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Relationship of Selected Physical Variables to Playing Ability of Seniornational Level Soccer Players

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Abstract:
Soccer is the most popular sport in world. Performance at optimal levels requires high levels of technical, tactical and physiological skills. Identification and selection of talented soccer players are not straightforward procedures.The data collected was analyzed by applying Pearson's product moment Correlation (r). This was used to find out the relationship of physical variables to playing abilities of senior national level soccer players, Kerala state. The subjects for the study were selected from during the time of Kerala state senior football coaching camp (Santosh trophy) held at FACT Udyogamandal ground Ernakulam. Age of the subjects ranged between 24 to 30 years.. They were tested on physical variables, namely speed, power, flexibility, endurance, and agility.These variables were put into statistical analysis of simple correlation and partial correlation to find out the relationship between selected criterions variables to playing ability.

Keywords: Soccer, Performance, Playing ability, Physical Variables.

1. Introduction

Sports have very prominent role in the modern society and are very important to an individual, a group, a nation and need to the world. There are more nation competing in the Olympics games than those participating in the united nation throughout the world because sorts has a popular appeal among people of all ages and sexes. Soccer is the most popular sport in world. All over the globe, people are attached to this game in deep and passionate cultural ways today soccer is front and centre in the lives of many families. The term 'soccer' is the name that has commonly been given in North America to a form of football played with a spherical ball. It is the most widely played team game in the world and the most popular spectator sport.

2. Background of the Study

A study of the relevant literature is an essential step to get a full picture of what has been done with regard to the problem under study. Such review brings about a deep and clear perspective of the overall field.

The literature is any field forms the foundation upon which all future work will be built." Now a day the educational programme of any type is characterized by forms and innovative ideas.it seems to be necessary one to formulate such as review of various scholar`s work. We can bring out a deep insight and clear perspective of the overall field in such reviews. In this chapter, literature related to the problem under study has been given. An attempt to the problem to familiarize and to provide a solid basis of for understanding the present day.

Anita Strauss et.al.,(2012);Anthropometric, fitness and technical skill characteristics of elite male national soccer players: A review Soccer is the most popular sport in the world. Performance at optimal levels requires high levels of technical, tactical and physiological skills. Identification and selection of talented soccer players are not straightforward procedures. Anthropometric, physiological and skill attributes may contribute to select talented players. The selection made at early ages may be relevant up until adulthood and many players may drop out of soccer only because of their date of birth. Team sport coaches thus have the dilemma of balancing the development of skill and physiological requirements of the players. Soccer requires superior levels of both aerobic and

anaerobic fitness. Optimal aerobic fitness is a prerequisite for elite soccer players and has benefits such as increased work intensity during a game; prevention of a second-half reduction in performance; doubling the number of sprints completed; and allowing players to cover a greater distance. The players’ aerobic capacity plays an important role in modern soccer and also has a major influence on their technical performance. Muscle strength, power and speed are important physiological characteristics in order to perform sprinting, jumping, tackling and kicking in soccer. Anaerobic activity may constitute the more crucial moments of the game and contribute directly to winning possession of the ball and to the scoring and conceding of goals. This review summarizes and provides an update of data available on the physiology of male soccer players representing different countries worldwide. The information may have important implications for the success of soccer players and teams and could guide coaches in the selection process.

Rebelo A et.al.,(2012);Anthropometric Characteristics, Physical Fitness and Technical Performance of Under-19 Soccer Players by Competitive Level and Field Position. Anthropometric characteristics, physical fitness and technical skills of under-19 (U19) soccer players were compared by competitive level (elite, n=95; non-elite, n=85) and playing position (goalkeeper, central defender, fullback, midfield, forward). Fitness tests included 5- and 30-m sprints, agility, squat jump (SJ) and countermovement jump (CMJ), strength and Yo-Yo intermittent endurance test level 2 (Yo-Yo IE2). Soccer-specific skills included ball control and dribbling. Independent of position, elite players presented more hours of training per year than non-elite players (d>1.2). Stature and body mass discriminated elite from non-elite players among goalkeepers and central defenders (d>0.6). Major differences were noted between elite and non-elite goalkeepers for SJ, CMJ, Yo-Yo IE2, and ball control (d>1.2). Elite central defenders performed better than their non-elite counterparts in SJ and ball control tests (d>1.2). Elite players presented better agility and Yo-Yo IE2 performances than non-elite players within all positional roles (d>0.6). In conclusion, U19 players differed in anthropometric characteristics, physical fitness and technical skills by competitive level within field positions.

3. Methodology
The methodology adopted for the study namely selection of subject, selection of variables, reliability of data, testers competency, instrument reliability, testers reliability, criterion measures, orientation of the subject, collection data, test administration and analysis were presented.

3.1. Selection of Subject
Thirty senior soccer players (N =30) who participated in the Santosh Trophy (2011-12) for Kerala state was selected as the subjects for the study.

3.2. Selection of Variables
The following variables were selected for the study:

Speed	50M Dash
Power	Standing broad jump
Agility	Shuttle rum
Flexibility	Sit and reach
Endurance	Sit ups

Table 1: Physical variables

i. Playing ability: Playing ability was chosen as the criterion variable for the study.
ii. Reliability of Data: The reliability of data was censured by establishing the instrument reliability and testers competency.
iii. Instrument reliability: The instrument used for the collection of data is of international standard and their test reliability was already set.
iv. Tester's reliability: The tester's competency was established by test retest method under the supervision of experts in the field of physical education and sports.

3.3. Criterion Measures
The criterion measures chosen to test hypothesis were:

3.3.1. Physical Variables
i. Speed was recorded to 1/100 of a second.
ii. Power in centimetre
iii. Endurance in number
iv. Flexibility in centimetre
v. Agility in 1/100 of a second

3.3.2. Playing Ability
The playing abilities were assessed by three qualified experts from the field of soccer.

3.3.3. Orientation of the Subject
Before measuring the anthropometric and physical variables the investigator had briefly explained to the subject the purpose of study and their role in the study.

3.3.4. Collection of Data
The data pertaining to selected anthropometric measurements such as physical fitness variables like power, agility, strength, endurance and speed were collected by administrating appropriate standard tests using correct measurement procedure

3.4. Test Administration

3.4.1. Physical Variables
1. Speed- (50mtrs dash)

Purpose :To measure the speed of the subject

Equipment's and facility: An area on the track with a starting line and finishing line stopwatch, whistle, score sheet, pencil

Procedure: After a short warm up period the students took a position behind the starting line. The starter used the command for start. The students ran across the finish line, one trial was permitted.

Scoring: The time was recorded to the nearest tenth of a second.

2. Power – (Standing Broad Jump)

Purpose : to measure the explosive power of the legs

Equipment: tape, non-slip floor for take-off, and soft landing area. The take-off line should be clearly marked.

Procedure: The athlete stood behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subjects attempted to jump as far as possible, landing on both feet without falling backwards. Three attempts were allowed.

Scoring : The measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels). Longest distance jumped was recorded from the best of three attempts.

3. Endurance- (Sit-Up)

Purpose: The curl up test measures muscular endurance.

Equipment: flat, clean, cushioned surface, stopwatch, recording sheets, and pen.

Procedure   : The subject is asked to lie on back with knee bent, feet on the floor with heels not more than 12 inches from the buttocks. The angle of knee should be less than 90degree. The subject is asked to put his hand on the back of the neck with figures clasped and to place the elbows squarely on the mat or turf or floor. The subject's feet are held by a companion to ascertain that the feet do not leave the surface and remain touching it, then the subjects to tighten the abdominal muscle and to bring the head and elbows forward so as to curl up to touch the elbows to the knee. The above entire process constitutes one sit –up. The tester gives the above demonstration to all the subjects to test before the actual performance of the test. The timer gives the starting signal ready, go then timer start the stop watch and the subject start the sit-up performance quickly as possible with his best efforts. The tester starts counting the numbers of sit-ups performed after 60 second the timer give the signal stop and the subject stop while the tester records the number of correctly executed sit-ups performed by the subject in 60 seconds.

Scoring : The completion of one complete curl up (up and back) counts as one. The sit-up was to be performed correctly for it to be counted. This gives the score of the test.

4. Agility-(shuttle run)

Purpose : To measure the general ability of the body

Equipment: Stopwatch, marking, score sheet, pencil, two blocks of wood 2x4 inches

Procedure: Two parallel lines are marked on the floor 10 yard apart. Two wooden blocks are placed behind one of the line the subjects were asked to start from the other line. On the signal ready go, the timer start the watch and the subject run towards the blocks, pick up one wooden block, run back to the starting line, place the block behind the starting line, run back and pick up the second block to carried back across the starting line.as soon as the second block is placed on the ground the timer stop the watch and recorded the tie.

Scoring : Thetimeof the best two trailswas recorded to the nearest 1/10 seconds.

5. Flexibility- (Sit and reach)

Purpose: the purpose of this test was to evaluate the flexibility of the lower back and hamstring.

Equipment's: sit and reach apparatus.

Procedure: Students were permitted to warm up by slow stretching of the lower back and hamstring muscle prior to taking this test. The students sat with the knees fully extended feet about shoulder width apart, feet flat against the board and palms down with one hand on the top of the other. In one steady movement the student reached forward, sliding the finger tips as far forward as possible and holding this position. Four trails were allowed with the fourth trail held for at least one second.

Scoring: Each subject was given three trials and the highest score of nearest to an inch is recorded.

3.4.2. Playing Ability
To judge the playing ability of the subject on five rating scale was used by three experts who had the required experience and qualifications in the field of football. The subjective rating was done to assess the playing ability during the time of Kerala state senior

football coaching camp (santosh trophy) held at (fact udyogamandal ground Ernakulum). The experts observed the game and on the basis of five point rating scale, they assessed each individual player and ranked them according to their individual performance in their technical and the tactical aspects. The score was the average of the three experts rating.

3.5. Statistical Technique

The data collected was analyzed by applying Pearson's product moment Correlation (r). This was used to find out the relationship of physical variables to playing abilities of senior national level soccer players, Kerala state. For this purpose the following formula was used.

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{N \sum X^2 - (\sum X)^2} \sqrt{N \sum Y^2 - (\sum Y)^2}}$$

4. Results and Analysis

This chapter deals with the analysis of the data collected from the subjects under study. The purpose of the study was to analyze the relationship of selected physical variables to playing abilities of senior national level soccer players, Kerala state. They were tested on physical variables namely speed, power, flexibility, endurance, and agility. These variables were put into statistical analysis and the results of which are presented in this chapter.

4.1. Test of Significance

This is the crucial portion of the thesis in arriving at the conclusion by examining the hypothesis. The procedure or testing the hypothesis was ended either by accepting the hypothesis or rejecting the hypothesis in accordance with the result that is obtained in relation to the level of confidence, 0.05 level of confidence, which was considered sufficient for this study.

4.2. Level of Significance

The probability level below which we reject the hypothesis is termed as the level of significance.

4.3. Tables and Figures

Physical Variables	Coefficient of Correlation
Speed	-0.241
Power	0.039
Agility	-0.596*
Flexibility	0.209
Endurance	0.439*

Table 2: The coefficient correlation of physical variables by playing ability
Correlation is significant at the 0.05 level.

The analysis of Table 3 shows that -The obtained correlation value of speed to playing ability was -0.241.It was lesser than the required correlation value of .355.However there was a negative relationship when the playing ability was related with speed. The obtained correlation value of power to the playing ability was 0.039. It was lesser than the required correlation value of .355.However, there was a negative relationship when the playing ability was related with power. The obtained correlation value of agility to the playing ability was -0.596*. It was higher than the required correlation value of .355. However, there was a positive relationship when the playing ability was related with agility. The obtained correlation value of flexibility to the playing ability was 0.209. It was lesser than the required correlation value of .355.However, there was a negative relationship when the playing ability was related with flexibility.The obtained correlation value of endurance to the playing ability was 0.439*. It was higher than the required correlation value of .355.However, there was a positive relationship when the playing ability was related with endurance.
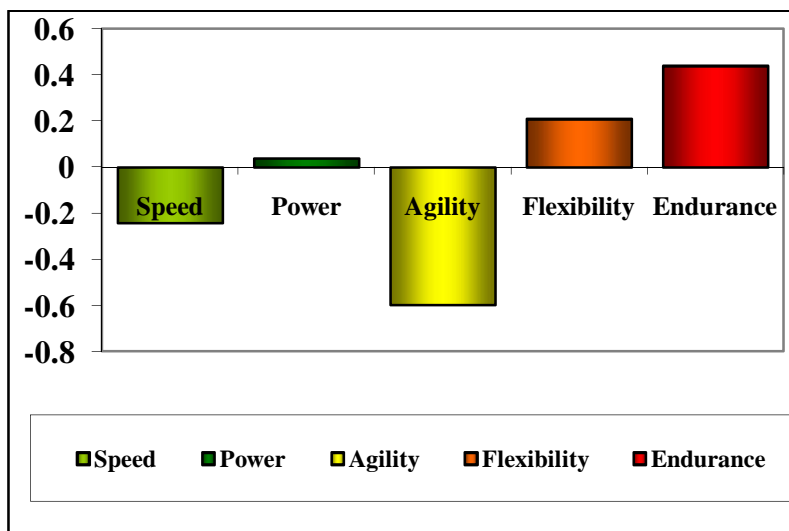
Figure 1:Graphical representation of relationship of selected physical   variables to the playing ability

Criterion	Variable Correlated	Control Variable	Coefficient Of Partial Correlation
Mean performance	speed	Power, agility, flexibility endurance	-0.069
	power	speed, agility, flexibility endurance	-0.109
	agility	speed, power, flexibility endurance	-0.539*
	flexibility	speed, power, agility endurance	0.081
	endurance	speed, power, agility flexibility	0.279

Table 3: Thecoefficientof partialcorrelation of physicalvariables to playingability

The above table shows the partial correlation of the respective variable speed, power, agility, flexibility endurance. Using the above result, we can make the following conclusions.

Table IV shows that physical fitness variables of agility when partialled out from the rest of the variable the 'r' value dropped to -.539.which shows the suppressed value agility. The rest of the variables when partialled out the 'r' values of -.069, -.109, .081, and .279 with speed, power, flexibility, and endurance respectively did not bring in a major difference. It can be concluded that agility can be used as the predictive variable of football performance of players at the state level.
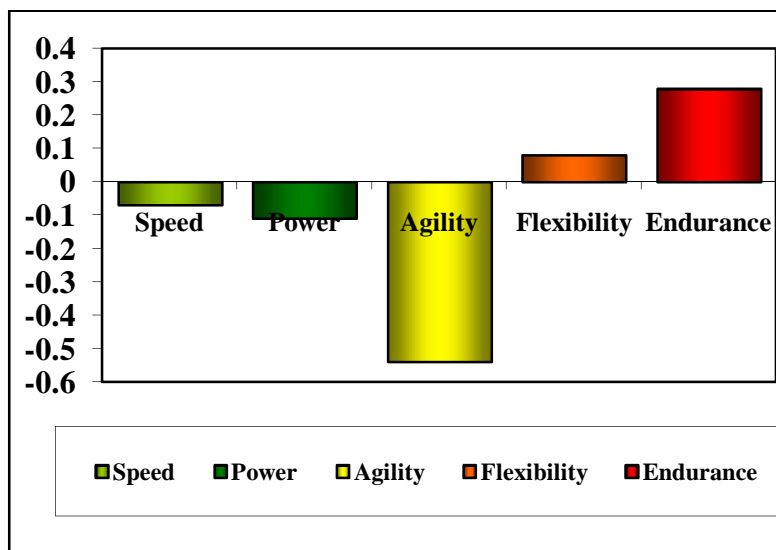

Figure 2: Graphical representation of the coefficient of partial correlation of physical variables to playing ability

4.4. Discussion of Findings

The finding of the study revealed that Agility and Endurance were significantly correlated to the playing performance of the state level soccer players. Soccer is a game, which requires speed endurance and strength to endure a ninety minute of quick sprint, stopping, change in direction and jumps. Hence the results are justified.

The rest of the physical fitness variables did not show any significant relationship with performance of state level soccer players. The probable reason would be the number of players selected for the study. A large sample would have given a different result probably. The data was collected on the players during the peak of this coaching camp which may have forced them to not to go all out during testing.

4.5. Discussion on hypothesis
On the basis of the findings of the study the hypothesis stated is the first chapter that there will be a significant relationship between physical fitness variables and playing ability has been accepted in the case of Agility and Endurance, and rejected in the case of speed, power and flexibility.

5. Summery, Conclusion and Recommendation

5.1. Summary
The purpose of the study was to analyze the relationship of selected physical variables to playing abilities of senior national level soccer players. The subjects for the study were selected from during the time of Kerala state senior football coaching camp (santosh trophy) held at FACT Udyogamandal ground Ernakulam. Age of the subjects ranged between 24 to 30 years. A total number of Thirty senior soccer players (N =30) who participated in the Santosh Trophy (2011-12) for Kerala state was selected as the subjects for the study.
Physical fitness variables selected for the study were Speed, Power, Agility, Flexibility, and Endurance. The physical variables were measured with steel tape and stopwatch. These variables were put into statistical analysis of simple correlation and partial correlation to find out the relationship between selected criterions variables to playing ability.

5.2. Playing ability
To judge the playing ability of the subject on a five rating scale was used by three experts who had the required experience and qualifications in the field of football. The subjective rating was done to assess the playing ability during the time of Kerala state senior football coaching camp. The analysis of data revealed a significant relationship of agility (-0.596), endurance (0.439) and a small contribution of calf girth (0.294) to soccer playing ability. But Speed, Power, Flexibility variables are not significant relationship with the soccer playing ability.

5.3. Conclusions
On the basis of the results of the study, there was a positive correlation between physical fitness variable of agility and endurance positively related to the playing ability of state level soccer players. Agility proved to be the single contributory variables to playing ability of state level soccer players. Endurance proved to be the single contributory variable to playing ability of state level soccer players.

5.4. Recommendations
On the basis of findings of the study and the conclusions drawn, the following recommendations are made;

- The study can be used as a guideline for the coaches and physical   education teachers for talent identification in soccer.
- The results of the study can be used to as an aid in selection of players.
- Similar study may be conducted with junior soccer players.
- It is recommended that similar study may be conducted with female soccer players.
- Similar study can be conducted on sports persons belonging to other sports.

6. References

i. DevinderKansal K. Test and Measurement in Physical Education. D.V.S. Publications, New Delhi.
ii. MB. Robert. Soccer the player's handbook. Sterling publication co.,Inc,378 Park Avenue South, New York. p. 1,2,31.
iii. Anita strauss, Suzanne Jacobs and Linda van denberg. Anthropometric, fitness and technical skill characteristics of elite male national soccer players: A review from African journal for physical, health education recreation and dance, 2012.
iv. Thomas Dillern, Jørgen Ingebrigtsen and ShalfawiShaher AI. Aerobic   capacity and anthropometric characteristics of female elite-recruit soccer players. Serbian Journal of Sports Sciences, 2012.
v. Rebelo A.et.al. Anthropometric Characteristics, Physical Fitness and Technical Performance of Under-19 Soccer Players by Competitive Level and Field Position. International journal of sports medicine, 2012.
vi. Jacobson BH. Anthropometric cross-sectional comparisons of college football players and potential health implications. Journal of strength and conditioning research/national strength conditioning association, 2012.
vii. Russell Mark, Tolley Edward. Anthropometric and performance characteristics of young male soccer players were competing in the UK. Serbian journal of sports science, 2011.