)	Pre-test	20	2.40	1.18	0.15	9.75*
	Post-test	20	3.90	1.07		

\*Significant level 0.05 level (degree of freedom 2.09,1 and 19)

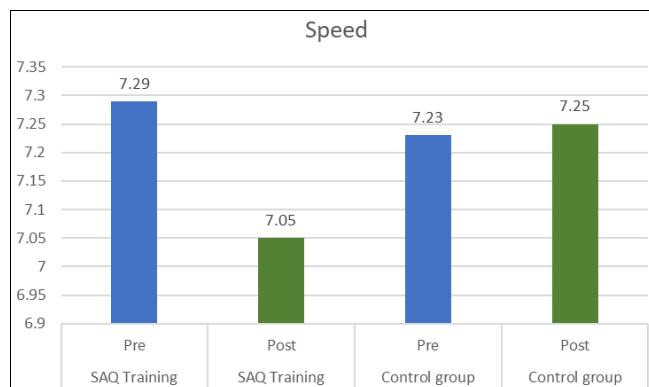
Table I presents the computation of the mean, standard deviation, and 't' ratio for selected corporeal, functional, and skill performance variables, namely speed, agility, flexibility, VO<sub>2</sub> max, service test of the experimental group. The obtained 't' ratios for speed, agility, flexibility, VO<sub>2</sub> max, service test were 9.28,8.28,7.56,8.52 and 9.75 respectively. The critical table value for 19 degrees of freedom at the 0.05 level of significance was 2.09. Since the obtained 't' values exceeded the table value, the results were considered statistically significant.

**Table 3:** Computation of the 't' ratio on selected corporeal, functional, and skill performance variables of intercollegiate volleyball players in the control group

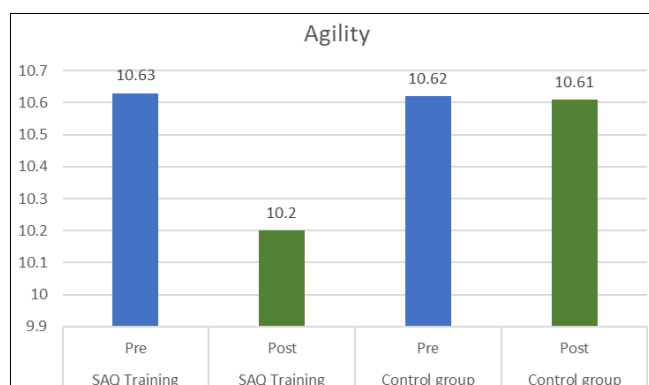
Control group						
Variables		N	Mean	Std. deviation	Std error mean	‘T’ ratio
Corporeal variables						
Speed (in seconds)	Pre-test	20	7.23	0.20	0.00	1.54
	Post-test	20	7.25	0.20		
Agility (in seconds)	Pre-test	20	10.62	0.18	0.00	0.28
	Post-test	20	10.61	0.19		
Flexibility (in centimetres)	Pre-test	20	22.58	1.02	0.16	1.31
	Post-test	20	22.79	1.03		
Functional variables						
VO2 max (in levels)	Pre-test	20	38.49	0.56	0.07	0.21
	Post-test	20	38.40	0.63		
Skill performance variable						
Service test (in Points)	Pre-test	20	2.20	0.89	0.08	1.83
	Post-test	20	2.35	1.03		

\*Significant level 0.05 level (degree of freedom 2.09,1 and 19)

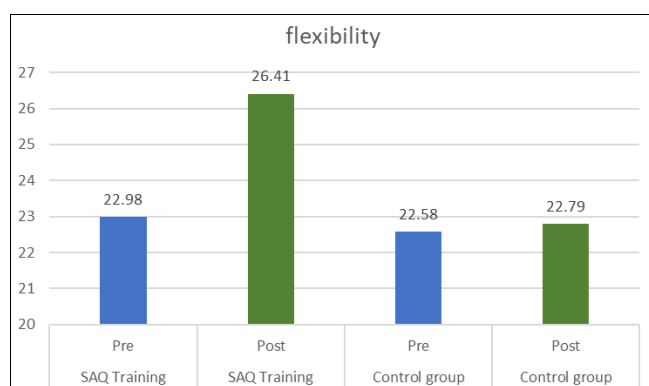
Table II presents the computation of the mean, standard deviation, and 't' ratio for selected corporeal, functional, and skill performance variables, namely speed, agility, flexibility, VO<sub>2</sub> max, service test of the control group. The obtained 't' ratios for speed, agility, flexibility, VO<sub>2</sub> max, service test were 1.54, 0.28, 1.31, 0.21 and 1.83 respectively. The critical table value for 19 degrees of freedom at the 0.05 level of significance was 2.09. Since the obtained 't' values exceeded the table value, the results were not statistically significant.



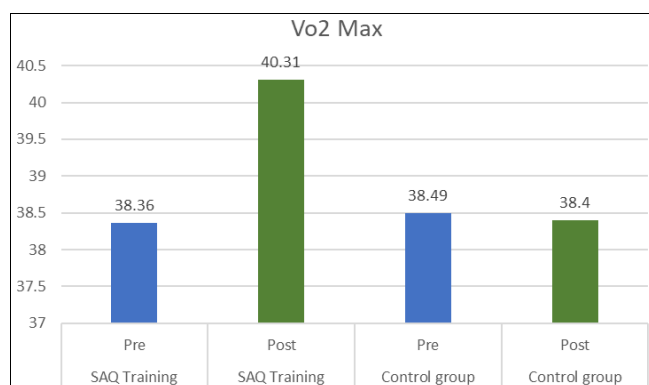
**Fig 1:** Bar diagram showing the mean value on corporeal variables of Speed intercollegiate volleyball players in the experimental and control groups



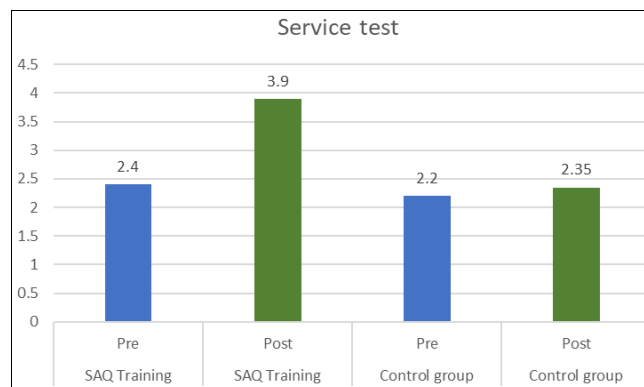
**Fig 2:** Bar diagram showing the mean value on corporeal variables of Agility intercollegiate volleyball players in the experimental and control groups



**Fig 3:** Bar diagram showing the mean value on corporeal variables of Flexibility intercollegiate volleyball players in the experimental and control groups



**Fig 4:** Bar diagram showing the mean value on corporeal variables of VO<sub>2</sub> max intercollegiate volleyball players in the experimental and control groups



**Fig 5:** Bar diagram showing the mean value on corporeal variables of Service test intercollegiate volleyball players in the experimental and control groups

### Discussion of findings

The purpose of this study was to investigate the influence of SAQ training on selected corporeal, functional, and skill performance variables among intercollegiate volleyball players. The findings revealed that the experimental group, which underwent twelve weeks of SAQ training, showed significant improvements in speed, agility, flexibility, VO<sub>2</sub> max, and serving performance, whereas the control group did not show any statistically significant changes in these variables. The improvement in speed and agility among the experimental group can be attributed to the nature of SAQ training, which emphasizes rapid acceleration, deceleration, and multidirectional movements. These results are consistent with the findings of (Jeffreys, 2006) <sup>[1]</sup>, who reported that SAQ training enhances neuromuscular coordination, leading to improved movement efficiency. Similarly, Little and Williams (2005) <sup>[2]</sup> highlighted that agility and quickness-based drills positively affect an athlete's ability to change direction quickly and effectively, which is essential in volleyball for both offensive and defensive actions. Supporting these findings, (Mahaboobjan *et al.*, 2022) <sup>[5]</sup> also reported significant improvements in speed and agility among Kabaddi players following an SAQ intervention, demonstrating its effectiveness in the Indian context.

The observed gains in flexibility and VO<sub>2</sub> max further demonstrate the holistic benefits of SAQ training. Improved flexibility may be due to the inclusion of dynamic movements and mobility-oriented drills within the program, which enhance the range of motion. The significant increase in VO<sub>2</sub> max indicates that SAQ training not only develops anaerobic power but also contributes to aerobic capacity, enabling players to sustain prolonged high-intensity activity. These findings align with (Miller *et al.*, 2006) <sup>[3]</sup>, who emphasized that SAQ-based conditioning improves both aerobic and anaerobic energy systems in athletes. Similarly, Tamilselvan and (Hassan, 2022) <sup>[6]</sup> found that SAQ training produced greater improvements in agility performance compared to skill-based training among Kabaddi players, highlighting the method's efficiency for developing functional capacities in Indian athletes. Regarding skill performance, the results showed significant improvement in the service test for the experimental group. Serving in volleyball requires a combination of explosive leg power, upper-body coordination, and precise timing. SAQ training likely improved these attributes by enhancing overall motor coordination and reaction time. This finding supports the work of (Bompa *et al.*, 2009) <sup>[4]</sup>, who stated that specific training interventions aimed at speed and power development

directly transfer to improved skill execution in sport-specific contexts. Similar observations were made by (Sasikumar *et al.*, 2019) [7], who noted that SAQ training significantly improved bio-motor variables such as agility and speed among Indian cricket players, which in turn enhanced their sport-specific performance.

In contrast, the control group did not demonstrate significant changes in any of the variables tested, which suggests that routine activities without specialized training are insufficient to bring about measurable improvements in performance. The findings of the present study align with both international and Indian research and provide strong evidence that SAQ training is an effective method for improving physical fitness and volleyball-specific skills in intercollegiate players. This highlights the importance of incorporating SAQ drills into regular training programs to maximize player development and competitive performance.

## Conclusion

It was concluded that twelve weeks of SAQ training significantly improved the of corporeal variables, speed, agility, flexibility, functional variables Vo2 Max, and Skill performance variable service test the inter collegiate volleyball players. Based on these findings, it is postulated that SAQ training is an effective method for inducing desirable improvements in the players. corporeal, functional and skill performance variables of intercollegiate volleyball players.

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