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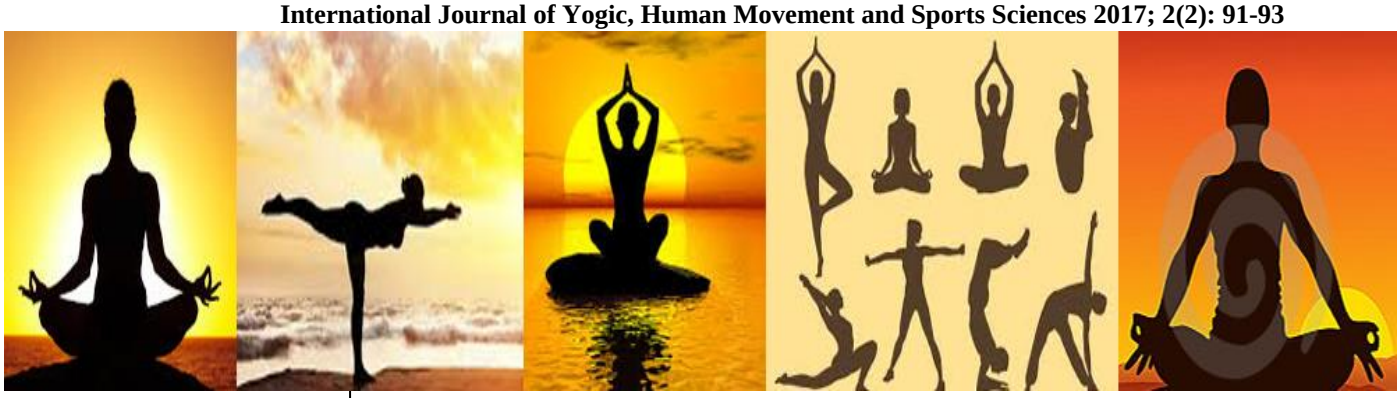

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Comparison of selected upper limbs dimensions of handball and basketball female players

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Abstract
In the quest to optimize performance of the elite athlete the sport scientist has sought to determine the ideal physique for a given sport or event. For some sports, specific structural characteristics offer definite performance advantages; for example in rowing, in addition to height, a large arm span has been identified as important. To achieve skill acquisition or sustain the skill for the top level performance in handball and basketball games on adequate body dimension are very essential for the optimum performance. Thus, the purpose of study was to determine comparison between selected upper limbs dimension of university level handball and basketball players who had participated at all India Inter university championship. Fifteen handball (N=15) and fifteen basketball (N=15) total thirty (N=30)playing female members of both the teams were selected with purposive sampling from the colleges affiliated with Panjab University, Chandigarh, Punjabi university, Patiala and Guru Nanak Dev University, Amritsar. The necessary data was collected by carrying and measurement of selected upper limbs dimension including height and weight with standardized tools. To find out the significant statistical difference between the scores of subjected upper limbs dimension of handball and basketball female players, the data obtained were statistically treated by using the SPSS and the "t" test was employed for testing of the hypothesis and the results were found to be insignificant at 0.05 level of significance.

Keywords: Upper limbs dimensions, handball and basketball

Introduction
Successful athletes in a particular sport tend to have similar body builds, and their physiques are compatible with the requirements of the sports. Kinanthropometry, which has developed from anthropometry, is concerned with measurement and evaluation of different aspects of human movement and individual variation in body shape, size, proportion and composition. For the assessment of adiposity a sum of skinfolds, usually over six sites, is most commonly used rather than percentage body fat formulae. Muscle mass can be assessed indirectly through girth and corrected girth measurements. Limb lengths and breadths are used to assess skeletal structure and proportional differences in limb size. The anthropometric methods most commonly used to describe the physique of the athlete, which appraise shape, size, proportion and composition suitable to identify and select a future of elite athlete right in the childhood or early adolescence. It takes planning of intensive and regular training till an international sports performance level is achieved.

In this regard the Association of Sports Scientist and Physical Education is doing a commendable job of developing expertise and activating interest of scientists from different sports specialization's in India by holding of regular national conference by this organization has played a significant role for the development of modern concept of sports science in India. For this purpose, researcher has to identify the factor which are responsible for the dismal performance of sports person such as physical, physiological, psychological abilities, technique, tactics, physique, body size and body composition that has to be researched from the root level.

Many studies have proved that the individuals who have excelled in different sports specific body type for example basketball player are found to be taller, whereas the gymnast can get benefit from shorter in stature, the hurlers are found to have long legs and trunk,

sprinters are more endomorphic and mesomorphic than other athletes (Cureton, 1954, and Tanner 1960) [1, 6].

In basketball and handball, players' body mass was the limiting factor that determined their playing position (Drinkwater *et al*., 2007; Hoare, 2000) [3, 4]. Specifically in basketball, results showed that center were taller, heavier and presented a higher percentage of body fat than forwards and point guard (Lamonte *et al*., 1999). Moreover, in handball back centers, goalkeepers and back wingers were heavier than wingers and forward center (Moncef *et al*., 2012) but as far as comparison of the upper limbs are concerned there is dearth of literature. Therefore, the purpose of the present study was to compare upper limbs of Handball and basketball players.

Methodology

In order to achieve the purpose of the study, data was collected from thirty (N=30) subjects. Fifteen Handball female players (N=15) and fifteen basketball (N=15) female players who had participated at All India Inter University level competition. They were administrated standardized anthropometric tests in the consultation with the experts in the field, minutely gleaning through the literature available and considering the feasibility criteria in mind, especially the availability of equipment. Height, weight, total arm length, fore arm length, upper arm length, hand breadth, hand span, hand length, wrist breadth, and elbow breadth were the variables selected for the present study. All the instruments required for collection of data were obtained from reputed suppliers of standard equipment which was produced by facility of sport sciences department of anthropology, Netaji Subhash National Institute of Sports, Patiala.

Thus, their calibrations were accepted as accurate measurement for the purpose of this study. All the anthropometric measurement were taken on the right side of the subject and these measurement were carried out of the female handball and basketball players the data was collected in the morning session from 6:00 am to 8:00 A.M. as it was convenient to the subjects.

Statistical Analysis

The data was statistically analyzed on computer by using the SPSS. 't' test of statistic was applied to compare the selected upper limbs dimensions of handball and basketball female players. The detailed comparisons were given in the form of table.

Table 1: Mean difference of selected upper limbs dimensions of handball and basketball female players

SR. No	Variables	Handball players		Basketball players		't' value
		MEAN	S.D	MEAN	S.D	
1.	Weight	52.67	4.91	54.00	4.36	0.44
2.	height	163.78	4.77	162.67	4.33	0.51
3.	Total arm length	73.55	2.59	70.51	2.12	0.00
4.	Upper arm length	30.42	1.56	29.75	1.03	0.18
5.	Fore arm length	25.57	1.23	25.34	1.25	0.62
6.	Hand length	17.49	' 1.07	15.42	0.74	0.00
7.	Hand breadth	7.65	0.39	7.40	0.47	0.13
8.	Hand span	20.03	1.33	19.54	0.10	0.25
9.	Elbow width	5.01	.41	5.83	0.28	0.00
10.	Wrist width	5.03	.45	5.05	0.34	0.89

$p< 0.05$ (df =28), t = 2.05

The above table revealed that there had been no significant difference found in handball and basketball players in variable of height at 0.05 level of confidence as the Obtained 't' value of 0.44 in this table were lower than the tabulated 't' value 2.05, same as insignificant difference is found in 't' value being 0.51, at level of 0.05, which was less than the tabulated 't' value 2.05 on the variable of weight. It showed that the basketball players had more weight than the handball players but statistically it is no significant. The table revealed that there had been insignificant difference found in handball and basketball players in variable of total arm length at 0.05 level of confidence as the obtained 't' value of 0.00,which was lower than tabulated 't' value, hence the difference were found statistically insignificant as calculated 't' value 0.18 was less than tabulated 't' value 2.05 on the variable of upper arm length, same as in significant difference was found in 't' value being 0.62, at level of 0.05, which was less than the tabulated 't' value 2.05 on the variable of fore arm length. It showed that the handball players had dominated the basketball players on the variable of fore arm length, hence the difference were found statistically insignificant as calculated 't' value 0.00 which was less than tabulated 't' value 2.05 on the variable of hand length, the mean and standard deviation value of basketball and handball players on the hand breadth, had no significant difference found in the handball and basketball players in variable of hand breadth at 0.05 level of confidence as the obtained 't' value of 0.13 in this were lower than the tabulated 't' value 2.05, same as in significant difference is found in 't' value being 0.25, at level of 0.05, which was less than the tabulated 't' value 2.05 on the variable of hand span. The above table revealed that there had been no significant difference found in handball and basketball players in variable of elbow width at 0.05 level of confidence as the obtained 't' value of 0.00 in this were lower than the tabulated 't' value 2.05, and on the variable of wrist width were also found insignificant at 0.05 level of confidence as calculated 't' value were being 0.89 which was less than tabulated 't' value on the behalf of the results of this study shown that the handball players and basketball players has no statistical significant difference between weight, height, total arm length, upper arm length, fore arm length, hand length, hand span, hand breadth, elbow width and wrist width.

Conclusion

The result revealed that the basketball players and handball players having inter university participant to their credit were found to possess non-significantly (t<05) at all selected upper limb body measures Hence the hypothesis is rejected. The results of the present statusmay be able to eradicate the confusion from the minds of the people that there is significant difference between the upper limbs of hand ball

and basket ball players but it suggest that the transfer of training must be done between these two games because good passing and throw abilities for handball and basketball players is unquestioned.as far as transfer of training is said to occur because of similarity in skill and context, thus, the more similar skill or context components are, the higher will be the positive transfer. This is based on one of the earliest explorations of transfer of learning, where Thorndike (1914) proposed that transfer occurs between "identical elements" shared across the different tasks (*identical element theory*). Baker and Cote (2006) proposed that identical elements could include (1) physical conditioning elements, which relate to general physiological changes shared between similar modes of activity (e.g., all aerobic training will promote system-wide cardiorespiratory changes), (2) movement elements, which relate to the anatomical and biomechanical similarities between tasks (e.g., overhand throwing in handball and basketball), (3) perceptual elements, which relate to the environmental information used to make performance related decisions (e.g., the need to recognize offensive and defensive patterns of the play) and (4) conceptual elements, which relate to similarities in the strategies, rules and guidelines governing behavior during competition (e.g., gymnastics and diving share some conceptual elements regarding judging aesthetics of performers' movements).

The second theory explains the existence of positive transfer as the result of similarities in learning or performance process characteristics. The *transfer-appropriate-processing* view (Lee, 1988) postulates transfer occurs due to similarities between the learning processes required for performance situations. For example, Damos and Wickens (1980) demonstrated positive transfer between training and test situations resulting from similar processing activities in both tasks, even with dissimilar task characteristics. In both theories, transfer is a complex process and several variables can influence the rate and degree of transfer (e.g., physical, temporal, social, or functional characteristics; Barnett and Ceci, 2002). Concerning the specific transfer of perceptual elements, it is important to differentiate between intra-task transfer, which refers to transfer of a skill practiced in one context to a novel context, and inter-task transfer, which relates to the influence of experience with one skill on the performance of a new skill (Magill, 1998). There has been some consideration of both intra-task (Singer *et al*., 1994; Starkes and Lindley, 1994; Tayler *et al*., 1994; Williams *et al*., 2003) and inter-task transfer (e.g., Smeeton *et al*., 2004; Abernethy *et al*., 2005); however, studying inter-task transfer of perceptual skill could provide deeper insight into the factors enabling expert players to apply their existing knowledge to new situations (Smeeton *et al*., 2004).

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