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MONITORING LEVELS OF STRESS AND OVERTRAINING IN AN ELITE BRAZILIAN FEMALE VOLLEYBALL ATHLETE: CASE STUDY

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KEYWORDS: Overtraining, Fatigue, Stress, Recovery, Volleyball.

ABSTRACT: Overtraining is the result of an imbalance between stress and recovery, in addition to short recovery time and psychosocial events. In this case study, a questionnaire of stress and recovery in sports was used to assess the level of overtraining of an elite female Brazilian volleyball player. The results showed that the heavy loads caused changes in the athlete's profile, resulting in an increase in the fatigue scales. The recovery periods were fundamental to restore her physical and psychological capacities. Finally, the method used detected changes in the athlete's profile after acute events, such as an unexpected defeat. We concluded that changes in the profile of the curve, showed by the instrument, reflected the different moments of the collection, thus reflecting the change in the stress overload. Therefore, the detection or monitoring of stressing factors might be valuable to improve the physical and psychological performance of a team.

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Introduction

Sports performance has greatly improved in the last years. Levels of performance previously considered impossible are common today. Nowadays, the evolution of Sports Science allows for the application of high training overloads (Bompa, 2002). Psychosocial agents, however, impose an extra load on the athlete. Often not taken into consideration by coaches, those events might lead athletes to states of excessive fatigue known as overreaching and overtraining, substantially impairing their performance (Weinberg and Gould, 2001; Samulski, 2002; Kuipers and Keizer, 1988; Suay et al., 1998).

Lehmann et al. (1998) explain that the stress resulting from the practice and the other daily activities without adequate rest is associated with the onset of overtraining. Suay et al. (1998) and Kellmann and Kallus (2001) corroborate this view, and suggest that social, educational, occupational, economical and nutritional factors, in addition to trips and the length and monotony of trainings, increase the risk for the development of the overtraining syndrome.

Still according to Kellmann (2002), most researchers agree with the definition proposed by Lehmann et al. (1998), since the general description of overtraining does not distinguish details between processes and results, and the consequences of overtraining. The details described in the literature as regards overtraining have caused some confusion, since the international terminology is not standardized and there are no criteria to clarify certain diagnoses (Hooper and Mackinnon, 1995; Kreider et al., 1998).

Morgan et al. (1987) state that the overtraining syndrome is a multifactor phenomenon that entails intercommunication and affects the performance of the athletes (Figure 1). Fry et al. (1991) define four main categories of symptoms, namely: physiological, psychological, biomechanical and immunological.

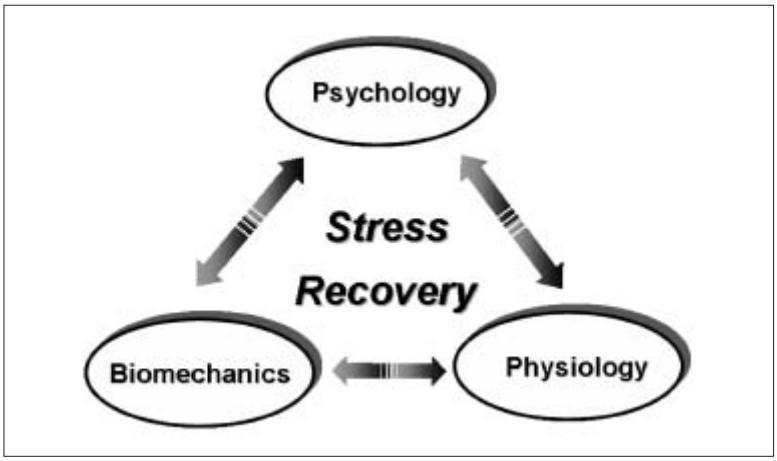


Figure 1. Three-dimensional system of stress (based on Morgan et al., 1987).

According to Kuipers (1998) and Kentha and Hassmen (1998), a training session should cause adaptative responses which, after the adequate training, would increase the tolerance to new loads, a phenomenon known as supercompensation (Figure 2).

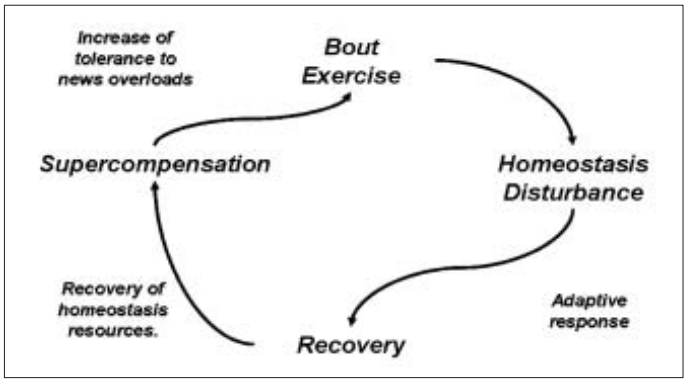


Figure 2. Supercompensation Cycle (based on Kuipers, 1998)

Hartmann and Mester (2000) state that, in case the recovery process is inefficient or incomplete, the process of overtraining takes place through the experience of overreaching, a phenomenon that usually happens some days after an intense training, but is quickly reversible (Kuipers, 1998; Halson and Jeukendrup, 2004). Should this condition remain, it can evolve to overtraining, and later on to more severe conditions that would lead the athlete to quit the modality temporarily (burnout) or permanently (drop-out) (Figure 3).

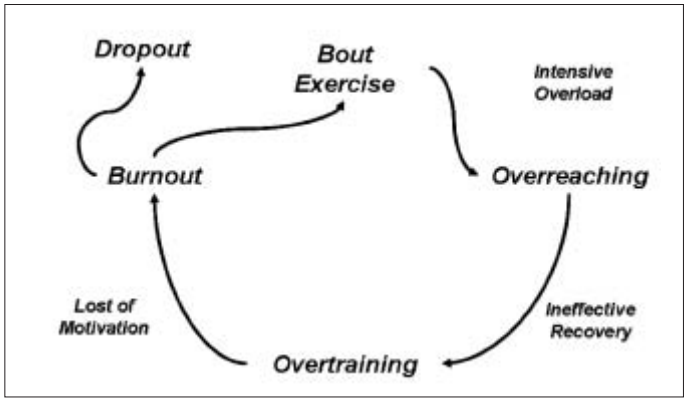


Figure 3. Evolution of Overtraining (based on Kuipers, 1998; Hartmann and Mester, 2000).

The diagnosis of overtraining is gradual (Kuipers, 1998), and established through a variety of symptoms that may be different from an interpersonal standpoint (Hartmann and Mester, 2000). The most common and easily detected ones are loss of performance and behavioral changes (Hooper and Mackinnon, 1995). However, there are other indicators (sleep disorders, loss of appetite, emotional instability, hormonal alterations, etc). Therefore, if one is detected, others will certainly be found (Lehmann et al., 1998; Alves et al., 2006).

According to Costa (2003), there are many ways to monitor overtraining, one of them being the *Recovery-Stress Questionnaire for Athletes* (RESTQ-Sport-76).

To Kellmann and Kallus (2001), the *Recovery-Stress Questionnaire for Athletes* (RESTQ-Sport-76) was developed to measure the frequency of the present stress state along with the frequency of associated recovery activities. The present stress state depends on the preceding stress and recovery activities. Through the simultaneous evaluation of stress and recovery, researchers can have a differentiated picture of the process. The precise characteristics of the RESTQ-Sport-76 are those which allow for the systematic and specific measurements in the evaluation of events, states and activities, taking into consideration their frequency as well as the stress-recovery processes.

Moreover, the RESTQ-Sport-76 can be used during the pre-competitive cycles as well as during the competition season, which provides the technical staff with valuable information to evaluate the balance between the stress state and the recovery, thus facilitating the implementation of early interventions that might prevent serious consequences.

Therefore, this case study aimed at monitoring and evaluating the level of stress of one single high performance volleyball player. She was followed up over a season in periods that presented distinct characteristics, so that we could prevent or make an early diagnosis of overtraining.

Methods

Technical and psychological variables were evaluated in a high performance female Brazilian volleyball team. One athlete stood out from the team due to the fact that she presented special characteristics (first team player, high level of self-criticism, high tactical importance to the team, member of the national team, no reserve player of the same level) that reflected a differentiated profile, justifying our choice for an individual analysis. To show this objective more clearly, the results of the athlete were compared to those of the team and of her immediate reserve for the position.

The athletes were informed on the objectives and procedures of the research, how the results would be used as well as on its voluntary and anonymous character. This study was carried out following the standards established by the Brazilian National Council on Health (Resolution 196/96) for research with humans.

The questionnaire (RESTQ-Sport-76), validated to Portuguese by Costa (2003), comprises 76 questions divided into 19 scales which in turn are divided into 04 large dimensions: “general stress”, “stress in sport”, “general recovery” and “recovery in sport”. They evaluate potentially stressing and relaxing events and their consequences in the last three days/nights as regards the aspects evaluated (Kallus, 1995; Kallus and Kellmann, 2000). The questions are answered by means of an evaluation scale of 7 values, where 0= never and 6= always (Annex 1).

The questionnaire was applied in seven different periods over the season (Table 1), which was relevant to evaluate the levels of stress of the athlete, along with the recovery activities. Before each period of data collection, the athlete went through a relaxation routine in which she should visualize the last three days/nights that preceded the collection. The athlete was instructed to answer all the questions without long periods of interruption. The athlete was not interrupted and answered the questions individually. Table 1 shows the characterization of the period of each collection. It was defined in a structured interview with the coach before each collection so that he would evaluate the period in terms of psycho-physical demand. The classification of the period ranged from "critical" (period with high psycho-physical demand) to "excellent" (period when the psycho-physical demand was perfectly tolerable for the athletes).

Collection	Characterization of the period according to the coach	Classification
01	• Period characterized by two daily practices with high physical loads. • Friendly game with little demand from the team. • Incidents characterized by aggressive reactions of some athletes, generating moments of high tension during practices.	Critical
02	• A great wish to play correctly was observed in this period due to the approaching competition which, to a certain extent, generated a high level of tension during practices. • A practice game against the male team was performed to help prepare the team.	Reasonable
03	• The group was happy due to the good presentation on the first day of competition. • The team defeated a strong adversary, had a difficult moment in the second set, got over, won the two next sets and won the game by 3 x 1.	Ordinary
04	• Return to practices after a 10-day period of rest. • The whole group practiced without any complaints.	Excellent
05	• First defeat in the competition, with the team's performance below average. • Some athletes were strongly affected by the defeat.	Ordinary
06	• Unexpected defeat. The team had the control of the game, could have won by 3 x 0, but ended up losing by 3 x 2. • Eight athletes and two members of the technical staff had intestinal and stomachal problems in the period.	Reasonable
07	• Period characterized by a 4-day rest • The team completed their participation in the championship before the period of rest by winning two important games 3 x 0	Excellent

Legend: classifications — level of physical and psychological demand imposed on the athlete by the period of practice and competition.

Table 1. Characterization of each period of collection.

We used the specific software of the RESTQ-Sport-76 to carry out a descriptive analysis of the data and determine the levels of stress and recovery.

The graphs presented in this section analyze the levels of stress and recovery, and are divided into four large dimensions, according to the theory proposed by the authors of the instrument ("general stress", "stress in sport", "general recovery" and "recovery in sport"). The minimum value of the scale is zero and the maximum value is six (Kellmann and Kallus, 2001). Therefore, the best result is the closest to six in the recovery dimensions, while this result is the worst for the stress dimension. The graphs presented in this study represent the different moments of collection (Table 1).

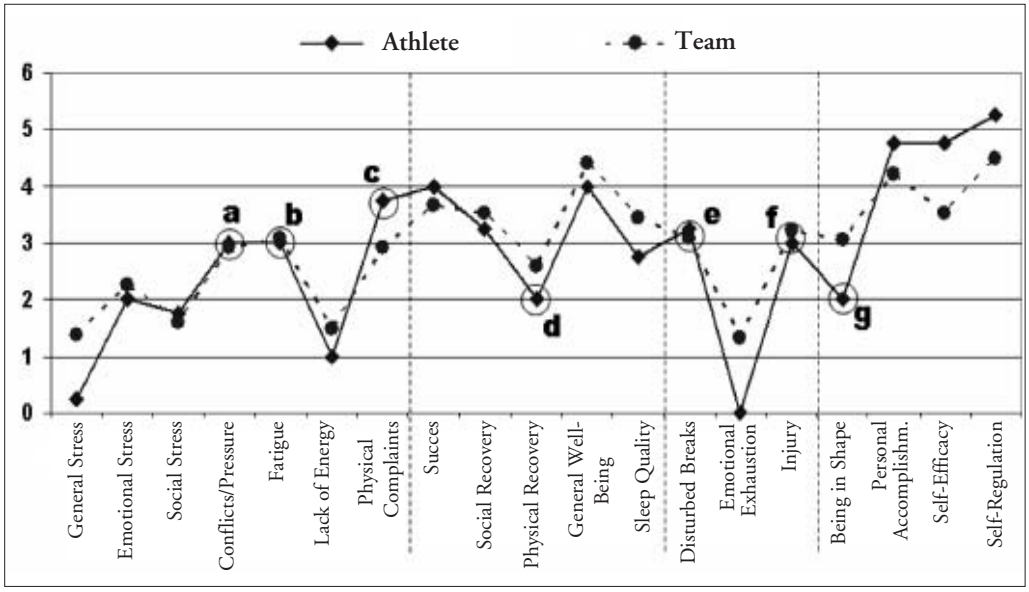
Results

Table 2 presents the technical data comparing the athlete analyzed (first team player) and her immediate reserve (reserve). The team played 27 games in the championship, and the athlete in our study participated in many more. However, when her performance resulted in less than 20% of the actions considered effective, her participation in the games was not considered. The actions were classified as excellent, wrong and those that allowed for a sequence. A formula indicated the efficacy percentage of each athlete. Consequently, we can observe that the data show a well differentiated profile, which required a much higher level of demand from the first team player.

Athlete	Actual Games	Total of Actions	Percentage of Actions	Efficacy
First Team Player	23	2002	75,38 %	27,93 %
Reserve	6	654	24,62 %	13,07 %

Table 2. Comparison of the volleyball technical aspects between the first team player and her immediate reserve.

Figure 4 shows a period of high training overload (collection 01). We can observe some determining aspects in the profile presented by the athlete when compared to the team. In this sense, the general scales that stand out are: (a) "conflicts and pressure" (3,00), (b) "fatigue" (3,00), (c) "somatic complaints" (3,75), (d) "somatic relaxation" (2,00). As regards the dimensions of the sport, we can observe that the relation between load and recovery (physical and psychological) presented values close to critical, where the specific scales stand out: (e) "disturbed breaks" (3,25), (f) "injuries" (3,00), (g) "being in shape" (2,00).



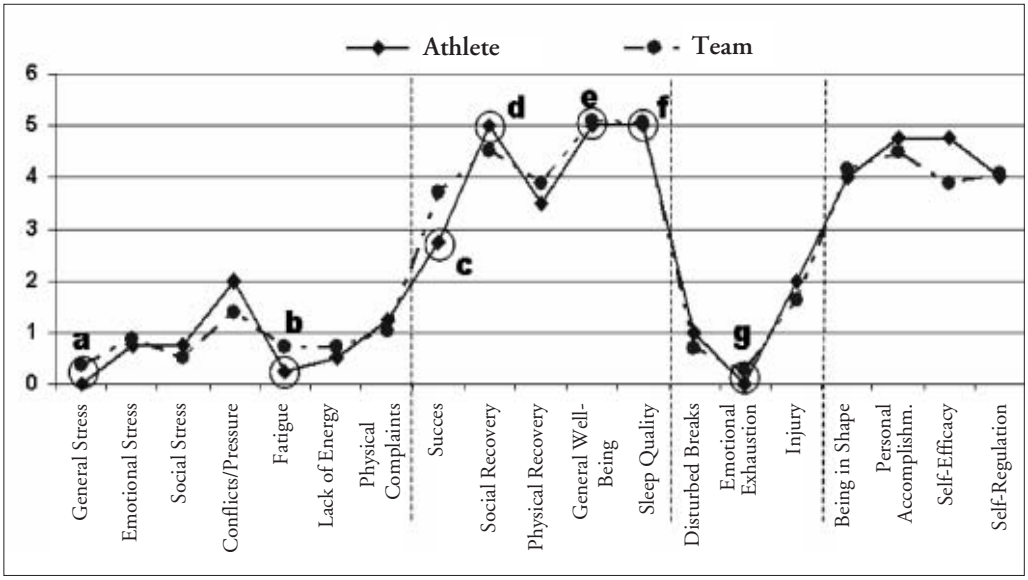
Legends (a) to (h) = scales that stood out for the athlete in the period.

Figure 4: Comparison between profiles of the athlete and the team after a period of physical training with high loads and physical strain.

Figure 5 presents the profiles of the athlete and the team after a period of 10 days of rest (collection 04), with the athletes showing a satisfactory profile in this period We can observe that the rest resulted in a satisfactory profile in this period, since all the scales of the dimensions regarding "general stress" and "stress in sports" are within acceptable values in that period. As regards the dimensions "general recovery" and "recovery in sports", we should highlight the following scales: (a) "general stress" (0,00), (b) "fatigue" (0,25), (c) "success" (2,75), (d) "social relaxation" (5,00), (e) "general well-being" (5,00), (f) "quality of sleep" (5,00), (g) "emotional exhaustion" (0,00).

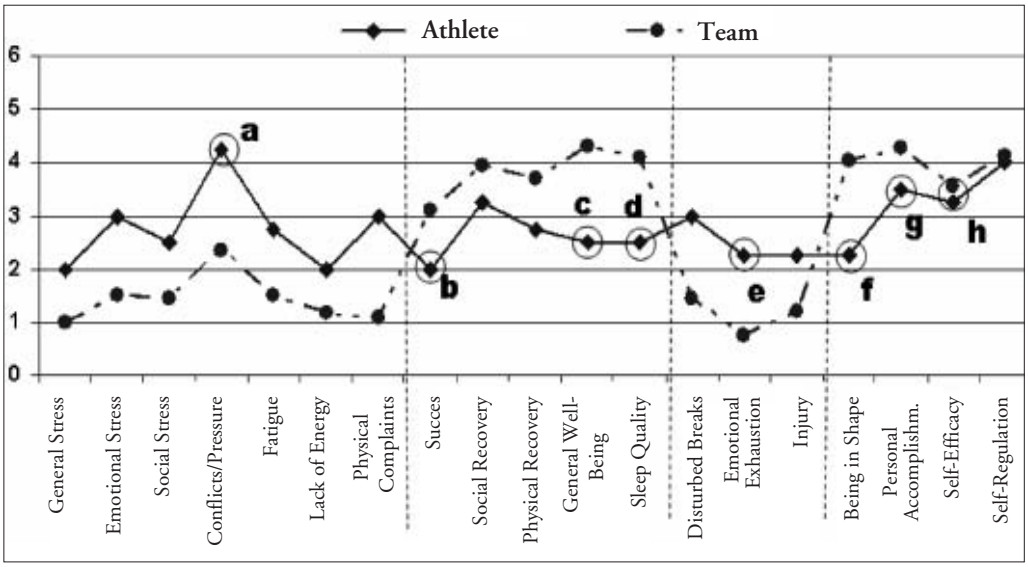
Figure 6 shows the profiles of the athlete and the team after an unexpected defeat to a weaker team (collection 05). According to the coach, the impact of the defeat was strong on the athlete, corroborating the profile presented in the graph. In this sense, the following scales stand out in the general dimensions: (a) "conflicts and pressure" (4,25), (b) "success" (2,00), (c) "general well-being" (2,50), (d) "sleep quality" (2,50), (e) "emotional exhaustion" (2,25), (f) "being in shape" (2,25), (g) "personal acceptance" (3,50), (h) "self-efficacy" (3,25).

Figure 7 presents a comparison between the profile of the athlete after a defeat, classified by the coach as unexpected (collection 06), and after a period of total rest (collection 07). We can observe a difference between the profiles in both situations, which attests the benefits of recovery periods for the athlete. The difference is clear, both in the dimension of stress and in the dimension of



Legends (a) to (h) = scales that stood out for the athlete in the period.

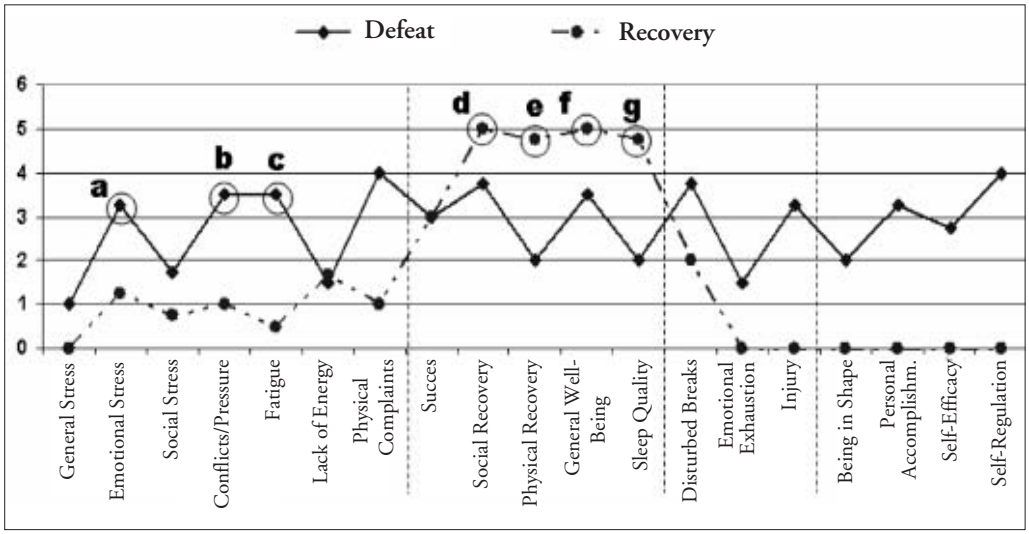
Figure 5. Comparison between profiles of the athlete and the team after a period of rest.



Legends (a) to (h) = scales that stood out for the athlete in the period.

Figure 6. Comparative profile between the athlete and the team after a defeat in a game.

recovery. There is a marked reduction in the negative levels in the scales (a) "emotional stress", (b) "conflicts/pressure" and (c) "fatigue" after the rest. The recovery scales (d) "social relaxation", (e) "somatic relaxation", (f) "general well-being" and (g) "sleep quality" also illustrate the improvement provided by the period of rest.



Legends (a) to (g) = scales that stood out for the athlete in the period.

Figure 7. Comparison between the profile of the athlete after a defeat and after a period of rest.

Discussion

Overtraining is a highly polemic variable of sports training, since it has multifactor implications and heterogeneous evaluation methods (Kuipers and Keizer, 1988; Hooper and Mackinnon, 1995; Fry et al., 1991; Kuipers, 1998; Hartmann and Mester, 2000; Kellmann and Kallus, 2001; Foster, 1998; Maso et al., 2004; Robson, 2003).

Due to the diversity of characteristics observed in the periods of collection (table 1), it is important to mention initially that Halson and Jeukendrup (2004) point to some incongruence in the literature, since most researches have investigated athletes with overreaching rather than overtraining. According to Foster, OVT is primarily related to the maintenance of a high training overload, frequently observed along with other stressors (Foster, 1998). Kentta and Hassmen (1998) state that it is very difficult to diagnose an athlete in the borderline between adaptation as a result of optimal training, and in the beginning of stages of lack of adaptation to excessive training.

The incongruence mentioned above can increase even more. Lehmann et al. (1998)

report the existence of two types of OVT with distinct signs. The parasympathetic one, also known as "modern", is characterized by fatigue, apathy, altered mood state, worsened performance and altered reproductive and immunological functions. The sympathetic one, also known as "classical", is characterized by hyperexcitability, restlessness and worsened performance. Therefore, researchers should observe a series of factors in the diagnosis of OVT, so that they do not mistake the symptoms.

Kentta and Hassmen (1998) believe that physiological, psychological, biochemical and immunological symptoms should be considered, independently or as a whole, together with the fatigue syndrome. Other studies, however, suggest that psychological tests might reveal early symptoms more clearly than many physiological or immunological markers (Shephard and Shek, 1994).

O´Connor (1998) provides many explanations to this advantage, among which: a) psychological changes are more reliable; b) some mood states are highly sensitive to the increase in the training load; c) variations in the measurements of mood are often associated with other physiological markers. In that aspect, Fernández et al. (2000) indicate the POMS to analyze the effect of the exercise programs in the overtraining process. Maso et al. (2004), in a study with rugby players, for instance, did not find a relation between the questionnaire and cortisol, a known stress marker.

As presented in figure 4, which represents a period of high training overload, the scale of "conflicts and pressure" was high due to the fact that the period preceding the beginning of the season is characterized by the anxiety of the premiere and also by the demand for a good performance. Fatigue and somatic complaints are typical characteristics of such a period, due precisely to the high overload of training. The "somatic relaxation", on the other hand, was reported as insufficient, which would be related to those scales. The breaks for recovery were insufficient or inadequate in that period, and the number of lesions was high, possibly stimulated by the somatic complaints and fatigue sensation. Even though all those signs indicate symptoms of overtraining (Morgan et al., 1987; Fry et al., 1991; Kentta and Hassmen, 1998; Foster, 1998), there is strong evidence according to which that condition, along with a long period of practice or the lack of adequate recovery, might trigger this syndrome.

Many studies report that recovery is reached after a period of rest and that an improvement in the performance of the athlete is usually observed, as demonstrated by the supercompensation curve (Angeli et al., 2004; Bruin et al., 1994; Garcia-Mas et al., 2003). Figure 5 clearly illustrates this situation. The "success" scale, which evaluates the involvement of the athlete in activities considered important, presented a relatively low value. We should keep in mind, however, that she might not have been involved in important activities in that period. The other scales are within the acceptable range. It is possible to observe in the other markers that stood out that rest, or simply staying away from the main activity, resulted in a considerable improvement in the profile of the athlete. Our results are in line with many previous studies which suggest that the recovery time is essential for the athlete as regards his/her mental and physical recovery (Kentta and Hassmen, 1998; Bruin et al., 1994).

A problem detected by Kentta and Hassmen (1998) is that there are many

mechanisms to evaluate the training process, but few of them include the recovery process.

According to Hooper and Mackinnon (1995) and Angeli et al. (2004), many studies suggest that the staleness of performance is enough to characterize the OVT syndrome. The same authors report that there are many monitoring ways available, such as physiological, psychological and self-analysis tools. Other works, on the other hand, did not find any correlation between some classical physiological indicators, as the levels of cortisol and ACTH, and the psychological aspects. A possible explanation is that other physiological indicators (serotonin and pro-inflammatory cytokines) might have a more significant influence on the psychological indicators (Atlaoui et al., 2004; Robson, 2003; Smith, 2003; Smith, 2000).

It is also important to stress the fact that many aspects other than the physical ones might unbalance the athlete, making him/her prone to the overtraining phenomenon. Kentta and Hassmen (1998) mention the psychological stress that can be understood within a context, as an imbalance between the athlete's expectations and his/her performance capacity. Social stress is the result of interactions with other people. Therefore, the self-demand for a good performance in the face of a negative result, along with the performance expectations generated by the other members of the team or the coach, could easily account for the results presented by the athlete on the occasion of the defeat. This observation can be seen in figure 6, which represents the collection after an unexpected defeat, and shows that the questionnaire is sensitive to acute events. It is clear that the defeat significantly influenced the behavior and the general feelings of the athlete, disheartening her and negatively changing her self-perception. The scales that stood out clearly show the effect brought about by this situation. For example, the increase of "conflicts and pressure" is closely related to a decrease of her "self-acceptance" and "self-efficacy", as well as the decrease in the feeling of "success" and the increase of "emotional exhaustion". It is also important to stress that these psychosocial aspects can easily influence biological aspects, such as "sleep quality" which, in turn, interfere in the efficacy of recovery and, therefore, in future performances.

Finally, individual differences as regards potential for recovery, effort capacity, and external stressors not related to the practice, and tolerance to stress might explain the different levels of the OVT syndrome experienced by athletes under the same type of practice (Kentta and Hassmen, 1998). This datum is essential for us to understand the difference between the first team player and the rest of the team presented in the graphs.

Hooper and Mackinnon (1995) believe it is difficult for the coach to adequately synchronize the practice overload and the rest only by observing the athlete's tolerance to practice and his/her recovery capacity, since the athlete might intentionally mask the signs of an imminent OVT syndrome and go on training because he/she was often prepared to stand pain and reach objectives.

Foster suggests that the OVT syndrome is more commonly observed when a high amount of physical exercise is combined with other stressors in the athlete's private life (Foster, 1998). O´Connor and Puetz (2005) reported a relation between chronic physical exercise and conflicting reactions, were some people reports sensations of fatigue while others report feeling energized. Halson et al. (2003) observed that overreaching is associated with a significant decline in performance and disorders in the mood states.

Conclusions

We can conclude that the recovery periods are fundamental to replenish the physical and psychological capacities of the athletes, since the athlete in our study presented a considerably better profile after a recovery period.

We can also observe that the methodology used systematically shows the athletes' states of stress and recovery, indicating the extent to which the athletes are physically and mentally stressed, and analyzing whether the strategies used in the recovery periods are effective.

The role of the coach is of utmost importance in the process in the sense that he/she reinforces the relevance of the procedures used and recognizes many forms of overtraining indicators in his/her athletes. This fact highly contributes to the diagnosis process and prevention which will certainly reflect on the performance of the athletes. This kind of monitoring, along with the daily observation of the team, is crucial to inhibit any signs of imbalance between stress and recovery.

Therefore, the psychological evaluation is useful in the prevention and/or early detection of the periods in which the athlete is more prone to overtraining.

MONITORIZACIÓN DE LOS NIVELES DE ESTRÉS Y DE SOBREENTRENAMIENTO EN UNA JUGADORA BRASILEÑA DE BALONVOLEA DE ÉLITE: UN ESTUDIO DE CASO

PALABRAS CLAVE: Sobreentrenamiento, Fatiga, Estrés, Recuperación, Balonvolea.

RESUMEN: El sobreentrenamiento es el resultado de un desequilibrio entre el estrés y su recuperación, combinado con cortos períodos de recuperación y determinados factores psicosociales. En este estudio de caso se ha empleado un cuestionario de estrés y recuperación en el deporte para analizar los niveles de sobreentrenamiento en una jugadora brasileña de balonvolea de elite. Los resultados indican que las elevadas cargas físicas provocan cambios en el perfil de la deportista, mostrando un incremento en las escalas de fatiga. Los períodos de recuperación se han mostrado como fundamentales para el restablecimiento de las capacidades físicas y psicológicas de la deportista. Finalmente, nuestro método de análisis ha evidenciado la existencia de modificaciones en el perfil de la deportista después de acontecimientos puntuales, tal como el observado después de una derrota inesperada. Se concluye que los cambios en el perfil de la curva, obtenidas por nuestro cuestionario, reflejan los distintos períodos de recogida de datos, lo que configuraría un indicador de los cambios de la sobrecarga estresante. De esta manera, la posibilidad de detección o de la monitorización de los factores estresantes para ella deportista puede ser de gran valor para la mejora del rendimiento físico y psicológico de un equipo.

MONITORAMENTO DOS NÍVEIS DE ESTRESSE E OVERTRAINING EM UMA ATLETA DE VOLEIBOL DE ALTO NÍVEL DO VOLEIBOL BRASILEIRO: ESTUDO DE CASO

PALAVRAS-CHAVE: Fadiga, Estresse, Recuperaçao, Voleibol.

RESUMO: O *overtraining* ocorre devido a um desequilíbrio entre estresse e recuperação, ou seja, uma carga excessiva de estresse físico ou psicológico, combinada com pouco tempo de recuperação, além dos eventos psicossociais. Utilizou-se, neste estudo de caso, um questionário de estresse e recuperação no esporte para verificar os níveis de ?overtraining? de uma atleta de elite do voleibol brasileiro. Os resultados apontam que as cargas físicas elevadas provocaram modificações no perfil da atleta, evidenciando um aumento nas escalas de fadiga. Os períodos de recuperação se mostraram fundamentais para o restabelecimento das capacidades físicas e psicológicas da atleta. Por fim, o método empregado detectou modificações no perfil da atleta após eventos agudos como o observado após uma derrota inesperada. Conclui-se que as mudanças de perfil da curva, demonstradas pelo instrumento, foram capazes de refletir os diferentes períodos de coleta, o que configuraria um indicativo da mudança da sobrecarga estressora. Assim, a possibilidade da detecção ou monitoramento dos fatores estressantes para o atleta pode ser de grande valia para a melhoria da performance física e psicológica de uma equipe.

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Annex 1

Single Code:_____ **Group Code:**_____

Name (Last):_____ **(First):** _____

Date:_____ **Time:** _____ **Age:** _____ **Gender:**_____

Sport/Event(s): _____

Nível educacional:

( ) primeiro grau incompleto ( ) primeiro grau completo ( ) segundo grau incompleto
( ) segundo grau completo ( ) superior incompleto ( ) superior completo

R E S T Q - 76 Sport

This questionnaire consists of a series of statements. These statements possibly describe your mental, emotional, or physical well-being or your activities during the past few days and nights.

Please select the answer that most accurately reflects your thoughts and activities. Indicate how often each statement was right in your case in the past days.

The statements related to performance should refer to performance during competition as well as during practice.

For each statement there are seven possible answers.

Please make your selection by marking the number corresponding to the appropriate answer.

Example:

In the past (3) days/nights

... I read a newspaper

0	1	2	3	4	5	6
never	seldom	sometimes	often	more often	very often	always

In this example, the number 5 is marked. This means that you read a newspaper very often in the past three days.

Please do not leave any statements blank.

If you are unsure which answer to choose, select the one that most closely applies to you.

Please turn the page and respond to the statements in order without interruption.

In the past (3) days/nights

	0	1	2	3	4	5	6		0	1	2	3	4	5	6
1) ... *I watched TV*								23) ... *I visited some close friends*							
2) ... *I did not get enough sleep*								24) ... *I felt depressed*							
3) ... *I finished important tasks*								25) ... *I was dead tired after work*							
4) ... *I was unable to concentrate well*								26) ... *other people got on my nerves*							
5) ... *everything bothered me*								27) ... *I had a satisfying sleep*							
6) ... *I laughed*								28) ... *I felt anxious or inhibited*							
7) ... *I felt physically bad*								29) ... *I felt physically fit*							
8) ... *I was in a bad mood*								30) ... *I was fed up with everything*							
9) ... *I felt physically relaxed*								31) ... *I was lethargic*							
10) ... *I was in good spirits*								32) ... *I felt I had to perform well in front of others*							
11) ... *I had difficulties in concentrating*								33) ... *I had fun*							
12) ... *I worried unresolved problems*								34) ... *I was in a good mood*							
13) ... *I felt at ease*								35) ... *I was overtired*							
14) ... *I had a good time with friends*								36) ... *I slept restlessly*							
15) ... *I had a headache*								37) ... *I was annoyed*							
16) ... *I was tired from work*								38) ... *I felt as if I could get everything done*							
17) ... *I was successful in what I did*								39) ... *I was upset*							
18) ... *I couldn't switch my mind off*								40) ... *I put off making decisions*							
19) ... *I fell asleep satisfied and relaxed*								41) ... *I made important decisions*							
20) ... *I felt uncomfortable*								42) ... *I felt physically exhausted*							
21) ... *I was annoyed by others*								43) ... *I felt happy*							
22) ... *I felt down*								44) ... *I felt under pressure*							

0: never 1: seldom 2: sometimes 3: often 4: more often 5: very often 6: always

In the past (3) days/nights

	0	1	2	3	4	5	6			0	1	2	3	4	5	6
45) ... *everything was too much for me*									62) ... *I pushed myself during performance*							
46) ... *my sleep was interrupted easily*									63) ... *I felt emotionally drained from performance*							
47) ... *I felt content*									64) ... *I had muscle pain after performance*							
48) ... *I was angry with someone*									65) ... *I was convinced that I performed well*							
49) ... *I had some good ideas*									66) ... *to much was demanded of me during the breaks*							
50) ... *parts of my body were aching*									67) ... *I psyched myself up before performance*							
51) ... *I could not get rest during the breaks*									68) ... *I felt that I wanted to quit my sport*							
52) ... *I was convinced I could achieve my set goals during performance*									69) ... *I felt very energetic*							
53) ... *I recovered physically*									70) ... *I easily understood how my teammates felt about things*							
54) ... *I felt burned out by my sport*									71) ... *I was convinced that I had trained well*							
55) ... *I accomplished many worthwhile things in my sport*									72) ... *the breaks were not at the right times*							
56) ... *I prepared myself mentally for performance*									73) ... *I felt vulnerable to injuries*							
57) ... *my muscles felt stiff or tense during performance*									74) ... *I set definite goals for myself during performance*							
58) ... *I had the impression there were too few breaks*									75) ... *my body felt strong*							
59) ... *I was convinced that I could achieve my performance at any time*									76) ... *I felt frustrated by my sport*							
60) ... *I dealt very affectively with my teammates' problems*									77) ... *I dealt with emotional problems in my sport very calmly*							
61) ... *I was in a good condition physically*																

0: never 1: seldom 2: sometimes 3: often 4: more often 5: very often 6: always