A STUDY OF PROFILE AND COMPARISON FOR TURKISH GRECO-ROMAN AND FREESTYLE WRESTLERS WHO PREPARED FOR RIO 2016

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Abstract
Aim. The purpose of the present study was to determine anthropometric and physical profile of Turkish Olympic level wrestlers severally as Greco-Roman and Freestyle, and similarities and differences of both two styles. The second aim of the study is to define relationship of the features which determining the profile with each other.

Methods. Greco-Roman (n=19, age=23.6 years) and Freestyle (n=17, age=23.7 years) wrestlers from senior national team participated in this study. For the research group anthropometric measurements were applied to calculate BMI, body fat percentage, fat free mass (FMM), somatotype rates and some biomotoric test protocols which are pinch, hand grip, leg strength, vertical jumps, speed, agility, flexibility and balance abilities so that the study was determined profiles and compared variables for Olympic level Greco-Roman and Freestyle wrestlers.

Results. The present study has found differences for mesomorph values, elastic strength, agility and linear speed abilities between Greco-Roman and Freestyle wrestlers. There is a strong relationship between FFM and anaerobic power for both wrestling styles. Besides, it was observed that the leg strength ability is an important component which supports speed, agility, balance and other strength variables for Greco-Roman wrestlers. Some anthropometric and biomotoric features which belong to wrestlers have shown differences between wrestling styles, as well as most of the relationships among variables for each style there were no similarities observed in terms of wrestling styles.

Conclusion. According to the results, the studies which are examined about wrestlers' features or abilities should be separate as Greco-Roman and Freestyle. Also it may consider for the future studies that it may not reflect the relationships among variables of Olympic level Greco-Roman and Freestyle wrestlers in order to other level wrestlers.

Keywords: Olympics, wrestling, anthropometry, biomotoric ability

Introduction

Mankind tries to understand its own nature since the early ages. This struggle comes out of the pursuit of excellence. This study has the latest results of such a seeking of perfection of the oldest physical activity which is wrestling. Wrestling consecutively reached from ancient Olympic to modern Olympic Games, it continues to hold world-wide popularity (Bromber et al., 2014; Yard & Comstock, 2008; Rahmani-Nia et al., 2007). Two styles of the wrestling are applied in Olympic Games and other international competition (Horswill, 1992). For the lower and upper extremities, freestyle wrestling allows holds and attacks. Whereas lower extremity attacks are forbidden in Greco-Roman wrestling (Yard & Comstock, 2008). Duration of the bout for seniors has two periods of 3 minutes with a 30-second break (FILA, 2016). According to the duration of the competition and due to its vigorous physical activity, the wrestling is primarily an anaerobic sport that wrestlers utilize just about ninety percent of energy needed from the ATP-CP and lactic-acid energy systems (Dawes & Roozen, 2012).

Besides that Olympic level wrestlers need a excellence level of physical fitness to perform Olympic success (Mirzaei, Curby et al., 2011).

Many studies have been conducted to determine the factors that affect wrestler's performance (Pallarés, María López-Gullón et al., 2011; Pallarés, López-Gullón et al., 2011; Mirzaei et al., 2009; Rahmani-Nia et al., 2007; Mirzaei, David, Curby et al., 2011; Utter, O'Bryant et al., 2002; Yoon, 2002; Kostovski et al., 2011; Horswill, 1992). The studies have shown that anthropometric features, upper and lower body strength, anaerobic power, speed, agility, flexibility, balance are important components for the success in wrestling. The traits of the wrestlers have compared on the basis of even the Olympic styles which are Greco-Roman and Freestyle, also successful and less successful wrestlers. There are few studies covering Olympic level wrestlers (Mirzaei, David et al., 2011; Utter, Bryant et al., 2002), yet most of researches are for elite junior or national senior level (Rahmani-Nia et al., 2007; Demirkan et al., 2012; Baić et al., 2007; Mirzaei et al., 2009; Pallarés, López-Gullón et al.,

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2011).

The majority of wrestlers try to increase fat free mass and decrease body fat and total body weight without diminish of their power (Horswill, 1992). The wrestlers have very high values for the mesomorphic characteristic, low endomorphy and ectomorphy, also there is no difference between Freestyle and Greco-Roman in terms of the ratings (Yoon, 2002). Carter (1984) reported that wrestlers' somatotype mean is 2.5-6.5-1.5, but they range from 1.5-5.5-2.5 in the under 60 kg class to 4-7.5-1 in the heavy weight class. Sklad et al. (1995) were found for Greco-Roman wrestlers that endomorphy from 1.6 to 3.5, mesomorphy from 5.2 to 6.0, ectomorphy from 1.4 to 1.5. For Freestyle, endomorphy from 2.1 to 3.5, mesomorphy from 5.8 to 6.2, ectomorphy from 1.1 to 1.2.

Two studies which are examining a case study with Olympian wrestlers are showing respectively 5.5 and 8.4 body fat percentages of Freestyle and Greco-Roman wrestlers (Utter, O'Bryant, et al., 2002; Mirzaei, David et al., 2011). Demirkan et al. (2014) has not found significant difference between Freestyle and Greco-Roman for body fat percentage.

In many sports strength and power are essential physical capacities, also performance has improved rapidly, like it is in wrestling, which needs a great deal of muscular strength and power throughout the whole body (Ackland et al., 2009). Studies shown that superior strength is advantageous when classed with successful and less successful wrestlers or beginners (Yoon, 2002). An important point of strength tests is to calculate the results of relative strength rather than absolute strength. So the findings will be objectively compared as thought of weight classes (Horswill, 1992). Horswill's review study has given that hand grip values are in a range from 0.70 to 0.92, and Basar et al. (2014) for the leg strength it is between 1.1 and 1.3 in the wrestlers. Power is related with quick and explosive manoeuvres to control the opponent in wrestling. When wrestlers have compared with other athletes in terms of anaerobic power, they pose more similar power athletes rather than endurance (Yoon 2002). It is known that the fibre composition of the skeletal muscle is a related matter with anaerobic power. In this context, Kikuchi et al. (2013) has found a strong relationship between athletic status and a genetic factor in elite wrestlers. Studies have stated that there are differences between Greco-Roman and Freestyle with respect to the findings of strength and power variables (Baić et al., 2007; Demirkan et al., 2014). In addition, it is known that anaerobic power was related to speed, agility, balance and flexibility abilities (Kostovski et al., 2011).

According to Mirzaei et al. (2011) speed, agility and flexibility playan imminent role on wrestling performance. Agility, change of direction of movement, has an important point when realizing the techniques of bringing the competitor down onto the mat (Baić et al., 2007). Numerous researches were pointed out being predicted of these abilities for the successful and less successful wrestlers. It shouldn't be forgotten that if wrestlers are to have high level of strength and power, they must be more flexible (Ackland et al., 2009). Also flexibility is crucial for carrying out of the diverse techniques (Mirzaei, Curby et al., 2011) and it may help to prevent injuries (Bompa, 1994; Hrysomallis, 2011). Besides that, balance and stability training has become attractive in the last ten years. Although balance training is used for injury recovery, it is proved that when it is used in a prehabilitation program, it avoids injuries (Hoffman, 2014).

According to researches, some biomotor abilities show difference when comparing the styles. Since the results of wrestling studies don't separate as Greco-Roman and Freestyle, it may make a dilemma in terms of sport science. Therefore, the purpose of the present study was to determine anthropometric and physical profile of Turkish Olympic level wrestlers severally as Greco-Roman and Freestyle, and similarities and differences of both two styles. The second aim of the study is to define relationship of the features which determining the profile with each other.

Methods
Participants
A total of 36 male Turkish wrestlers, 19 Greco-Roman wrestlers and 17 Freestyle wrestlers have participated as volunteers in this study. They were informed in detail about tests procedures, possible risks and benefits of the results. The study was performed in accordance with the Declaration of Helsinki. The subjects were nominated for Rio Olympic Games. Six Freestyle and three Greco-Roman wrestlers within them, have represented the Turkey National team. Besides, they have gained five Olympic medals in Rio 2016 Olympic Games (1gold, 2 silver, 2 bronze), thus the team was fifth place on the medal table in Rio 2016.

Demographic and anthropometric features of the whole research group is shown in Table 1 without differing between the styles.

Table 1. Demographic and anthropometric features (mean±sd) of the research group (n=36)

	Mean ± SD	Min.	Max.
Age (year)	23,7 ± 3,1	17,0	29,8
Training experience (year)	12,3 ± 3,1	6,0	19,0
Stature (cm)	171,7 ± 7,8	159,8	194,3
Body mass (BM) (kg)	82,3 ± 17,7	58,0	121,2
BMI (kg/m2)	27,7 ± 3,9	22,7	35,9
Body fat (BF) %	16,4 ± 4,7	8,0	25,0
Fat Free Mass(FFM) (kg)	68,1 ± 11,6	51,0	95,4

Procedures

Anthropometrics: In order to identify athletes' somatotype, body fat percentage and body mass index (BMI), body height, body mass, triceps, biceps, sub scapular, suprailiac and middle of calf' skin fold values, diameter measurements of humerusbicondylar and femur bicondylar, diameter measurements of muscled biceps and calf were obtained. The whole skin fold and diameter measurements was taken from the right side of the body. The Heat-Carter formula was used to identify the somatotype (Carter & Heath 1990). Body fat percentage were calculated with the formula developed by Siri (Durnin & Womersley 1974; Siri 1956).

Strength Tests: Right-left hand grip strength, right-left finger pinch strength and leg strength tests were performed by dynamometers (Baseline dynamometer, Fabrication Enterprises, USA). All strength tests result were calculated as relative strength values, which is dividing the test performance by the athlete's body weight.

Jumping Test: It was utilized jumping mat device for squat jump (SJ), counter movement jump (CMJ), drop jump (by using 40 cm box) tests (Smartjump, Fusionsport, Australia). Jumping mat was used during the drop jump test to measure the contact time of athletes. Elastic strength potential score was calculated by taking the difference between the CMJ-SJ performances (Arteaga et al., 2000). In determining anaerobic power (AP) with Lewis nomogram, the subjects' CMJ heights (d) and body weight were calculated by using the jump formula (given below).

$$AP= [(\sqrt{4,9} \times Weight) \times \sqrt{d}] \times 9.81 = watt$$

Speed Tests: In order to determine the subjects' sprint ability, running tests of 10 and 20 meter were performed. All results were recorded using photoelectric timing gates (Smartspeed, Fusionsport, Australia).

Pro-agility Test: For the pro-agility test, which is also known as the 20 yard running test, pins were set 5 yards (4,57m) on the left and on the right side (Figure 1). A timing gate (Fusionsport, Australia) was placed at the starting line. This way repeating passes were recorded. Before the test starts

the athletes takes position. When the athlete is ready she is first touching the right pin, then the left pin, passes the starting line and finishes the test. For each athlete the total time was recorded (Dawes & Roozen, 2012).
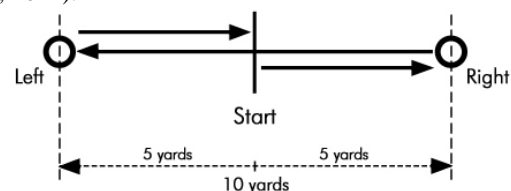

Figure 1. Diagram of the pro-agility test

Flexibility of the wrestlers were determined with using modified sit-and-reach test by normalized arm length (Baseline sit-reach scale, Fabrication Enterprises, USA).

Balance Tests: The standing stork test and standing stork test-blind were performed to determine the wrestlers' balance abilities (Mackenzie, 2005).

The participants were fully resting between the tests in the measurement process.

Statistical analysis

General characteristics of the participants were presented as means and standard deviations (±SD). Statistical comparison of the Greco-Roman and Freestyle wrestler groups was carried out using Mann Whitney-U test. Spearman's correlation coefficients (r=Spearman's rho) were used to express the relationships between parameters. Interpretation of correlation coefficients was as follows: $r \leq 0.49$ weak relationship; $0.50 \leq r \leq 0.74$ moderate relationship; and $r \geq 0.75$ strong relationship (Portney & Watkins, 2015). A p value less than 0.05 was considered statistically significant.

Results

The demographic and anthropometric features of the Greco-Roman and Freestyle wrestlers are presented in Table 2. No significant differences were found between the age, training experience, body height, body mass, BMI, FFM, endomorph and ectomorph variables of Greco-Roman and Freestyle except "Mesomorphy". The Freestyle wrestlers were

significantly muscled than Greco-Roman wrestlers (U=68, p=0.003, p<0.05).

Strength abilities which are hand grip, finger pinch and leg strength of the research group are presented in Table 3. And no significant differences were found for strength abilities in the Greco-Roman and Freestyle wrestlers.

Jumping abilities and anaerobic power in the groups are presented in Table 4. The Freestyle wrestlers were significantly differed for elastic strength ability than Greco-Roman wrestlers (U=77.0, p=0.007, p<0.05). Whereas the squat jump (SJ), counter movement jump (CMJ), anaerobic power (AP), drop jump (DJ) and contact time of drop jump values were similar between two groups (p>0.05).

Athletes' linear speed, pro-agility, flexibility and static balance results and their comparison were presented in Table 5. The Freestyle wrestlers were significantly faster and agile than Greco-Roman wrestlers (10mS: U=71.5, p=0.004; 20mS: U=55.0, p=0.001; ProA: U=84.0, p=0.014; p<0.05). On the other hand flexibility and balance abilities were similar according to findings (p>0.05).

Spearman's correlation coefficients were used to express the relationships among the selected variables for Greco-Roman and Freestyle wrestlers. These results were presented in Table 6. According to the findings, the moderate significant relationship between age and leg strength, elastic strength, agility values (r=-0.51/-0.60/0.52; p<0.05, respectively) were shown for Greco-Roman wrestlers. It means that a young wrestler has better leg strength, elastic strength and more agile than his older counterparts. Also Greco-Roman wrestlers has a negative relationship between training experience and elastic strength ability (r=-0.64, p<0.05). So the wrestlers who have elastic strength values are low while they have much training experience than others. For Freestyle wrestlers, the elastic strength ability has related with agility and flexibility (r=-0.49/-0.62; p<0.05, respectively).

There is a significantly and moderate level relationship between HG-total and leg strength ability for each of the group (Greco-Roman: r=0.63, p<0.05; Freestyle: r=0.61, p<0.05). When the total pinch strength were examined, it was seen that there is a positive significantly relation with HG, leg strength and a negative with body fat percentage for Greco-Roman wrestlers, but not for Freestyle wrestlers. The leg strength ability of Greco-Roman wrestlers can be explained as, the more it improves, the more their HG, pinch, speed, agility and balance abilities are improving as well.

For the Greco-Roman wrestlers, linear sprinting speed ability were found to be related with HG, leg strength, balance and body fat percentage values (r=-0.46/-0.59/0.71/-0.60/0.53; p<0.05, respectively). In other words, faster athletes within Greco-Roman wrestlers can perform a good level in terms of strength, agility and balance ability as well as less body fat percentage. No significantly relationship was found between speed ability and these abilities for Freestyle wrestler (p>0.05) as Greco-Roman wrestlers are.

The moderate relationships were found between body fat % and AP for both wrestling styles. In addition, there are moderate relationships between agility and balance (r=-0.52, p<0.05), also there are weak relationships between agility and body fat % (r=0.48, p<0.05) for Greco-Roman wrestlers. That means that if Greco-Roman wrestlers would like to be more agile, they should improve the values of their balance ability and reduce body fat percentage. It was found no relationship among these abilities for Freestyle wrestlers.

The significantly strong relation were found between FFM and AP values for not only Greco-Roman wrestlers but also Freestyle. Also FFM has moderate level significantly but negative relationship with grip strength for both wrestling styles. Once the lean mass of wrestlers have increased, athletes have exposed better AP ability. Whereas the grip strength values have decreased for the Greco-Roman (-0.66) and Freestyle wrestlers (-0.54).

Table 2. Demographic and anthropometric features of the research group and comparison of the variables

Variables	Greco-Roman	Freestyle	P
Age (year)	23.6±3.7	23.7±2.5	0.96
Training experience (year)	12.0±3.6	12.7±2.5	0.41
Stature (cm)	171.6±7.6	171.7±8.2	0.98
Body mass (kg)	82.9±17.8	81.6±18.1	0.64
BMI (kg/m^2)	27.9±3.9	27.4±4.0	0.51
Body fat %	17.3±4.2	15.4±5.2	0.25
Fat Free Mass (kg)	68.0±11.7	68.2±11.8	0.89
Endomorph	4.1±1.4	3.4±1.4	0.14
Mesomorph	7.7±1.2	9.1±1.3	0.00*

Ectomorph	1.0±0.5	1.2±0.6	0.13

*p<0.05

Table 3. Comparison of wrestlers' strength variables (kg) by their style. This results are relative to the body mass of athletes.

Variables	Greco-Roman	Freestyle	P
HG-right	0.64±0.78	0.68±0.96	0.16
HG-left	0.63±0.97	0.67±0.13	0.09
HG-Total	1.27±0.16	1.35±0.21	0.08
Pinch-right	0.15±0.02	0.16±0.04	0.13
Pinch-left	0.14±0.03	0.14±0.04	0.27
Pinch-Total	0.29±0.05	0.30±0.08	0.76
Leg Strength	2.21±0.21	2.12±0.62	1.00

p>0.05

Table 4. Comparison of the research group's jumping ability and anaerobic power (AP) between Greco-Roman and Freestyle

Variables	Greco-Roman	Freestyle	P
SJ (cm)	38.59±4.05	36.95±4.31	0.37
CMJ (cm)	39.71±4.46	39.70±3.97	0.92
Elastic strength (cm)	1.12±1.89	2.75±1.37	0.01*
AP (watt)	1129.2±228.1	1112.8±243.1	0.60
DJ (cm)	39.81±5.40	42.14±7.04	0.24
DJ-Contact time (s)	0.253±0.05	0.258±0.05	0.89

*p<0.05

Table 5. Comparison of Greco-Roman and Freestyle wrestlers' speed, agility, flexibility and balance abilities (s)

Variables	Greco-Roman	Freestyle	P
0-10m sprint(10mS)	1.761±0.09	1.692±0.04	0.00*
0-20m sprint (20mS)	3.084±0.14	2.963±0.06	0.00*
Pro-agility (ProA)	4.585±0.18	4.478±1.17	0.01*
Flexibility	45.68±7.53	42.43±8.67	0.25
Balance	9.20±9.53	20.51±18.99	0.06
Balance-Blind	2.59±0.67	3.17±1.62	0.15

*p<0.05

Table 6. Relationship among age, training experience, strength, anaerobic power, speed, agility, flexibility, balance abilities and body fat percentage, FFS in Greco-Roman and Freestyle wrestlers

		Age	Training Experience	HG-Total	Pinch-Total	Leg Strength	Elastic Strength	AP	20mS	ProA	Flexibility	Balance	Balance-Blind	Body Fat %
Age	Greco	1												
	Free													
Training Experience	Greco	0.84*	1											
	Free	0.86*												
HG-Total	Greco	-0.18	-0.47	1										
	Free	0.07	-0.11											
Pinch-Total	Greco	-0.01	0.08	0.58*	1									
	Free	-0.07	-0.06	0.34										
Leg Strength	Greco	-0.51*	-0.29	0.63*	0.46*	1								
	Free	-0.30	0.08	0.61*	0.17									
Elastic Strength	Greco	-0.60*	-0.64*	0.22	0.16	0.39	1							
	Free	-0.08	-0.11	-0.05	-0.11	-0.26								
AP	Greco	0.07	0.05	-0.60*	-0.33	-0.13	-0.21	1						
	Free	0.01	0.27	-0.59*	-0.55*	-0.36	-0.11							
20mS	Greco	0.10	0.01	-0.46*	-0.26	-0.59*	-0.20	0.22	1					
	Free	-0.07	-0.01	-0.26	0.03	-0.22	0.36	0.06						
ProA	Greco	0.52*	0.43	-0.44	-0.24	-0.49*	-0.36	0.21	0.71*	1				
	Free	-0.28	-0.07	-0.16	0.14	-0.09	-0.48*	-0.11	-0.04					
Flexibility	Greco	-0.36	-0.39	0.07	-0.02	0.04	0.10	-0.13	-0.06	-0.21	1			
	Free	0.09	0.05	-0.04	0.10	-0.01	-0.62*	-0.02	-0.21	0.30				
Balance	Greco	-0.22	-0.27	0.25	0.30	0.51*	0.44	-0.06	-0.38	-0.52*	-0.12	1		
	Free	-0.20	-0.27	0.43	0.00	-0.01	0.30	-0.42	0.15	0.17	-0.09			
Balance-Blind	Greco	0.08	0.05	0.41	0.25	0.38	0.20	-0.22	-0.60*	-0.35	-0.01	0.37	1	
	Free	-0.23	-0.38	0.05	0.07	-0.26	-0.08	-0.38	0.09	0.25	0.23	0.36		
Body Fat %	Greco	0.08	0.07	-0.40	-0.47*	-0.36	-0.30	0.64*	0.53*	0.48*	-0.09	-0.12	-0.28	1
	Free	0.20	0.45	-0.72*	-0.15	-0.45	-0.15	0.74*	0.05	0.13	0.14	-0.36	-0.35	
FFM	Greco	0.11	0.10	-0.66*	-0.37	-0.19	-0.27	0.95*	0.22	0.21	-0.17	-0.19	-0.38	0.51*
	Free	0.00	0.22	-0.54*	-0.55*	-0.28	-0.09	0.98*	0.16	-0.14	-0.09	-0.41	-0.42	0.67*

*p<0.05

Discussion

The study compares the anthropometric variables, strength, anaerobic power, speed, agility, balance and flexibility abilities in Olympic level male Greco-Roman and freestyle wrestlers.

In the comparing studies which have examined differences between elite Greco-Roman and Freestyle wrestlers were shown that there are not significantly differences in terms of the age and training experience (Zaccagni, 2012; Lopez-Gullon et al., 2011), it is also applied to elite junior wrestlers (Demirkan et al., 2014). The present study also has not found statistically significant differences concerning age and training experience in wrestling styles (p>0.05).Whereas there is a difference between elite and amateur wrestlers in terms of training experience (Pallarés, López-Gullón et al., 2011).

Optimal body composition is crucial for the wrestlers since they are paired by weight of body and they usually "gain weight" before each bout. Most of the wrestlers would like to have more lean mass, less body fat while reducing body weight (Basar et al. 2014). It was found that BMI was 27.9 and 27.4,

body fat percentage 17.3 and 15.4, FFM was 68.0 and 68.2 for Greco-Roman and Freestyle wrestlers, respectively. Additionally, there are no significant differences between wrestling styles (p>0.05). Kilinc and Ozen (2015) reported similarity to BMI in elite Greco-Roman (25.2) and Freestyle (26.3) wrestlers. In a research which deals with Italian wrestlers there was not found statistically significant differences concerning to BMI, body fat % and FFM for senior high level Greco-Roman and Freestyle wrestlers (Zaccagni 2012). In contrast to them, Basar et al. (2014) found differences for BMI, body fat percentage and FFM values in Greco-Roman and Freestyle wrestlers. Further, Turkish wrestlers who participated in the present study have much more body fat percentage (16.4%) than in other studies. Ramirez-Velez et al. (2014) have reported 13.6% for body fat rate of the Colombian wrestlers as well as Callan et al. (2000) 7.6% for US wrestlers. Horswill (1992) has shown that body fat percentages were range from 8.2% to 13.0% for senior wrestlers in his review study. In another study which is composed of the research group from five different countries found

that body fat percentage of Greco-Roman wrestlers were between 10.3% and 13.2%, for Freestyle were range from 10.3% to 14.1% (Lopez-Gullon et al. 2011). Generally, rates of body fat percentage are notified between 5% and %16 for male wrestlers(Kenney et al. 2012).

In terms of somatotype values, wrestlers are thought to have a mesomorphic character (very high muscularity) as the study that having been with Olympic wrestlers had an average somatotype of 2.3 (endomorph), 6.4 (mesomorph) and 1.6 (ectomorph) (Horswill 1992). Ackland (2009) have defined that somatotype of wrestlers is 2.8-6.1-1.6. Some previous studies have found somatotype values of elite wrestlers which are 3.8-5.3-1.6 (Ramirez-Velez et al. 2014), 1.8-6.7-1.1 (Sterkowicz-Przybycień et al. 2011), 2-8-1 (Carter & Heath 1990). The present study has revealed the somatotypes 4.1-7.7-1.0 for Greco-Roman and 3.4-9.1-1.2 for Freestyle wrestlers, and a difference was found for only mesomorphy value between the styles (p<0.05). However, a study which concerning European wrestlers has decelerated that somatotypes were 2.7-6.2-1.7 for Greco-Roman and 2.6-6.3-1.6 for Freestyle and found similarity between wrestlers of two styles (Charzewski et al. 1991). As well as Horswill (1992) reported no difference was observed between Greco-Roman and Freestyle wrestlers for the ratings.

Strength tests usually take part in the evaluation process of each level wrestlers due to one of the major component in order to the wrestling performance (Baechle & Earle, 2008). The present study has also examined strength ability with tests which are pinch, hand grip and leg strength tests through dynamometers. It were not found statistically significant differences between Greco-Roman and Freestyle wrestlers in terms of strength abilities which are pinch, hand grip and leg strength (p>0.05). In other words the wrestlers have been shown similar strength features notwithstanding to their different styles. Lopez-Gullon et al. (2011) reported alike results that there were not differences among strength abilities of Greco-Roman and Freestyle wrestlers. Contrary to these findings, the relative leg strength ability was found significantly different between the wrestling styles by Basar et al. (2014). According to Demirkiran et al. (2014), junior wrestlers have shown similarity not in leg strength ability but in hand grip values.

The current study has detected that no differences were observed in the jumping heights (SJ, CMJ, DJ) and anaerobic power which is related CMJ between the Greco-Roman and Freestyle athletes. In one of the previous studies reported that vertical jumping abilities and anaerobic power values which are both related to CMJ and Wingate test results were shown no differences between the Greco-Roman and Freestyle wrestling (Lopez-Gullon et al., 2011). In addition, numerous studies also have not found

differences in terms of anaerobic power values for lower body between the wrestling styles (Kilinc & Ozen, 2015; Demirkan et al., 2014; Horswill, 1992; Yoon, 2002). The elastic strength value has shown differentiation between wrestlers of both styles (p<0.05). It could not be found any studies about elastic strength ability in wrestling. The elastic strength is considered of the muscle contraction potentiation. If an athlete is able to perform better result, he or she is able to get more advantage of neuromechanical potentiation of muscle contraction given by the stretch shortening cycle (Arteaga et al., 2000). The Freestyle wrestlers have achieved a better performance than Greco-Roman wrestlers regarding to elastic strength values in the current study.

The importance of both speed and agility for determining the success of an athlete is well acknowledged among coaches of anaerobic sports (Hoffman, 2014) such as wrestling. Sprint test have been conventionally used in evaluation of wrestling performance, however the agility tests have taken place in the recent years (Mirzaei, Curby et al., 2011; Mirzaei et al., 2009; Demirkan et al., 2014; Kostovski et al., 2011; Baić et al., 2007; Mirzaei, David et al., 2011). The present study has occurred that concerning by the speed and agility abilities which were observed there are differences between the Greco-Roman and Freestyle wrestlers (p<0.05). In other words, Freestyle wrestlers are faster for 10 m. (1.692s), 20 m. (2.963s) run tests and more agile (4.478s) then Greco-Roman wrestlers (10m=1.761s, 20m=3.084s, ProA=4.585s). In contrast to this study, Mirzaei (2013) has not found differences between wrestling styles for speed and agility ability, as well as Lopez-Gullon et al. (2011) found similarity between the wrestling styles in terms of speed ability. But, Baic et al. (2007) have reported that the speed abilities seem to be similar, while the agility ability were observed as different between Greco-Roman and Freestyle.

The aim of this Olympic event is to disturb the opponents balance, there for the wrestlers have to control their static and dynamic posture so they can adequately perform techniques like displacements, pushes and pulls to let the rival fall (Perrot et al. 1998). In the present study, balance ability has been tested with open eyes and closed eyes. Vision, vestibular and somatosensory are three main balance systems of the body. By closing your eyes you shut down one of three systems which maintain your balance. Doing that shows how good the other systems are working. Such a test which is performed by shutting eyes gives as an idea about the balance system and how much of it is related to the eyes (Elphinston, 2008). Both of the balance tests findings have not shown significantly differences between Greco-Roman and Freestyle wrestling in the current study. Freestyle wrestlers was better than Greco-Roman about balance abilities, although not

statistically significant (p>0.05).It could not found any studies in terms of examined differences among wrestling styles for balance ability. However, Morán-Navarro et al. (2015) reported that no significant differences were observed in balance abilities between elite and no elite wrestlers. The researchers explained that in elite and Olympic levels of this sport the balance performance cannot be considered as a critical component of success. This inference was provided by the current study.

Flexibility is the most important component of physical fitness (Mirzaei, Curby, et al., 2011) and may help to prevent injury (Yoon, 2002) as well as one of the traditional tests to evaluate wrestlers as well as it has taken place almost all of the studies which have examined to determine profile of wrestlers or assessment of wrestlers' performance. In this context, the present study has also examined the flexibility of the research group. It could not be found any differences between the ability of Greco-Roman and Freestyle wrestlers in this study. The evidence is confirmed with the studies which are Lopez-Gullon et al. (2011), Mirzaei et al. (2013) and Basar et al. (2014). On the other hand, a study has found significantly differences between wrestling styles of junior wrestlers (Demirkan et al., 2014). The flexibility values which were found in the current study were higher than other studies findings both Greco-Roman and Freestyles (Arslanoglu, 2015; Mirzaei, Curby, et al., 2011; Mirzaei, David, et al., 2011; Mirzaei et al., 2009; Rahmani-Nia et al., 2007; Pallarés, López-Gullón, et al., 2011; Mirzaei et al., 2013; Demirkan et al., 2014; Lopez-Gullon et al., 2011; Schick et al., 2010).

As for the relationships among variables, the selected demographic, anthropometric and biomotoric features of wrestlers were compared to each other with one by one wrestling styles. According to a finding, strong relationships were found between AP and FFM for both Greco-Roman (0.95) and Freestyle (0.98) wrestlers. The previous studies have confirmed this result (Vardar et al. 2007; Horswill 1992; Yoon 2002). But the studies have found that there were not significant correlation between AP and body fat percentage unlike the current study which has found moderate relationship in the Greco-Roman (0.64) and Freestyle (0.74) wrestlers. The contradictory situation may explained that the research group has been the moderate relationship between body fat % and FFM, namely the wrestlers who have high body fat ratio they have also more muscle mass than other.

In addition, the body fat % of the research group were observed that has correlated moderate level with HG-total (-0.72) for Freestyle, speed (0.53) abilities and low level for pinch strength (-0.47) and agility (0.48) abilities for Greco-Roman wrestlers. The situation can explain that the abilities may be observe high level as well as when an athlete has low

body fat percentage. Even if Horswill (1992) and Yoon (2002) have declared that there was not relationship between body fat % and level of wrestler success, the present study has found that body fat percentage has effected speed, agility and some strength abilities of Olympic level wrestlers.

Wrestlers' features were compared in terms of strength abilities that were observed in a relationship between leg strength and age (-0.51), HG-total (0.63), pinch-total (0.46), speed (-0.59), agility (-0.49), balance (0.51) abilities for Greco-Roman wrestlers, however leg strength ability has correlated with the only HG-total (0.61) for Freestyle wrestlers. It can be deduced from the result that leg strength is a most important component which is supported with other biomotoric abilities of wrestlers. It was known that there were relationships between strength features of athletes and speed, agility abilities (Peñailillo et al., 2016), also there were the relationships between AP and speed, balance abilities of wrestlers (Kostovski et al., 2011).

Although the most studies were not found or a low relationship between the linear speed and agility ability (Mirzaei, Curby, et al., 2011; Sheppard & Young, 2006), the present study was observed the moderate level correlation (0.71) for Greco-Roman wrestlers, not Freestyle. Besides that, the linear speed ability has correlated with balance-blind ability in which moderate level (-0.60) for Greco-Roman wrestlers. In other words, the faster wrestler could be shown good level balance-blind ability than the others.

Conclusions

The present study has found differences for mesomorph values, elastic strength, agility and linear speed abilities between Greco-Roman and Freestyle wrestlers. However there were not found differences for other variables which are age, training experiences, stature, body mass, body fat %, FFM, strength, AP, vertical jumps, flexibility, balance abilities in wrestling styles. According to the correlation statistic, there are strong relationships between FFM and AP for both wrestling styles. Besides, it was observed that the leg strength ability is an important component which is supporting speed, agility, balance and other strength variables for Greco-Roman wrestlers. Some anthropometric and biomotoric features belong to wrestlers has shown differences between wrestling styles, as well as most of the relationships among variables for each style that were not observed similarity in terms of wrestling styles. Therefore, the studies which are examined about wrestlers' features or abilities should be separate as Greco-Roman and Freestyle. Also it may consider for the future studies that it may not reflect the relationships among variables of Olympic level Greco-Roman and Freestyle wrestlers in order to other level wrestlers.

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