Prediction of Volleyball Playing Ability from Selected Anthropometrical and Skill Variables of State Level Volleyball Players

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Abstract

The purpose of the study was to predict the volleyball playing ability from selected anthropometrical and skill variables of state level volleyball players. To achieve the purpose of the study, the investigator selected 100 state level volleyball players who participated in state level coaching camps conducted by Tamil Nadu Volleyball Association and Clubs. The subjects were in the age group between 18 to 25 years. All the subjects had participated in the state level Volleyball tournaments. Only volunteer, healthy and anthropometrically fit subjects were selected for this study. Volleyball playing ability as the criterion variable and selected anthropometrical and skill variables as the predictor variables. Height was measured using Stadiometer. Leg Length, arm length, arm girth and fore arm girth were measured using flexible tape. Volleyball Skills, Serve, Set, Attack, Block, and Pass were measured using standard tests. The volleyball playing ability was determined by subjective rating by three experts and was used as the criterion variable. The backward selection in multiple regression method was used to determine the prediction equation. The volleyball playing ability could be predicted from anthropometric variables, such as arm girth. The volleyball playing ability could be predicted from skills, such as, set, serve and block.

Key words: *Volleyball, Anthropometrical, Skill, Prediction, Playing Ability.*

Introduction

Volleyball is characterized mainly by its dynamic work of broken intensity. There are periods of significant muscular activity in alteration with periods of relative relaxation intensity of work. During the time of play, the intensity of play oscillates from moderate to maximum. The time playing approaches three hours during which intensity increases to a points where, pulse rate reaches 200 beats / min and weight loss goes upto 2.5 to 3 Kgs. **(Yuri Kteshcer 1988).** In every tactical move in volleyball, one depends on team work and the individual skills, good passing, setting,

spiking, jumping, controlling the ball, participation and speed to the ball and keeping the eyes on the ball. Tactics will succeed only through individual fundamental skills and with players thinking as a team **(Men's Volleyball 1974).**

All the sports activities involve the application of skills of same kind, cognitive or intellectual, perceptual or motor. According to **Reilly (1996)** skills have been classified as open and closed. Open skills are those which are dictated by and are varied according to external situations, for example opponents, support players,

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movement, weather, ground conditions and on how a player acts according to what he sees going on in the game. Closed skills are pre-learned sequences of movements, little affected by the environment, and are well timed and coordinated. Anthropometric measurements have been a part of physical education research and evaluation since its inception. The earlier research in the area of anthropometry was with the emphasis on changes in muscle size, brought about through exercises **(Clarke and Clarke, 1989)**

Anthropometry constitutes the earliest form of measurement in physical education, as one might surmise. Study of the human physique and its proportions began many centuries ago. The early beginnings can be traced to the remote civilization of India, where a treatise called "Silpi Sastri" analyzed the outline of the body by dividing it into 480 parts. Anthropometry evolved in the quest to determine the ideal body proportions, and artists and sculptors directed their study to it as shown by the artwork of early civilizations.

Materials and Methods

The purpose of the study was to predict the volleyball playing ability from selected anthropometrical and skill variables of state level volleyball players. To achieve the purpose of the study, the investigator selected 100 state level volleyball players who participated in state level coaching camps conducted by Tamil Nadu Volleyball Association and Clubs. The subjects were in the age group between 18 to 25 years. All the subjects had participated in the state level Volleyball tournaments. Only volunteer, healthy and anthropometrically fit subjects were selected for this study. Volleyball playing ability as the criterion variable and selected anthropometrical and skill variables as the predictor variables. Height was measured using Stadiometer. Leg Length, arm length, arm girth and fore arm girth were measured using flexible tape. Volleyball Skills, Serve, Set, Attack, Block, and Pass were measured using standard tests. The volleyball playing ability was determined by subjective rating by three experts and was used as the criterion variable. The backward selection in multiple regression method was used to determine the prediction equation.

Results

The descriptive statistics on selected anthropometrical variables of subjects are presented in Table I.

Table I. Descriptive statistics on selected anthropometrical variables of the subjects

S.No	Variables	N	Mean (M)	Standard Deviation (SD)
1	Height	100	180.29	± 5.582
2	Leg Length	100	99.77	± 5.731
3	Arm Length	100	79.26	± 5.304
4	Arm Girth	100	27.72	± 1.753
5	Forearm Girth	100	25.77	± 1.681

Table I shows the mean values of subjects in selected anthropometric variables. The mean values of the subjects' height was 180.29 with standard deviation of ± 5.582 the leg length was 99.77 with standard deviation of ± 5.731, the arm length was 76.26 with standard deviation of ± 5.304 and arm girth was 27.72 with

standard deviation of ± 1.753 and fore arm   ± 1.681.
girth was 25.77 with standard deviation of .

Table II. Descriptive statistics on selected skill variables of the subjects.

S.No	Variables	N	Mean (M)	Standard Deviation (SD)
1	Serve	100	29.19	3.457
2	Set	100	28.23	5.111
3	Attack	100	10.12	1.380
4	Block	100	10.34	1.597
5	Pass	100	33.88	4.989

Table II shows the skill variables of the subjects. The mean values of serve was 29.19 with standard deviation of ± 3.457, set of the subjects was 28.23 with standard deviation of ± 5.111, attack was 10.12 with standard deviation of ± 1.380, block was 10.34 with standard deviation of ± 1.597, pass was 33.38 with standard deviation of ± 4.989.

Table III. Correlation coefficient between volleyball playing ability and selected anthropometrical variables of the subjects

S.No	Variables	N	Mean (M)	Obtained 'r' value
1	Height	100	180.29	0.014
2	Leg Length	100	99.77	0.107
3	Arm Length	100	79.26	0.247*
4	Arm Girth	100	27.72	0.241*
5	Forearm Girth	100	25.77	0.259*

* Significant at 0.05 level.

The relationship between volleyball playing ability and anthropometric variables, arm length, arm girth and fore arm girth with 'r' value of 0.247, 0.241 and 0.259 were significant. The other variables, height and leg length were not significant.

Table IV. Correlation coefficient between volleyball playing ability and selected **skill** variables of the subjects

S.No	Volleyball Playing Ability Vs Variables	N	Mean (M)	Obtained 'r' value
1	Serve	100	29.19	0.770*
2	Set	100	28.23	0.636*
3	Attack	100	10.12	0.663*
4	Block	100	10.34	0.309*
5	Pass	100	33.88	0.705*

* Significant at 0.05 level

The relationship between volleyball playing ability and skill variables serve, set, attack, block and pass with 'r' values of 0.770, 0.636, 0.663, 0.309 and 0.705 respectively were significant.

Table V. The variables selected for prediction with beta and ' t ' values for volleyball playing ability

Variables	Beta in	t	Sig	Partial Correlation	Collinearity Statistics
					Tolerance
Arm Girth	0.083	2.176	0.032	0.226	0.903
Set	0.268	5.155	0.00	0.482	0.481
Serve	0.131	2.773	0.007	0.283	0.58
Block	0.081	2.012	0.047	0.21	0.803

Table V shows that the partial correlation between volleyball playing ability and selected predictor variables arm girth, set, serve and block were 0.226, 0.481, 0.58 and 0.803 respectively which were significant at 0.01 level.

Table VI. Multiple correlation, r square, r square change and significance of the selected predictor variables by backward selectors

S.N	Variables Predicted	R	R square	F change	ANOVA 'F'	Significance of 'F' change
1 2 3 4	Arm girth Set Serve block	0.941	.885	1.553	61.787	0.000

In Table VI the selected predictor variables by backward regression method, namely, arm girth, set, serve and block. The multiple correlation R 0.941 with R square value of 0.885, F change of 1.553 and ANOVA 'F' of 61.787 with the significant F change of 0.000 are presented in the above table.

Table VII. Beta unstandardised co-efficients, constant value and significants of each backward selected variables

Selected Variables	Unstandardized Beta Coefficients	Constant	Sig
Constant		-62.413	
Arm Girth	0.69		0.032
Set	0.768		0.00
Serve	0.556		0.007
Block	0.742		0.047

In Table VII the beta unstandardized co-efficients, constant value and significance of each backward selected variable are shown. The constant value of -62.413 are presented. Based on the results presented, the following multiple regression formula was determined by the backward selection method from model 10 (Table X) and the null hypothesis were rejected at 0.10 level of significance with agility, muscular endurance, shoulder strength, flexibility, vital capacity, breath holding time and anaerobic power.

$$Y^1 = +0.690 \, X_1 + 0.768 \, X_2 + 0.556 \, X_3 + 0.742_4 - 62.413$$

Where Y^1 = the predicted score
X_1 = Arm Girth
X_2 = Set
X_3 = Serve
X_4 = Block
a = -62.413 (constant)

Conclusion
Based on the limitation and delimitation of the present research study, it was concluded that:
1. The volleyball playing ability could be predicted from anthropometric variables, such as arm girth.
2. The volleyball playing ability could be predicted from skills, such as, set, serve and block.

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