

Assessment of a perceived exertion session between the coach and sub17 athletes during a soccer championship

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Abstract:

Introduction: For a precise prescription of training loads, it is important that the perceived exertion (RPE) between coach and athlete are in agreement. Thus, the aim of this study was to verify the association between the RPE of the session (SRPE) perceived by coach and athlete for the daily monitoring of training loads in young athletes during the main championship of the year, for this team. Methods: Twelve young soccer players (age: $15,8 \pm 0,9$ years; weight: $59,9 \pm 11,7$ Kg; height: $1,71 \pm 0,09$ m; IMC: $20,5 \pm 3,2$ Kg/m²; body fat: $12,7 \pm 2,1$ %) and one coach volunteered to participate in this study. All participants were familiar with the SRPE method. Prior the beginning of the trainings the coach was asked the SRPE, and the athletes answered after the training session. RPE was collected for 11 weeks. Results: The SRPE of the eleven-week session was similar between coach and athletes ($p = 0.09$), with strong correlation ($p = 0.001$, $r = 0.73$). However, the SRPE according to training-intensity categories was similar only in the difficult category ($p = 0.075$). Conclusion: SRPE is a reliable tool for quantifying the training load but should be used with more experienced athletes.

Key words: training load; young soccer players; rating of perceived exertion.

Introduction

Sports training is a systematic activity that aims to provide morphological, metabolic and functional changes that increase performance (C. Foster et al., 2001; Kindermann, Simon, & Keul, 1979). Important variables for the prescription of training such as volume, intensity, frequency and training load control should be applied, to produce positive physiological adaptations. When these variables were increased randomly, and a training load control applied inadequately, these applications can cause physical and psychological damage to athletes (Halson, 2014). Therefore, the quantification of the training load is an important tool to achieve the expected results (Freitas, Nakamura, Miloski, Samulski, & Bara-Filho, 2014).

Several methods for internal and external training load quantification have been proposed in recent years (Borresen and Lambert, 2008; Halson, 2014), for example the practical and easy-to-apply way to prescribe and quantify the training load, was developed by (C. Foster, et al., 2001), using the rating of perceived exertion (RPE) of session. According to them, the calculation of the internal training load is performed by multiplying the RPE of the session (SRPE) by the duration of the training in minutes. This method has been used to evaluate athletes for several sports, due to the characteristics and scientific evidence (i.e. correlation with heart rate, oxygen intake, lactate) (Halson, 2014), currently sports teams using this method to evaluate athletes for different sports as judo (Agostinho et al., 2015), swimming (Wallace, Slattery, & Coutts, 2009), soccer (Alexiou and Coutts, 2008), in order to increase performance and avoid injuries.

However, for a precise prescription of training loads, it is important the agreement that the training load perceived by coach will be the same as felt by the athlete (J. P. Foster, Carl, Kara, Esten, & Brice, 2001). Otherwise, the prescription of training loads become incorrect, can increase the monotony of training and can influence adaptive responses and leading the athletes to overtraining (Lehmann et al., 1997; Malisoux, Frisch, Urhausen, Seil, & Theisen, 2013). For example, Barroso et al. (2014) found strong correlation between RPE in more experienced swimmers with respective coaches, compared with young athletes. Redkva et al., (2016) don't found differences between SRPE of adult soccer players and their coaches, during monitoring load of three

weeks of training (physical, technical and tactical), this suggest that professional soccer players perform similarly to that intended by coaching staff. Despite these results, the studies evaluated a short time of the year, and to analyze SRPE for athletes and coach during the season or in main championship would show the reality of sports.

Currently, the competition levels start earlier for all sports and the evaluate of these athletes is necessary (Oliveira, Spinesi-Silva, & De Oliveira, 2017). These, also occur in soccer by players of categories under 15 and under 17 years, due the interest in soccer teams. Thus, the present study aims to verify the association between the RPE of the session perceived by coach and athlete for the daily monitoring of training loads in young athletes during the mainly championship of the year, for this team.

Material & methods

Subjects

Twelve young soccer players (age: $15,8 \pm 0,9$ years; weight: $59,9 \pm 11,7$ Kg; height: $1,71 \pm 0,09$ m; IMC: $20,5 \pm 3,2$ Kg/m²; body fat: $12,7 \pm 2,1$ %) and one coach volunteered to participate in this study. All athletes are regular training participants for at least 5 years, five days a week and on average 165 minutes per training session and participants in regional and national championships. The coach trained the team more than one year, and had five years of the experience as a coach. Experimental procedures, risks and benefits were explained for players and your parents or responsible before getting their signature on a written consent form, the procedures of this study were performed according to the Declaration of Helsinki 1996.

Experimental design

Participants were familiarized with the procedures, because the method of SRPE was used in the previous season (at least one year of experience with PSE). Prior to each week training the technical committee responsible for the training session, technical or fitness coach, rated the RPE in accordance with “the main objective” determined by the technical coach for each training session (without interference from the researchers) and classified on a scale of 0 (resting) to 10 (maximal effort) according Foster et.al., (2001). The duration of session was noted at the beginning of warm-up, at end of training, and after each training session. Players assessed the training itself using the same scale, 0 to 10 (C. Foster, et al., 2001; J. P. Foster, et al., 2001), using the following question: “How was your workout?”, this was answered 30 minutes after the workout.

Statistical Analysis

Data were analyzed statistically using the SPSS® program (Version 20.0) and they were presented in median \pm interquartile range. The distribution was checked by Kolmogorov-Smirnov and Shapiro Wilk test. The relationship and comparison between coach and athletes SRPEs of the 59 sessions, was analyzed using bivariate correlation of Kendall’s and Mann-Whitney test. The correlation coefficient was analysed using a scale proposed by Hopkins (1997), where: < 0.1 , trivial relationship; $0.1- 0.3$, low; $0.3-0.5$ moderate; $0.5-0.7$, strong; $0.7-0.9$, very strong; > 0.9 , nearly perfect.

Based on the coach's perception, the training sessions were divided into easy (<3) moderate (3-5) and difficult (> 5) intensities. The Mann-Whitney test was utilized to compare coach’s and athletes’ perceptions at each intensity level. The Friedman test was used to compare the coach’s and athletes’ RPEs of the weeks. A significance value was assumed with a $p \leq 0.05$.

Results

In the 59 training sessions analyzed, were found strong correlations ($p = 0,001$, $r = 0.73$) between coach’s and athletes’ RPE. The comparison between them was performed and are presented in figure 1. The results show that the coach did not overestimate the RPE during the championship ($p=0.27$).

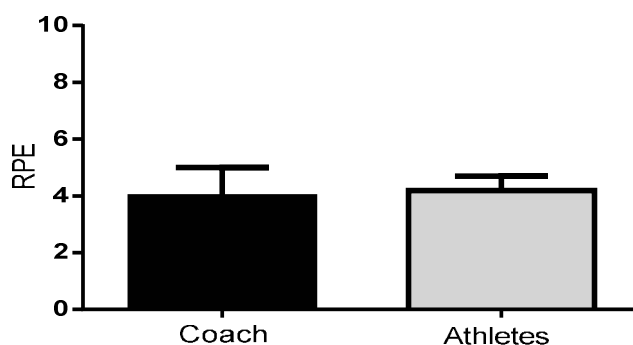


Fig. 1. Comparison of SRPE between athletes and coach ($p=0.09$).

Figure 2 shows SRPE for athletes and coaches according to the intensity of the training sessions (easy, moderate and difficult). Only the SRPE of the trainer and athlete in the training sessions qualified as difficult did not present differences ($p = 0.75$).

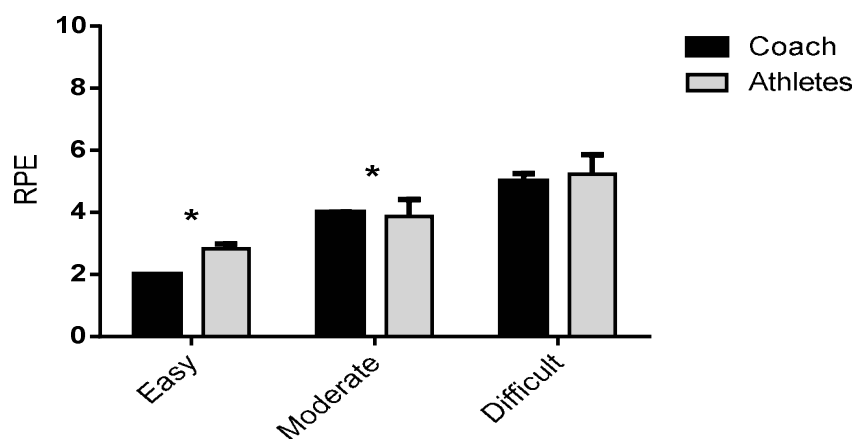


Fig. 2. Comparison of the SRPE between Coach and Athletes, according to training-intensity categories (Easy: $p = 0.046$; Moderate: $p = 0.001$). * indicates significant different between coach and athletes ($p < 0.05$).

The expected coach's SRPE was reviewed weekly. The results show that in every week the perceptions of coach and athletes were similar (figure III).

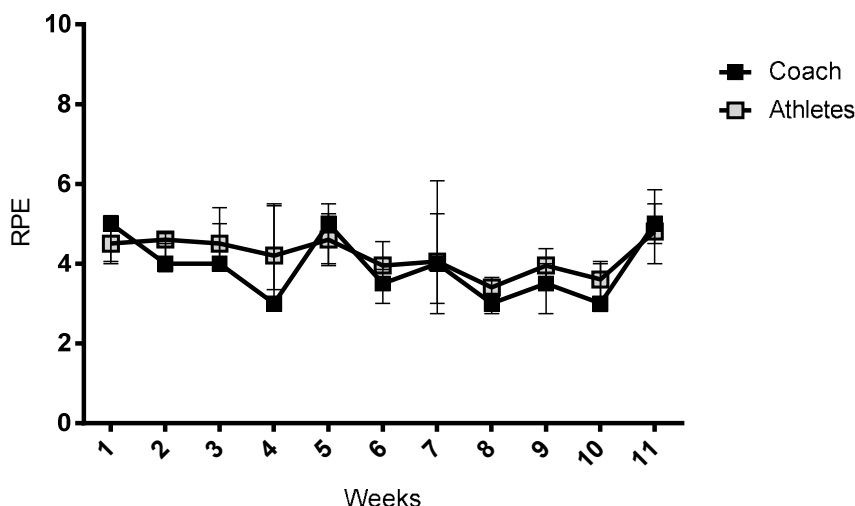


Fig. 3. The perceived exertion of the session for each group (coach and athletes) during the weeks of the championship.

Discussion

In this study, the SRPE was performed during the main championship of the year, and we evaluated whether the responses between coach and young athletes were similar in this period. Current literature available showed research with pre-season, mid-season or the entire season, but doesn't monitor training load during the competition.

In this paper, our results show that the coach did not overestimate the RPE during the championship (figure I) and a tuning between RPE perceived by athletes and coach was achieved. All athletes and coaches of this study had moderate experience with sports training and used the SRPE for the quantification and monitoring of loads of the previous season. This familiarization and the experience in the use of the SRPE may have influenced the tuning between them. In study of the Redkva et al., (2016), authors found moderate correlation ($r = 0.60$) when comparing the SRPE perceived by coach and professional soccer players for three weeks of the basic preparatory period of a professional team. In addition, Wallace et al. (2009) evaluate the SRPE perceived by coach and swimmers over four months and his results showed strong correlation between subjects ($r = 0.85$). Similar correlation was also found in SRPE perceived between coaches and elite tennis players under 16 years

old ($r = 0.71$) (Murphy, Duffield, Kellett, & Reid, 2014). In all of these studies, the athletes were familiar and experienced with the use of SRPE.

Another important point of this tuning is the coach's knowledge about athletes. As they were together for more than one year, this knowledge influenced the tuning of the SRPE. According to Brink et al. (2017) the coaches base their intended and observed exertion on what they expect players will do and what they actually did on the training, thus the level of knowledge between coach and athlete become the key to the use of SRPE.

The intensity of the training is an important variable and difficult to control and plan mainly in collective sports like soccer. Our results showed a difference of SRPE between coach and athletes in the easy and moderate intensities planned by the coach (figure II). Barroso et al., (2014) evaluating the tuning of SRPE between coaches and athletes of different ages, showed that more experienced athletes differed less the SRPE in relation the training intensity, results that differ from this study. However, the athletes in the study by Barroso et al. (2014) had more experience in sports training than the athletes of our study. According to Gearhart et al. (2004), athletes that experience a variety of physiological changes caused by different intensities and training volumes, Identify more easily with the intensity levels. Therefore, although they are experienced with the use of SRPE, these differences in SRPE in intensity may decrease with increasing level of experience of our athletes. Despite the differences corresponding the intensity of training, the SRPE during the competition season was similar between them (Figure 3). This shows the importance of SRPE familiarization and experience with the SRPE and sports training.

Most studies concluded that coaches overestimated the training load reported by athletes (Doeven, Brink, Frencken, & Lemmink, 2017; Murphy, et al., 2014; Rabelo et al., 2016). However, these studies monitored the subjects for long periods or the entire season and this can be a problem, mainly for collective sports where there is dispute for position among the players, thus, we hypothesize that athletes report less effort in order to appear in better physical condition. In this case, we suggest coaches and coaching staff use the SRPE method based on athletes' performance during training and not to plan tasks previously using this method, in accordance with Brink et al. (2017). Another limitation of this study was the absence of physiological markers for training load control. However, the current literature is consistent regarding the association between the SRPE method and biological markers as heart rate (Wallace, et al., 2009), oxygen uptake (Pires et al., 2011), lactate (Pyne, Lee, & Swanwick, 2001), creatine kinase (Freitas, et al., 2014).

As practical applications of our study we first highlight the low financial cost of the method and easy application anywhere. As previously mentioned, the use of the SRPE is conditioned to the experience of the athletes and the previous knowledge with the method (Barroso, et al., 2014; Brink, Kersten, & Frencken, 2016). Therefore, a training for familiarization with the method is recommended.

Conclusion

The SRPE perceived by coach and soccer was a valuable tool of monitoring training load, but it needs prior training before use and is recommended for more experienced athletes with sports training.

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