**Pawandeep Kaur**
Assistant Professor, Shri Guru
Harkrishan College Management
and Technology Raipur
Bahadurgarh, Patiala Punjab,
India

# Study to select the circumference of body parts of football and volleyball players

**Pawandeep Kaur**

## Abstract

The present study was designed to determine the study to select the circumferences of body parts of football and volleyball players. Total forty (N=40) Football (N=20) and Volleyball (N=20) players were selected to act as subjects for the present study, with the age ranging between 18-25 years. In consultation with the experts in the field, minutely gleaning through the literature available and considering the feasibility criteria in mind, especially the availability of instrument. The following components of Kin anthropometric variables were selected for the present study circumference of body parts such as chest circumference, abdominal circumference, upper arm circumference, forearm circumference, thigh circumference and calf circumference. Statistical analysis was performed using SPSS version 16.0 for windows (SPSS Inc, Chicago, IL, USA). All descriptive data were report as mean and standard deviation. Independent samples t-test was used to test if population means estimated by two independent samples differed significantly. The level of significance to test the hypothesis was set at 0.05. The results authenticated that, insignificant differences among between football and volleyball players for their thigh circumference and significant difference found chest circumference, abdominal circumference, upper arm circumference, forearm circumference and calf circumference.

**Keywords:** Volleyball, football, males, chest circumference, abdominal circumference, upper arm circumference

## Introduction

"Kin anthropometry" has been gaining more popularity in the recent years. Kin anthropometry is a science which deals with measurements of body and those body parts which are related to kinetics and kinematics. The word kin anthropometry is an acronym of three Greek words "Kineein" means to move, "Anthrop" means man and "Metering" means to measure. The physical education teachers, trainers and coaches have understood the importance of various factors such as training, skill, personality, motivation in the sports performance but most important of them all is morphology, Somatotyping, body composition and kin anthropometric characteristics because these factors are definite predictions of the degree of efficiency and level of success of sportsperson. The sports performance of athletes is greatly influenced by such factors as age, height and weight and body structure. It is also observed that persons of the same age group vary in body size and shape, the individuals of the same height differ greatly in body weight, the persons may weigh the same, but the relative proportion of muscle, fat, and bone will be varied (Johnson and Nelson 1982) [4]. Body composition, kin anthropometric dimensions and morphological characteristics play a vital role in determining the success of sportspersons. (Kopecky & Pridalova, 2001) [6] Stated that sports performance is determined in a differentiated way by somatic, functional, physiological and motor characteristics and capabilities.

Kin anthropometry is a newly emerging scientific specialization (Ross *et al*., 1978) [9] it is the scientific study of human size, shape, proportion, composition, maturation and gross function in order to understand human growth, exercise, performance and nutrition with implication for medicine, education and government with respect to individual rights in the service of humankind. In other words, kin anthropometry is the application of measurements of human size, shape, proportion, composition, maturation and gross function. It has the purpose of helping us to understand human movement in the context of growth, exercise, performance and nutrition enabling its objectives being achieved through applications in medicine, education and government (Koley and Sandhu, 2005) [5].

**Correspondence**
**Pawandeep Kaur**
Assistant Professor, Shri Guru
Harkrishan College Management
and Technology Raipur
Bahadurgarh, Patiala Punjab,
India

Identical to the mechanistic approach of human motion, anthropometry has a rich tradition in sports sciences and sports medicine. For instance, the physique of Olympic athletes was studied by kin anthropometrics since a long back. Though, in different times, different terms were used like dynamic anthropometry, sports anthropometry, biometry, physiological anthropometry, anthropometrica etc. by scientists. They tried to establish some relationships between the body structure and the specialized functions required for various tasks. They have also tried to understand the limitations of such relationships. Apart from the measurements of structural characteristics, the field of kin anthropometry extends the study of human adaption, maturation, nutrition and body composition (Koley and Sandhu, 2005) [5].

We know that the condition of the human species is the result of adaption, both genotypic and phenotypic. Phenotypic adaptions or developmentally acquired traits, in fact are comparable to the changes produced by athletic training (Stini, 1985) [10]. In this particular point the interests of the physical anthropologists and kin anthropometrics come together. The skills of anthropometry have been practiced by physical anthropologists for many decades. Jan borms opined that the term kin anthropometry is a young one. It must be clear that what is young is the terminology and not the use of anthropometry, studying the relationship of form and functions, the interaction of anatomy, growth and performance (Stini, 1985) [10]. If it is true that anthropologists have always been interested in the contributions of form and function, then they are earliest kin anthropometrics.

Football is a sport that requires physical performance skills as well as tactical and technical expertise. Helgerud indicates a significant correlation between maximal oxygen consumption (VO2 max) and elite soccer team performance (Helgerud *et al.*, 2001) [2]. According to recent studies, the average work intensity during a football match is usually about 75–90% of maximum heart rate, respectively 70–85% of VO2max (approximately 75% of VO2 max). Whereas the average works intensity of basketball game is above 80% of VO2 max, respectively above 85% of maximal heart rate (Balciunas, 2006) [1] (Nudri *et al.*, 1996) [7] (Reilly & Williams, 2005) [8]. The basketball game contains different elements compared with the football game (more running, jumping, and extending). Jumping ability of the basketball players depends on their strong thigh and calf muscles, players need body forward as well. Strong abdominal muscles and upper body, as well upper extremities allow basket ballers to throw their body up into the air. Combination of all these muscle movements, indicate the importance of explosive force, speed, level of aerobic endurance, and anaerobic abilities, which basket ballers should possess to make their game. The aim of this study was to explore the influence of different sports (basketball and football) in growth and development of the anthropometrical variables, which inform about volume and distribution of the subcutaneous adipose tissue of athletes.

Hetzler *et al.* (2012) [3] examined the purpose of this study was to compare existing 1 repetition maximum (1RM) bench press prediction equations in National Collegiate Athletic Association (NCAA) Division IA college football players and determine if the error associated with the prediction of 1RM bench press from the National Football League (NFL)-225

test could be reduced through the addition of anthropometric measurements. Anthropometric measures, 1RM bench press, NFL-225 test repetitions to fatigue, and body composition data were collected on 87 Division IA football players (mean+/-SD age 19.9+/-1.3 years; height 182.3+/-7.3 cm; body mass 102.3+/-21.1 kg;% fat 13.9+/-6.7; 1RM bench press 140.5+/-2 6.6 kg; and NFL-225 reps to fatigue 14.1+/-8.0). Hierarchical regression revealed an R=0.87 when predicting 1RM from the NFL-225 test alone, which improved to R=0.90 with the addition of the anthropometric variables: arm circumference and arm length. The following equation was the best performing model to predict 1RM bench press: 1RM (lb) =299.08+2.47 arm circumference (cm) --4.60 arm length (cm) +5.84 reps @ 225; SEE=18.3 lb). This equation predicted 43.7% of subjects' within +/-10 lb of their actual 1RM bench press. Using a cross validation group, the equation resulted in estimates of 1RM which were not significantly different than the actual 1RM. Because of the variability that has been shown to be associated with 1RM prediction equations, the use of actual 1RM testing is recommended when this is a critical variable. However, coaches, scouts, and athletes, who choose to estimate 1RM bench press using repetitions to failure from the NFL-225 test, may benefit from the use of the equations developed in this study to estimate 1RM bench press with the inclusion of simple anthropometric measurements.

This study was done with the aim of circumferences of body parts of football and volleyball players. Keeping in the mind the importance of kin anthropometric variables at football and volleyball players for attaining for development and enhance the performance of players, the investigators therefore, designed a study to select the circumferences of body parts of football and volleyball players.

**Sampling Procedure**
In this study, only those football and volleyball players were study, who was participated in inter college football and volleyball competition from year 2017 to 2018. The players from various colleges from all over Punjab were analyzed. The players falling under the age between 18 and 25 years was study. The players were divided into two groups in footballers and volley-ballers.

**Selection of Variables**
In consultation with the experts in the field, minutely gleaning through the literature available and considering the feasibility criteria in mind, especially the availability of instrument. The following components of Kin anthropometric variables were selected for the present study.

**Circumferences of Body Parts (cm)**
1. Chest Circumference
2. Abdominal Circumference
3. Upper Arm Circumference
4. Forearm Circumference
5. Thigh Circumference
6. Calf Circumference

**Tools Used**
1. Pen
2. Copy
3. Steel tape

**Table 1:** Comparison of circumference of body parts mean, standard deviation and 't' value of football and volleyball players

| Variables | Football Players | | Volleyball players | | t-value |
|---|---|---|---|---|---|
| | Mean | S.D | Mean | S.D | |
| Chest Circumference | 80.61 | 9.28 | 86.01 | 10.27 | 2.748* |
| Abdominal Circumference | 21.03 | 2.66 | 25.03 | 2.78 | 3.205* |
| Upper Arm Circumference | 23.33 | 2.25 | 26.33 | 2.35 | 5.406* |
| Forearm Circumference | 22.08 | 3.65 | 25.08 | 3.70 | 3.441* |
| Thigh Circumference | 45.92 | 8.36 | 48.92 | 8.46 | 1.505 |
| Calf Circumference | 30.25 | 2.98 | 33.25 | 3.02 | 4.218* |

t.05 (38) = 2.02

The table & figure 1 reveals that the mean of football and volleyball players circumference of body parts chest circumference, abdominal circumference, upper arm circumference, forearm circumference, thigh circumference and calf circumference were recorded as 80.61 & 86.01, 21.03 & 25.03, 23.33 & 26.33, 22.08 & 25.08, 45.92 & 48.92 and 30.25 & 33.25 whereas the standard deviation were 9.28 & 10.27, 2.66 & 2.78, 2.25 & 2.35, 3.65 & 3.70, 8.36 & 8.46 and 2.98 & 302 respectively. The calculated t- value of circumference of body parts chest circumference, abdominal circumference, upper arm circumference, forearm circumference, thigh circumference and calf circumference football and volleyball players of intercollege male were 2.748*, 3.025*, 5.406*, 3.441*, 1.505 and 4.218 set at. 05 level of significance. So, it implies that there were significant difference found between football and volleyball players of chest circumference, abdominal circumference, upper arm circumference, forearm circumference and calf circumference on the other hand thigh circumference found was insignificant difference between football and volleyball players.
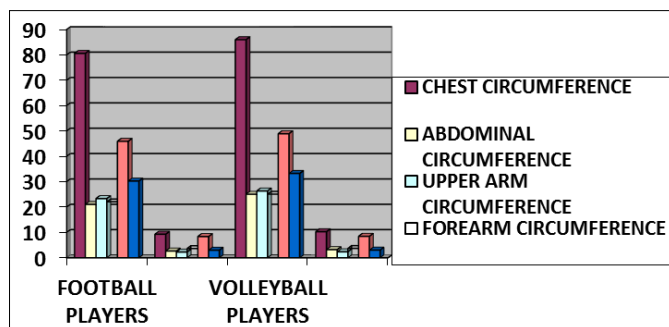


**Fig 1:** Comparison of circumferenece of body parts mean, standard deviation and 't' value of football and volleyball players

**Conclusion of the Study**
On the basis of findings of present study, the following conclusions were drawn.
The results authenticated that, insignificant differences among between football and volleyball players for their thigh circumference and significant difference found chest circumference, abdominal circumference, upper arm circumference, forearm circumference and calf circumference.

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