

Kinanthropometric Measurements in Players of Athletics and Boxing - A Comparative Study

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Abstract

The study was conducted on 100 boxers and 100 athletes in the age range of 15-25 years to compare their anthropometric characteristics. The subjects were taken from various colleges of Punjab namely Guru Kanshi College, Nehru Memorial College, Mansa, Barjindra College, Faridkot, Rajindra College, Bhatinda. The results of the study in general reveal that boxers are bulky, taller and heavier than athletes; the significant differences however were noted in chest circumference between the two groups. Boxers in general are found to possess more deposition of subcutaneous fat in the regions of biceps, triceps and calf than the athletic group. However in statistical terms it is significant only in the triceps and calf regions. Comparison has also been made between senior and junior athletes and boxers by dividing the subjects into 15-20 and 20-25 year age groups.

Key Words: Body Weight, Height, Circumferences, Skinfold Thickness

Introduction

In spite of huge population, India has not been able to make much impact in the field of international sports. The poor performance of Indian athletes and boxers at international level has been a matter of great concern, especially to the coaches, sports scientists and sports administrators. Despite the efforts made to improve the standard of sports in the country, little success has been achieved so far. Scientific researches are needed to improve the performance of sports persons. Some reports are available in this context (*Carter, 1970; Drinkwater and Ross, 1978; Mueller et al, 1982; Bharadhwaj et al, 1990; Sodhi and Rajni, 1992; Hortobagni et al 1992; Thorland et al 1993, Sidhu et al, 1996 and Nindl et al 1998*). More studies are required in Indian context. In the present study an attempt has been made to evaluate the Kinanthropometric measurements in the players of athletics and boxing in Punjab.

Material and Method

The sample consisted of randomly selected 100 boxers and 100 athletes aged 15-25 years. The subjects were taken from various colleges of Punjab namely Guru Kanshi College, Nehru Memorial College, Mansa, Barjindra College, Faridkot, Rajindra College, Bhatinda.

Measurements of body weight, height, chest circumference, upper arm circumference, hip circumference, thigh and calf circumference and skinfold thicknesses from the biceps, triceps, subscapular, supra-iliac and calf sites were taken by following standard techniques as described by *Singh & Bhasin (1989)*. To account for the large age range, the data has been split into two five yearly age groups namely, the 15-20 and 20-25 years and subsequently comparison has been made between the players of boxing and athletics. The data was statistically analyzed using student 't' test.

Results & Discussion

Table 1 describes the statistical attributes of kinanthropometric data of

players (15-25 years) of athletics and boxing. From the results of the distribution of means and standard deviations of the twelve Kin-anthropometric measurements, significant differences were noted in the chest circumference and biceps skinfold ($p < 0.05$). In the triceps skin fold and calf skin fold highly significant differences ($p < 0.01$) were seen between the boxers and the athletes. In rest of the kin-anthropometric measurements no significant differences

were observed.

The results of the study in general reveal that boxers are bulky, taller and heavier than athletes; the significant differences however were noted in chest circumference between the two groups. Boxers in general are found to possess more deposition of subcutaneous fat in the regions of biceps, triceps and calf than the athletics. However in statistical terms it is significant only in the triceps and calf regions.

Table 1: Distribution of Mean Values and Standard Deviation of different Kin-anthropometric Measurements among the Players of Athletics and Boxing (Aged 15-25)

MEASUREMENTS	N	ATHLETICS			N	BOXING			t
		Mean	S.D.	S.E.		Mean	S.D.	S.E.	
Body Weight, kg	100	57.91	8.71	0.87	100	60.34	10.09	1.01	1.77
Height, cm	100	169.90	16.87	1.69	100	171.42	1.016	0.10	0.95
Chest Circumference, cm	100	83.45	5.35	0.53	100	86.10	7.151	0.72	2.59*
Upper Arm Circumference, cm	100	24.65	2.04	0.20	100	25.70	3.11	0.31	1.92
Thigh Circumference, cm	100	48.20	3.13	0.31	100	48.43	4.42	0.44	0.32
Calf Circumference, cm	100	33.29	2.24	0.22	100	33.66	2.33	0.23	0.69
Hip Circumference, cm	100	73.98	5.43	0.54	100	74.50	6.36	0.66	0.50
Bicep Skin Fold, mm	100	3.51	0.79	0.08	100	4.24	1.56	0.16	2.14*
Triceps Skin Fold, mm	100	6.95	1.81	0.18	100	8.38	2.77	0.28	2.81**
Calf Skin Fold, mm	100	5.70	1.43	0.14	100	7.04	2.35	0.24	3.01**
Subscapular Skin Fold, mm	100	7.95	2.09	0.21	100	8.36	2.55	0.25	0.79
Suprailiac Skin Fold, mm	100	6.40	1.59	0.16	100	7.16	2.99	0.29	1.53

*Indicates $P < 0.05$, ** Indicates $P < 0.01$ ***Indicates $P < 0.001$

Table 2 compares the kin-anthropometric characteristics along with the statistical correlates of players of boxing and athletics falling in the age range of 15 to 20 years. It is observed from the table that anthropometric features of boxers and athletes of 15-20 years age group exhibit the same trend as

was seen in the 15-25 years group. Boxers possess significantly greater deposition of fat in the biceps, triceps and calf regions as compared to the athletic group of comparable age. In the rest of the anthropometric variables no significant differences were found.

Table 2: Distribution of Mean Values and Standard Deviation of different Kin-anthropometric Measurements among the Players of Athletics and Boxing (Aged 15-20)

MEASUREMENTS	N	ATHLETICS			N	BOXING			t
		Mean	S.D.	S.E.		Mean	S.D.	S.E.	
Body Weight, kg	66	55.39	9.07	1.12	66	57.17	10.42	1.14	1.12
Height, cm	66	170.00	7.19	0.85	66	168.73	6.72	1.28	1.39
Chest Circumference, cm	66	82.54	5.66	0.70	66	84.20	3.08	0.83	1.53
Upper Arm Circumference, cm	66	24.08	2.00	0.25	66	25.30	4.08	0.38	1.15
Thigh Circumference, cm	66	47.40	3.23	0.39	66	47.55	2.29	0.50	0.23
Calf Circumference, cm	66	32.68	2.20	0.27	66	33.06	6.33	0.27	0.98
Hip Circumference, cm	66	72.45	5.49	0.68	66	73.10	1.66	0.78	0.64
Bicep Skin Fold, mm	66	3.45	0.69	0.09	66	4.23	2.80	0.20	3.53***
Triceps Skin Fold, mm	66	6.91	1.89	0.03	66	8.22	2.57	0.34	3.15**
Calf Skin Fold, mm	66	5.90	1.38	0.17	66	7.33	2.62	0.31	3.97***
Sub scapular Skin Fold, mm	66	7.83	2.18	0.27	66	8.05	2.62	0.32	0.53
Suprailiac Skin Fold, mm	66	6.23	1.75	0.20	66	7.05	3.26	0.40	1.79

*Indicates P < 0.05, ** Indicates P < 0.01 ***Indicates P < 0.001

Distribution of mean values of the players of athletics and boxing aged 20-25 years are shown in Table-3.

Table 3: Different Kin-anthropometric Measurements among the Players of Athletics and Boxing Aged (20-25 Years)

MEASUREMENTS	N	ATHLETICS			N	BOXING			t
		Mean	S.D.	S.E.		Mean	S.D.	S.E.	
Body Weight, kg	34	62.79	5.22	0.89	34	66.5	8.81	1.51	2.08*
Height, cm	34	168.1	27.04	4.64	34	176.76	7.06	1.21	3.50***
Chest Circumference, cm	34	85.23	4.15	0.71	34	89.80	6.50	1.11	3.27**
Upper Arm Circumference, cm	34	25.75	1.60	0.27	34	26.50	2.99	0.51	1.02
Thigh Circumference, cm	34	49.60	2.33	0.40	34	50.13	4.54	0.78	0.78
Calf Circumference, cm	34	34.48	1.78	0.30	34	34.82	2.07	0.35	0.51
Hip Circumference, cm	34	76.96	3.84	0.66	34	77.30	5.44	0.93	0.27
Bicep Skin Fold, mm	34	3.60	0.95	0.16	34	4.26	1.36	0.23	1.41
Triceps Skin Fold, mm	34	7.01	1.65	0.28	34	8.60	2.71	0.46	2.84**
Calf Skin Fold, mm	34	5.40	1.48	0.25	34	6.49	1.73	0.29	1.87
Sub scapular Skin Fold, mm	34	8.16	1.86	0.32	34	8.98	2.27	0.39	1.18
Suprailiac Skin Fold, mm	34	6.74	1.15	0.20	34	7.38	2.35	0.40	1.08

*Indicates P < 0.05, ** Indicates P < 0.01 ***Indicates P < 0.001

From the results of the table highly significant differences ($p < 0.001$) were observed in height and statistically significant differences in body weight and chest circumference among the players of athletics and boxing of aged 20-25 years ($p < 0.05$ and $p < 0.01$ respectively). Statistically significant differences ($p < 0.01$) were also noted in triceps skin fold among the athletes and boxers of that age group. In rest of the anthropometric variables non significant differences were observed between these two groups of players. From the table it was clear that boxers of age group 20-25 years have higher body weight, height, chest circumference and triceps skin fold values than their athletic counterparts. The athletes of this age group were

comparatively leaner and less bulky which is ideal for different athletic events. Tallness is of advantage to the boxers as it helps the boxer to work outside the reach of his opponent as well as enables him to stay just close enough to make contact with his punches. Therefore it can be viewed that a long range boxer should be tall, lanky fighter with long and lean build. The boxers of the present study are far away from the ideal characteristic features possessed by successful boxers as per the requirements of boxing.

Table-4 compares the mean values and standard deviations of twelve anthropometric measurements among the boxers' of age group 15-20 years and 20-25 years.

Table 4: Mean Values and Standard Deviation of different Kin-anthropometric Measurements among the boxers aged 15-20 years and 20-25 years

MEASUREMENTS	N	BOXERS 15-20 YEARS			N	BOXERS 20-25 YEARS			t
		Mean	S.D.	S.E.		Mean	S.D.	S.E.	
Body Weight, kg	66	57.17	9.22	1.14	34	66.5	8.81	1.51	4.41 ***
Height, cm	66	168.7	10.42	1.28	34	176.76	7.05	1.21	4.55***
Chest Circumference, cm	66	84.20	6.72	0.83	34	89.80	6.50	1.11	4.03***
Upper Arm Circumference, cm	66	25.30	3.08	0.38	34	26.50	2.99	0.51	1.88
Thigh Circumference, cm	66	47.55	4.08	0.50	34	50.13	4.54	0.78	2.75**
Calf Circumference, cm	66	33.06	2.24	0.27	34	34.82	2.07	0.35	3.92***
Hip Circumference, cm	66	73.10	6.33	0.78	34	77.30	5.44	0.93	3.46***
Bicep Skin Fold, mm	66	4.23	1.66	0.20	34	4.26	1.36	0.23	0.10
Triceps Skin Fold, mm	66	8.22	2.80	0.34	34	8.68	2.71	0.46	0.79
Calf Skin Fold, mm	66	7.33	2.57	0.31	34	6.49	1.73	0.29	1.90
Sub scapular Skin Fold, mm	66	8.05	2.62	0.32	34	8.98	2.27	0.39	1.96
Suprailiac Skin Fold, mm	66	7.05	3.26	0.40	34	7.38	2.35	0.40	0.59

*Indicates $P < 0.05$, ** Indicates $P < 0.01$ ***Indicates $P < 0.001$

The results of this table show that boxers of senior age group 20-25 years

have higher mean values than their younger counterparts, in all the twelve anthropometric variables highlighting

highly significant differences ($p < 0.001$) in body weight, height, chest, calf and hip circumferences. In rest of the six variables, non-significant differences were noted. Boxers of senior age group in general are taller and heavier having large circumferences. This is understandable because many of the 15-20 year age group boxers comprise of the subjects who are passing through their growth periods and are yet to realize their full physical growth potentials. While in the 20-25 year age group the subjects are fully grown in terms of their physical dimensions and therefore are significantly heavier, taller and possess greater circumferential values than their counterparts belonging to the 15-20 year age group.

It is believed that a suitable physique is important to achieve success

in particular sports therefore judging the performance of the human body by its size, shape and form has been a topic of great exploration. In the present day of tough competition, when scientific principles are applied for training of athletes, the size, the shape and the form of the body together with its efficiency in performance have been the outlook of researchers for identifying, selecting and developing the talent in sports. Stature and body mass have significant impact on elite boxers. Present results of the study that senior boxers possess higher stature, body mass and body fat compared to junior boxers' exhibit important base for formulating training strategies to be adopted for their success in boxing.

Table 5: Distribution of Mean Values and Standard Deviation of different Kin-anthropometric Measurements among the players of athletics aged 15-20 years and 20-25 years

MEASUREMENTS	N	ATHLETICS 15-20 YEARS			N	ATHLETICS 20-25 YEARS			t
		Mean	S.D.	S.E.		Mean	S.D.	S.E.	
Body Weight, kg	66	55.39	9.07	1.12	34	62.79	5.22	0.89	5.10 ****
Height, cm	66	170.90	7.19	0.85	34	168.10	27.04	4.64	0.59
Chest Circumference, cm	66	82.54	5.66	0.70	34	85.23	4.15	0.71	2.70**
Upper Arm Circumference, cm	66	24.08	2.00	0.25	34	25.75	1.60	0.27	1.67
Thigh Circumference, cm	66	47.40	3.23	0.39	34	49.60	2.33	0.40	3.91***
Calf Circumference, cm	66	32.68	2.20	0.27	34	34.48	1.78	0.30	4.42***
Hip Circumference, cm	66	72.45	5.49	0.68	34	76.96	3.84	0.66	4.79***
Bicep Skin Fold, mm	66	3.45	0.69	0.09	34	3.60	0.95	0.16	0.81
Triceps Skin Fold, mm	66	6.91	1.89	0.03	34	7.01	1.65	0.28	0.27
Calf Skin Fold, mm	66	5.90	1.38	0.17	34	5.40	1.48	0.25	1.97
Sub scapular Skin Fold, mm	66	7.83	2.18	0.27	34	5.16	1.86	0.32	0.79
Suprailiac Skin Fold, mm	66	6.20	1.75	0.20	34	6.74	1.15	0.20	1.73

*Indicates $P < 0.05$, ** Indicates $P < 0.01$ ***Indicates $P < 0.001$

Table-5 highlights distribution of

mean values and standard deviations of

twelve anthropometric measurements among the athletes of age group 15-20 and 20-25 years. The results show that the athletes of age group 20-25 years have higher mean values in all the twelve anthropometric variables than their junior counterparts (15-20 years). Highly significant differences ($p < 0.001$) were noted in body weight, thigh, calf and hip circumferences. Statistically significant differences were also observed in the chest circumference among them. In rest of the other seven anthropometric variables non-significant differences were noted among them. This is explicable because a large number of the 15-20 year age group athletes comprise of the subjects who are through their development period and are thus far from realization of their complete physical development potentials. While the 20-25 year age group, comprises of the subjects who are fully grown in terms of their physical size and therefore are significantly heavier, taller and possess greater circumferential values than their counterparts belonging to the 15-20 year age group.

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