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Anthropometric and physiological variables as predictor of playing ability of university male football players

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Abstract
Background: The objective of the study was anthropometric and physiological variable as predictor of playing ability of university male football players.
Method: For the purpose of study, sixteen male university football players were selected. Football playing ability was selected as a dependent variable and anthropometric and physiological variable was considered as Independent Variable. The football playing ability was measured by judges rating and anthropometric and physiological variable were measured by anthropometric and physiological kit. To find out the significant relationship Pearson's Product Moment correlation and find out the joint contribution multiple correlations was used and find out prediction multiple regression equation was used. The level of significance was set at .05 levels.
Results: Football performance was found significantly correlated with calf girth, resting heart rate, vital capacity, diastolic blood pressure at 0.05 level of significance and multiple correlations to anthropometric variables are 0.799 and physiological variables are 0.904.

Keywords: Anthropometric, physiological variables, playing ability, male football players

Introduction
Football is the most popular sport in the world and is played regardless of such factors as age, sex, race, fitness level or sport performance. It depends on a number of factors such as technical and tactical skills, mental readiness and physiological factors.
Anthropometric Measurement is defined as set of noninvasive, quantitative techniques for determining an individual's body fat composition by measuring, recording, and analyzing specific dimensions of the body, such as height, weight, arm length, leg length: skin-fold thickness; and bodily circumference at the waist, hip, and chest. Anthropometric variables such as weight, standing height, thigh length, and leg length and shoulder width are related to optimum and skilful performance in team as well as individual sport.
High level of performance in sports and games might be dependent upon the physiological make up and it was recognized that physiological proficiency was needed for the high level performance. How much athletic ability present in a particular person is attributable to genetics, and how much is determined by training and other adaptations made by the athlete.

Objective of the study
The objective of the study was an anthropometric and physiological variable as predictor of playing ability of university male football players.

Methodology
Selection of subjects
For the purpose of study, sixteen young football men players belonging to the age level of 18 to 25 years in university selected as the subject for the study from Tezpur University.

Criterion measures
1. Height was measured by Stadiometer and recorded in centimetre.

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2. Weight was measured by digital weighing machine and recorded in kilogram.
3. Leg length was measured by steel tape and recorded in centimetre.
4. Calf girth was measured by steel tape and recorded in centimetre.
5. Thigh girth was measured by steel tape and recorded in centimetre.
6. Blood Pressure was measured by Stethoscope and sphygmomanometer and recorded in mm/Hg.
7. Resting Heart rate was measured by Stop watch and recorded in Heart beats/minute.
8. Vital Capacity was measured by Spirometer and recorded in liter/minutes.

Statistical analysis
1. To find out the relationship between playing ability

(dependent variable) and selected Anthropometrical variables (independent variables) among the university men football players. Pearson's Product Moment method of correlation was used.
2. To find out the relationship between playing ability (dependent variable) and selected physiological variables (independent variables) among the university men football players. Pearson's Product Moment method of correlation was used.
3. For predicting dependent variable (Football Playing Ability) on the basis of independent variables (Anthropometric and Physiological Variables) among the university men football players. Multiple regression equation will be used.

Findings

Table 1: Multiple correlations of selected anthropometrical variables and playing ability of university men basketball players

Independent Variables	Mean	Standard Deviation	Pearson r- value	R-Value
Height	169.75	4.12	.326	
Weight	61.37	6.53	.343	
Leg Length	88.62	3.53	.223	.799*
Thigh Girth	52.06	3.71	-.298	
Calf Girth	33.37	1.82	.799*	

*Significant at 0.05 level with df 14 is 0.426.

The table above showed that the Pearson product moment values between the playing ability and calf girth of university men football players were greater than the tabulated r value at .05 level of confidence. Therefore, it was concluded that there was significant relationship between playing ability and calf girth of university men football players and there was insignificant relationship between playing ability and height, weight, leg length and thigh girth of university men football players as the calculated r-value is less than tabulated r-value.

The table above also showed that the multiple correlation (R) value between the playing ability and the combined effect of height, weight, leg length, thigh girth and calf girth were greater than the tabulated R value at .05 level of confidence. Therefore, it was concluded that there was significant relationship between playing ability and the combined effect of height, weight, leg length, thigh girth and calf girth of university men football players.

Table 2: Multiple correlations of selected physiological variables and playing ability of university men basketball players

Independent Variables	Mean	Standard Deviation	Pearson r12 value	R-Value
Resting Heart Rate	62.75	6.97	-.59*	
Vital Capacity	3115	291.89	.776*	.905
Systolic Blood Pressure	114.43	4.08	.418*	
Diastolic Blood Pressure	72.81	4.84	.513*	

*Significant at 0.05 level with df 14 is 0.426.

The table above showed that the Pearson product moment values between the playing ability and resting heart rate, vital capacity and diastolic blood pressure of university men football players were greater than the tabulated r value at .05 level of confidence. Therefore, it was concluded that there was significant relationship between playing ability and resting heart rate, vital capacity and diastolic blood pressure of university men football players and there was insignificant relationship between playing ability and systolic blood pressure of university men football players as the calculated r-value is less than tabulated r-value.

The table above also showed that the multiple correlation (R)

value between the playing ability and the combined effect of resting heart rate, vital capacity, systolic blood pressure and diastolic blood pressure were greater than the tabulated R value at .05 level of confidence. Therefore, it was concluded that there was significant relationship between playing ability and the combined effect of resting heart rate, vital capacity, systolic blood pressure and diastolic blood pressure of university men football players.

Pearson Product moment correlation values between the selected anthropometrical variables and playing ability were graphically presented in figure IV.

Table 3: Multiple correlation coefficients for the predictors of playing ability of university women basketball players

S. No	Variables (Stepwise Method)	R-Value	R Square	R Square Change
1	Calf Girth	.799	.639	.639
2	Calf Girth & Vital Capacity	.886	.786	.146
3	Calf Girth, Vital Capacity & Resting Heart Rate	.934	.872	.087

From the table 3, it was found that the multiple correlation

coefficients for predictors such as calf girth, vital capacity and

resting heart rate is 0.934 which produce highest multiple correlations with football playing ability of university men players. R square values showed that the percentage of contribution of predictors to the playing ability (dependent variable) in the following order.

1. About 63% of the variation in the playing ability was explained by the regression model with one predictor calf girth.
2. About 78% of the variation in the playing ability was explained by the regression model with two predictors, Calf Girth & Vital Capacity. An additional 15% of the variance in the playing ability is contributed by Vital Capacity.
3. About 87% of the variation in the playing ability was explained by the regression model with three predictors, Calf Girth, Vital Capacity & Resting Heart Rate. An additional 9% of the variance in the playing ability is contributed by Resting Heart Rate.

Discussion
The regression equation for the prediction of football playing ability of university men player includes Calf Girth, Vital Capacity & Resting Heart Rate. As the multiple correlations on playing ability with the combined effect of these independent variables are highly significant, it is apparent that the regression equation has a high predictive validity.

The findings of the statistical analysis have shown dominant role of selected variable for the male football players in terms of predictor of football performance. From anthropometric and physiological Variables calf girth, Resting Heart Rate, vital capacity and diastolic blood pressure was found to be significant in football performance of male football players. Calf girth, vital capacity and Resting Heart Rate is determinant factor to football playing ability. The statistical analysis of the data has clearly indicated that those selected anthropometric and physiological Variables which were not significantly related to Male football performance i.e. height, weight, leg length, thigh girth, systolic blood pressure. But in relation to multiple correlations, a significant multiple correlation coefficients were found between anthropometric and physiological variables and male football performance.

Conclusion
In football playing ability and calf girth were found significant with anthropometric variables. Multiple correlation coefficients are 0.799.

Football playing ability and vital capacity, resting heart rate and diastolic blood pressure were found significant with physiological variables. Multiple correlation coefficients are 0.905.

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