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Effects of plyometric exercise and S.A.Q. on volleyball players' speed ability

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Abstract
A contemporary ball game that is a member of the team sports family is volleyball. It incorporates the best aspects of several sports, including the advantages of technical proficiency, tactical awareness, and physical prowess. The purpose of this study was to determine how volleyball players' speed ability was affected by plyometric training and SAQ. The researcher chose thirty male volleyball players, ages 18 to 25, for this study. In addition, the subjects received 12-weeks of plyometric and SAQ training. Samples from Raghogarh College in Madhya Pradesh state were chosen at various playing levels, including AIU, SGFI, HFI, and PHA. The sample was chosen using a random sampling procedure. For this study, physical fitness variables like speed were used. The ANCOVA test was used at the 0.05 level of significance to determine the differences between each group's physical fitness level. The findings demonstrated that each group differs significantly from the others.

Keywords: Volleyball, speed, SAQ group, training, AIU, PHA

Introduction
The human body is an amazing machine. All human motions, such as blinking the eyes and running marathons, depend on the proper function of the skeletal muscles. A ballet dancer's graceful pirouette or a sumo wrestler's exhausting battle are two instances of how physical activity requires muscular effort to be achieved. Gill and Deol (2017) [4] look into how a 12-week S.A.Q. training course affects volleyball players' skill performance elements. Every volleyball skill variable showed a substantial difference, according to the data. Emeish (2015) [3] asserts that improving speed, agility, and quickness via training improves performance in all sports. The results of the tests for reactive agility and speed-agility showed a significant difference between the pre- and post-measurements. It is suggested that S.A.Q. training might benefit young athletes by improving their speed, agility, flexibility, and ability to leap. Siva and Jesudass (2015) [12] investigated how male hockey players' performance on a few key skills was impacted by S.A.Q. training. The results demonstrate that there was a substantial difference in the dribbling of the experimental group compared to the control group, hence validating the researcher's present inquiry. Shivaji *et al*. (2013) [15] attempted to study the speed, agility, and quickness (S.A.Q.) training, which is currently a popular form of athlete training. After 12 weeks of S.A.Q. training, junior volleyball players' serving and passing talents are clearly enhanced, as demonstrated by the current study's results.

Materials and Procedures
The aim of the research was to determine how volleyball players' speed ability was affected by SAQ and plyometric training. A total of thirty male volleyball players, ages eighteen to twenty-five, were chosen. The source of the data was from Raghogarh College in Madhya Pradesh state.

Statistical analysis
To analyse the data, statistical methods were used to determine mean differences. Moreover, the "ANCOVA" test was used to determine how different groups differed from one another.

Results
Various descriptive statistics, including the mean and standard deviation, were calculated to provide a statistical description of every variable. The significance threshold was established at. 05. The results are displayed in the table below.

Table 1: Shows the covariance analysis (ANCOVA) of the speed test between the control, plyometric, and SAQ groups

Source	Type III Sum of Squares	DF	Mean Square	F	Sig.
Corrected Model	41.40[a]	3	13.80	1.435E3	.000
Intercept	.02	1	.02	2.56	.11
SPEED	4.85	1	4.85	504.33	.00
Groups	.07	2	.03	3.66	.03
Error	.82	86	.01		
Total	2684.04	90			
Corrected Total	42.23	89			

The F value for speed comparison between the control, plyometric, and SAQ groups is displayed in Table 1; the p-value for the F-statistics is.000, which is less than 0.05, indicating significance. As a result, the alternate theory is acknowledged. Given the significance of the F-value, a post hoc test was conducted to determine the essential differences; the results are displayed in the following table.

Table 2: Shows Plyometric, SAQ, and Control Group Pairwise Speed Test Comparisons

Group (Mean)		Mean Diff	Std. Error	P-Value (Sig.)
Control Group N= 30 (5.48[a])	Plyomtric Group	.12	.05	.09
Plyometric Group N= 30 (5.36[a])	SAQ Group	-.04	.02	.33
SAQ Training Group N= 30 (5.40[a])	Control Group	-.08	.06	.53

According to Table 2, there is not much of a mean speed difference between the plyometric and control groups 12. The speed of the plyometric group (5.36) was noticeably faster than that of the control group (5.48). Plyometric group and SAQ group mean differences are determined to be minor, at -.04. The SAQ group (5.40) demonstrated considerably higher speed than the plyometric group (5.36). The SAQ group's mean speed difference from the control group is a significant -.08. The SAQ group's speed difference from the control group is not statistically significant.

Discussion and Findings

A statistically significant difference was discovered between all the groups when comparing the mean speed value, even though there was an increase in speed values as a result of the training. On the other side, it is claimed that young male volleyball players' sprint performance can be favourably impacted by a 12-week programme of high-intensity plyometric and SAQ training. The result could have been caused by the experimental group's twelve weeks of SAQ training, which included short sprints, high knees, butt kicks, inclined running, weighted arm swings, figure drills, and other SAQ drills designed to increase the speed component of volleyball players. During the play, the enhanced speed ability may be useful for rapid breaks and offensive and defensive counterattacks. Clark *et al*. (2014) [2] corroborate these findings by stating that SAQ drills may also be utilised to train or teach movement to athletes. Plyometric training is employed by many coaches and training specialists to increase players' speed and sprinting abilities, according to McArdle, Katch, and Katch (2001) [7]. A research on the "effect of 12 weeks of SAQ drills training programme on selected physical, physiological variables and hockey skills" was carried out by Singh & Deol (2016) [11]. further discovered that there is a notable impact on the speed variable following the SAQ drill instruction. In a study published in 2013, Nageswaran investigated the effects of Speed Agility Quickness (SAQ) training on intercollegiate athletes' speed, agility, and balance. The study also found that, when compared to a control group, there were notable differences and improvements in speed as a result of SAQ training. Additionally, it was discovered by Chettiamkudiyil *et al*. (2015) [1] that plyometric exercise increased speed more than SAQ training. Emeish (2015) [3] has also shown that SAQ workouts can help young athletes by strengthening their muscles and enhancing their speed performance. The findings are consistent with the research on how plyometic training increases tennis players' speed and power (Salonikidis & Zafeiridis, 2008; Villarreal *et al*., 2009) [9, 14]. These results were further supported by Sheppard *et al*. (2006) [10]; Sivarajan (2003) [13]; Kamalakkannan and Mahadevan (2012) [6] and Gill (2019) [5].

Conclusion

Based on the study's findings, it was concluded that the experimental group showed a greater rate of increase in speed performance compared to the volleyball players in the control group.

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