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Full Length Research

The Study Of The Body Mass Index And Somatotype Of An Elıte Female Boxer (A Longtıdunal Study)

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This study was done with the aim of studying the changes in the body mass index and somatotype of a female elite boxer in 3 years time. The study was conducted between the years 2014-2017, with the participation of Buse Naz SÜRMENELİ, a boxer registered to the Trabzon Belediye Sports Club in Trabzon province. In the study, single group, pre-test, post- test patterned experimental research method was used. To determine the somatotype of the athlete, Heath-Carter method was used. To study the changes in the body mass index and somatotype of the female boxer, two anthropometric measurements were taken first in 2014 and then -three years later -in 2017. Descriptive statics was used to assess the data collected in the study. Athlete's age ; 16, height; 167 cm, weight; 71 kg, body mass index; 25,4 kg/m^2 were found in the pre-testing session.Athlete's age ; 19, height; 170 cm, weight; 74 kg, body mass index; 25,6 kg/m^2 were found in the post-testing session. Somatotype values of the athlete were found as endomorphy 5,0 mezomorphy 5,3 ectomorphy 1,0 in pre-testing andendomorphy 4,2 mezomorphy 5,0 ectomorphy 1,1 in post-testing. As a conclusion boxers are expected to have high mesomorphic components and low endomorphic components for their athletic performance. In our study, elite female boxer was found as having high mesomorphic components and low endomorphic components, too. In this respect, it is recommended that the athletes use muscle power building and body fat burning training programs .

Key Word: Anthropometry, Boxing, Female, Somatotype
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INTRODUCTION

Within the period beginning from the early ages upto now, the relationship between the somatotype and the physical activity- upon which lots of different remarks made- attracting the attention of the sports scientists has been the main objective of the various studies sometimes for review and comparisons and sometimes for being related to the performance (Bilge and Tuncel, 2003). For that reasons, sports scientists have studied intensily not only the physiological profiles of the athletes but also their body compositions and physical profiles (Gökdemir et al., 1990).

When the results of the elite level performance sports are taken into consideration, it is seen that success or failure is related to many factors (Gündüz et al., 2002).

Anthropometry is one of the best factors affecting performance. With the researches on the anthropometric characteristics, it has been aimed to determine which of the various body profiles fits which sports and through the talent selection process the athletes appropriate for these profiles are selected (Söğüt et al., 2004).

One of the other factors affecting sport performance is body structure;in other words physical aspects, because these aspects affect the performance of the physiological capacities. Unless the characteristic of the physical structure owned is appropriate to the sport being engaged by the athlete, it is quite impossible to reach the desired level of performance. Physical structer is just one of the characteristics necessary for an athlete to have high level performance (Özkan et al., 2005).

However, studies on physical characteristics of elite level female boxers are rare. Therefore; in our study the change in the body mass index and somatotype of Buse Naz SÜRMENELİ -licenced boxer in Trabzon Belediye Sports Club in Trabzon province and the winner of Turkey, European and World boxing championships-has been studied.

MATERIAL AND METHOD

Buse Naz Sürmeneli- licenced boxer in Trabzon Belediye Sports Club in Trabzon province and the winner of

Table 1: The athlete's defining data

Categories	Pretest	Posttest	Change (Dıfference)
Age (year)	16	19	+3
Weight(kg)	71	74	+3
Height (cm)	167	170	+3
Triceps Skinfold thickness (mm)	19	16,4	+2,6
Subscapula Skinfold thickness (mm)	13,6	13,2	+0,4
Supraspinal Skinfold thickness (mm)	16	11,4	+4,6
Calf Skinfold thickness (mm)	30,6	20,2	+10,4
Fbiceps Circumference (cm)	31,3	32,5	-1,2
Calf Circumference (cm)	37,5	37,2	-0,3
Elbow Width (cm)	6,4	6,5	+0,1
Knee Width (cm)	10,2	9,6	-0,6
Endomorph	5	4	-1
Mesomorph	5	5	0
Ectomorph	1	1	0
BMI	25,4	25,6	+0,2

Turkey, European and World boxing championships at 75 kg-volunteered in this study. The single subject, pre-test-post test design experimantal research method was used in the study (Çepni S, 2002).

After the approval of the club authorities for the measurements to be taken in this study, the measurements were taken by one person at the Cemal Kamacı Sports Facility.The athlete's trainer told that they had 10 training sessions totally 20 hours a week during the competitions and 6 trainings sessions totally 12 hours a week during the off-season.

The anthropometric measurements of the athlete participated in our study were taken using the techniques in accordance with "International Biological Programme (IBP)" (Lohman et al., 1988) and "International Society for the Advancement of Kinanthropometry (ISAK)"nin (Ross and Marfell-Jones, 1991).

In our study, Heath-Carter method was used to determine the somatotype of the athlete (Carter and Heath, 1990).

Statistical Analyses

Determining statistics of the data were studied. The statistical analyses of the data were done using SPSS 22,0.

Heath-Carter Somatotype Formula

Endomorphy = - 0.7182 + 0.1451 * x – 0.00068 * x^2 + 0.0000014 * x^3

(x = "triceps" skinfold thickness + "suprailiac" skinfold thickness + "subscapula" skinfold thickness)

Height Correction Formula = x * 170.18 / height (cm)

Mesomorphy = [0.858 + 0.601 * elbow width -"bicondylar humerus" (cm) + 0.601 * knee width -"bicondylar femur" (cm) + 0.188 * arm width (cm) + 0.161 * calf width (cm)] – [height (m) * 0.131] + 4.50

Ectomrphy = (Height-weight ratio) * 0.732 – 28.58

(Height-weight ratio = Height / $\sqrt[3]{}$ Weight)

The location of X and Y coordinates on the somatochart is determined according to the formula below.

X= Ectomorphy – Endomorphy

Y= 2 x Mesomorphy – (Endomorphy + Ectomorphy)

The somatoype is determined by marking X and Y coordinates found on the somatochart .

FINDINGS

In the study, defining values of the female boxer is given in table 1.

In figure 1 the graphical dispersion of the athlete's BMI, Endomorph, Mesomorph and Ectomorph pretest, posttest values are given.

With the help of X and Y componants obtained, the athlete's pre-test, post- test and mean somatotype values are determined on somatochart in figure 2, table 2 while table 3 shows the ranks and their variables.

DISCUSSION AND CONCLUSION

In the studies that have been done since the past anthropometric measurements and somatotype have become significant to determine the talent. In the world-wide studies on anthropometric characteristics it has been discussed that which body profile fits which sport and what is its role in talent selection for infrastructure. It has been known that the parameters-named as structural and generally having inherited characteristics- such as height, weight,somatotype and body mass index affect skills and functional factors in sport branches (Barış L et al., 2003).

In our study the female athlete's BMI was found as 26.5 kg\m^2 and her somototype was found as 4-5-1 (Table 1).

In the study by Noh, Woong at al the mean BMI of boxing athletes was found as 23.3±0.6 kg\m^2 (JI-Woong et al., 2014).

In the study by Noh, Woong at al, they reported that the

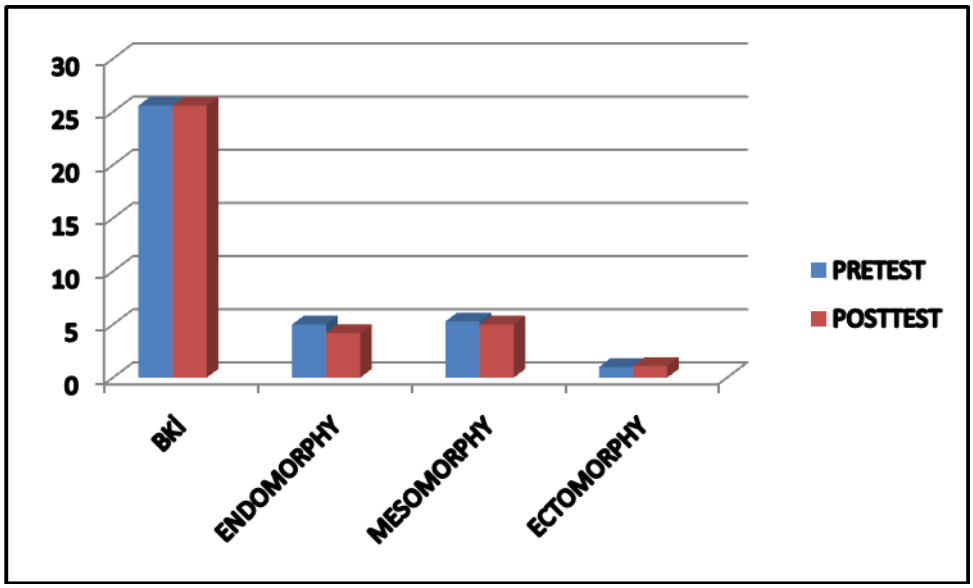

Figure 1: The athlete's pre-test and post-test values.

Table 2: The athlet's Somatochart X,Y Statistical Values.

		N	Values
X	Pre-Test	1	-3,9
	Post Test	1	-3,0
	Avarage	1	-3,5
Y	Pre-Test	1	4,6
	Post Test	1	4,8
	Average	1	4,7

X= Ectomorphy – Endomorphy
Y= 2 x Mesomorphy – (Endomorphy + Ectomorphy)

Table 3: The Athlete's Ranks In Terms of Date, Weight and Age Categories

Date	Category	Weıght	Rank
2013	JUNIOR	75 kg	Turkısh Boxıng Champıon
2013	JUNIOR	75 kg	European Boxıng Champıon
2013	JUNIOR	75 kg	World Boxıng Champıon
2014	YOUTH	75 kg	Turkısh Boxıng Champıon
2014	YOUTH	75 kg	European Boxıng Champıon
2015	YOUTH	75 kg	Turkısh Boxıng Champıon
2015	YOUTH	75 kg	European Boxıng Champıon
2015	YOUTH	75 kg	World Boxıng Champıon
2016	YOUTH	75 kg	Turkısh Boxıng Champıon
2016	YOUTH	75 kg	Europeanboxıng Champıon
2017	ELITE	75 kg	Turkısh Boxıng Champıon

boxing athletes had high mesomorphic component values and lower endomorphic component values. At the same time they found the percantage of mesomorph types in elite boxing group much higher in the same study (JI-Woong et al., 2014).

In their study Noh, Woong at al found the somatotype

of the middle weight (69-75 kg) boxing athletes as 2.1-3.5-2.6 (JI-Woong et al., 2014).

Alonso RF, found the mean somatotype of the male boxers-mean age 12,5- 2,5-4,4-2,6 (Carter and Heath, 1990).

In the study by Chan at al., (2003) they found the somatotype of the female tae-kwon-do (one of the other defense sports) athletes as 6.3–4.2–2.0.

In the study by Taaffe and Pieter (1990) they found the somatotype of the elite female tae-kwon-do athletes as 2.08–3.23–3.98. Song at al., (1997) found the somatotype of the female tae-kwon-do athletes as 5.0–4.1–2.5. In the study by Frıtzsche and Raschka (2007) they found the somatotype of the elite female karate athletes as 3.4–2.4–2.4. In the study by Frıtzsche (2006) he found the somatotype of the elite female karate athletes as 3.6–4.5–2.7. In the study by Ghorbanzadehkoshki (2009) he found the somatotype of the female national team athletes as 2.40–5.08–3.63 and the female athletes not accepted to the national team as 3.15–3.43–3.12.

Our study does not show resemblance with those studies on boxers by Noh, Woong at al and Alonso RF. With our study, it was found that the other defense sports athletes had high mesomorphic and much lower endomorphic component values.

As a conclusion; boxing athletes are expected to have high mesomorphic and lower endomorphic components for their athletic performances. Also, in our study, it was found that the elite female boxer had high mesomorphic and lower endomorphic components. From this point of view it is recommended that athletes should have muscle strengthening and body fat lessening training programs.

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