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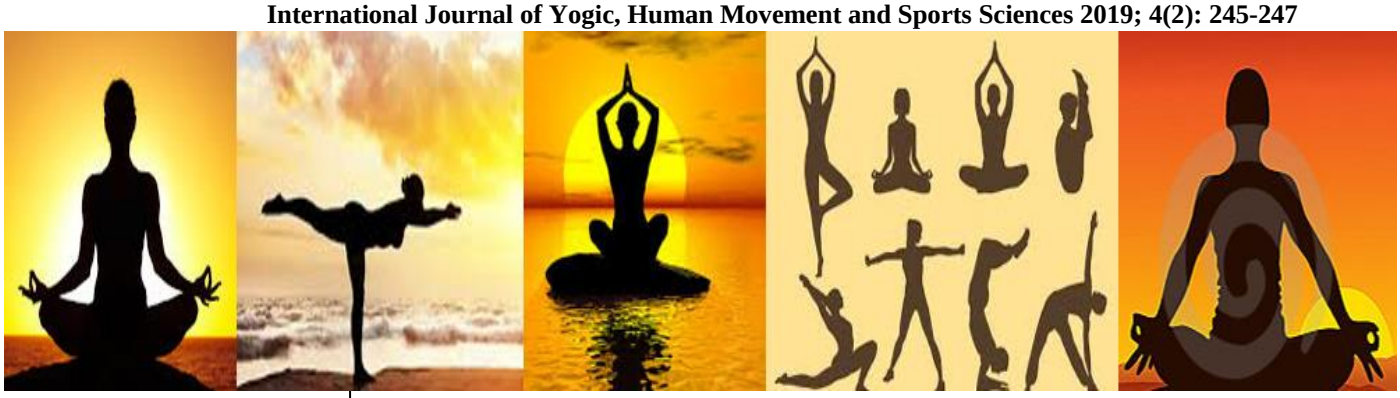

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Study of playing ability of national male volleyball players in relation to their physical characteristics

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Abstract
The aim of the present study was to find out the effect of some selected physical characteristics on playing ability of male volleyball players. To conduct the study 96 national male volleyball players were selected. The selected subjects were part of teams which qualified for quarterfinals in senior national volleyball championship. The average age of the selected national male volleyball players was 27.92 years. Volleyball playing ability was based on comprehensive rating of three judges. The physical characteristics namely speed, explosive strength of legs, agility and flexibility was assessed with the help of 50 meter run, standing broad jump, 4x10 meter shuttle run and sit and reach test respectively. Linear regression explained 40.8% variance in overall data on volleyball playing ability. Agility has significantly higher impact on volleyball playing ability followed by explosive strength of legs then speed and lastly flexibility. The non-significant t-ratio for flexibility also denotes its minimal impact on volleyball playing ability. It was concluded that physical characteristics in the form of agility, explosive strength of legs and speed are major contributors in playing ability of national male volleyball players.

Keywords: Volleyball playing ability, physical characteristics

Introduction
One of the most important factor in volleyball performance is the capacity of a player to rapidly react to a game situation while using his full body potential to gain upper hand. It is believed that physical characteristics such as strength, speed, agility and flexibility are essential for volleyball playing ability. An optimal muscle strength along with other motor abilities are pre-requisites of good volleyball playing ability. A large pool of research indicated the association between physical characteristics and volleyball playing ability. Schaun *et al*. (2013) [4] found a significant relationship between motor and physical fitness variable with volleyball playing ability. They reported that performance of volleyball player is greatly dependent upon agility and lower limb strength. Peeri *et al*. (2013) [3] reported the meaningful association between bodily characteristics with volleyball playing ability. They reported that offensive and defensive skills in volleyball depend upon height, body mass index and explosive strength of legs. Bojonic *et al*. (2015) [1] also documented the association of motor potential and situation competence in a group of volleyball players. They found useful role of balance, speed, strength and coordination in assessment of situational competence of volleyball players. Similarly Pawar (2015) [2] also found speed and abdominal strength as major physical variables in volleyball performance. In similar line Singh and Singh (2016) [5] also reported meaningful association of psychomotor ability on serving proficiency of volleyball players. Despite numerous studies the contribution of selected physical variables for prediction of playing ability of volleyball players has not been studied so far. Hence the present study was planned to assess the contribution of selected physical characteristics namely explosive strength of legs, speed, agility and flexibility in prophecy of playing ability in national male volleyball players.

Objectives
The objective of the present study was to evaluate the contribution of physical characteristics namely explosive strength of legs, speed, agility and flexibility in determining the playing ability of national male volleyball players.

Hypothesis
It was hypothesized that physical characteristics namely explosive strength of legs, speed, agility and flexibility will generate significant variance upon playing ability of national male volleyball players.

Methodology
The following methodological steps were taken in order to conduct the present study.

Sample
To conduct the study 96 national male volleyball players were selected. The selected subjects were part of teams which qualified for quarterfinals in senior national volleyball championship. The average age of the selected national male volleyball players was 27.92 years.

Tools
To assess explosive strength of legs, standing broad jump test was used. To assess flexibility, sit and reach test was used.
To assess speed of selected national male volleyball players, 50 meter run was used. 4x10 meter shuttle run test was used to assess agility of selected national male volleyball players.
Volleyball performance rating scale standardized by Yadav in 1989 was used to assess playing ability of selected national male players. It is based on subjective judgment on the basis of five components / skills during play in the form of Serve, Organization of Attack, Attack, Block and Back Court play or floor defence. These components were analysed separately on five point scale as given in performance analysis rating scale. The subjective judgment of three experts was considered. The subjective judgment of three judges was based on their evaluation of five components during a tournament. The average score of three experts rating on all the five components together was considered as the score of volleyball performance of the national male players.

Procedure
96 national male volleyball players from quarterfinalist teams senior national volleyball championship were selected. Subjective rating of three judges based on skills was used to assess volleyball playing ability. Tests related with speed, explosive strength of legs, agility and flexibility was performed by selected national male volleyball player under the strict supervision of researcher and his support team. Regression method was used for analysis of data.

Result and Discussion

Table 1: Value of Correlation (r) between Physical Characteristics and Volleyball Playing Ability (N=96)

	Speed	Explosive Strength of legs	Agility	Flexibility
Volleyball Playing Ability	-.420**	.437**	-.467**	-.010

** Significant at 0.01 level
r with (df=94) = 0.195 at .05 level and 0.254 at .01 level

Results shown in table 1 reveals significant association between physical characteristics namely speed, explosive strength of legs and agility with playing ability of national male volleyball players at .01 level of statistical significance except for flexibility which was not found to be significantly associated with volleyball playing ability.
To determine the fact about degree of extent physical characteristics namely speed, explosive strength of legs, agility and flexibility predicts volleyball playing ability, Multiple Linear Regression was calculated. The results are shown in table no. 2, 2(a) and 2(b) respectively

Table 2: Model Summary (Dependent Variable - Volleyball Playing Ability) (Independent Variables: Speed, Explosive strength of legs, agility, Flexibility)

R	R Square	Adjusted R Square
0.639	0.408	0.382

Table 2a: Anova Prediction of Volleyball Playing Ability in relation to Physical Characteristics

Model	Sum of Squares	df	Mean Squares	F
Regression	286.554	4	71.638	15.68, $p< .01$
Residual	415.565	91	4.567	
Total	702.118	95		

Table 2b: Anova Standardized Coefficients

Model	Unstandardized B	Standardized Beta	t	Significance
Constant	33.425		4.69	.01
Speed	-1.607	-.177	-1.94	.05
Explosive Strength of Legs	5.228	.356	4.06	.01
Agility	-1.340	-.385	-4.52	.01
Flexibility	-.093	.074	-.102	p>.05

A perusal of model summary shown in table 2 revealed that linear regression explained 40.8% (R square = .408) variance in overall data on volleyball playing ability. A significant regression was also obtained. The calculated F(4,91) = 15.68, p<.01 with R^2 being .408 confirms this findings. The t ratio for variable speed was 1.94 with Beta of -.177 while the t-ratio for explosive strength of legs was 4.06 with Beta of .356. for agility the t-ratio was 4.52 with Beta of -.385 while for flexibility the t-ratio was 1.25 with Beta of -.102. The reported Beta coefficient for physical characteristic revealed that agility has significantly higher impact on volleyball playing ability followed by explosive strength of legs then speed and lastly flexibility. The non-significant t-ratio for flexibility also denotes its minimal impact on volleyball playing ability.
Results indicate that contribution of physical characteristics namely strength, speed, agility and flexibility is nearly 40% in playing ability of national male volleyball players. Since playing ability of volleyball players was based on their skill ability in the form of serving, organization of attack, attack, block and back court play, the results are not surprising. As per nature of sport like volleyball, spiking, blocking or back court play explosive strength, movement speed, agility and flexibility are of utmost importance hence there is no surprise that fairly large contribution of these physical variables was observed on playing ability of national male volleyball players.

Conclusion
On the basis of results it was concluded that physical characteristics in the form of agility, explosive strength of legs and speed are major contributors in playing ability of national male volleyball players.

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