

Relationship of Selected Anthropometric Measurements and Physical Fitness Componentes to Selected Skills In Basketball

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ABSTRACT

The purpose of the study was to establish the relationship of anthropometric measurements and physical fitness components to selected skills in basketball. Twenty male basketball players of Lakshmbai National College of Physical Education, Gwalior, were selected as subjects for the purpose of this study. This was a purposive sample. Those students who had at least represented college in the Jiwaji University Inter-collegiate Competition. For this study Anthropometric Measurements and Physical Fitness Variables were selected as Independent variables and Basket ball skill variables are the depended variables. Within the limitations of the present study the following conclusions were drawn: Ponderal Index, arm length, wrist strength, arm strength, leg strength, speed, fat weight and reaction time all- contributed positively to basketball skill proficiency. Chest girth, leg length, Crural Index, calf girth, upper arm girth and agility did not exhibit any contribution towards better skill performance. Arm length, wrist strength, arm strength and speed contribute the most toward the basketball skill proficiency.

Key Words: Ponderal Index, Crural Index, Agility, Explosive Leg Strength

INTRODUCTION

Basketball today is one of the most popular and highly paid sport in the world. Basketball as it is seen today, has undergone a tremendous amount of improvement. Since its birth in 1891 at Y.M.C.A., Springfield College of Physical Education (U.S.A.) by Dr. James Naismith. "Basketball means a semblance of three 'S' stamina, skill and shooting prowess." In modern basketball, a player is required to continuously be on the move over a certain period of time varying his pace from slow to fast or medium and vice-versa, and many time jumping, hopping and changing directions in movement. This puts a great deal of demand in terms of physical effort on the part of each player. To really enjoy the game of basketball, one need to develop proficiency in the skill of ball handling, shooting for goals and defending against opponent's play (Schafsma France, 1968). A high level execution of basketball skill not only require certain physical qualities (speed, explosive power, agility etc.) but also a good physical structure. One aspect of scientific approach which is receiving greater attention is that of the structural measures, lengths, breaths and girths of body and body composition to achieve optimum playing weight. In modern sports, the anthropometric measurements and their relationship with various physical fitness traits are an important guide for the coaches and athletes themselves for making training schedules and for classification of students into different groups according to their ability (Sodhi and Sindhu, 1964). Today different factors are considered for the selection criteria of top notch basketball players. Important factors are physical size, structural measures and body composition. Measurement of body size include such descriptive information as height, weight, and surface areas, while measures of body proportion describe the relationship between height and weight and among lengths, widths and circumference of various body segments. It has been found that top athletes in some sports tend, to have those proportions that bio-mechanically aid the particular performance (Zeigle, Earle, 1982).

The basketballers are tall with longer upper and lower extremities which make them suitable to catch the ball with jumps, provide them with a wider reach during the passes and make it easier for them while throwing the ball into the basket. This also help them to rebound and also to guard the ball to impede the action of an opponent (Hooks, 1959).

Fitness, especially physical fitness regarded as an essential component even if the team consists of highly skilled, technically sound and experienced players. Physical fitness is gaured by performance and this performance is based on outcome of many factors. The most commonly mentioned fitness factors are strength, endurance, power, speed and agility. Scientists and physiologists have been of the view that anthropometric measurements and physical components of an athlete have a lot to do with his performance. More than the technique and tactics of a player or a

team, physical and physiological characteristics help him for better performance. The research findings show that a high level technique perfection alone has nothing to do with the competitive sports. Most of the games demand a higher level of speed, strength, endurance, coordination, agility and optimum fitness of the game for higher performance.

It has been fully recognized by all experts and sports scientists that performance in basketball team game does not directly depend on the mastery of skills but also on the optimum development of physical and physiological factors with a good physique. Twenty male basketball players of Lakshmi Bai National College of Physical Education, Gwalior, were selected as subjects for the purpose of this study. This was a purposive sample. Those students who had at least represented college in the Jiwaji University Inter-collegiate Competition and were still maintaining form in basketball were selected in to the sample. All the subjects had their regular practice in the optional period and hence were under continuous training program me. The research scholar reviewed the available scientific literature pertaining to the game of basketball from books, journals, magazines and research papers. According to the discussion with / experts, feasibility criteria, availability of instruments and the relevance of the variables to the present study, the following variables were selected. Anthropometric Measurements Ponderal Index Crural Index Total Arm Length Leg Length Thigh Girth Calf Girth Upper Arm Girth Body Composition (Biceps, Triceps, Suprailia and Sub-scapular).

Physical Fitness Variables – 1) Strength { a) Arm Strength b) Wrist Strength c) Explosive Leg Strength } 2) Speed 3) Agility 4) Reaction Time

Basketball Skill Variables -Passing ,Dribbling , Shooting and Rebounding

Statistical Procedure

The relationship of anthropometric and physical fitness variables to basketball skill variables was established by computing Pearson's Product Moment Correlation Method.

To test the hypothesis the level of significance was set at .05.

ANALYSIS OF DATA AND RESULTS OF THE STUDY

Findings -The data obtained on each of the anthropometric and physical fitness variable correlated with skill variables in order to find out the relationship between anthropometric and physical fitness variables to skill variables. The analysis of data pertaining to anthropometric and physical fitness variables to Wall passing ,Speed dribble and Rebounding is shown in Table 1.

Table 1. Correlation Of Anthropometric And Physical Fitness Variables To Skill Variables (Passing, Dribbling and Rebounding)

Sl No	Variables	Coefficient of Correlation (Passing -Wall passing)	Coefficient of Correlation (Dribbling-Speed Dribble)	Coefficient of Correlation (Rebounding)
1	Ponderal Index	-.0561	-.7035	-.0734
2	Crural Index	.2139	.1208	.3676
3	Total Arm Length	.4992*	.0372	.5926*
4	Leg Length	.0753	-.2894	.1621
5	Thigh Girth	.2924	-.3809	-.0734
6	Calf Girth	.3012	.0194	.3676
7	Upper Arm Girth	.4201	-.2018	.5926*
8	Fat Weight	.0476	-.0583	.1621
9	Arm Strength	.4501*	.4166	-.0734

10	Wrist Strength	.5131*	.3811	.3676
11	Explosive Leg Strength	-.0682	.0306	.5926*
12	Speed	.1390	.5103*	.1621
13	Agility	.4257	.0003	-.0734
14	Reaction Time	-.0214	-.6407*	-.3676

The analysis of data in the above table reveals that passing ability (wall passing) is significantly related to total arm length ($r = .4992$), wrist strength ($r = .5131$) and arm strength ($r = .4501$). However, variables of Ponderal Index, Crural Index, Leg Length, Thigh Girth, Calf Girth, Upper Arm Girth, Fat Weight, Speed, Agility, Leg Strength and Reaction time showed no significant relation to wall passing. The table also shows the significant correlation of Speed ($r = .5103$), and Reaction Time ($r = .6407$) to Speed Dribble. Ponderal Index, Total Arm Length, Leg Length, Thigh Girth, Upper Arm girth, Fat Weight, Agility, Explosive Leg Strength, Wrist Strength, Calf Girth and Arm Strength shows insignificant relation to speed dribble. Total arm length, fat weight and explosive leg strength were shown significantly related to rebounding ability. But all other variables shows insignificant relation to rebounding ability.

Table 2. Correlation Of Anthropometric And Physical Fitness Variables To Skill Variables (Shooting and Throw For Accuracy)

Sl No	Variables	Coefficient Correlation (Shooting -Under basket Shooting)	Coefficient Correlation (Shooting-Jump shot)	Coefficient Correlation (Throw for Accuracy)
1	Ponderal Index	-.6035	.4621*	-.0809
2	Crural Index	.3195	.2091	.0101
3	Total Arm Length	.5107*	-.3189	.4880*
4	Leg Length	-.0321	-.8103	-.0214
5	Thigh Girth	.0342	.0344	-.3055
6	Calf Girth	-.2822	.1130	.1002
7	Upper Arm Girth	.0135	.2272	-.2420
8	Fat Weight	.2893	.0051	.2139
9	Arm Strength	.4504*	.3947	.5613*
10	Wrist Strength	.3873	-.2917	.0877
11	Explosive Leg Strength	.4658*	.4527*	-.0395
12	Speed	.2840	.2945	.1332
13	Agility	.0768	-.0270	.2588
14	Reaction Time	-.0814	-.3877	-.1403

The three variables, total arm length (.5107) arm strength ($r = .4504$) and explosive leg strength ($r = .4658$) were significantly correlated with under basket shooting. Other variables like Ponderal Index, Crural Index, Leg Length,

Thigh Girth, Calf Girth, Upper Arm Girth, Reaction Time, Fat Weight, Agility and Wrist strength had shown insignificant correlation to under basket shooting. Also shows the significant relationship of Ponderal Index ($r = .4621$) and Explosive leg strength ($r = .4527$) to jump shot. Crural Index, Total Arm Length, Leg Length, Thigh Girth, Calf Girth, Upper Arm Girth, Fat Weight, Arm Strength, Wrist Strength, Speed, Agility and Reaction Time shows insignificant relation to Jump Shot. This table reveals the significant relationship of total arm length ($r = .4880$) and arm strength ($r = .5613$) to throw for accuracy and other variables like Ponderal Index, Crural Index, Leg Length, Thigh Girth, Calf Girth, Upper Arm Girth, Fat Weight, Wrist Strength, Leg Strength, Speed Reaction Time and Agility shows insignificant relation to throw for accuracy.

DISCUSSION OF FINDINGS

The findings indicated that arm length showed significant relationship to passing (wall passing and throw for accuracy) shooting (under basket shooting) and rebounding ability. Same way strength variables also showed significant relationship to passing (wrist strength and arm strength to wall passing) shooting (arm strength to under basket shooting and explosive leg strength to under basket shooting and jump shot) and rebounding (explosive leg strength to rebounding). In addition reaction time and speed showed significant relationship to speed dribble.

It may be logically accepted that those who are stronger and faster could have performed better on these items. Explosive leg strength is a pre-requisite for basketball skill performance because a player requires it in abundance to execute jump shot, rebounding and other situations to intercept a pass or a shot. Besides this it helps in executing a better jump, which in turn helps the player to perform a skill effectively without disturbance from a tall player (Ann Garden, 1978). Therefore, it may be logically accepted that those who are having greater leg strength could have performed better on these items. Arm strength and wrist strength play a vital role in basketball game. The game is mainly played by arm (Phillips, 1979). The player has to use the arm and wrist strength not only during passing but also during all the aspect of the game. Arm strength also contributes towards the jumping ability of the basketball player which in turn helps him, collect the rebound and facilitate a better jump for a jump shot. Speed and reaction time had shown a significant relation to the skill variables (Bakker, Clarena, 1969). In basketball game, a player is required to continuously be on the move with the ball or without the ball over a period of time varying his pace from slow to fast or medium and vice versa. The significant relationship may be attributed to this reason (Mathews, 1978).

The significant relationship of arm length and Ponderal Index may be contributed to the fact that while passing and shooting the tall player with longer upper limbs has greater ability to maintain contact developed with the ball through greater distance and thus he can pass the ball or shoot the ball in a particular direction to hit at proper target. Same way the length of the arm determines the velocity of pass. If the arm length is longer, one will have a greater linear velocity is possible (Berg, Gary, 1969). When the radius of rotation is maximum i.e. the length of the power arm (Dey, 1986). It is concluded that the basketballers are tall with longer upper extremities which make them suitable to catch the ball with jumps, provide them with a wider reach during the passes and make it easier for them while throwing the ball into the basket. This also help them to rebound and also to guard the ball to impede the action of an opponent.

CONCLUSIONS

Within the limitations of the present study the following conclusions were drawn :

1. Ponderal Index, arm length, wrist strength, arm strength, leg strength, speed, fat weight and reaction time all- contributed positively to basketball skill proficiency.
2. Chest girth, leg length, Crural Index, calf girth, upper arm girth and agility did not exhibit any contribution towards better skill performance.
3. Arm length, wrist strength, arm strength and speed contribute the most toward the basketball skill proficiency.

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