

ISSN: 2456-0057

IJPNPE 2018; 3(1): 1847-1850

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Received: 23-11-2017

Accepted: 24-12-2017

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## A comparison of anthropometric measurements among elite team games male players

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### Abstract

**Introduction:** The main objective of this study was to compare the selected anthropometric measurements between football and volleyball elite players of Sri Lanka.

**Aim of The Study:** To compare the selected anthropometric measurements between football and volleyball elite male players of Sri Lanka.

**Methods:** The sample consists of forty athletes N=40 (Age ranged between 18-32 mean value and SD was  $24.02 \pm 3.03$  years). Out of which twenty N=20 Football elite male athletes their age mean value and SD was  $(24.05 \pm 3.28$  years) and other twenty N=20 volleyball elite male athletes their age mean value and SD was  $(24.0 \pm 2.89$  years). They were the members of the Sri Lankan national team camp during preparation for their international competition in Colombo 2017. Anthropometric measurements namely; standing height, body weight, arm length, upper arm girth, forearm girth, thigh girth, calf girth, chest girth, and leg length were selected for this study.

**Result and Discussion:** To determine the significant differences of anthropometric measurements, the data was analyzed by applying independent t - test in order to determine the anthropometric differences between the football and volleyball male athletes, 0.05 level of confidence was fixed to test the significance.

**Conclusions:** The results showed that there was significant difference in the selected nine anthropometric measurements between football and volleyball athletes, and not found significant difference in one measurement.

**Keywords:** Anthropometric measurements, elite, athletes, football, volleyball

### Introduction

It is the most latest and appropriate research problem in the field of team games training has been the founding of reference anthropometric measurements for every single game. Even though it is generally accepted that team games training desires a multifaceted approach to realize every one of the achievement factors affecting competition, moreover fine identified that the improvement of fitness levels is important to a best result. Every discipline seems to present exact anthropometric measurements owing to precise actions and necessities for every position of the game. Though, a few general characteristics can be defined while comparing various games. The exact meaning of reference profile in games is not merely vital for suitable training of elite athletes' it is also necessary to carry out capable talent selection procedure.

It is obviously evident that special anthropometric measurements assume whether a player is physically fit and set for challenging in the top levels in a particular sport field (Claessens, et al. 1999; Bourgois, et al. 2000; Ackland, et al. 2003; Slater et al. 2005) [9, 10, 11, 12].

Anthropometric deals with measurement of the dimensions, mass, and distribution of the human body. It estimates the length, masses, location of the centre of mass, and moment of inertia of the human body, that are used in the study of human motion. Anthropometrics was found by a French savant called Alphonse Bertillon who 1883 gave the name Anthropometrics to a system that he designed which involved him taking certain measurements and when they were recorded he found out that every single individual could be distinguished from other people by these measurements (Anthropometrics: An introduction, 2017) [11].

Although the anthropometric profiles of Olympic athletes, as a group, have already been published by there is still a need to define "specific reference data for each sport" given that each discipline has its own characteristics (Norton & Olds, 2001) [11].

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The physical activities, movements and competition have always been an essential part of human actions (Diafas, V. et al. (2011) [2]. Human beings have been penetrating for the relations between physical characteristics and their performance and abilities to recognize their physical features and individuality and limitations and benefits such traits may form in their performance. Hence, methods and apparatus were required to attain further precise and suitable facts on physical features. Such demand progressively resulted in a systematic origin, named anthropometry. Anthropometry refers to measurements used for quantitatively accepting human physical differences (Misigoj, M., & Heimer, S. 1992) [3].

The sports science experts consider that though, with right selection of persons and utilization of accurate values of carry out and creating of right atmosphere can be flourish in rising of effectiveness and performance of athletes, but above all, paying concentration to the physical composition and anthropometrical measurements of persons is the case that can differentiate them from each one (Dashti K.A., & Zafari, A. 2014) [4]. The measurement and purpose of the anthropometric profile is vital to a winning achievement in a game (Shephard, R.J. 1999) [6].

This research study has been designed considering the limited quantity of articles that focus on the anthropometric measurements of football & volleyball players and, more purposely, the figures discipline. The purpose of this research study was to establish the differences between the anthropometric measurements of elite football and volleyball male players.

### Objectives of the Study

The objectives of this study were to compare the anthropometric measurements of elite male players of football and volleyball games.

- To study the anthropometric measurements of the football players.
- (ii) To study the anthropometric measurements of the volleyball players.
- (iii) To investigate the differences in the anthropometric measurements between the football and volleyball players.

### Methodology

#### To achieve the aim of the study

A total of forty ( $N=40$ ) elite male players. Twenty ( $N=20$ ) elite football male players and other twenty ( $N=20$ ) from volleyball male elite players who were voluntarily participated in this study. Their age ranged 18 to 32 years, mean and SD value was  $24.02 \pm 3.03$ . Age mean and SD value of football team was  $24.05 \pm 3.28$  years, and age mean and SD value of volleyball team was  $24.0 \pm 2.89$  years.

#### Selection of test item and Data collection:

Anthropometric measurements such as standing height, body weight, arm length, upper arm girth, forearm girth, thigh girth, calf girth, chest girth, and leg length were used to assessing the anthropometric differences. Data was collected during training camp of football and volleyball elite male players for international competition which training was held in Colombo 2017.

#### Statistical analysis

Independent t- test was used to determine the difference between elite male football and volleyball players. The

proposed hypothesis was tested at 0.05 level of confidence. Beside this mean and standard deviation was also calculated, along with descriptive statistics by using SPSS 22 version.

### Results and Discussions

Anthropometric measurements may perhaps possibly be used to identify potentially successful players for a specific discipline. The present research study aimed to assess differences in anthropometric measurements of elite two discipline football as compared to volleyball. Anthropometric data were very valuable tools in the assessment of players. However, having reviewed global scientific publications, It is for this reason that the discussion was based on a comparison with artistic ice skaters, focusing on the variables in which a comparison was possible, given the similarities between both disciplines (Barkoff & Heiby, 2004) [8].

The data collected was treated with the statistical technique‘t’ and results were presented in the following tables.

**Table 1:** Shows mean, standard deviation, and‘t’ value of standing height of football and volleyball players.

| Participants | Sample Size | Mean | Std. Deviation | t- value |
|--------------|-------------|------|----------------|----------|
| Football     | 20          | 1.72 | 0.06           | 7.68*    |
| Volleyball   | 20          | 1.88 | 0.08           |          |

Degree of freedom (38) =2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of standing height between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in height between football and volleyball players. Volleyball players were found taller than the football male elite players.

**Table 2:** Shows mean, standard deviation, and‘t’ value of body weight of football and volleyball players.

| Participants | Sample Size | Mean | Std. Deviation | t- value |
|--------------|-------------|------|----------------|----------|
| Football     | 20          | 64   | 7.16           | 7.42*    |
| Volleyball   | 20          | 81   | 8.19           |          |

Degree of freedom (38) =2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of body weight between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in weight between football and volleyball players. Volleyball players were found heavier than the football elite male players.

**Table 3:** Shows mean, standard deviation, and ‘t’ value of arm length of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 81.15 | 4.33           | 3.58*    |
| Volleyball   | 20          | 85.52 | 5.08           |          |

Degree of freedom (38) =2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of arm length between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in arm length between football and volleyball players. Volleyball players were found significant than the football elite male players.

**Table 4:** Shows mean, standard deviation, and 't' value of upper arm girth of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 26.05 | 1.61           | 7.74*    |
| Volleyball   | 20          | 30.07 | 1.90           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of upper arm girth between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in upper arm girth between football and volleyball players. Volleyball players were found significant than the football elite male players.

**Table 5:** Shows mean, standard deviation, and 't' value of fore arm girth of football and volleyball players.

| Participants | Sample Size | Mean | Std. Deviation | t- value |
|--------------|-------------|------|----------------|----------|
| Football     | 20          | 24   | 1.18           | 5.89*    |
| Volleyball   | 20          | 26.1 | 1.33           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of fore arm girth between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in forearm girth between football and volleyball players. Volleyball players were found significant than the football elite male players.

**Table 6:** Shows mean, standard deviation, and 't' value of thigh girth of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 49    | 3.78           | 3.93*    |
| Volleyball   | 20          | 52.75 | 3.39           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of thigh girth between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in thigh girth between football and volleyball players. Volleyball players were found significant than the football elite male players.

**Table 7:** Shows mean, standard deviation, and 't' value of calf girth of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 33.65 | 2.41           | 1.59     |
| Volleyball   | 20          | 34.5  | 2.37           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of calf girth between football and volleyball elite male players. As the t value indicated in the table showed there was no significant difference between in calf girth football and volleyball players. In this variable volleyball players was found no significant than the football elite male players. But, when mean values were compared volleyball players having bigger calf muscles than football elite male players.

**Table 8:** Shows mean, standard deviation, and 't' value of chest girth of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 83    | 3.85           | 7.45*    |
| Volleyball   | 20          | 93.75 | 4.31           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

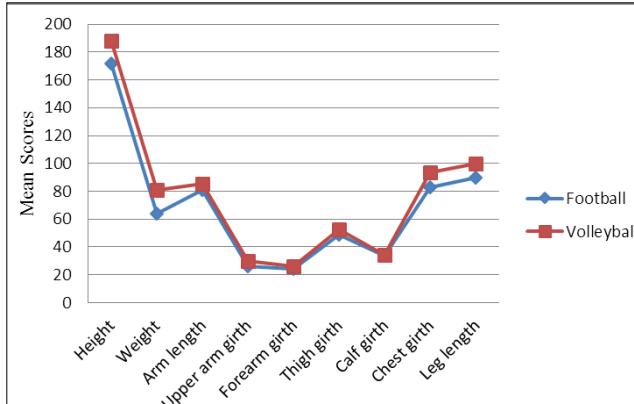
The above table showed the mean value, standard deviation, and t value of chest girth between football and volleyball male elite players. As the t value indicated in the table showed there was a significant difference in chest girth between football and volleyball player. Volleyball players were found significant than the football male elite players.

**Table 9:** Shows mean, standard deviation, and 't' value of leg length of football and volleyball players.

| Participants | Sample Size | Mean  | Std. Deviation | t- value |
|--------------|-------------|-------|----------------|----------|
| Football     | 20          | 89.55 | 5.29           | 7.19*    |
| Volleyball   | 20          | 99.6  | 5.25           |          |

Degree of freedom (38) = 2.02 \*Significant at 0.05 level

The above table showed the mean value, standard deviation, and t value of leg length between football and volleyball elite male players. As the t value indicated in the table showed there was a significant difference in leg length between football and volleyball players. In this variable volleyball players were found significant than the football male elite players.

**Fig 1:** Graphical illustration of findings mean scores of football and volleyball teams in various assessments

### Conclusion

The result of the study showed that the anthropometric measurements of elite players of football and volleyball games varied among them. Results showed that the significant differences were found in standing height, body weight, arm length, upper arm girth, forearm girth, thigh girth, chest girth, and leg length between football and volleyball male elite players. But, there was not found significant difference found in calf girth between football and volleyball players. According to the study, games have different demands on anthropometric attributes, which were specific to each elite player of football and volleyball games.

Therefore, for this variety of results, instructors, teachers, and coaches have to design work out programs according to the games condition and every players in the field. The specific anthropometric measurements differ, mainly in elite male volleyball players. These results recommend that common

anthropometric measurements must be included in any testing of the selection of games discipline players. However, the selection must not be limited to anthropometric data, especially in younger ages, where maturation must be considered.

### Acknowledgements

The authors would like to thank respective federations, coaches, and athletes for the support and cooperation in successfully completing this study.

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