117 - PHYSIOLOGICAL AND METABOLIC ANSWERS OF ATHLETE OF JUDO DURING TRAINING

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INTRODUCTION

Judo is a dynamic sport, that requires great physical and tactical ability for the success in high level (BRANCO and NARDO JR, 2007; FRANCHINI, 2001). It is characterized by combat that had short duration, high intensity and intermittent exercise (SIKORSKI, 1987). Of this form, judo is characterized for being a highly lactic sport. Mcardle (2001) displays that to if carrying through physical exercises of great intensity, accumulation of lactate in muscular group active e will have to occur, sequentially, this will be carried to sanguine chain. In collections carried through in the decade of 90 in the open games of São Paulo, the technician of the athletes of high level had perceived that the previous sanguine lactate concentration was one of the determinative factors for the success in the combat. Before the combat if initiating the value of sanguine lactate was verified, and the athlete with lesser concentration probably would win fight (DRIGO et al, 1994; CAVAZANI, 1991). Therefore it is of great importance that if trains physical aptitude e, mainly, the aerobic of judoka. It is basic that the aerobic training is periodic, therefore, assists in the removal of sanguine lactate and, with the great number of fights in the competitions, it probably would be less tired. Being thus, it is important to increase the performance of judoka in the competition, therefore the efforts are of high intensity and short duration, in which the main way of energy supply is the lactic anaerobic (FRANCHINI and TAKITO, 1998). This was demonstrated by innumerable studies that had verified high lactate concentrations after situations of trainings of judo and after combats properly said (SANTOS, 2002; MACEDO, 2001; STERKOWICZ, 1999; MORAES, 2000; FRANCHINI, 2001). As judo presents a long calendar of events, the athlete needs to be always in good physical condition. On the basis of the related aspects above, we search to analyze the following variable: corporal composition, perception of effort and sanguine lactate of the classified athletes to represent the city of Maringá in the open games of the Paraná in 2007.

MATERIAL AND METHODS

The sample of the study was constituted by 10 athletes of the Maringá team of judo that they were in activity and they will go to participate of the final phase of JAP'S 2007 (open Games of the Paraná) and had agreed to participating of the study, signing the Term of Free Assent and Information, being the study approved for the committee of ethics of the State University of Maringá, as seeming 184/2007. All the athletes have age between 18 years old and 35 years old. The average time of practical of the modality is superior the 14,5 years and the majority already participated of competitions of national and international level. In relation to the social-economic level it was questioned to the athletes in which classroom if they would fit (of low the high one), to this respect all had been included in the middle class. The date had been collected in the months of June and July of 2007. Measures in rest: A Filizola scale was used as instrument for attainment of the data with precision of 0,1 kg, maximum capacity of 150 kg and precision of 100g.

The measuring of the height was executed using one estadiometer with connected mobile connecting rod to the manual scale, with maximum capacity of 202 cm and precision of 1 mm). The cutaneous folds had been measured by an only appraiser, using adipometer of mark CESCORF scientific model, with precision of 0,1 mm. All the measures had been made three times of intercalated form, in hemicorp right, being identified and marked the anatomical places of the folds previously, in accordance with the standardization of Lohman et al, (1991). The corporal density was esteem through the equation of Guedes (1985), and the percentage of corporal fat through the equation of Siri cited for Guedes (1994). For measuring of the arterial pressure one used a stethoscope of the mark Premium and one sphygmomanometer of the mark BD, both of national manufacture. A metallic measurer of the Sanny mark was used for accomplishment of the measures of perimeters.

Parameters evaluated after the combats: CF, IPE, lactate concentration. Used instruments after the combats: lactometer of the mark Accutrend Lactate, manufactured in Germany, BM-Lactate ribbons, lancetador and lancets of the Roche mark, frequencymeter Polar FS1.

Immediately after the ending of the combat was carried through the measuring of the CF, using frequencymeter Polar located on the thorax of the athlete, while this measure was gotten the athlete indicated the index of perception of effort of the fight. Simultaneously, as an appraiser prepared the athlete for the collection of a drop of blood for the determination of the sanguine lactate concentration. For this, the asepsis was done of saves digital of an one of the fingers of the hand of the athlete and after that with the lancetador. For measuring of the maximum cardiac frequency it was used formula of Karvonen (apud Moraes, 2005), 220 FC = - Age. For the analysis of the data the descriptive statistical method with measures of position was used (central trend and dispersion), being demonstrated through tables. Also the correlation coefficient was used to analyze the association level enters the variable with level of significance of $p<0,05$.

ANALYSIS AND QUARREL OF THE DATA

In table 01 the data gotten in the evaluation of Maringá/PR judokas team are presented, expresses for the average, shunting line standard, maximum and minimum value, amplitude and coefficient of variation.

Table 1 - Characteristics of the sample.

	Age	Weight	Height	ICM	% Fat	Practice (years)	Graduation/band
Average	**23,4**	**75,6**	**1,747**	**24,61**	**11,54**	**14,5**	**Black**
S.L.S	4,74	14,86	0,07	3,61	7,78	6,24	-
Max.	34	102	1,82	31,48	25	27	Black
Min.	18	60	1,65	20,76	4,8	5	Green
Ampl.	16	42	0,17	10,72	20,2	22	-
V.C	20,27	19,66	3,76	14,66	67,39	43,03	-

The data presented in table 1 indicate that the athletes are young, however, count on a good practical time of the modality being in average 14,5 years, consequently raised graduation, 90% of the sample are characterized as sho-dan (first band-black color degree). In relation to the antrophometrics parameters it is verified that, in average, the athletes are eutrophycs

(normal weight) in accordance with the ICM, despite this present basses adiposity indices, what it allows to conclude that the same ones have raised ratio of lean corporal mass. In relation to other studies, one perceives that the present sample is sufficiently qualified (graduated) and, therefore, it has characteristics techniques sufficiently refined, what, probably, it influences in the indicating parameters of adopted intensity of effort. In the study carried through for Drigo et al (1996), the athletes had in average 10 years of practical in the modality. No longer of Franchini et al (2005), judokas of international level was all black band with minimum of 12 years of training. This strengthens the quality of the sample analyzed in the present study. In table 2 four combats are presented the data gotten after. The pointers of effort intensity had been collected (IPE) index of perception of effort of adapted Borg, cardiac frequency (CF) and sanguine lactate.

Table 2. Physiological answers of the athletes after the combats.

	CF Max.	LAC1	IPE1	LAC2	IPE2	LAC3	IPE3	LAC 4	IPE4
Average	**196,6**	**7,95**	**6,6**	**7,17**	**6,5**	**6,58**	**5,9**	**7,06**	**6,8**
S.L.S	4,74	2,56	1,17	2,91	2,22	2,53	1,97	2,48	1,40
Max.	202	12,3	8	12,5	9	11,4	9	10,8	9
Min.	186	4,2	5	3,2	4	3,5	3	3,6	5
Amplitude	16	8,1	3	9,3	5	7,9	6	7,2	4
V.C.	2,41	32,25	17,78	40,63	34,21	38,43	33,38	**35,11**	**20,56**

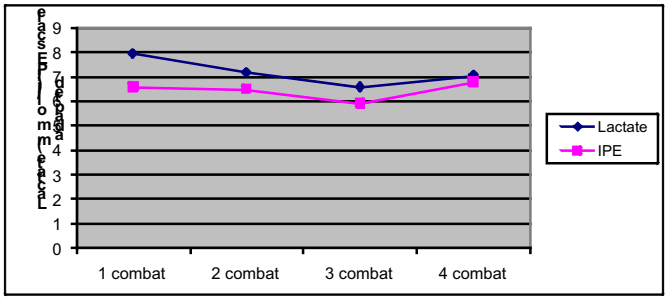
It is perceived that the combats had presented high intensity, therefore, all the adopted pointers had reached expressive values. The cardiac frequency, for example, arrived to reach a average of 93% of the maximum cardiac frequency for the age and the lesser percentile value was of 88% of the CF max., being able itself to evidence thus, that the level of the combats sufficiently was raised. As comparison parameter, it can be used the results observed in other flat modalities as 100 mts (athletism), flat tennis of field, 50 mts in swimming (Bompa, 2002 and McArdle, 2004).

One notices that the accumulation of sanguine lactate after-combat has narrow relation with the perception of effort in the combat properly said. The biggest lactate concentration was in 12,3 (mmol/l-1), what it very represents a superior concentration of the anaerobe threshold, that, when adopted the criterion of fixed concentration, establishes 4mmol-1. Despite this, these values meet next to the observed one in another specific study with judokas that the accomplishment of resistance tests and speed had presented 8 after average concentrations of mmol/l-1 (PUJADAS et al., 2002). On the other hand, Weineck (1999, p.189) affirms that lactate concentrations between 6,0 and 8,0 mmol/l-1 in the end of an examination indicate that the athlete was not stimulated until its limit of tolerance. Already a corresponding average stimulation the concentration around 8,0 the 12,0 mmol/l-1, between 12,0 and 16,0 mmol/l-1 a high load and values above of 16,0 mmol/l-1 would represent a high load very. How much the subjective perception of effort of the combat, the biggest observed value was of 8 points, in a scale that vary between zero and ten points.

In the other extremity, the minimum lactate concentration was of 4,2 (mmol/l-1), while that the IPE, relatively low/moderate indicated for the athlete was of 5 points. For Bald et al, (2002) the sanguineous lactate concentration becomes related with the IPE, or either, how much lesser will be the concentration of Lac, probably lesser it will be the IPE. Practical of specific exercises of judo demand the use of diverse power plants, in the combat predominates the anaerobic efforts, the pauses (it kills) in the combat, includes works more intense, reaches less high values of sanguine lactate (PUJADAS et al, 2002). During the fight sanguine lactate is close to the intensity and the duration of the effort, therefore if the combat will be short, being the projected adversary of Ippon, (perfect blow in short period of combat) certainly the sanguine lactate concentration will be lesser in relation to a combat that inside had end of the time stipulated for the rule, that is of 5 minutes (SOSA and FERNÁNDEZ, 2003).

One notice that the percentage of the maximum cardiac frequency (%CF max) after the combats is relatively high, being that 60% of the sample had reached the level of 90% of its maximum cardiac frequency in first handori (fight). No longer last confrontation % CF still more is raised, reaching 80% of the sample with levels above of 90 and 100% of its stipulated principles. This final relation can be express for the fatigue and muscular fatigue that also modulate tonus likeable of the independent nervous system, affecting, thus, this parameter (POWERS and HOWLEY, 2003).

Graph 1. Sanguineous lactate concentration x IPE (adapted).



In graph 1 it can be observed that the sanguine lactate concentration and the index of effort perception (IPE) ploughs correlated. This is evidenced with to bigger clarity in, third and room combats. In this way, it is possible, in the practical one of judo, the adoption of to pointer IPE form of accompaniment in the sessions of training of the athletes. This to pointer has been used successfully in to other modalities, they tell you the Borin et al (2007) in relation you basquet, volley, tennis. Such procedure, will be being not invasive and of easy attainment has great possibility of application in judo. Another aspect that consider detach is the intensity of the fights, demonstrated will be the physiological pointers (CF, lactate concentration) and also will be the IPE. Thus, it is evident that the practitioners of this olympic modality need orientations and evaluations that indicate them its limits and potentialities, so that they can explores its potential with the minimum of risks.

CONCLUSION

The gotten results demonstrate that the training of judo in the daily pay-competitive phase produces high sanguine lactate concentrations, raised IPE and cardiac frequency. In this way, knowing itself that the adopted performance of the athletes and physiological pointers are close on to the victory or defeat of judoka sends regards use to it of the periodic training in judo, as tactical, physical training (with weights) and mainly the aerobic organism, that will assist in the reduction of the concentration of sanguine lactate.

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PHYSIOLOGICS AND METABOLICS ANSWERS OF JUDO ATHLETES DURING TRAINING

ABSTRACT

The objective of this study was to verify in athlete of judo of the masculine sex the physiological and metabolic variable during a training session. The athletes had age between 18 - 34 years old, being all pertaining a have equipped participant of the open games of the Paraná in the year of 2007. The sample was constituted by 10 athletes, who had in average 14,5 years of practical of the modality. The sanguineous lactate concentration, cardiac frequency (CF), and the IPE had been collected as parameters of effort intensity, during the *Handoris* (combats). We evidence that the accumulation of sanguineous lactate has great relation with the index of effort perception (during the combats how much lesser the concentration of lactate, minor would be the subjective scale of effort demonstrated for the athlete). The gotten results demonstrate high sanguineous lactate concentrations during the training, with 12,5 peak (mmol/l-1), and also raised answers of cardiac frequency, reaching 102% of the CF max. for the age. Knowing of the importance of the income and performance of the athletes and that sanguineous lactate is closer to the victory or defeat of judoka suggests that the periodic training in judo can use the tactical, physical training mainly (with weights) and the aerobic organism, that would assist in the reduction of the concentration of sanguineous lactate.

RÉPONSES PHYSIOLOGIQUES et METABOLIQUES DES ATHLÈTES de JUDO PENDANT LA FORMATION

RESUMÉ

L'objectif de cette étude était de vérifier dans l'athlète du judô du sexe masculin 0 les variables physiologique et métabolique pendant une session de formation. Les athlètes ont eu l'âge entre 18 - 34 ans de , tout concernant un participant équipé par des jeux ouverts du Paraná par année de 2007. L'échantillon a été constitué par 10 athlètes, qui ont eu à la moyenne 14.5 ans de pratique de la modalité. La concentration sanguineous en lactate, la fréquence cardiaque (FC), et l'IPE avaient été rassemblés comme paramètres de l'intensité d'effort, pendant le Handoris (combats). Nous démontrons que l'accumulation du lactate sanguineous a la grande relation avec l'index de la perception d'effort (pendant les combats combien moins la concentration du lactate, mineur coûteraient la balance subjective de l'effort démontrée pour l'athlète). Les résultats obtenus démontrent des concentrations sanguineous élevées en lactate pendant la formation, avec la crête 12.5 (mmol/l-1), et des réponses également augmentées de la fréquence cardiaque, atteignant 102% du FCmáx. pour l'âge. Savoir d'importance du

revenu et de l'exécution des athlètes et de ce lactate sanguineous est intimamente sur la victoire ou la défaite du judoka suggère que le periodization de la formation dans le judô puisse employer la formation tactique et physique principalement (avec des poids) et l'organization aérobie, qui aideraient à la réduction de la concentration du lactate sanguineous.

RESPUESTAS FISIOLOGICAS y METABOLICAS DE LOS ATLETAS de JUDÔ DURANTE EL ENTRENAMIENTO

RESUMÉN

El objetivo de este estudio era verificar en el atleta del judô del sexo masculino las 0 variables fisiológica y metabólica durante una sesión del entrenamiento. Los atletas tenían edad entre 18 - 34 años de viejo, todo perteneciendo un participante equipado tener de los juegos abiertos del Paraná en el año de 2007. La muestra fue constituida por 10 atletas, que tenían en promedio 14.5 años de práctico de la modalidad. La concentración sanguineous del lactato, la frecuencia cardiaca (FC), y el IPE habían sido recogidos como parámetros de la intensidad del esfuerzo, durante el Handoris (combates). Evidenciamos que la acumulación del lactato sanguineous tiene gran relación con el índice de la opinión del esfuerzo (durante los combates cuánto menos la concentración del lactato, menor de edad sería la escala subjetiva del esfuerzo demostrada para el atleta). Los resultados conseguidos demuestran altas concentraciones sanguineous del lactato durante el entrenamiento, con el pico 12.5 (mmol/l-1), y las respuestas también levantadas de la frecuencia cardiaca, alcanzando 102% del FCmáx. para la edad. El saber de la importancia de la renta y del funcionamiento de los atletas y de ese lactato sanguineous es intimamente en la victoria o la derrota del judoka sugiere que el periodization del entrenamiento en judô pueda utilizar el entrenamiento táctico, físico principalmente (con los pesos) y el organismo aerobio, que asistirían a la reducción de la concentración del lactato sanguineous.

RESPOSTAS FISIOLÓGICAS E METABÓLICAS DE ATLETAS DE JUDÔ DURANTE TREINAMENTO

RESUMO

O objetivo desse estudo foi verificar as variáveis fisiológicas e metabólicas em atletas de judô do sexo masculino durante uma sessão de treinamento. Os atletas tinham idade entre 18 e 34 anos, sendo todos pertencentes à equipe participante dos jogos abertos do Paraná no ano de 2007. A amostra foi constituída por 10 atletas, que tinham em média 14,5 anos de prática da modalidade. Foram coletados como parâmetros de intensidade de esforço a concentração de lactato sangüíneo, freqüência cardíaca (FC), e o IPE, durante os *Handoris* (combates). Constatamos que o acúmulo de lactato sangüíneo tem grande relação com o índice de percepção de esforço (durante os combates, quanto menor a concentração do lactato, menor seria a escala subjetiva de esforço demonstrada pelo atleta). Os resultados obtidos demonstram altas concentrações de lactato sangüíneo durante o treinamento, com pico de 12,5 (mmol/l^{-1}), e também elevadas respostas de freqüência cardíaca, atingindo 102% da FCmáx. para a idade. Sabendo da importância do rendimento e desempenho dos atletas e que o lactato sangüíneo está intimamente ligado a vitória ou derrota do judoca, sugere-se que a periodização do treinamento no judô possa empregar o treinamento tático, físico (com pesos) e principalmente o aeróbio, que auxiliará na redução da concentração do lactato sangüíneo.

PALAVRAS-CHAVE: Judô; Lactato Sangüíneo; Freqüência Cardíaca, IPE.