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ΧΟΡΟΣ – DANCE SCIENCES

Οι «ιεροί» και «κοσμικοί» χοροί στο πλαίσιο του εθίμου «Γιανίτσαροι» και «Μπούλες» στη Νάουσα Μακεδονίας Καρλής Στ., Τυροβολά Β. & Κουτσούμπα Μ.	185
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A comparative study of body composition, aerobic power, anaerobic power and strenght of Iranian free-style and Greco-Roman whestlers participating in the beijing Olympic Games 2008

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ABSTRACT

The aim of this study was to investigate the relationship between body composition, aerobic power, anaerobic power and strength of Iranian Free-Style and Greco-Roman wrestlers participating in Beijing Olympic Games 2008 and comparison of these variables between two groups. Subjects: Twelve Iranian national Wrestlers [(Free-Style, N = 7, age = 22.8 ± 3.9 , height = 172.7 ± 6.3 , BF% = 11.1 ± 2.8) and (Greco-Roman, N = 5, age = 23.8 ± 1.6 , height = 179.2 ± 7 , BF% = 11.8 ± 4.4)] participated in this study. Method: fat free mass (FFM) and body fat percentage (%FM) were measured using bioelectrical impedance analyzer. Aerobic power was measured using Gas analyzing method. Wingate anaerobic and ergo jump tests were used to assess anaerobic power of arm and leg respectively. Strength was measured in 5 parts of body by multi-purpose machine included chest press, abdominal crunch, upper back, hand grip and dead lift. A Pearson correlation coefficient was used to determine relationship between variables and Independent-samples t test for comparison between variables. Results: the results showed that there are significant correlation between values of arm and leg Wingate tests with FFM ($r=0.83$, $p \leq 0.05$ and $r=0.91$, $p \leq 0.05$ respectively). The results of arm Wingate test was also positively associated with chest press ($r=0.72$, $p \leq 0.05$), and Leg Wingate test positively associated with upper back and dead lift ($r=0.85$, $p \leq 0.05$ and $r=0.68$, $p \leq 0.05$ respectively) and we found significant correlated between results of VO_{2max} and Ergo-jump test ($r=0.75$, $p \leq 0.05$). The results of Ergo-jump were negatively associated with BF% ($r=-0.64$, $p \leq 0.05$). Conclusion: We conclude that use of physical fitness tests for the measurement of the current status of the wrestler can provide both the wrestler and coach with information relative to the wrestler's current physiologic capability and can allow them to compare that capacity to reference values for appropriate peer groups. Practical implementation: the assessment of current status reveals strengths and relative weaknesses, and can become the basis for the development of an optimal training program.

Key-words: Elite wrestlers, physical fitness tests, power

INTRODUCTION

Competitive wrestling activity is extremely dynamic in nature and one of the most physically and metabolically challenging events in international level. Wrestling just like many other anaerobic sport fields puts a high amount of pressure on the body of the wrestlers and it changes the acid-base balance intensely (Kraemer, 2004). Different studies on worldwide young champion wrestlers, reveals that anaerobic power and strength are most important physical factors of success in wrestling (Hubner, 2004; Horswil, 1992). Nilsson et al. (2002), in a study on 42 Greco-Roman wrestlers from 9 different countries who had participated in the worldwide championship in 1998, has been reported that the range of accumulation of lactate in wrestlers' blood after the match was between 6.9 to 20.6 ml. mol/lit, and had the average of 1.48 ml. mol/lit in minutes.

Schmitt et al. (2005) reported that the body fat percentage of the national college wrestlers as 11.6 ± 3.9 and their fat free mass about 68.5 ± 8.7 Kg. Buford et al. (2008) reported this amount as 3 to 10 percents among national college wrestlers. James et al. (1997) reported that the change of fat free mass during one season has a direct relationship with power and strength of the wrestlers.

According to the current rules of wrestling, elite wrestlers must compete in tournament consisting of 4-5 games within the same day. In this situation, the importance of high power and aerobic fitness becomes more prominent. Since the wrestlers require faster recovery for the next contest. This can be gained just by high aerobic fitness.

There is no full agreement between the sport scientists and coaches regarding to the amount of using resistance training for optimum performance (McGuigan, 2006). Mirzaei et al. (2009), investigated the relative strength of the lower-extremity muscles applying Squat Test, and reported that in young national team wrestlers of Iran it is about 1.7 ± 0.02 kg/w.

Over the past 30 years, many researchers provided physical fitness profile and characteristics of elite wrestlers, but there are few research studies that compared physiological aspects of two distinct style of amateur wrestling. So, the aim of present study was to compare of body composition, aerobic power, anaerobic power and strength of Iranian

Free-Style (FS) and Greco-Roman (GR) wrestlers participating in the Beijing Olympic Games 2008. For this purpose, we identified the differences between GR and FS wrestlers in the variables assessing physical fitness.

METHODS

Participants

7 FS & 5 GR wrestlers who had qualified for the Beijing Olympic Games were assessed during the phase of general preparation in the training camps.

Measurements

FFM and %FM: FFM and %FM were measured using the body composition analyzer (Bioelectrical impedance method).

$\dot{V}O_{2max}$: Each wrestler performed a graded treadmill exercise test (Gas analyzer test) to estimate $\dot{V}O_{2max}$ by indirect calorimetry.

Wingate test: Maximal anaerobic power of the legs and arms were assessed by 8 seconds of leg cycling and arm cranking (Wingate test). The Wingate test consisted of an 8-s supramaximal cycling against a resistance load. Each test was performed on a Monark cycle ergometer (Model 894-E) and the load was calculated as $0.090 \text{ kg} \cdot \text{kg}^{-1}$ body mass for each participant. The wrestlers were requested to pedal or crank as fast as possible to preserve maximal pedaling speed until the end of the 8 second test period.

Ergo-jump: The score of repetitive jumps were recorded by predetermined work load formula in the machine.

Muscular strength: 5 tests including (Dead lift- Chest press- Abdominal crunch- Upper back- Grip strength) were used for assessing muscular strength of wrestlers using Technogym machine and a standard hand grip dynamometer.

Statistical analysis

General characteristics of the participants were presented as means and standard deviations. Statistical comparison of the FS & GR groups was carried out using Independent-samples t test.

RESULT

The results of Wingate tests, hand grip, chest press and dead lift in GR wrestlers were significantly better than FS wrestlers. The results of $\text{Vo}_{2\text{max}}$ and upper back in FS wrestlers were significantly better than GR wrestlers.

DISCUSSION

One of the main factors on which the athletes and coaches spent their time on, is the physical fitness. Regarding the importance of physical fitness in the success of athletes in reaching the elite level around the world; this factor received a special attention from the sport scientists and researchers. Finding the type and intense of relation between various factors of physical fitness in athletes, regarding different factors like sport field, age, gender, and different levels is of outmost importance.

The better results obtained by the GR wrestlers in the tests assessing anaerobic power and absolute strength can be explained by adaptive nature of GR wrestlers in executing a great number of specific techniques in this style of wrestling.

The better results obtained by the FS wrestlers in the tests assessing aerobic power and Ergo-jump scores can be explained by a greater complexity of this style of wrestling. Because in FS wrestling, all techniques from GR wrestling can be used as well as the techniques that include leg locks executed by using either arms or legs.

Generally the records obtained by the present study were somewhat lower than those of several reports. These differences may be explained by the stage of preparation of Iranian wrestlers.

In this study, the wrestlers were tested while they were at the start of general preparation of their periodization of training. The second reason for the differences from the previous research studies may probably explained by specific features of population of wrestlers that has been tested.

Although, promotion of the performance of a wrestler requires physical, psychological, technical, and tactical fitness and their related branches of the wrestlers at the same time; but measurement and evaluation of the factors of wrestlers' physical fitness, investigating the relationship among them, and comparing it with the present norms can lead to an understanding of strength and weak points of the wrestlers, as well as, scheduling and designing the wrestling exercises based on training science paradigms.

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