

57 - JUDOKAS ANAEROBIC CAPACITY ASSESSMENT

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INTRODUCTION

Judo is one of the most popular sports in the world and, according to the International Olympic Committee (IOC), it is the second most widespread sport worldwide. Turns out this way, the transformation of a martial art created to run as self-defense in a sport with high competitive level. Several ongoing studies have addressed the relevant features in the performance of judo athletes such as physiological variables, biomechanical and anthropometric.

Judo has physiological characteristics as the supply of energy for metabolism in exercise, and use both aerobic and anaerobic system. Thus, anaerobic fitness is extremely important for the sport, mainly when athletes apply a coup or shy away from an opponent's attack, speed of reaction or attack could decide the winner of the fight (FRANCHINI, 2001). So during the fights occur several peaks of action involving the features of anaerobic metabolism, since in each fight are applied several blows that require vigorous effort of the athlete so that it can succeed.

Some studies suggest that aerobic fitness is also important in this sport, because the fights are lasting five minutes, and in competitions, athletes are struggling on average 6-8 times per day. For maximum above exercises performed intermittently, as in judo, there is a decrease in the use of the glycolytic pathway and increased aerobic contribution to meet the energy demand of the activity (FRANCHINI et al., 1998).

In judo, the athlete must have a good system of glycolytic energy production, which can be demonstrated by high blood lactate concentrations found in judo athletes during the fight itself (FRANCHINI et al., 1998) and an adequate capacity aerobic power to sustain a good performance during the fight (Thomas et al., 1989).

To verify the characteristic anaerobic judokas there are studies that evaluate this physiological variable by means of anaerobic power. Thus, this study seeks to establish the physiological parameters of anaerobic power in judo athletes underwent a protocol of maximal anaerobic power an upper body cycle ergometer.

MATERIALS AND METHODS**Sample**

The sampling was intentional type of convenience, it was composed of 9 male judo athletes, aged between 14 and 26 years old (mean 18.7 ± 4.9). All participants performed a training with weekly frequency of four times, and participated in competitions at state and national levels. All subjects were informed of the research procedures, those responsible for teenagers and older athletes signed a consent form.

Instruments and Procedures

To characterize the sample it was collected anthropometric measures of body mass and height. After anthropometric measurements BMI it was calculated by dividing body mass (kg) by height squared (cm), producing the index in kg/m².

For the evaluation of anaerobic power it was performed four series of tests wingate for each athlete. The test protocol was followed according to Gaige & Docherty (1995), and adapted for the upper limbs in a bike brand Maxx adapted for upper limbs.

The protocol consisted of four sets of 30 seconds of maximal exercise on ergometer wingate, with an interval of 3 minutes between sets. During the break, the players sat and recovered passively. For each series it was determined relative mean power (RMp) and relative peak power (RPr). During the Wingate test, heart rate (HR) was monitored by a Polar S810i monitor. This procedure aimed to determine the FC post-test (higher heart rate after each series), 1min HR (HR 1 minute after the test) and lower HR (lower HR during the 3-minute recovery).

Statistical Analysis

For data analysis we used descriptive statistics with mean, standard deviation. Minimum and maximum. Data were analyzed with Excel 2007 software.

RESULTS AND DISCUSSION

The results of descriptive statistics of maximum, minimum, average and standard deviation regarding the sample characteristics for age, body mass and height of athletes, they are shown in Table 1.

TABLE 1 - Descriptive statistics of the sample regarding age, body mass and height of athletes.

	Minimum	Maximum	Mean	Standard Deviation
Body weight (kg)	58.5	94.5	71.0	10.5
Height (cm)	165	181	172	5.2
Age (years)	14.00	26.00	4.9	18.7
BMI (kg/m ²)	19.4	28.8	23.9	2.6

The results of descriptive statistics of maximum, minimum, average and standard deviation for the 1st test Intermittent Anaerobic are found in Table 2.

TABLE 2 - Descriptive statistics of the sample on the 1st test of anaerobic power

	Minimum	Maximum	Mean	SD
HR PRE TEST	72.00	120.0	95.1	16.8
HR POST TEST	163.0	187.0	171.8	7.0
HR AFTER 1 min.	119.0	151.0	132.8	12.3
HR AFTER 3 min.	99.0	130.0	113.3	10.3
AVERAGE POWER (W)	237.0	310.0	269.8	27.0
PEAK POWER (W)	320.8	505.7	414.8	57.9
RELATIVE POWER AVERAGE (W)	3.0	4.8	3.9	0.6
RELATIVE POWER PEAK (W)	4.5	7.3	5.9	0.9

The results of descriptive statistics of maximum, minimum, average and standard deviation for the 2nd test Intermittent Anaerobic found in Table 3

TABLE 3 - Descriptive statistics of the sample on the 2nd test of anaerobic power.

	Minimum	Maximum	Mean	SD
HR PRE TEST	95.0	136.0	115.6	12.3
HR POST TEST	168.0	203.0	180.7	10.5
HR AFTER 1 min.	122.0	153.0	139.3	8.8
HR AFTER 3 min.	107.0	145.0	125.8	11.4
AVERAGE POWER (W)	215.2	278.9	253.0	23.2
PEAK POWER (W)	298.0	653.1	426.7	119.2
RELATIVE POWER AVERAGE (W)	2.8	4.7	3.6	0.6
RELATIVE POWER PEAK (W)	4.3	10.9	6.1	2.0

The results of descriptive statistics of maximum, minimum, average and standard deviation for the 3rd test Intermittent Anaerobic found in Table 4.

TABLE 4 - Descriptive statistics of the sample as the 3rd test of anaerobic power.

	Minimum	Maximum	Mean	SD
HR PRE TEST	106.0	133.0	123.7	9.4
HR POST TEST	135.0	190.0	173.3	15.8
HR AFTER 1 min.	125.0	151.0	140.8	7.6
HR AFTER 3 min.	100.0	137.0	123.3	12.1
AVERAGE POWER (W)	187.4	269.3	220.0	30.9
PEAK POWER (W)	240.6	637.3	409.3	142.7
RELATIVE POWER AVERAGE (W)	3.9	4.7	3.2	0.6
RELATIVE POWER PEAK (W)	3.6	7.3	5.7	1.4

The results of descriptive statistics of maximum, minimum, average and standard deviation for the 4th Intermittent Anaerobic test are shown in TABLE 5.

TABLE 5 - Descriptive statistics of the sample as the 4th of anaerobic power test.

	Minimum	Maximum	Mean	SD
HR PRE TEST	102.0	152.0	129.4	15.5
HR POST TEST	152.0	191.0	176.0	12.1
HR AFTER 1 min.	109.0	157.0	138.4	15.2
HR AFTER 3 min.	94.0	135.0	120.2	12.8
AVERAGE POWER (W)	168.7	294.1	210.7	36.6
PEAK POWER (W)	305.6	529.7	394.3	79.7
RELATIVE POWER AVERAGE (W)	1.9	5.0	3.1	0.9
RELATIVE POWER PEAK (W)	4.7	7.0	5.6	0.7

The purpose of this study was to describe the behavior of athletes through the verification of anaerobic power and heart rate and to compare the variables with the other area studies.

According to Bogdan (1996), the increase in aerobic metabolism partially compensated for the reduction in the supply of energy from anaerobic pathways in a second series of above maximum exercise (Wingate test) and that the percentage of oxygen consumption at anaerobic threshold intensity (4 mmol) appears to be important in determining the recovery of output during repeated maximal exercise above.

Due to the predominance of anaerobic metabolism with lactic acid, the characteristic intermittence and the major demands of the upper limbs, the Wingate test for upper limbs has been the most widely used protocol for evaluation of anaerobic power and capacity in judo athletes (BAR-OR, 1987).

It was observed in the relative average power, a gradual decrease from the first test to last one. When comparing these results to another study with judoka proposed by Franchini (1999), we observed that the judoka of this study showed a lower performance on the test of anaerobic power. Thus, it is shown that for high performance sport, athletes need to train with higher volume of activities for enhancing anaerobic test performance and in the course of struggles.

The post-test heart rate when compared to the same study Franchini (1999) was higher, thus observing the evaluated judoka they were with indexes of cardiorespiratory recovery to a lesser degree. The frequency 1 minute post-test showed an increase among tests 2 and 3 and a drop in the fourth test, but when compared to the study team Franchini (1999), we analyzed the judoka of this study was better, i.e. improvement anaerobic capacity.

The peak power increased from first to second test due to physical wear and there was a fall in both the second and the third as the third to the fourth test. Relating to the average power observed a clear drop from first to fourth test. And comparing both the average power, when in power relative to the study of Franchini (1999) found lower values for test performance. It is suggested the athletes evaluated a training program aimed at increasing the anaerobic power, since that physical ability is of great importance for the athlete in judo.

CONCLUSION

From the results and limitations of this study, we can conclude that: judokas sample appear to be less able to do more anaerobic work compared to other studies. With respect to relative peak power of judo, it was clear that the 3-minute recovery interval and were sufficient to make recovery ability.

Finally, the results were analyzed HR post-test, it shows us the need to improve cardiovascular efficiency. Thus, it seems appropriate to include aerobic and anaerobic mode specifically as part of the training program for athletes involved in anaerobic intermittent mode feature.

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ABSTRACT

This study sought to evaluate the performance of judo athletes in an anaerobic task. The test was composed of four sets of wingate for upper limbs with an interval of 3 minutes between sets. For each series were determined relative mean power (RMP) and relative peak power (RPP). The sample was intentionally convenience, it was composed of 09 judo male, aged between 14 and 26 years old. The results showed that the judoka showed a low anaerobic performance. Regarding the relative peak power, it was indicated that the 3-minute recovery interval were sufficient to make recovery ability. The post-test heart rate should be improved to better cardiovascular efficiency for the same effort.

KEYWORDS: judo, anaerobic power, motor performance.

EXAMEN DE L'APTITUDE ANAEROBIQUE DE JUDOKAS

RÉSUMÉ

Cet étude a eu l'objectif de vérifier le dégagement de judokas en une activité anaerobique. L'examen a été composé par quatre séries de wingate pour des membres supérieurs avec l'intervalle de trois minutes entre les séries. La puissance moyenne relative (PMr) et la puissance de pic relative (PRr) ont été déterminées pour chacune des séries. L'échantillon a été intentionnelle par convenance constituée de neuf athlètes de judo du genre masculin avec l'âge entre 14 et 26 ans. Les résultats ont été que les judokas ont montré bas dégagement anaerobique. Concernant la puissance de pic relative, les trois minutes de récupération ou intervalle ont été indiqués comme suffisants pour montrer la capacité de récupération. La fréquence cardiaque après l'examen a besoin d'améliorer pour une meilleure efficacité cardiovasculaire pour le même effort.

MOTS-CLÉ : judo, puissance anaerobique, dégagement moteur.

EXAMEN DE LA APTITUD ANAERÓBICA DE JUDOCAS

RESUMEN

Este estudio procuró verificar el desempeño de judocas en una actividad anaeróbica. El teste fue compuesto de cuatro series de wingate para miembros superiores con intervalos de tres minutos entre las series. Para cada una de las series fueron determinadas la potencia media relativa (PMr) y la potencia de pico relativa (PRr). La muestra fue de forma intencional por convención constituida de nueve atletas de judo del género masculino con edad entre 14 y 26 años. Los resultados demostraron que los judocas presentaron bajo desempeño anaeróbico. En relación a la potencia de pico relativa fue indicado que los tres minutos de recuperación o intervalo fueron suficientes para presentar capacidad de recuperación. La frecuencia cardiaca después del teste necesitará ser mejorada para mayor eficacia cardiovascular par un mismo esfuerzo.

PALABRAS-LLAVE: judo, potencia anaeróbica, desempeño motor.

AVALIAÇÃO DA APTIDÃO ANAERÓBIA DE JUDOCAS

RESUMO

Este estudo procurou verificar o desempenho de judocas em uma tarefa anaeróbia. O teste foi composto de 4 séries de wingate para membros superiores com intervalo de 3 minutos entre as séries. Para cada uma das séries, foram determinadas a potência média relativa (PMr) e a potência de pico relativa (PPr). A amostra foi de forma intencional por conveniência, constituída de 09 atletas de judô do sexo masculino, com idade entre 14 e 26 anos. Os resultados demonstraram que os judocas apresentaram um baixo desempenho anaeróbio. Em relação à potência de pico relativa, foi indicado que os 3 minutos de recuperação ou intervalo foram suficientes para apresentarem capacidade de recuperação. A frequência cardíaca pós-teste deverá ser melhorada para melhor eficiência cardiovascular para um mesmo esforço.

PALAVRAS-CHAVE: judô, potência anaeróbia, desempenho motor.