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Comparative Study of Anthropometric Measurements and Body Composition among Individual and Team Game

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Abstract: The purpose of the study was to compare the Anthropometric measurements and Body Composition among Individual and Team Game. The subjects for this study were thirty male students, each from Soccer and Track and Field Intervarsity teams of Lakshmibai National University of Physical Education, Gwalior. They were selected with the view of obtaining scores on selected Anthropometric measurements and Body Composition. The age of the subjects ranged between 18 to 25 years. The variables selected for the study under Anthropometric measurements were Standing Height, Sitting Height, Total Arm Length, Total Leg Length, Upper Arm Girth, Hand Girth, Thigh Girth, Calf Girth and Chest Girth while under Body Composition the variables under taken were body Weight, Percentage of Body Fat and Lean Body Mass. To determine the significant difference between the mean scores of subjects belonging to Soccer and Track and Field on Anthropometric measurements and Body Composition variables, the't' ratio was employed. The level of significance chosen was 0.05. The results of the present study indicate that Soccer and Track and Field Athletes did not differ much on selected Anthropometric measurements and Body Composition; however a significant difference in Total Leg Length, Total Arm Length and Standing Height was obtained.

Key words: *Anthropometric measurements and Body Composition.*

Introduction:

Anthropometry is the branch of anthropology that is concerned with the measurement of human body. The definition has confined to the kind of measurements commonly used in associating physical performance with body build. Anthropometry involves the measurement of external part of the body, including body diameters, body circumferences somatotypes.

Specific anthropometric characteristics are needed to be successful in certain sporting events. It is also

important to note that there are some differences in body structure and composition of sports persons involved in individual and team sports. The tasks in some events, such as shot put or high jump, are quite specific and different from each other and so are the successful physiques. This process whereby the physical demands of a sport lead to selection of body types best suited to that sport is known as "morphological optimization" (Bloomfield et al., 1995).

Body Composition is concerned in part with the obesity of the individual. In measuring this aspect of body composition, the total body weight is divided into two components: Lean Body Weight and Fat Body Weight. Lean Body Weight includes muscle, bone and vital organs. Thye underlying assumption is that total Body Weight equals Lean Body Weight plus Fat Body Weight. The higher percentage of Fat Body Weight in relation to Lean Body Weight, the higher the degree of Obesity (Verducci, 1980).

In athletes, body composition measures are widely used to prescribe desirable body weights, to optimize competitive performance, and to assess the effects of training (Sinning, 1996). It is generally accepted that a lower relative body fat is desirable for successful competition in most of the sports. This is because additional body fat adds to the weight of the body without contributing to its force production or energy producing capabilities, which means a decrease in relative strength. It is obvious that an increased fat weight will be detrimental in sporting activities where the body is moved against gravity (e.g. high jump, pole vault, volleyball spiking action) or propelled horizontally (e.g. running).

Physical characteristics and body composition have been known to be fundamental to excellence in athletic performance (Mathur & Salokun, 1985). Specific athletic events require different body types and weights for maximal performance (American Dietetic Association, 1987). Today it has been widely accepted by the experts that top performance in sports is achieved if an athlete possesses the basic anthropometric characteristics suitable for the event. There are numerous factors which are responsible for the performance of a sportsman. The physique and body composition, including the size shape and form are known to play a significant role in this regard. At present, sportsman for superior performance in any sports is selected on the basis of physical structure and body size. Structural measurement include anthropometric measurements which consist of objective measurement of structures such as height, weight, width, depth and the circumference of the various part of body.

Therefore, the athletes in a particular sport must possess such typical characteristics which are of advantage to their performance. Body composition also makes an important contribution to an individual‟s level of physical fitness for performance, particularly in such sports that require one to carry one‟s body weight over a distance, which is facilitated by a large proportion of active tissue

(muscle) in relation to a small proportion of fat tissue. Morphological parameters are an essential part of the evaluation and selection of sports persons for diverse fields of sports, standard data on such parameters are still lacking in the Indian context in soccer and track and field athletic events. The present study was therefore aimed at evaluating the physical parameters, anthropometric measurements, body composition and somatotype of male soccer players and track and field athletes from India, and to compare the data with counterparts of other sports.

Method and Materials:

The subjects for this study were thirty male students, each from Soccer and Track and Field Intervarsity teams of Lakshmibai National University of Physical Education, Gwalior. They were selected with the view of obtaining scores on selected Anthropometric measurements and Body Composition. The age of the subjects ranged between 18 to 25 years.

The required data in Anthropometric measurements and Body Composition were taken during the course of seven days in research laboratory of Lakshmibai National University of Physical Education, Gwalior.

The variables selected for the study under Anthropometric measurements were Standing Height, Sitting Height, Total Arm Length,Total Leg Length, Upper Arm Girth, Hand Girth, Thigh Girth, Calf Girth and Chest Girth while under Body Composition the variables under taken were body Weight, Percentage of Body Fat and Lean Body Mass.

Statistical Procedure:

To determine the significant difference between the mean scores of subjects belonging to Soccer and Track and Field on Anthropometric measurements and Body Composition variables, the„t‟ ratio was employed. The level of significance chosen was 0.05.

Results:

Table-1

Significance of Differences in the mean scores of Anthropometric Measurements and Body Composition variables of Soccer Players and Track and Field Athletes

Sl. No.	Variables	Units	Means		SD		SE	„t‟ ratio
			Soccer	Track & Field	Soccer	Track & Field		
1	Leg Length	cms	86.63	90.38	4.33	3.55	1.02	3.68*
2	Calf Girth	cms	34.27	35.72	2.11	7.92	1.50	0.97
3	Thigh Girth	cms	52.53	51.55	2.81	3.82	0.86	1.14
4	Chest Girth	cms	89.22	89.03	3.86	3.77	0.98	0.19
5	Total Arm Length	cms	74.70	77.70	2.88	3.71	0.86	3.49*
6	Upper Arm Girth	cms	25.23	25.07	1.52	1.86	0.44	0.36
7	Hand Girth	cms	20.50	20.23	1.31	1.10	0.32	0.84
8	Standing Height	cms	167.72	172.60	5.69	5.36	1.43	3.41*
9	Sitting Height	cms	89.33	89.17	2.67	2.43	0.66	0.24
10	Body Weight	kgs	61.23	62.70	5.26	6.01	1.46	1.01
11	Percent Body Fat	mms	14.10	12.98	1.88	3.07	0.66	1.70
12	Lean Body Mass	kgs	52.59	54.45	4.04	4.97	1.17	1.59

*Significant at 0.05 level

Value required to be significant at 0.05 levels with 58 degree of freedom was 2.00.

Discussion of Findings:

The results of the present study indicate that Soccer and Track and Field Athletes did not differ much on selected Anthropometric measurements and Body Composition; however a significant difference in Total Leg Length, Total Arm Length and Standing Height was obtained. The comparison of the subjects did not reveal any significant difference between Soccer players and Track and Field Athletes. Statistical analysis of the data reveals that Track and Field Athletes ‟Total Leg Length, Total Arm Length and Standing Height is higher than the Soccer players. Probably the reason in case of Track and Field has some advantages in Standing Height,Total Leg Length and Total Arm Length. These factors

are very less trainable. On realizing the advantages of body structure, the Athletes select Track and Field events as their main sports.

In case of Calf Girth, Thigh Girth, Chest Girth, Upper Arm Girth, Hand Girth, Sitting Height, Body Weight, Percent Body Fat and Lean Body Mass were not significant. It may be due to the training effect the Soccer players and Track and Field Athletes developed these variables equally. Physical characteristics and body composition have been known to be fundamental to excellence in athletes performance (Mathur & Salokun, 1985). It has been found that the athletes with lower body fat percentage had higher maximum oxygen uptake (VO max). In other words, the athletes with lower body fat percentage seemed to utilize oxygen most efficiently (Heck, 1980), while the excess of body fat was reported to be a deterrent to physical performance (Leelarthae-pin, Chesworth & Boleyn, 1983). Minimum level of fatness is particularly advantageous for gymnasts, figure skaters, wrestlers, distance runners and other endurance athletes (Smith, 1984). Thus in retrospect it seems justifiable to suggest that the distinct sports selected for this study did not differ significantly in their Anthropometric measurements and Body Composition.

Conclusions:

Track and Field Athletes have significantly higher scored inTotal Leg Length, Total Arm Length and Standing Height as compared to Soccer players. In case of Calf Girth, Thigh Girth, Chest Girth, Upper Arm Girth, Hand Girth, Sitting Height, Body Weight, Percent Body Fat and Lean Body Mass, there were no significant differences between Soccer players and Track and Field Athletes.

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