

A comparative study of the maximal oxygen uptake (VO₂max) and body mass index (BMI) between Freestyle and Greco-Roman Wrestlers

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Abstract:

The research aims to conduct a comparative study in the vo₂max and BMI between Freestyle and Greco-Roman Wrestlers. As Wrestlers were selected for ages (23-26) years, and they are elite wrestlers for the Iraqi national team. They are (6) Wrestlers who were divided into two groups according to the type of activity being practiced. For vo₂max evaluation we used Fitmate Pro. Fitmate Pro is one of the products of the Italian company Cosmed specialized in the manufacture of sports and medical laboratory devices, and it is a reliable company on the international level and produces a lot of modern laboratory devices, as well as we used BMI to estimate the quantification of fat in whole body, the statistically analysis was performed via use T-test for analogues groups . We concluded that there were no significant differences between Freestyle and Greco-Roman Wrestlers in the two indicators of the vo₂max and BMI.

Keywords: Vo₂max, BMI, freestyle wrestling, Greco-Roman wrestling

I. Introduction:

Physiological tests play essential role in assessing the level of performance addition to finding comparisons, that places great demands on athletes in terms of physical preparation (Sterkowicz-Przybycień et al., 2011).The wrestling game have two styles, Freestyle and Greco-Roman that require functional and physical integration. Freestyle wrestling includes upper and lower body wrestling and is characteristic of short duration, high-intensity intermittent effort that lasts a total of 6 min for senior and junior wrestlers (2 × 3-min bouts). Greco-Roman wrestling allows only upper body moves and also has a bout duration of 6 min (2 × 3-

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min bouts) for senior and junior wrestlers according to new official rules. The sports level clearly distinguishes the results of tests of strength endurance of arm and trunk muscles, of which function is extremely important in wrestling (Sterkowicz and Starosta, 2005). The importance of lower and upper body power lies in the ability to lift the opponent during offensive maneuvers and resist attacks while in defense, elite wrestlers have been characterized by high maximal power output of the arm and leg muscles (Yoon, 2002). The vo_2max is an important aspect in order to comprehensive the best functional indicators in the both circulatory and respiratory systems, which are considers have a vital role in the mechanical point of the body because they work together to transport oxygen and nutriment through the blood to the various tissues of the body, and then they maintain its work. Also, the body mass index, which is the division of body weight by the square of height, is an important indicator, because the body mass index has shown a significant impact on all loads due to the importance of height and weight factors in wrestling struggles, as well as its importance in detecting diseases of the cardiovascular system addition to determine obesity. Many studies have compared the physical fitness characteristics of both wrestling styles (Horswill, 1992; Baić et al., 2007; Gullón et al., 2011,).Other than Demirkan and his collages reported Freestyle and Greco-Roman wrestlers have similar characteristic features (age, body height, body mass, fat percentage, fat-free mass, and body mass index) and sports experience, but Greco-Roman wrestlers have a higher level of anaerobic upper body power and capacity than Freestyle wrestlers. Greco-Roman wrestlers perform dynamic moves (e.g., lifting, throwing, and resisting opponents) that require upper body power, and all of the techniques in Greco-Roman wrestling must be performed with the upper body, both in competitions and training (Demirkan,etal 2014).Therefore, the present study compared between Freestyle and Greco-Roman elite wrestlers in both VO_2max and BMI, Our hypothesis was that the official rule differences between the Freestyle and Greco-Roman styles promote physical fitness differences based on technical implementation in wrestling, in which the implementation of the different styles of wrestling partially influences the physical fitness of wrestlers.

II. Material and Methods:

The researcher used the descriptive method to its suitability to the nature of the problem to be examined, as the sample was chosen intentionally by the Iraqi national team for wrestling, and the number (6) wrestlers were chosen on the basis of achievement and regularity in training, as three wrestling were chosen from the free activity and three wrestlers from the effectiveness and from the business side For living between (23-26) years.

Equipment:

The researchers have used the following devices to achieve the research goals, as follows:

- Fitmate Pro device to measure the(vo_2 max).
- The treadmill.
- Watch and pulse oximeter.

- Stop watch.

Subjects:

The researchers approved the following tests according to the: (BMI): It is extracted according to the following formula (Ted, 1999) Body mass index (BMI) = weight (kg) / squared length

as well as the ability to extract it and programmed into the (Fitmate Pro) device.

III. VO2Max during effort:

The measurement process was carried out according to the (Fitmate Pro) device and the related test, known as the Bruce test (Bruce, 1969), which was implemented based on the walking belt device.

- The sample of current research was attended to the fitness hall, after that we measuring the pulse, belt was installed remotely on the wrestler chest and fixative the mask connections on the Fitmate Pro device,

- then entering the basic information about the wrestler in the device, and after completing all procedures, the mask is applied to measure the maximum consumption

- The oxygen mask governed on the wrestler faces to allowed breathing via the mouth or nose only ,and

- after wearing the mask the wrestler was go up on the moving device and apply Bruce's test to estimate the vo2max through a maximum physical effort on the moving belt and this estimate as described in one of the reference books depends on the time of running on the convey or belt using the famous Bruce protocol, in which the speed of the moving belt is increased and the degree of inclination elevated every three minutes during the seven stages of the test steps.as well as the next paragraph explain table No.1 which clearly stages of Bruce test steps :

Table (No.1): illustrate the complete steps of Bruce test.

Stage	Time (Minutes)	Km/hour	% Gradient
1	3	2.7	10
2	3	4.0	12
3	3	5.4	14
4	3	6.7	16
5	3	8.0	18
6	3	8.8	20
7	3	9.6	22

Data analysis:

The general characteristics of the participants are presented as means and standard deviations (SD). The differences between the Freestyle and Greco-Roman wrestlers were determined using an independent *t*-test by using spss. Additionally, discriminant function analysis was performed to determine which set of variables most accurately predicted wrestling styles.

IV. Results:

The statically description of current result of the Freestyle and Greco-Roman wrestlers are presented in Table No 2. The differences between two groups in the variables assessing of physiological characteristics.

Table (NO.2) Mean and standard deviation of physiological characteristics of free style and Greco-roman wrestlers

Variables	Groups	mean	Std.Deviation	Std. Error mean
VO2MAX	freestyle	57.3000	8.6070	4.9692
	Greco-Roman	54.8333	2.2591	1.3043
AGE	freestyle	21.0000	3.0000	1.7321
	Greco-Roman	26.0000	.0000	.0000

WEIGHT	freestyle	69.0000	11.5326	6.6583
	Greco-Roman	70.6667	4.5092	2.6034
HEIGHT	freestyle	170.6667	4.9329	2.8480
	Greco-Roman	169.6667	3.7859	2.1858
BMI	freestyle	23.5667	2.9280	1.6905
	Greco-Roman	24.5000	1.7349	1.0017

The result of current study explains the physical characteristics and training experience of the Freestyle and Greco-Roman wrestlers which are presented as following: No significant differences were found between the characteristic level for all of the statistical analyses were $p < 0.05$. as explains on the table No. 3.

Table (No 3): Comparison of VO₂max and BMI between freestyle and Greco-Roman

Variables	unit Measure	Levene's test	Sig.	T. test	DF	Sig.
VO ₂ MAX	ml/kg/min.	2.316	0.203	0.480	4	0.656
BMI	Kg/m ² .	0.722	0.443	-0.475	4	0.660

V. Discussion:

The major findings of this investigation indicated that elite level of both Greco-Roman and Freestyle junior wrestlers presented by Vo₂max which considered one of the functional variables that are developed during the general preparation stage for that reason, this characteristic is subject to the development of all factories without exception, as it is an essential functional characteristic for the development of other physical characteristics, so there was no significant difference. This result coordinated with (Horswill, etal .1992) who suggest the absence of a significant difference between freestyle and Greco- Roman wrestlers at the (peak oxygen absorption). More over These results are consistent with previous studies that reported no differences in any of the anthropometrical and physical characteristics between the two mentioned groups (Demirkan *et al.*, 2011). As well as aerobic performance may be a basic requirement for wrestlers because a high level of

aerobic power allows the athlete to maintain a high intensity of activities during a match and provides effective recovery during the 30 s rest period between the two 3-min rounds (Demirkan *et al*, 2014 ;Sharratt, etal.1986).

On the other hand the body mass index, revealed no significant difference in both groups so that the researchers suggested that the effectiveness of wrestling is subject to the weight factor as a primary indicator for entering any championship, as a result the weight considered a basic competitor for the wrestler before the competitor himself who will face him. Accordingly, no significant difference appeared in the variable under consideration. this is also demonstrated by (Demirkan, etal. 2014) .Likewise this was also confirmed by others researchers who reported that no significant difference between wrestling and Roman wrestlers in the body mass index. (Gullón, etal. 2011).The researchers believe that the body mass index mostly reflects good physical and functional characteristics, in other words, that the low body mass index depends greatly on the individual's oxygen capabilities and his practice of physical and oxygen activities that help him to reduce the percentage of body fat, thus improving the functional capabilities and specifically the VO₂max, which was a natural consequence of the absence of significant differences due to the convergence of the two research groups in the variables under study.

VI. Conclusion:

Through the results obtained by the researchers, it became clear that there were no significant differences in the (VO₂Max) and body mass index (BMI) between freestyle and Greco-Roman wrestlers, and that the difference in the formal rules of wrestling style does not reinforce the difference in fitness between the two types recognized in the wrestling game.

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