Training Load Monitoring in Judo: Comparison Between the Training Load Intensity Planned by the Coach and the Intensity Experienced by the Athlete

EXERCISE AND SPORTS SCIENCES

ORIGINAL ARTICLE

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ABSTRACT

The aim of this study was to compare the perception of the training load intensity of Judo coaches and athletes. The sample consisted of 4 coaches and 40 athletes of the Brazilian National Judo Team. The comparison between the intensity planned by the coach and the intensity experienced by the athletes was determined by the Session RPE method during a "Training camp". In order to assess lactate responses to training, blood samples were collected pre- and post training session. The intensity experienced by athletes was higher than the intensity planned by coaches in all training sessions. Regarding lactate concentration, it was observed an increase at post-training as compared to pre-training in all sessions, with no differences between sessions. The results of this study demonstrate that although the training session has been developed by experienced coaches, significant differences were detected between the intensity of external training load planned by the coach and the intensity of the internal training load experienced by the athletes. These data reinforce the relevance of training monitoring in order to maximize performance of elite athletes.

Keywords: ratings of perceived exertion, periodization, sports training, internal training load, external training load.

INTRODUCTION

Sports training is a systemic activity which aims to induce morphological, metabolic and functional alterations which enable consequent increase in competitive results[1,2]. In order to promote the expected adaptations, the athlete should receive appropriate stimuli; thus, the control of the training loads is crucial for the success of the training process[3-6]. In martial arts, as well as in other types of intermittent activities, this type of load control is fairly complex, due to the stochastic nature of the modality and the many training methods used in the preparations of these athletes.

Nowadays, there are many methods for quantification of the training load[6-8], among these, we can highlight the method proposed by Foster[3] and recently revised by Nakamura et al.[9], known as method of session rating of perceived exertion (RPE). This method of training load quantification has been used in martial arts[10,11]. The RPE method uses a fairly simple question: "How was your training session?". The answer should be provided 30 minutes after the end of the training session, from the Borg's CR10 scale[12]. The RPE method of the session is a practical manner to assess/quantify the internal training load regarding the training content. Moreover, the referred method[3] can also be used to assess whether there is concordance between the load planned by the coach and/or strength and conditioning coach (training external load) and the load experienced by the athlete (training internal load)[7,11,13].

Currently, the sports training monitoring becomes relevant because despite the great effort in the sports periodization planning which generally is used by coaches with a good level of theoretical-practical background, the incidence of overtraining syndrome (or non-functional overreaching) still remains high[13,14]. Foster et al.[13] suggest that one of the potential causes for high incidence of negative results of sports training is the incompatibility between external load planned by the coach and the internal load perceived by the athletes. Therefore, the aim of the present study was to compare perception regarding the training load intensity planned by the coaches with the intensity perceived by the athletes from the Brazilian Judo Team, using the session RPE method, during a training camp.

MATERIALS AND METHODS

Experimental Outlining

Data collection was performed in the training camp of the Brazilian Judo Team. The athletes of the Brazilian team remained reunited

during a period of three days, in which four training sessions were performed. Each session was planned by a different coach. All training sessions were monitored in order to compare the intensity of the load planned by the coach and the intensity perceived by the athletes, following methodology by Foster[3] (session RPE method). Besides the RPE measures, the assessment of lactate concentration was performed before and immediately after the training sessions.

Sample

The sample was composed of 40 athletes from the Brazilian Judo Team. All of them agreed on voluntarily participating in the present study ADN hence signed the Free and Clarified Consent Form. The experimental procedures were approved by the Ethics Committee of the Physical Education School of the University of São Paulo (protocol # 2.008/21).

Description of the training sessions

Four sessions were performed in the training camp, in order to compare the training load expected by the coach and the one perceived by the athletes. The description of the four evaluated training sessions follows.

Session 1 – warm-up (light run, lateral movement, arm movements) – 15min; NE WAZA – 15min (ippon change); RANDORI –1 x 5min/5 x 3min/4 x 2min.

Session 2 – warm-up (light run, lateral movement, arm movements) – 15min; OCHI KPMI NE WAZA – 10min; NE WAZA 5 x 3min (groups of three athletes); RANDORI 2 x 4mim/3 x 3min/4 x 2min.

Session 3 – warm-up (light run, lateral movement, arm movements) – 15 min; NE WAZA 10min (ippon change); RANDORI 2 x 5min/2 x 4min/2 x 3min/2 x 2min + 1 x 3min + 1 golden score; 1 x 2min + 1 golden score; 1 x 1min + 1 golden score.

Session 4 – warm-up (light run, lateral movement, arm movements) – 15min; UCHI KOMI RANDORI 3 x 3min/3 x 2min/3 x 1min + 1 golden score.

Monitoring of the training load intensity

The training load intensity was determined through the session RPE method[3]. The RPE method uses a very simple question: "How was your training session?". The answer should be provided 30 minutes after the end of the training session, from the scale presented in table 1, which was adapted from the Borg's CR10 scale[10]. The evaluator should instruct the evaluee to choose a descriptor and a number from 0 to 10, which can also be provided in decimals (for example: 7.5). The maximum value (10) should be compared with the one with the highest physical effort experienced by the individual, while the minimum value is the abloute rest condition (0)[3]. Concerning the coaches, the planned load intensity classification was performed before the beginning of each training session[13].

Determination of the lactate concentration

The lactate concentration was determined in five athletes randomly chosen, and these five individuals were kept in all training sessions. The blood collection was performed in the beginning and immediately after the end of the session. Subsequently to the collection procedure, the lactate concentration was determined by the portable apparatus Accutrend Lactate (Roche©).

Table 1. The Borg CR10 scale (1982) modifiied by Foster et al. (2001).

Classification	Descriptor
0	Rest
1	Very, very easy
2	Easy
3	Moderate
4	Somewhat hard
5	Hard
6	-
7	Very hard
8	-
9	-
10	Maximum

STATISTICAL ANALYSIS

The results are expressed in mean and standard deviation. The data analysis was performed through the Wilcoxon test (lactate concentration) and the t test (RPE), and the minimum significance value was set at $p < 0.05$.

RESULTS

The comparison between the session RPE scores reported by the coaches and athletes showed that the intensity experienced by the athletes was higher to the intensity expected by the coach in all training sessions (figure 1).

Concerning the lactate concentration, a significant increase was detected in the post-training for all sessions of the training camp and no difference was found between sessions (table 2).

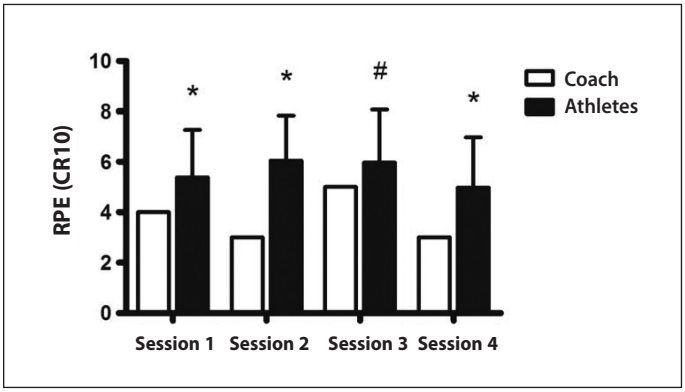

Figure 1. Comparison between training load intensity planned by the coach and the training load intensity experienced by the athletes (n = 40) through the session RPE method.

* = $p < 0.0001$ concerning the load intensity expected by the coach; # = $p < 0.02$ concerning the load intensity expected by the coach.

Table 2. Pre and post-training sessions lactate concentration and intensity level planned by the coach compared to the intensity level experienced by the athletes.

	RPE Coach	RPE Athletes (n = 5)	Pre [Lactate] (n = 5)	Post [Lactate] (n = 5)
Session 1	4	6.0 ± 0.7	2.8 ± 0.4	7.8 ± 2.3*
Session 2	3	7.6 ± 0.5	3.0 ± 0.7	7.3 ± 2.7*
Session 3	5	5.8 ± 1.6	2.8 ± 0.2	5.4 ± 2.1#
Session 4	3	7.0 ± 0.7	2.7 ± 0.3	7.2 ± 2.6*

*$p < 0.01$ concerning rest; #$p < 0.05$ concerning rest.

DISCUSSION

The present study had the aim to compare the training load planned by the coach with the intensity perceived by the athletes from the Brazilian Judo Team during of a training camp. Thus, the results present difference between the intensity expected by the coach and the one perceived by the athletes (figure 1). In all training sessions evaluated the intensity reported by the athletes was higher than the intensity expected by the coach.

Foster et al.[13] suggest a classification of the training sessions from the session RPE method: easy (RPE < 3); moderate (RPE between 3-5) and difficult (RPE > 5). The mentioned classification enables us to verify, according to the intensity expected by the coach, that the sessions should present guidance to moderate loads. Nevertheless, the athletes reported that these sessions were performed more intensely than the coach's expectation (figure 1).

One of the issues which can justify the RPE high scores presented by the athletes is the characteristic of the training methodology to which they were submitted. The training camp happens outside the regular competition season, with the purpose to improve physical fitness and technical aspects of the athletes. Therefore, this strategy involves training sessions performed at high intensity with in comparison to the ones regularly carried out[15].

However, it has been reported that long periods of high intensity activities during the training camps can cause noticeable physiological disorders in the athletes[16,17], such as eating behavior disorders, severe muscle damage and dehydration/electrolytes loss[18,19].

Thus, Fry et al.[20] state the importance of suitable training loads periodization, with sufficient recovery periods in order to avoid undesired adaptations. The session RPE method can be hence very feasible to assess/control the training loads[4,21,22], favoring better balance between the distribution of the training sessions.

One of the potential causes which could explain the session RPE differences between the coaches and athletes would be the lack of communication. This flaw was pointed by Foster et al.[13]. These researchers verified that endurance athletes train more strongly on the days the coaches plan weaker trainings and more weakly on the days the coaches elaborate stronger sessions[13]. On the moderate days, according to Foster et al.[13], there seems to be concordance between what was planned by the coach and what was reported by the athletes. Imamura et al.[11] also verified incompatibility between the intensity planned by the coach and the intensity experienced by the karate athletes. When comparing the score of experienced coaches and athletes, after performance of 1,000 punches and 1,000 kicks, Imamura et al.[11] verified that the coaches reported higher RPE values in comparison to the values reported by the athletes. This incoherence between coaches and athletes in the studies by Foster et al.[13] and Imamura et al.[11] stresses even more the importance of the use of monitoring methods, such as the session RPE, in order to efficiently plan the external training loads.

Foster et al.[13] also highlight that their method could aid in the detection of a common sports training mistake: the tendency of the training loads to preferably remain at moderate levels, instead of extreme values. The results of the present study seem to lead to this same tendency for loads centralization, since in all assessed sessions the RPE of the athletes approximately ranged between 5-6 (figure 1). This tendency of the athletes to report similar scores for the loads should be carefully analysed by the coach since the monotony of stimuli leads the athletes to sub-optimal performance[13,20], besides contributing to overtraining syndrome etiology[14]. Foster[3] proposes simple calculations through the same method, which can be used to evaluate the sessions' monotony in a given training period.

Concerning the lactate concentration, the results of the present study point that the training sessions presented significant demand for the anaerobic metabolism (table 2), which is a characteristic of Judo [23]. Drigo et al.[24] verified similar lactate responses in fights (three fights of two minutes and 90 seconds of interval) ground simulated (6.7 ± 2.8mmol/l) and projection fights (6.5 ± 2.8mmol/l). However, Franchini et al.[23,25-27] found higher values (~10-12mmol/l) after simulated fight of five minutes (official time of international competitions). It is probable that during the fight simulation (short duration), the effort intensity is higher than the mean training session intensity. Moreover, it is important to highlight that the lactate concentration in the present study was measured immediately after the end of the training session. The intensity cadence, as fatigue is installed at the end of the training session, could also have attenuated the blood lactate response.

Therefore, it seems that the lactate concentration observed after the training sessions does not explain the high scores of session RPE exposed by the athletes. It is plausible to speculate that other aspects previously reported in Judo training camps, such as accumulation of training load with no rest period, incapacity of recovery, severe muscle damage and immunological alterations[15] can partly explain the high session RPE scores reported by the athletes of the present study. On the other hand, it is also possible that the lactate response (pre- and post-training), per se, is not aboe to translate the session training load magnitude.

CONCLUSION

The results of the present study demonstrate that, although the training program has been designed by experienced coaches, difference between the external load intensity expected by the coach and the internal load intensity perceived by the athletes was detected. Such result corroborates the importance to adopt strategies which monitor/control the training loads in the preparation of elite athletes, since this discrepancy between the planned and experienced loads may contribute to performance sub-optimum level. In addition to the session RPE method, further strategies such as physical performance tests, questionnaires and biochemical parameters can also be used to monitor the sports training process.

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