

ANALYSIS OF STRESS AND RECOVERY IN THE SPORTING PERFORMANCE OF AMATEUR AMERICAN FOOTBALL ATHLETES

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Abstract: American football is a contact sport, which emerged from a rugby variation and which is based on individual physical strengths and team play, with the objective of advancing to the scoring zone. As it is a high-contact sport, stress among athletes is inevitable; recovery, in turn, is neglected in the training regime. The present study aimed to analyze the perception of stress and recovery in the sports performance of amateur American football athletes through the Restq-Sport-76 questionnaire, using it in an uncontrolled clinical study during a period of 12 months. The same was carried out at the Training Center of the American Football Team Maceió Marechais and 56 male athletes aged between 16 and 36 years were evaluated. The values obtained in the mean of the stress and recovery scales of the experienced athletes were considered moderate levels, while the non-experienced group obtained means of low stress and moderate recovery. It was concluded from this study that the level of recovery from sports stress can be considered satisfactory. Therefore, it is understood as important the development of a state of physical and mental recovery and the identification of their profile, to avoid the deleterious effects of focusing only on training volume. More studies must be carried out in this line, since it is a sport on the rise in Brazil.

Keywords: Stress. Recovery. Physiotherapy. American football.

INTRODUCTION

American Football (FA) is a team and contact sport, which emerged from a variation of *rugby* and which is based on physical valences of speed, agility, tactical ability and brute strength of the players, who, as a team, push, block and chase opponents, trying to make the ball advance to the scoring zone.^{1,4}

As a sport with great contact between players and taking into consideration,

the tournaments for team classification, the occurrence of stress among athletes becomes inevitable. This is accompanied by emotional symptoms such as anxiety and anger, heightened activation in the central and autonomic nervous systems, humoral responses, changes in immune functions, and behavioral changes², which lead to adaptive and coping processes in action.

The recovery process, in turn, is often overlooked as an essential aspect of any training regimen⁵. Some scholars have approached that recovery is not just the elimination of stress, but the processes of reestablishing the resources and psychological and physical states of the athlete after training or competitions⁶, being, therefore, a specific and individual process that occurs over time and depends on the type and duration of stress⁸. It has also been suggested that recovery is understood as a sensitive process that can be easily disturbed or prevented⁹ and has physiological, subjective as well as action-oriented components, and ends with a psychophysiological state of efficacy homeostatic balance is restored³.

Increased sports performance is achievable when athletes balance training with proper recovery¹¹. Therefore, an athlete's condition depends on the balance/imbalance of these two aspects. Recovery-stress status indicates the extent to which someone is physically or mentally stressed, as well as whether or not the person is able to use individual recovery strategies⁵. It is important to monitor the athletes' subjective view of stress and recovery, as inadequate recovery (recovery deficit and/or disturbances) may occur and therefore athletes may suffer from overtraining syndrome.

Studies on sports training have estimated that training loads have increased by around 20% in recent decades⁷, and have defined stress as a non-specific reactional orientation

syndrome that is characterized by a deviation from the norm of the body's biological/psychological state¹. This way, stress is related to the body and mind if the athlete cannot balance training volume with recovery.

Signs and symptoms of overtraining, as an undesired result of the athletic training regimen, are characterized by a loss of performance and increased fatigue caused by the imbalance between stress and recovery². The first phase of this syndrome is termed overreaching, which is reversible within a short-term recovery period and may be rewarded with overcompensation, i.e. recovery takes the athlete to a higher level of performance compared to the pre-value effort. Therefore, recovery and stress must be treated in a multilevel approach, dealing with the psychological, emotional, cognitive-behavioral performance and social aspects of the athlete¹⁰. The Recovery and Stress Questionnaire for Athletes (RESTQ-Sport) is one of the few questionnaires with which the complexities of stress and recovery can be addressed¹³.

Thus, basing the present study to analyze the perception of stress and recovery in the sports performance of athletes so that the signs and symptoms of overtraining or psychological changes in athletes can be avoided, thus, preventing the appearance of injuries. Thus, this article aims to analyze the perception of stress and recovery in the sports performance of amateur American football athletes, seeking qualitative results in their development.

MATERIAL AND METHOD

This project was approved by the Research Ethics Committee (CEP) of ``Universidade Estadual de Ciências da Saúde de Alagoas`` - UNCISAL and executed after its approval, with approval number: opinion 1.480.327/2016 All study participants were instructed regarding their participation, purpose of the study, procedures, benefits, risks and stages of the research and signed the Informed Consent Form (TCLE), in accordance with Resolution No. 466/12 of the National Health Council, of the Ministry of Health (CNS/MS).

This is an uncontrolled clinical study that aimed to analyze the level of stress and recovery of American football athletes, during a sports season, over a period of 12 months. The study was carried out at the Training Center of the American Football Team Maceió Marechais, in the city of Maceió, Alagoas, during the period from August 2016 to August 2017. were in AF sports training at the time of study initiation. Those away from training and sports competitions at the beginning of the study were excluded.

For data collection, the athletes were personally approached by the researchers at their sports training location, informed about the study objectives and invited to participate in it. Those who agreed to participate and met the research inclusion criteria and did not have exclusion criteria were instructed about their participation, procedures, benefits, risks and stages of the research. After all clarifications about the research, the athletes were invited to sign the Free and Informed Consent Term (TCLE) and, in sequence, to participate in the first stage of the research, that is, application of the RESTQ-Sport questionnaire.

After signing the TCLE, the athletes were instructed on completing the RESTQ-Sport questionnaire and a general form about their personal and sporting aspects. The RESTQ-Sport allows the measurement of stress and

recovery in athletes, with 76 questions, on a six-point Likert scale (1 - very few times to 6 - always). In order to fill it out, the evaluated individual is asked to take into consideration, the last three days in relation to behaviors, feelings and emotions experienced.

The original instrument contains 19 factors: General Stress, Emotional Stress, Social Stress, Fatigue, Loss of Energy, Physical Complaints, Success, Social Recovery, Physical Recovery, General Well-Being, Sleep Quality, Interval Disturbances, Emotional Exhaustion, Injuries, Being in Shape, Personal Acceptance, Self-efficacy and Self-Regulation, with reliability ranging from 0.58 to 0.85, with 16 of the 19 subscales presenting significant reliability, that is, above 0.70¹⁴. By varying the scale from 0 to 6, values above 4 are considered “high”, below 2 are considered “low” and between 2.01 and 3.99 are “moderate”, either for specific stress, general stress or recovery. During the period of execution of the study, the athletes were submitted to two moments of evaluation (initial evaluation and final evaluation) in their training place. After the first evaluation, the athletes were submitted to the FIFA 11+ preventive protocol, being applied once a week for 12 months until the last evaluation, totaling 24 applications of the program.

Data tabulation was performed using Microsoft Office Excel, version 2013 (Microsoft, Redmond, WA, USA); Descriptive and inferential analyzes were performed using the SPSS statistical package, version 21.0 (IBM SPSS Inc, Chicago, IL, USA). Initially, the adherence of the data to the normality standards was tested using the Kolmogorov-Smirnov test, then the T test for paired samples and the Wilcoxon test were applied, according to the adherence of each variable. To test the independence between the categorical variables, the Chi-square and Fisher's exact tests were used, respecting the assumptions of each test. Differences were

considered statistically significant when $P < 0.05$ for a 95% confidence interval.

RESULTS AND DISCUSSION

The sample consisted of 56 male amateur athletes, aged between 16 and 36 years, selected for convenience, who were divided into experienced athletes and novices in the sport. Table 1 presents data regarding their characterization.

The results inherent to stress and recovery, with their characteristics and their averages throughout the season for athletes with more experience are shown in table 2. It presents data from two evaluation moments, through which increasing levels can be observed. of stress and low levels of recovery during the season.

According to sports recovery scholars, the increase in training volume will promote mood disorders, which can be mitigated by reducing the training intensity and claim that there is a direct dose-response relationship between the training volume and its high intensity, generating high levels of stress as training intensity or volume increases, as well as higher levels of recovery when given low exercise intensities^{2,5}. some other scholars¹⁴ exposed that hours of training and practice time are directly related to the number of injuries and injuries in American football, along with professional activity and the accumulation of positions in the game can increase the level of stress.

The data obtained show that the levels of stress, general, emotional, social, lack of energy and emotional exhaustion had low levels; all the other points addressed had moderate levels at the beginning of the season that increased during the competition period, but remained at moderate levels with the exception of the minor ones: General stress, social and emotional exhaustion that remained at low levels throughout the season.

The recovery scale, on the other hand, always remained at moderate levels, with the exception of slipping: Self-regulation, which in the first data collection presented a level considered high, proving that the athletes always had considerably good recovery periods, even some points showed a decrease in the end of the season, but that is justified by reaching the final of the championship.

Comparing the average stress and recovery of the athletes, the levels were always satisfactory during the two moments of data collection, the averages of the stress scale were: 2.05 at the beginning of the season and 2.25 at the end of the season. The recovery scale averages were: 3.56 at the beginning of the season and 3.10 at the end of the season, showing that all athletes had good results.

Table 3 presents the stress and recovery data of novice athletes who were not in competition, but were training for competitions.

We can observe in the table that all the athletes had low levels of stress that this can be justified with the period of low intensity training because they were not yet close to the period of competitions, corroborating with Steinacker & Lehmann, 2002, describing that the greater the training intensity, the higher the stress levels and the longer the recovery period.

Graph 1 compares the athletes from the 2 groups who answered the RESTQ-Sport questionnaire at the beginning of the season with the older athletes in order to verify whether the levels of stress and recovery differed, comparing the stress scale, the levels are different in all scores, so athletes with more experience in American football show higher levels of stress, this can be justified by the time they already train and their social activities compared to novice athletes.

On the average stress scale, athletes with more experience are at a moderate level (2.25), whereas novice athletes have a low

stress level (1.01). However, the average of the recovery scales shows that the two groups have moderate levels, showing that athletes with more experience in American football have a moderate stress demand and also a moderate recovery.

In the recovery scale of athletes with less time in sport in the variables (17. personal acceptance, 18. self-efficiency and 19. self-regulation), an inversion was identified, showing the points to be addressed specifically that can be worked with athletes, because they are characteristics subject to professional psychology analysis making a multidisciplinary approach with the Physiotherapist, Physical Educator and the trainer.

CONCLUSION

Given the findings of the present study, we can guide athletes, health professionals dedicated to sports and American football coaching staff and conclude that athletes with more experience in the sport reached moderate stress levels throughout the season and moderate recovery throughout the entire season. their season, athletes with less experience abstained from low levels on the stress scale and moderate levels on the recovery scale, which is justified by the low-intensity training period; In the comparative chart of the two groups of athletes, the scores disagreed on the stress scale, justifying it with the time of sports practice and the volume of training since they were in competition and on the recovery scale, both groups acquired moderate levels, so we fulfilled the objective of the study that was to analyze the perception of stress and recovery levels in the sports performance of athletes. We suggest that more studies be carried out on American football since it is a sport on the rise in Brazil, both in terms of sports performance of athletes and in the physical-mental analysis of athletes.

VARIABLES	Pre Intervention n= 39 % (n)	Post intervention N= 39 % (n)	P value
STRESS SCALE			
General stress	1,24	1,76	0,834 ¹
2. Emotional stress	1,99	2,02	0,913 ¹
3. Social stress	1,75	1,94	0,959 ¹
4. Conflict/Pressure	2,86	2,94	0,636 ²
5. Fatigue	2,23	2,50	0,918 ¹
6. Lack of energy	1,69	2,12	0,909 ²
7. Somatic complaints	2,03	2,40	0,957 ²
13. Interval disturbances	2,46	2,58	0,741 ²
14. Emotional exhaustion	1,33	1,43	0,760 ¹
15. Injuries	2,95	2,81	0,567 ²
Average - stress scales	2,05	2,25	
RECOVERY SCALES			
8. Success	3,52	3,69	0,835 ¹
9. Social Relaxation	3,63	3,85	0,867 ²
10. Somatic relaxation	3,40	3,53	0,932 ¹
11. General well-being	3,99	3,73	0,963 ²
12. Quality of sleep	2,51	2,37	0,521 ²
16. Be in Shape	3,60	3,29	0,832 ²
17. Personal Acceptance	3,58	3,38	0,960 ²
18. Self-Efficacy	3,62	3,35	0,779 ²
19. Self-Regulation	4,19	3,89	0,917 ¹
Average- recovery scales	3,56	3,10	

Table 2 – Comparative values on the level of stress and recovery for athletes evaluated through the RESTQ 76 - Sport questionnaire applied to a group of American football athletes from the city of Maceió-AL.*

¹ Wilcoxon test; ² T test for paired sample

*Source: survey data.

VARIABLES	n= 17 % (n)	VARIABLES	n= 17 % (n)
STRESS SCALE		RECOVERY SCALES	
General stress	0,58	8. Success	3,75
2. Emotional stress	0,75	9. Social Relaxation	5,08
3. Social stress	0,75	10. Somatic relaxation	4,67
4. Conflict/Pressure	1,08	11. General well-being	5,08
5. Fatigue	1,08	12. Quality of sleep	3,00
6. Lack of energy	0,75	16. Be in Shape	4,50
7. Somatic complaints	1,33	17. Personal Acceptance	2,50
13. Interval disturbances	2,25	18. Self-Efficacy	3,00
14. Emotional exhaustion	0,58	19. Self-Regulation	3,33
15. Injuries	1,00	Average- recovery scales	4,46
Average - stress scales	1,01		

Table 3 – Comparative values regarding the level of stress and recovery for athletes evaluated through the RESTQ 76 - Sport questionnaire applied to a group of American football athletes from the city of Maceió-AL.*

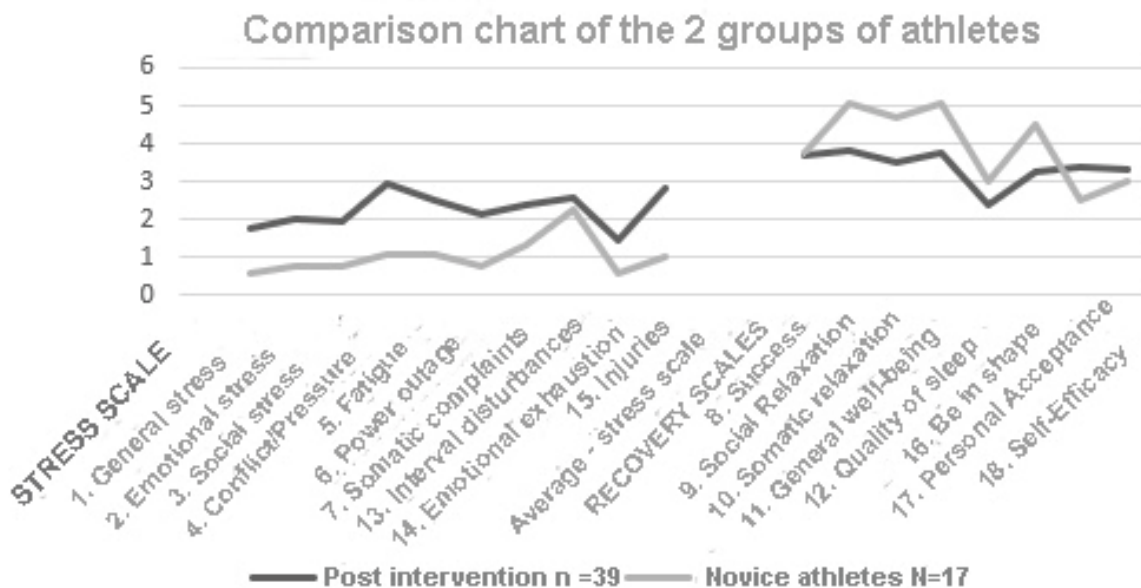
*Source: survey data.

VARIABLES	Experienced athletes n= 39 % (n)	Novice athletes N= 17 % (n)	P value
Age (years)			
17 a 25	74,36 (29)	76,47 (13)	
26 a 30	20,51(8)	11,76 (2)	0,699 ¹
31 a 40	5,13 (2)	11,76 (2)	
Professional activity			
Student	48,72 (19)	58,82 (10)	0,573 ¹
Professional	48,72 (19)	41,17 (7)	
Without occupation	2,56 (1)	0 (0)	
Time practicing sports (years)			
<1 year	8,70 (4)	100 (17)	
Between 1 and 3	34,78 (16)	0 (0)	
Between 4 and 6	47,82 (22)	0 (0)	<0,001 ¹
Between 7 and 9	8,70 (4)	0 (0)	
> 10	0 (0)	0 (0)	
Position in game			
Attack	53,84 (21)	41,17 (7)	0,201 ²
Defense	46,15 (18)	58,82 (10)	

Table 1 – Characterization of American football athletes from the city of Maceió-AL.*

¹ Fisher's Exact Test; ² Chi-square test

*Source: survey data.



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