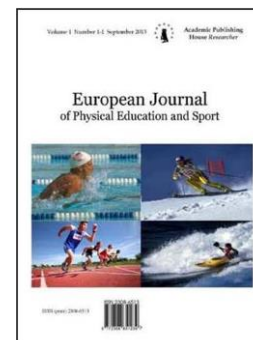


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Articles and Statements

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Monitoring the Response of Judoists' Organisms To Training Load

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Abstract

The aim of our contribution was to find out the response of organisms to training load in the judoists of the Army Sports Club Dukla Banská Bystrica. The research sample consisted of 6 top judoists. The main method was finding out the level of blood lactate by means of the automatic analyzer Biosen C Line Sport. Due to the maximum values of blood lactate, which were measured in randori training – 8.03 mmol/l, it is obvious that the presented values do not reach average values, which were stated by e. g. Degoute et al. (2003) 12.3 mmol/l, Žára (1989) 12.36 mmol/l, Zbigniew et al. (2010) between 12 mmol/l and 13.4 mmol/l depending on the duration of a match in randori matches in competitions.

Keywords: Judo; Training load; Blood lactate.

Introduction

Judo is an Olympic sport characterized by short duration, high intensity of load with frequent interruptions of this performance. If judoists want to be successful in international competitions, they have to acquire complex skills and tactical perfection connected with high physical fitness during trainings (Franchini et al 2011).

As for physical abilities, high demands are laid on a sportsman referring to the endurance in dynamic strength of all main muscle groups and static strength of the arms and trunk. The main prerequisite for the development of strength abilities is a high level of maximum strength. Endurance requirements, according to Velé (2000) are based on the duration of individual matches – in many cases it is as much as 5 minutes of actual time. Velé (2000) further states that achieving a ranking place in a judo competition involves taking part in 4 – 5 matches in a day or half a day, and the heart rate in important matches ranges between 180 and 195 pulses per one minute. The lactate level in such cases ranges between 10 and 15 mmol/l. In this view, the above facts put high demands on the ability of the organism to give a top performance in hypoxic conditions.

Zbigniew et al. (2010) in their research point to the fact that the longer the duration of individual matches (randori) is, the higher the blood lactate level in competitors is; – this can be confirmed by the results of measuring 29 senior Polish judoists at the age of 24 – 28 years.

According to Štefanovský and Janata (2010), the intensity of load in judo is basically in agreement with the intensity of energy expenditure. In practice it means that the change in voluntary effort of a judoist during a match induces corresponding changes in energy expenditure, which however, is not, according to Clarisa et al. (2011), properly illustrated. It is connected with the variety of training programmes, but also with non-structured movement activities during the matches – randori, whether in training or non-training conditions, due to the available methods of observing.

Due to the above facts, the indicators of energy metabolism – the heart rate and lactate, are indirect indicators of internal load, which were, in judo, investigated by e. g. Franchini et al (2009), Bonitch et al. (2010), and others.

Knowing the level of blood lactate enables analyzing several spheres of training process:

↳ it enables an analysis of aerobic capacity of a sportsman in order to determine an appropriate intensity of exercises for further progress in training process (Faude, Kindermann and Meyer, 2009);

↳ the information on lactate characteristics of a sportsman gives us an idea of how the muscle system struggles during individual exercises or matches (Beneke, Leithäuser and Ochentel, 2011).

The aim of each systematic training process is to gradually increase the resistance of the organism to adequate load with respect to a competition period. Respecting the adaptation patterns in the organism should aim at the change in biological and psychical discomfort to the internal comfort in higher physiological and biochemical model parameters such as competition conditions. This long-term adaptation mechanism creates optimal prerequisites for the development and long-term maintenance of physical form.

The knowledge of the inner and outer load in a training match will enable us to determine the current level of special fitness and physical form of judoists. Model situations in training, which are based on real match situations, can be repeated in training with great fitness load, and this process increases specific stamina of the organism. The aim of our work within the framework of grant Vega 1/0927/12 **“Diagnostics of the Response of Organism to Training and Competition Load in Combat Sports”** was, on the basis of detected values of blood lactate, to compare the intensity of load in judo training after a training match – randori.

Materials and methods

We measured lactate levels during the training process in the judoists of the Army Sports Club (ASK) Dukla Banská Bystrica. Lactate levels were detected from capillary blood of the judoists after a training match randori, which lasted 5 minutes of actual time, in the 1st, 4th, and 8th minute of rest. Blood samples were taken from finger tips. Lactate levels were measured by means of the apparatus Biosen C Line Sport. The apparatus employs an electrochemical principle of measuring, combined with chip technology, and makes it possible to analyze lactate levels within the range of 0.5 – 40 mmol/l with an accuracy of up to 1.5 % at 12 mmol/l.

In order to minimize mistakes (the apparatus's deviation), we repeatedly evaluated the results three times, and in our paper we present average values of the three measurements. The analyzer contains a rotor with 15 positions, and enables almost 100 analyses in one hour. Our research sample consisted of 6 top judoists, members of the Army Sports Club (ASK) Dukla Banská Bystrica.

Research results and discussion

Fig. 1 – 6 present the values of blood lactate in 6 top judoists in the 1st, 4th, and 8th minute of rest after a training match randori, which took 5 minutes of actual time. Fig. 7 shows the arithmetic mean of blood lactate values that we detected.

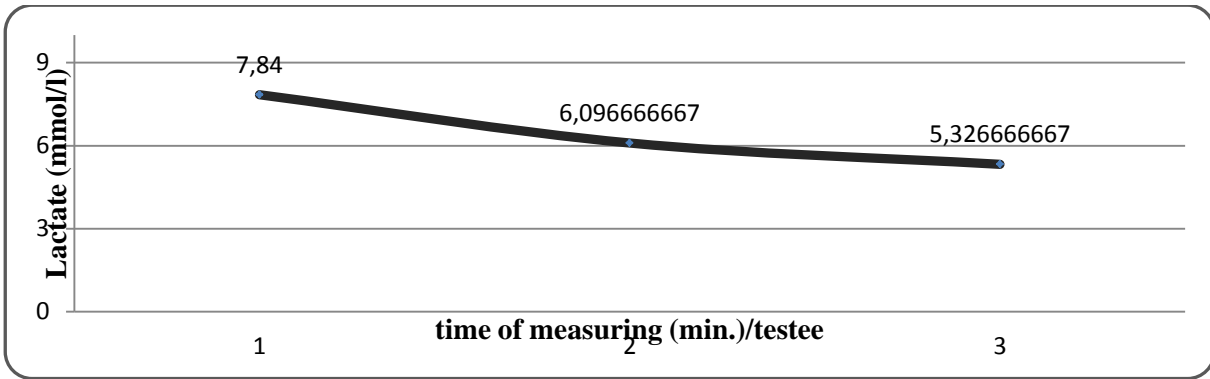


Fig. 1. The values of blood lactate of the judoist M.R. in the 1st, 4th and 8th minute of rest

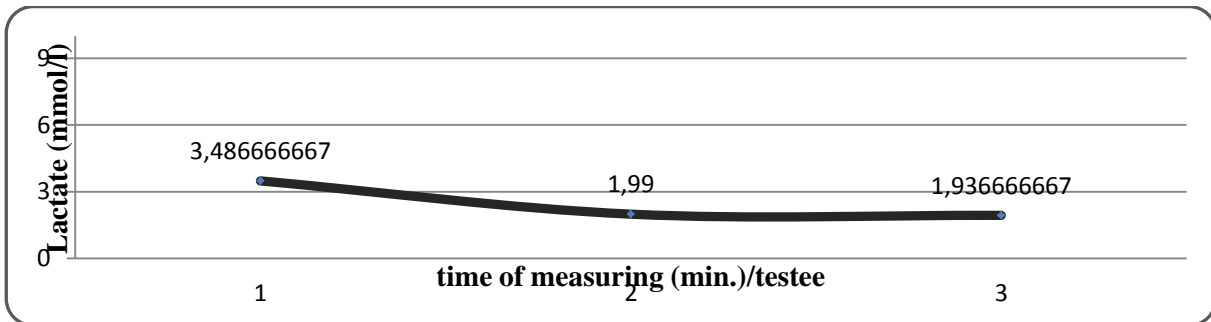


Fig. 2. The values of blood lactate of the judoist M.M. in the 1st, 4th and 8th minute of rest

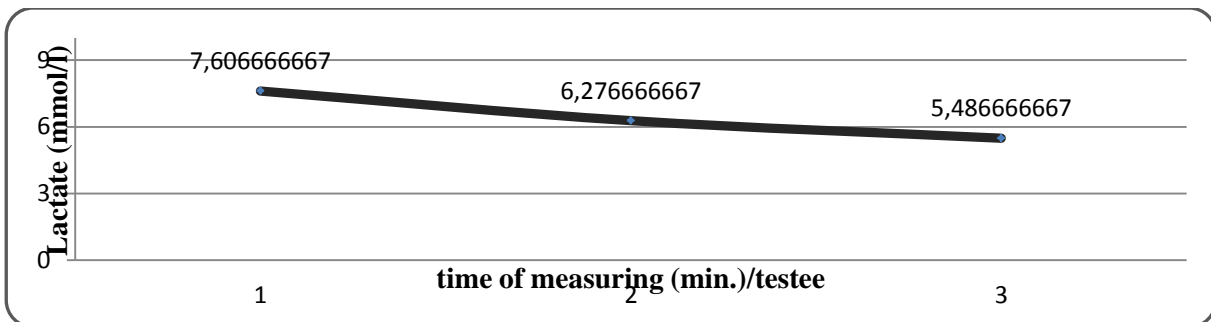


Fig. 3. The values of blood lactate of the judoist A.G. in the 1st, 4th and 8th minute of rest

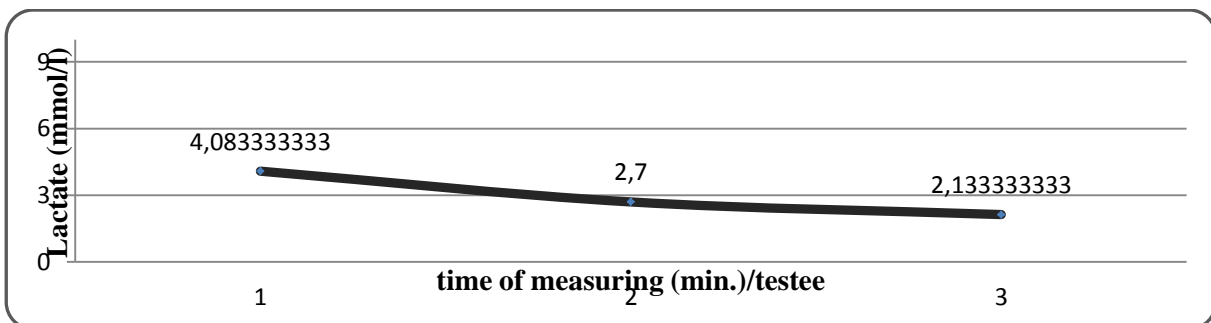


Fig. 4. The values of blood lactate of the judoist M.P. in the 1st, 4th and 8th minute of rest

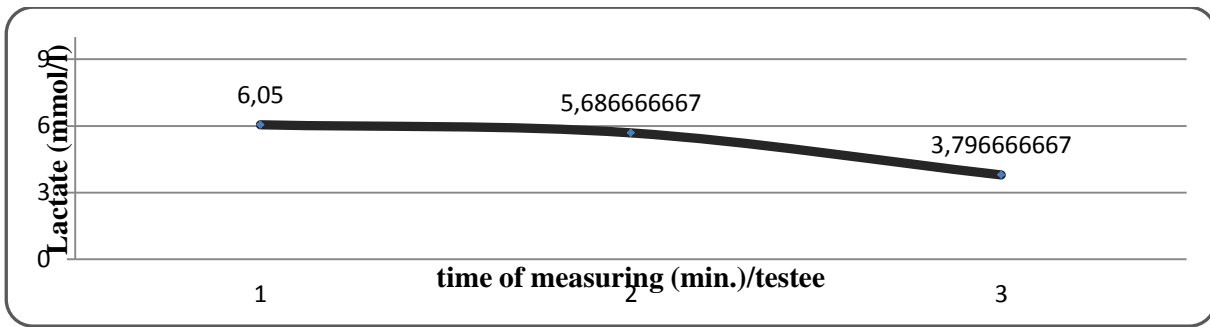


Fig. 5. The values of blood lactate of the judoist M.J. in the 1st, 4th and 8th minute of rest

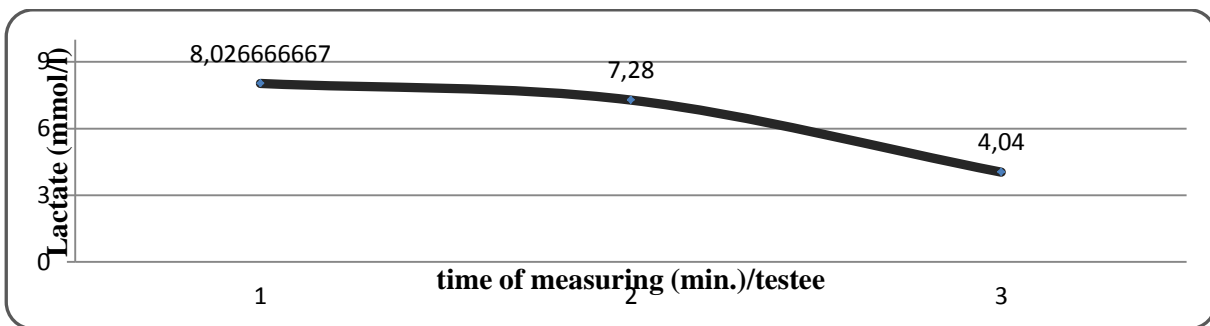


Fig. 6. The values of blood lactate of the judoist M.H. in the 1st, 4th and 8th minute of rest

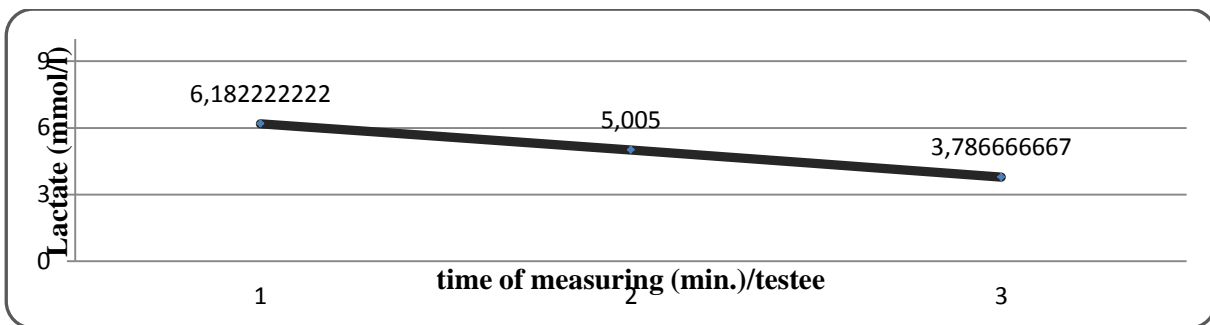


Fig. 7. Arithmetic mean of blood lactate values of six top judoists in the 1st, 4th and 8th minute of rest

The results presented in Fig. 1 – 6 show that the highest values of blood lactate in the 1st minute of rest occurred in the sportsman M.H. – 8,03 mmol/l, and the lowest values in the sportsman M.M. – 3,49 mmol/l. In the 4th minute of rest the highest values of blood lactate were again detected in the sportsman M.H. – 7,28 mmol/l, and the lowest values in the sportsman M.M. – 1,99 mmol/l. The highest level of blood lactate in the 8th minute of rest was detected in the sportsman A.G. – 5,49 mmol/l, and the lowest level in the sportsman M.M. – 1,94 mmol/l.

As can be seen in Fig. 7, the arithmetic mean of blood lactate values in the sportsmen was 6.18 mmol/l in the 1st minute of rest, 5.01 mmol/l in the 4th minute of rest, and 3.79 mmol/l in the 8th minute of rest.

Due to the maximum blood lactate values, which were detected in a training randori – 8.03 mmol/l, it is obvious that the values do not amount to the average values that were detected by e. g. Degoute et al. (2003) 12.3 mmol/l, Žára (1989) 12.36 mmol/l, Zbigniew et al. (2010) from 12 mmol/l to 13.4 mmol/l in dependence on the duration of a match in match randori in competitions.

Conclusion

We are fully aware of the fact that there are many factors that can influence blood lactate values, e. g. the intensity, duration and quality of motion activity (the quality of the opponent and his combat employment), the dominance of a certain type of muscle fibres, capillarization of muscle fibres, current reserves of glycogen in the muscles and liver, and also the range of tissue buffer system (Bielik, 2004). However, based on the results of our work, we can point out to the following facts and recommendations.

- to monitor and analyze the inner load of sportsmen in the main parts of the training process – not only on the basis of lactate level, VO_2 max., but also from the aspect of heart rate, saturation of haemoglobin by oxygen in the arterial part of the bloodstream, and the like;
- to model the training process according to the conditions of competition load – mainly in the view of structure and intensity of load, with the aim to approximate to competition load as much as possible;
- to use sparring partners from other clubs – common trainings;
- to participate in common training camps, where judoists can be confronted with a wider number of opponents;
- to introduce into the training process means of general load where we can more effectively model maximum and sub-maximum intensity of load, which should correspond to the intensity of competition load (Štefanovský-Janata, 2010).

References:

1. BENEKE R., LEITHÄUSER, R. M. & OCHENTEL, O. (2011). Blood lactate diagnostics in exercise testing and training. *J Sports Physiol Perform* 2011;6(1):8-24.
2. BIELIK, V. (2006). Laktát – významný medziprodukt látkovej premeny. *Telesná výchova a šport*, roč. 16, 2006, č. 1, s. 29-31.
3. BONITCH et al (2010). Changes in peak leg power induced by successive judo bouts and their relationship to lactate production. *J. Sports. Sci.*, 2010;28(14):1527-1534
4. CLARYS, P. et al (2011). Energy expenditure and intake in judo athletes during training camp. *Journal of Combat Sports and Martial Arts*, 2011, vol. 2, n. 1, s.7-11. [citované 17.11.2014] Dostupné z <http://combatsports.edu.pl/abstracted.php?level=5&ICID=>
5. DEGOUTTE, F., JOUANEL, P. & FILAIRE, E. (2003). Energy demands during a judo match and recovery. *Br J Sports Med* 2003;37:245-249 doi:10.1136/bjism.37.3.245 [citované 17.11.2014] Dostupné z <http://bjsm.bmj.com/content/37/3/245.full>
6. FAUDE, O., KINDERMANN, W. & MEYER, T. (2009). Lactate threshold concepts: How valid are they? *Sports Med* 2009;39(6):469-490.
7. FRANCHINI E. et al (2011). Physiological profiles of elite judo athletes. *Sports Med* 2011;41(2):147-66.
8. FRANCHINI, E. et al (2009). Effects of recovery type after a judo match on blood lactate and performance in specific and non-specific judo tasks. *Eur. J. Appl Physiol.*, 2009;107(4):377-383.
9. ŠTEFANOVSKÝ, M. & JANATA, M. (2010). Meranie laktátu v súťažnom stretnutí džudo. *Studia Kinanthropologica*, roč.2, 2010, č. 11, s. 63-69.
10. ŠTEFANOVSKÝ, M. (2009). *Džudo I. Teória a didaktika*. Bratislava: Fakulta telesnej výchovy a športu, UK Bratislava, 2009, 104 s.
11. VELE, T. (2000). *Metodika nácviku juda pro začátečníky*. [citované 17.11.2014] Dostupné z <http://web.quick.cz/judo.turnov/frame.htm>
12. ZBIGNIEW, O. et al (2010). Studies on lactate peak in blood following judo match. *Journal of Combat Sports and Martial Arts*, Volume 1, Number 2, 2010. [citované 17.11.2014] Dostupné z <http://combatsports.edu.pl/abstracted.php?level=5&ICID=>
13. ŽÁRA, J. (1989). *Objektivizace intenzity tréninkových zatížení judistů*. Metodický dopis. Praha: ÚV ČSTV Védecko-metodické oddělení, 1989, 35 s.

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Мониторинг тела спортсменов в дзюдо под влиянием тренировочной нагрузки

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Аннотация. Цель данной работы было определить реакцию организма на тренировочной нагрузки у спортсменов в дзюдо Дукла Банска-Быстрица. Выборка включала шесть лучших спортсменов по дзюдо. Ключ метод обнаружения пожара лактата в крови быть автоматический анализатор Биосен С Line Sport. С учетом максимальных уровней лактата в крови, которые были измерены в учебном рандори – 8,03 ммоль / л, то ясно, что значение падает ниже среднего значения, как в примере: Degoute и др. (2003) 12,3 ммоль / л, Зара (1989) 12,36 ммоль / л, а Збигнев и др. (2010) от 12 ммоль / л до 13,4 ммоль / л в зависимости от продолжительности матча рандори в соревнованиях.

Ключевые слова: дзюдо; тренировочная нагрузка; лактата в крови.