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An analytical study of relationship of selected anthropometric measurement and general motor ability to basketball playing ability

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Abstract
The aim of the present study was to find out the interrelationship of selected anthropometric measurement and general motor ability to Basketball playing ability. There would be significant relationship of selected anthropometric measurement and motor ability to the performance of Basketball players. Twenty Basketball players who represented in Inter-collegiate Basketball Tournament conducted by Sant Gadge Baba Amravati University, Amravati, Maharashtra, were selected as subjects for the present study. The tests were employed to the subjects immediately after the tournament was over. The ages of the subjected participated in this study ranged from 18 to 25 years. All the subjects involved in the present study were physically fit for tests to be administered to them. This was a statistical study for the relationship of two groups. Anthropometric measurement and motor ability components to performance of Basketball players, related to criterion measure, weight and crucial index of the players did not correlate with performance as the coefficient of correlation of weight and crucial index of the players did not correlate with performance as the coefficient of correlation of weight and crural index with playing ability performance was 0.169 and 0.017 respectively, whereas height, arm length, leg length, thigh length, foreleg length of an individual correlated quite satisfactorily with performance in Basketball playing ability as their coefficient of correlation were 0.898, 0.798, 0.961, 0.753 and 0.807 respectively.
Significant correlation with selected motor ability components i.e., speed (0.84, agility (0.671) and eyehand coordination (0.751). On the basis of the results of the present study and within the limitations identified, the following conclusions were drawn. The speed, agility, eye-hand coordination, height, arm length, leg length, thigh length and foreleg length were significantly correlated with Basketball playing ability performance. The anthropometric measurements i.e., weight and crucial index were not significantly related to Basketball playing ability performance.

Keywords: Anthropometry, General Motor Ability, Basketball, Playing Ability etc

Introduction
The scientific approach by physical education is characterized by a profound substantiation of all its initial propositions and of the entire process of physical education by the achievement of science and by the inseparable unity of science and advanced practice. The attributes of this man's nature and the scientific approach to physical amalgam to make a single entity on the basis of the following principles universality, the link with social practice, the comprehensive development of the personality and the efficiency of improvement of public health.
As an important part of physical education programme, sport has grown so big that it has come to be recognized as a very strong social force. Some people assert a separate entity for sports, a separate study. The word physical education indicates that physical activity develops the learner. The common denominator in sport and physical education is movement activities. What may not be understood from the combined term is that the motor activities must be performed to develop skilful or artistic execution and also to develop the performer. Physical education and sports together form a coherent systematic and scientifically sound programme based on the current accepted principles. The major performance qualities commonly recognised are strength, circulo-respiratory speed, power, agility, flexibility, reaction time, balance and coordination.
In most sports other factors such as somato type, skill, fitness, training, rest, nutrition, being equal, speed etc., becomes a deciding factor in one's ultimate performance. Several research studies indicated that speed was significantly related to power and that it was more significant than strength in athletic performance.

Motor Learning and Sport Skills

In the field of sports and games, sport skills are so important, voluntary and coordinated tasks in order to achieve specific goals. In order to learn sport-specific skills, one should learn the first step which is considered as learning basic movement skills for better athletic performance. Understanding these basic sport movements helps coaches make good training decisions for skill learning as well as for sports fitness.

The sport skills are classified into different categories by the field of motor (movement) learning so that they can be more easily studied and applied to coaching and training. Coaches who understand such groupings have an advantage for developing appropriate instructional (how to teach) and training activities (what athletes do). These skill classifications are also used in the fields of childhood development, special education, and physical therapy.

Classifications of Sport (Motor) Skills

Gross movements are those that involve large muscle coordination. Running, jumping, and sliding are examples. These movements can be reinforced through fitness training. Transfer of learning among sports activities with common gross movements is greater due to the similarities between them.

Fine movements involve precise control of small muscles. Tasks such as writing or piano playing are examples. While most sport skills fall on the gross motor end of the continuum, finger dexterity for controlling a ball arguably requires some level of fine, sport-specific coordination.

The Environment or Competitive Situation

Open tasks are performed when the athlete has to react to activities in the environment. For example, tennis players respond to the movements of an opponent, the speed, and direction of an oncoming ball. Attention focus, reactions, and decision-making are keys to success for these tasks. Very often, athletes must develop power to improve these skills.

Closed tasks do not require athletes to focus on outside forces. The environment is stable, so the athlete can concentrate on executing the movement rather than opponents. In basketball, the free throw is a closed task. Weight training exercises are closed skills.

Beginning and Ending Points of a Skill

Discrete tasks have distinct beginning and ending points. Batting a baseball, throwing a javelin, and kicking a soccer ball are examples. Serial skills consist of a string of discrete skills performed in sequence. Floor exercise routines in gymnastics are serial tasks.

Continuous tasks have arbitrary beginning and end points. Swimming and running are examples. In this case, endurance fitness and a high aerobic capacity are usually important.

The Motor Learning Process

Motor learning is a process of acquiring, completing and using motor information, knowledge, experience, and motor programmes (Adams, 1976). It is closely connected with mental abilities, motor abilities, foreknowledge, and the cognitive and connative characteristics of an individual as well as his familiarity with the theoretical bases of movement technique. Based on Hay's biomechanical studies (1985), it may be ascertained that running, as the most elementary manifestation of human motor abilities, involves more than 80 muscle groups and 46 bones of the locomotor system. To facilitate the correct performance of a motor action, optimal coordination of movements is necessary. Magill's (1993) definition of motor learning divides muscle activity into seven phases:

1. The selection and innervations of those muscles necessary for the efficient execution of a movement.
2. Sequencing (the correct sequence of muscle activation).
3. Time structuring of the movement (the duration of the activity of an individual muscle during the entire movement).
4. Gradation (Varied application of the power of the engaged muscles).
5. Timing (adapting the structure of the movement to external conditions).
6. Alternative movements (selection of the optimal movement structure in view of the current situation) 7. Movement control (movement automation and movement adaptation in non-standard circumstances).

Objective of the study

The aim of the present study was to find out the relationship of selected anthropometric measurement and general motor ability to Basketball playing ability.

Methodology

It was hypothesized that there would be significant relationship of selected anthropometric measurement and motor ability to the performance of Basketball players. Twenty Basketball players who represented in Inter-collegiate Basketball Tournament conducted by Sant Gadge Baba Amravati University, Amravati, Maharashtra were selected as the subjects of the present study. Tests were administered to the subjects immediately after the tournament was over. According to the eligibility records, their ages ranged from 1825 years. All the subjects participated in this study were physically fit and sound for the tests to be administered to them. This was a statistical study for the interrelationship of two groups, Anthropometric Measurement and Motor Ability components to performance of Basketball players, related to criterion measures.

Results

The statistical analysis of data pertaining to weight, height, arm length, leg length, thigh length, foreleg length, crucial index and motor ability components i.e., speed, agility, eye-hand coordination and Basketball playing ability collected from Inter-collegiate Basketball competition held at Amravati, Maharashtra, have been presented in this study.

Relationship between Dependent Variables and Independent Variables

The relationship between the dependent variable that is Basketball playing ability (performance) and independent variables — selected anthropometric measurement and selected motor ability components was obtained by using the following formula:

$$=1-\frac{63d2}{N(N2-1)}$$

The coefficient of relationship was obtained by correlating the dependent variables to independent variables, prescribed in Table 1 below:

Table 1: Relationship of Dependent Variables to Independent Variables

S. No.	Independent Variables	Correlation co-efficient
1.	Weight	0.169
2.	Height	0.898*
3.	Arm Length	0.798*
4.	Leg Length	0.961*
5.	Thigh Length	0.753*
6.	Foreleg Length	0.807*
7.	Crural Index	0.017
8.	Speed	0.84
9.	Agility	0.671*
10.	Eye-Hand Coordination	0.751*

N = 20 for df 18, r required to be significant at .05 level = .444
* Significant at .05 level of confidence. @ Not significant at .05 level of confidence.

Table 1 revealed that weight and crural index of the Basketball players did not correlate with performance as the coefficient of correlation of weight and crucial index with playing ability performance was 0.169 and 0.017 respectively, whereas height, arm length, leg length, thigh length, foreleg length of an individual correlated quite satisfactorily with performance in Basketball playing ability as their coefficient of correlation were 0.898, 0.798, 0.961, 0.753 and 0.807 respectively. Table 1 also shows significant correlation with selected motor ability components i.e., speed (0.84; agility (0.671) and eye-hand coordination (0.751).

Discussions

The findings of the present study indicated (Table 1) that speed of the Basketball player correlated significantly with Basketball playing ability (r = 0.84) at .05 level of confidence. The significant positive relationship between speed and performance in Basketball may be attributed to the fact that Basketball is the game of speed and agility where players have to frequently sprint and jump to cover the ground and make the basket. The findings reveal that the relationship between agility (r = 0.671) and performance in Basketball playing ability was also significant at .05 level of confidence. This significant relationship may be due to the fact of nature of the game of Basketball where always dodging, faking, sudden fast movement, jumping and rapidly changing direction take place; so being a Basketball player one has to be more agile in performing movement successfully.

The findings also reveal that the relationship between eye-hand coordination (r = 0.751) and Basketball playing ability performance was significant at .05 level of confidence. This significant relationship may be due to the fact that Basketball players need more perception power to judge the movements of opponent and vice versa and hand coordination to perform specific skill i.e., Shooting, Dodging and Pivoting. The findings also show that the relationship between height (r = .89) and performance in Basketball ability was significant at .05 level of confidence.

Besides this, the findings also showed that the relationship between arm length, leg length, thigh length and foreleg length with the Basketball playing ability, performance (r = 0.798; r = 0.961; r = 0.753 and r = 0.807, respectively) were found significant at .05 level of confidence. These significant relationships may be due to the fact that well coordinated movements of running, receiving, jumping, dodging, shooting, diving, and rapidly changing the direction in Basketball depend upon arm length and well proportionate leg length (i.e., thigh length, foreleg length) of Basketball players. The findings reveal that the relationship between anthropometric measurements i.e., weight and crural index with performance in Basketball playing ability (r = 0.169, 0.017 respectively) were not significant at .05 level of confidence. These insignificant relationships may be due to some of the facts that heavy body weight hampers motor ability components of Basketball players and ultimately affect his/her performance in Basketball. Therefore, the hypothesis on the study has been accepted with respect to speed, agility, eye-hand coordination and selected anthropometric measurements i.e., height, arm length, leg length, thigh length and foreleg length, whereas rejected in case of weight and crural index of anthropometric measurements.

Conclusions

Within the limitations identified and on the basis of the results of the study, the following conclusions were drawn:

1. The speed, agility, eye-hand coordination, height, arm length, leg length, thigh length and foreleg length were significantly correlated with Basketball playing ability performance.
2. The anthropometric measurements i.e., weight and crural index were not significantly related to Basketball playing ability performance.

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