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Recording process of judo training

Gustavo Ferreira Pedrosa[1], Bruno Teobaldo[1], Marcelo Januário[1], Ytalo Mota Soares[1], André Fernandes Chaves Filho[1], Gleysson Riveiro Alves[1], Leszek Antoni Szmuchrowski[1], Dariusz Śledziewski[2]

[1] Load Evaluation Laboratory; Federal University of Minas Gerais, Brazil
[2] Department of Theory of Sport, Józef Piłsudski University of Physical Education in Warsaw, Poland

Abstract

Background & study aim: The judo training is highly complex and recording methods should help coaches to a better understanding of what is in fact been trained. The purpose of this study was recording the exercises performed by judo athletes during fourteen training sessions.

Material and Methods: During fourteen days a digital camera video recorded the training of a judo team. The exercises were posteriorly analysed according to the magnitude, structure and dynamic through the time spent to perform each exercise.

Results: 1422 minutes were recorded and the *randori* was the exercise more performed along the fourteen days training. The *randori* was always executed at the end of the training session with only two days exception. Specific exercises were more executed than general and special exercise.

Conclusion: The recording process is an efficient method to analyze the magnitude, structure and dynamic of the exercises and can help to a better understanding on the adaptations caused by the training practice.

Key words: dynamic • magnitude • structure

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Corresponding author: Gustavo Ferreira Pedrosa, Federal University of Minas Gerais, Antônio Carlos Av. 6.627, Belo Horizonte, Brazil; e-mail: gustavofpedrosa@hotmail.com

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Introduction

Judo is a combat sport which requires effective physical preparation [1]. To achieve high levels of physical conditioning, the fighters must be undertaken to a rigorous process of training [2]. The judo trainers are responsible to organize and elaborate this training process [3]. Eventually, trainers use a periodization model to structure the distribution of the training load along a microcycle, mesocycle and macrocycle [4]. However, although trainers may find different scientific sources to substantiate the judo periodization [5-6], seem the recording of training load performed has been neglected by coaches [7].

The recording of the training load may help to visualize some important aspects of the training process [7]. During a training session, coaches may switch exercises for other, or they can just eliminate an exercise [8]. Different reasons can justify this changing, such as injury what forces coaches to reprogram the training load; lack of motivation by the athletes, in this case, coach has to eliminate an exercise because the athletes group was not motivated enough for it in that time. Since the adaptations are responses directly related to the training process [9], it's expected that chronically the changing on the daily training program may influence on the athletes adaptations [8]. To facilitate the understanding of the adaptations occurred in athletes, is necessary to record exactly what was in fact trained by the athletes during the training session [8, 10].

Brink et al [7] monitored the training load practiced by soccer players during a training period using a recording method. This method consists in recording in minutes all time spend to practice the exercises of the training day and also the eventually matches. These authors were interested in analyzing the relation of injury and the training volume and the recording of the training load helped to identify a high likelihood risk of injury due the high training volume noticed. However, for a greater understanding of the training load response, other aspects should be taken on account. Szmuchroswki and Couto [8] proposed the training load should be recorded under three indicators: *magnitude*, *structure* and *dynamic*.

The *magnitude* represents the time spent to perform a unique type of exercise or a group of similar exercises. This recording may help to identify how much time the athletes spent by training a determined exercise along a macrocycle, mesocycle or microcycle [8]. The *structure* represents the order in which a determined exercise or a group of similar exercises was utilized along the cycles of training [8]. Since the order of the exercise can influence the adaptive response, the analyzes of the *structure* is very important [11]. The indicator *dynamic* represents a perspective that evidence when an exercise stopped to be practiced [8]. To access this analyze, is necessary to record the date and the *magnitude* in what an exercise was practiced [8]. These three indicators are very important for the planning, and need to be duly recorded and noted [8].

Pedrosa et al. [12] aiming to contribute for the judo training planning and also for the training record, elaborated a catalog with seventy six judo training means. These exercises were divided in three groups: general, special and specific training means according to the level of specificity. Exercises which reproduce the pattern of movement and the physical demand required during a judo combat were classified as specific. Exercises which reproduce only the pattern of movement but not the physical demand of a judo combat were classified as special and the exercises that not reproduce the judo movement and the judo demand were classified as general training means.

This catalogue can be used as a tool of reference to record the exercises performed during the judo training program [12]. As the exercises are numerically coded, the insertion of the exercise code on a training sheet, such the one designed by Kalina [13], could be an alternative for the training recording process. Thus, the objective of this study was to record the exercises and the time spent to each exercise performed during fourteen judo training sessions and analyze the indicators of *magnitude*, *structure* and *dynamic* of the exercises practiced during the fourteen training days.

Material and methods

This study was approved by the Ethic Committee of the Federal University of Minas Gerais, under the number 26568314.3.0000.5149 and all volunteers were informed about the methods, risks and benefits and all gave written consent to participate in this research.

The recording method adopted in this study is presented in Szmuchrowski and Couto [8] when both researches contextualized the training system named Planning, Recording and Analyzes of Sports Training Load (PRACTE).

Fourteen judo training session, corresponding to two microcyles of training (accumulation) were entirely video recorded by camera (Sony®, Digital HDR – XR150, United States). This microcycles are at the

initial period of a mesocycle of training (preparatory). However, only the first fourteen days were recorded. The judo team was formed by twenty fighters and four staff members. The characteristics of the fighters and the staff members are present in Table 1. The training session occurred in an appropriate place to develop judo (mat area) and the researchers of this study have no influence on the training program. The training programs were previously elaborated by the staff members and the training days started on Monday and went straight the following days (excepted on weekends). The camera was placed at the corner of the mat and all exercises were recorded in high definition. The training session lasted around 150 min per day.

After each training session, one of the researches watched the video recorded and through the software

Table 1. Judo team characteristics

Athletes			
Age (years)	Time of experience (years)	Weight (kg)	Height (cm)
18 (±4)	3 (±2)	60 (±8)	172 (±10)
Staff members			
Function	Time of coaching (years)	Title as coach	Graduation in judo
Main Coach	12	Pan-American	Black Belt
Secondary Coach	8	Brazilian	Black Belt
Physical trainer	-	-	Brown Belt
Cooperator	5	State	Black Belt

Table 2. Transcriptions of the codes

Code	Transcription
7	Aerobic running. e.g. Running on treadmill.
9	Warm up exercise. e.g. Jogging.
12	Competitive recreational activities. e.g. Captor flag and dodge ball.
13	Circuit exercises for the general motor skills development.
14	Sprints running. e.g. running very intense short distances.
15	Classics weight exercises. e.g: Bench press, squat and rows.
17	Strength resistance exercise to improve gripping.
45	Tandoku-renshu.
48	Exercises aiming improvement of the submission technique
49	Static *uchi-komi*. e.g. Performing *uchi-komi* statically.
51	Exercises to improve time decision making and time reaction in a fight.
52	Linear *uchi-komi.*
53	*Ukemi* exercise. e.g. Front rolling and back rolling.
54	Exercises to develop *Fusegi.*
55	Uchi-komi on ground. e.g. On ground, performing *uchi-komi* for any *ne-waza*.
65	*Uchi-komi* performed in free direction
67	Exercises aiming the technique of *kaeshi-waza. Tori* applies a blow against *uke* who defends and applies a counterblow.
69	*Renraku-henka-waza.* Sucessive technique blows application.
70	*Randori* on ground.
71	*Nage-komi.* e.g. Successive throws.
73	*Randori* without blows, aiming of *kumi-kata* supremacy.
74	*Randori.* e.g. fight.
76	*Tokui-waza*.

Note: Codes from the catalog of judo training means elaborated by Pedrosa et al. [12]

Handycam® Camcorder (Sony, United States), the time spent to each exercise (including the resting time between sets) were calculated and noted in a spreadsheet (Microsoft Excel, 2010). The exercises from the catalogue of training means developed by Pedrosa et al. (12) have all a number code. The codes were typed on the same spreadsheet and whenever an exercise was performed, one of the researchers recorded the code (with the time spent).

To former graphically the indicator *magnitude*, the time spent to each exercise was summed along fourteen days. To former graphically the indicator *structure*, the order in which every exercise was executed and its respective duration (time spent) was registered daily in the spreadsheet. To former graphically the indicator *dynamic*, the exercises performed were registered according to the day of the training session.

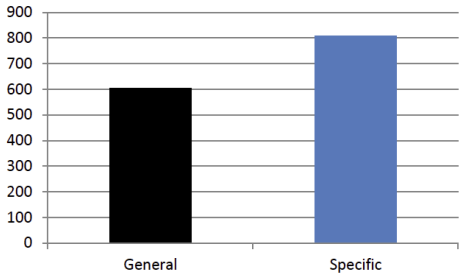
The indicator of *magnitude*, of each level of specificity (general, special and specific exercises) were also performed by the summed of time spent in exercise that belong the same specificity.

Results

The exercises are presented in code number. The transcription of each code can be found in Table 2. During fourteen training sessions none special exercise were used, only general or specific exercise were performed in this microcycle.

Magnitude

During the fourteen training session, 1.422 minutes (min) of exercises were performed. The *magnitude* for specificity demonstrated a higher predominance of time spent in specific exercises where the exercise code 74 was the exercise most performed. Figures 1 and 2 shows the *magnitude* for specificity and for each exercise respectively.

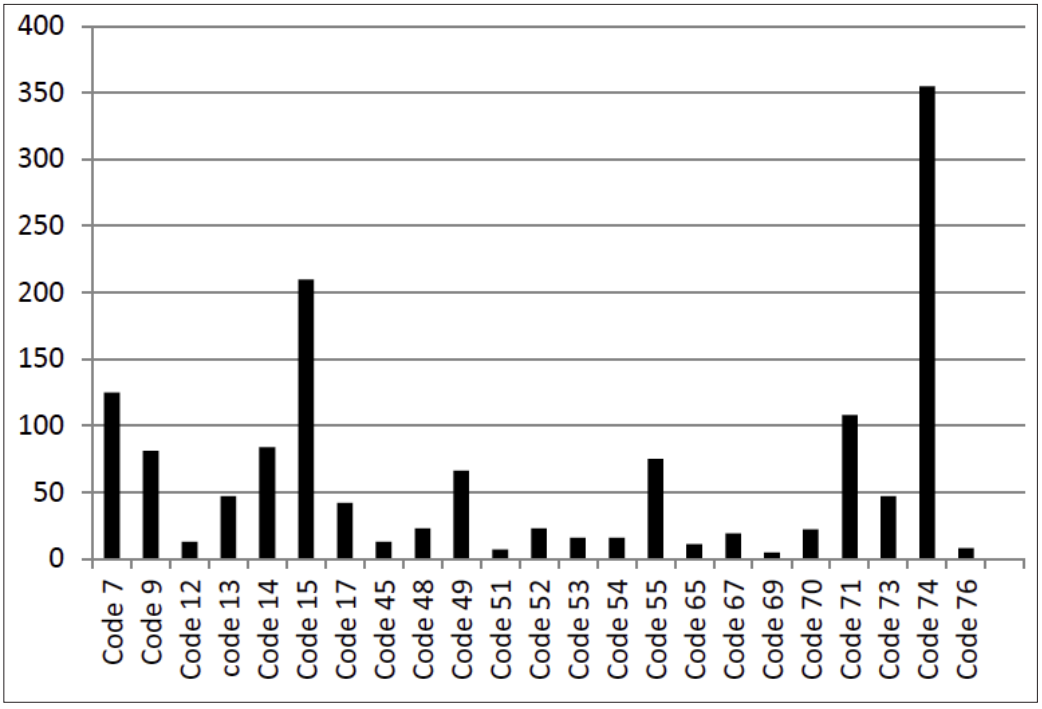


Note: 606 min for general exercises x 816 min for specific exercises

Figure 1. Magnitude per specificity in minutes

Structure

The *structure* for specificity revealed that always a general exercise starts the training session and a specific exercise was always performed as the last



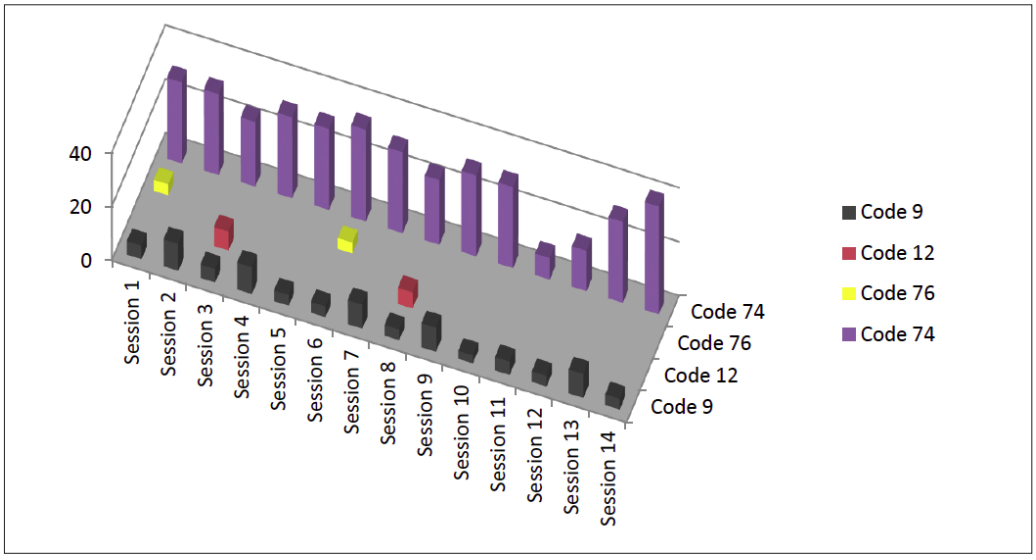
Note: Minutes spent in each exercise. The transcriptions of the codes are presented in Table 2

Figure 2. Magnitude of each exercise along fourteen training sessions

Table 3. Structure of the exercises during the training sessions

Session number	Order of how the exercises were performed (1-12) – Recording according to the code proposed by Pedrosa et al. [12]											
	1	2	3	4	5	6	7	8	9	10	11	12
1	9	15	14	17	49	45	73	71	74	76		
2	9	7	55	48	54	71	70	74				
3	9	17	30	12	14	53	73	71	74			
4	9	7	55	48	54	71	70	74				
5	9	17	15	14	13	53	51	52	73	74		
6	9	14	15	17	49	45	71	73	74	76		
7	9	7	48	54	71	70	74					
8	9	12	17	15	12	53	73	71	74			
9	9	7	48	55	54	70	71	74				
10	9	13	15	14	17	54	51	52	67	65	73	74
11	9	49	69	71	74							
12	9	17	15	14	13	45	52	73	71	70	74	
13	9	7	48	55	54	71	70	74				
14	9	17	15	14	49	45	71	74				

Note: The transcriptions of the cods are shown in Table 2



Note: The transcriptions of the four codes are present in Table 2
Figure 3. Dynamic of the five exercises during fourteen training sessions

exercise of the day training. The *structure* for exercise shows that exercises code 9 and code 74, most of time, started and finished the training sessions respectively. Table 3 presents the *structure*.

Dynamic

The *dynamic* for specificity revealed that in all training sessions a general and specific exercise was performed, however none special exercise was performed during the fourteen sessions. The Dynamic for exercise shows that exercises code 12 and 76 were practiced only two times and the exercises code 9 and 74 were performed in all training sessions but the amount of time performed on the exercise code 74 was greater than any other exercise. The *dynamic* of four exercises (codes 12, 76, 9 and 74) is shown in Figure 3.

Discussion

The objective of this study was to record the exercises performed during fourteen days and show the

indicators *magnitude*, *structure* and *dynamic* of these exercises.

During the fourteen days training, none special exercise was performed by the judo fighters. According to Baker [14] and Nunez et al. [15] special exercises are more used when competition is approaching. As we recorded only the first fourteen days of periodization, maybe if we had continuing recording, the special exercises should be recorded. Tota et al. [10] recorded the exercises performed by mixed martial arts fighters during ten microcycles. At the beginning of the periodization, short time was spent for special exercises in comparison with the end of the periodization, leaving no doubt those special exercises are more important from the middle to the end of the periodization.

The total time spent for training during the fourteen days was 1.422 min. Every training session lasted 150 min. Thus, it would be expected to record 2.100 min of training. However, 678 min was spent to explain the exercises, water time and for extra resting between the exercises. The judo team that participated in this study is formed majoritarian by judoist with less than 3-4 years of experience. This fact may impose to trainers spend more time in resting to avoid injuries.

The catalogue of training means elaborated by Pedrosa et al. [12] was very accurate once all exercises performed during the recording phase could be located in the catalogue. The indicator *magnitude* showed that specific exercises were more performed than general exercises during the fourteen days. The construction of the training planning was conducted by the staff members of the judo team and they divided the training session into two phases: the first one aimed to develop the physical fitness and the second one aimed to develop specific aspects related to the judo fight with prevalence in time to the second phase. As this judo team is not formed by professional athletes and the judo requires many different specific skills [16-18], perhaps the short time (150 min per day) of daily training obligate the coach to train more specific demands even at the beginning of the periodization.

The *magnitude* also revealed that exercise code 74 (*randori*) is the exercise most performed along the fourteen days. *randori* is considered by experts as one of the most important exercise of judo training [12] once it symbolize a competition between two fighters [19].

The *structure* presented in Table 3 shows that the training session always started with a general exercise. This exercise in question was the code 9 (warming up). According to Smith [20] the warm up is an important mean to prevent injury and increase the performance of the athletes during the training session. The *structure* has also demonstrated the exercise code 74 (*randori*) was always practiced at the end of all training day with two exceptions (session 1 and session 6). As mentioned earlier, the *randori* is a very important exercise for judo, however, maybe the performance of fighters during the *randori* may have suffer influence of the fatigue accumulated earlier through the exercises performed before. As the order of exercises may influence the performance acute and also the chronically adaptations [11], perhaps should be more interesting perform the *randori* at the beginning of the training session sometimes with the fighters less fatigued.

What refers to the *dynamic*, Figure 3 shows the exercises code 12 (ludic warming up) and 76 (*tokui waza*) were practiced only two times and the exercises code 9 (warming-up) and 74 (*randori*) were practiced in all training sessions. As the trainer have only 150 min to train daily and ludic warm-up may consume long time for playing, maybe this is the reason that why this exercise was not more explored. The *tokui -waza* is related to the practice of the *toris´* best technique [12], and it is more recommended for experienced fighters and some judoist in this study are still on formation. On the other hand the warming-up and *randori* was present in all training sessions due they importance in preparing the training session [20] and the development of specific demand required for judo [19] respectively.

Conclusion

The recording of fourteen training days, permitted the analyzes of the *magnitude*, *structure* and *dynamic* of exercises performed. This process can be very utilized by coaches to prevent injuries and to achieve better results. We strongly recommend the recording and the analyzes of *magnitude*, *structure* and *dynamic* of the entire periodization.

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