

## Exploring the relationship between oral health and quality of life as indicators of Burnout in football athletes

THUANNY CASTILHO

Postgraduate Program in Dentistry of Niterói Faculty of Dentistry  
Federal Fluminense University (PPGO-FOUFF), Niterói, Rio de Janeiro, Brazil

PHILIPPE SARKIS

Undergraduate Student of CNPq/UFF Scientific Initiation  
Fluminense Federal University (UFF), Nova Friburgo, Rio de Janeiro, Brazil

ANA JÚLIA MILANI

Postgraduate Program in Dentistry of the Health Institute of Nova Friburgo Faculty of  
Dentistry, Fluminense Federal University (PPGO-ISNF), Nova Friburgo  
Rio de Janeiro, Brazil

LEONARDO SANTOS ANTUNES<sup>1</sup>

Department of Specific Formation of the Health Institute of Nova Friburgo (FFE-ISNF)  
Federal Fluminense University, Nova Friburgo, Rio de Janeiro, Brazil;  
Postgraduate Program in Dentistry of Niterói Faculty of Dentistry  
Federal Fluminense University (PPGO-FOUFF), Niterói, Rio de Janeiro, Brazil

LÍVIA AZEREDO ALVES ANTUNES

Department of Specific Formation of the Health Institute of Nova Friburgo (FFE-ISNF)  
Federal Fluminense University, Nova Friburgo, Rio de Janeiro, Brazil  
Postgraduate Program in Dentistry of the Health Institute of Nova Friburgo (PPGO-  
ISNF), Federal Fluminense University, Nova Friburgo, Rio de Janeiro, Brazil  
Postgraduate Program in Dentistry of Niterói Faculty of Dentistry, Federal Fluminense  
University (PPGO-FOUFF), Niterói, Rio de Janeiro, Brazil

### Abstract

**Aims:** *To assess the relationship between Oral Health Status (OHS), Oral Health-Related Quality of Life (OHRQoL) and Sports Related Quality of Life (SRQoL) as predictors of Burnout in football athletes.*

**Materials and methods:** *The sample consisted of 34 male and Brazilian football athletes. The study was conducted in four phases: i) oral health evaluation; ii) evaluation of OHRQoL using the Oral Health Impact Profile (OHIP-14); iii) evaluation of SRQoL using Athlete's Quality of Life Questionnaire (AQoLQ); iv) evaluation of Burnout risk (low, moderate and high) using the Athlete's Burnout Questionnaire (ABQ). Univariate and*

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<sup>1</sup> Corresponding author: leonardoantunes@id.uff.br

*bivariate statistics were computed and statistical significance was set at a value of  $P < 0.05$ .*

**Results:** *The mean age were 22.35 ( $\pm 4.72$ ) years. Regarding total scale, only athletes with moderate (79.4% -  $n=27$ ) and low risk (20.6% -  $n=7$ ) of Burnout were identified, with the majority being at moderate risk. When the subscales were evaluated, the domain “Reduced sense of accomplishment” and “Emotional/physical exhaustion” presented respectively 67.6% ( $n=23$ ) and 61.8% ( $n=21$ ) of athletes in the high-risk group to present Burnout syndrome. There were no association between the characterization of athletes and oral conditions with Burnout risk ( $p > 0.05$ ). Considering scales and subscales of OHRQoL and SRQoL instruments, no association was observed with risk of presenting Burnout syndrome ( $p > 0.05$ ).*

**Conclusion:** *This study provided evidence that OHS, OHRQoL and SRQoL are not indicators of Burnout syndrome in football athletes.*

**Keywords:** Oral health, Burnout syndrome, Quality of life, Athletes.

## INTRODUCTION

Burnout is described in terms of emotional, physical and mental exhaustion, depersonalization, and reduced personal fulfillment (Raedeke, 1997). These changes in athletes may change the pace of training and competition (Brenner et al., 2007; Gustafsson et al., 2011; Lemyre et al., 2008). The physical exercise can interact directly with the mood, physical health and indirectly, with the athlete’s social life (Cunha et al., 2008). Thus, the regular and continuous practice of sports activities can favor the performance and maintenance of quality of life since it can provide several biological benefits (e.g. improving sleep quality and reducing hypertension levels), psychological (well-being, reduction of stress level and symptoms of depression and anxiety) and social (greater socialization) to the athlete (Paluska & Schwenk, 2000; Rosembloom & Bahns, 2006]. However, the intense preparation of athletes and the increase of the training intensity, striving for improved performance, can lead them to exceed their limits. This allows for the appearance of physical injuries and the development of a series of psychological, physiological and hormonal changes which result in the reduction of sport performance levels as evidenced in Burnout syndrome (Small, 2002).

Football is increasingly common with amateurs. Due to their differentiated training and nutritional habits, these athletes are likely to present different risks to oral health compared to the average person who does not exercise. Oral diseases, such as dental erosion and dental caries, as well as changes in salivary parameters should be treated with care. However,

their special needs regarding dental care and education in oral hygiene have not been adequately considered in dental research (Frese et al., 2015). Athletes should pay special attention to the prevention and treatment of periodontal diseases, since this disease can affect muscle metabolism[35]. These conditions can impact the physical and psychosocial functions that influence training and competitions (Needleman et al., 2015).

Considering the relationship between oral pathologies and quality of life in non-athletes, there are studies about stress related to the progression of caries lesions (Gaio et al., 2012; Gay-Escoda et al., 2011), with periodontal problems and temporomandibular joint dysfunctions (Li & Bernabé, 2016; Sáez-Prado et al., 2016; Silva et al., 2016). However, to the best of our knowledge, no studies evaluating the oral health-related quality of life (OHRQoL) in athletes were found in the literature.

As mentioned above, there is literature that describes Burnout syndrome and the effect of stress on the functionality of athletes (Creswell & Eklund, 2004; Gustafsson et al., 2011; Lemyre et al., 2008; Schellenberg et al., 2013; Small, 2002; 36]. However, the investigation of oral health status (OHS), oral health-related quality of life (OHRQoL) and sport related quality of life (SRQoL) as indicators of Burnout in athletes is scarce. Thus, the objective of this study was to explore the relationship between these parameters as indicators of Burnout in Brazilian football athletes.

## **MATERIAL AND METHODS**

### **Ethical Approval, Type of Study, and Sampling**

The study was approved by the local Ethics and Research Committee (#2.175.625) in accordance with resolution 466/12 of the National Health Commission. Appropriate written informed consent was obtained from all participants and from legal guardians when the athlete is underage. This cross-sectional study was carried out in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (Von Elm et al., 2008). The sample was composed of athletes from the Football Team, in Nova Friburgo, Rio de Janeiro, Brazil. The selection process involved athletes who had been training for at least six months with the team and speak fluent Portuguese. Exclusion criteria were confounding factors for detecting Burnout syndrome (athletes in psychiatric treatment; using antidepressant medication) and quality of life (athletes under dental treatment; using orthodontics appliances; athletes with special needs, syndromes, systemic disorders); and who did not fill out the forms properly.

## **Data Collection**

### ***Non-clinical data***

Data referring to the general characterization of the athletes were collected through an interview in Portuguese language that was previous tested in a pilot project. The questionnaire addressed age, ethnicity, economic status and educational level. Economic status was calculated using the Brazilian Economic Classification Criterion of the Brazilian Association of Research Companies (ABEP). The athletes have been classified in A, B, C, D, E, in which the higher economic conditions correspond to classification A and lower economic conditions correspond to classification E (ABEP, 2015).

Data about dental history (e.g. dental erosion, dental sensitivity, and bruxism) were obtained. We also assessed the athlete's diet, toothbrush, toothpaste, intrinsic factors that could be related to dental erosion (e.g. vomiting, regurgitation, gastro esophageal problems, bulimia, anorexia, xerostomia, radiotherapy and hemodialysis), teeth grinding and teeth clenching.

### ***Clinical data***

A single pre-trained and calibrated examiner performed the athletes oral examination. The calibration process was coordinated by an experienced examiner in epidemiological surveys (Gold-Standard) who guided the conduct of the theoretical and practical training steps. The training exercise was performed using images of different clinical situations and the calibration was carried out with an oral examination of 30 athletes (from a previous study, not part of this study population) on two separate occasions with a two-week interval between sessions. Intra- and inter-examiner reliability was assessed. Inter-examiner reliability ranged from 0.80 (95% CI 0.80–0.95) to 1.00 and intra-examiner reliability was Kappa =1.00. The examination was conducted in a dental clinic with the athletes seated in a chair, using tongue depressors, gauze, probe, mirror, disposable gloves, and illumination. evaluated the following oral conditions: dental caries (WHO, 2013); periodontal disease (community periodontal index) (WHO, 2013); dental erosion (Bartlett et al., 2008); dental trauma (WHO, 2013); malocclusion (Jenny & Cons, 1996); and bruxism (AASM, 2005; Antunes et al., 2016; Johansson et al., 1993; Mengatto et al., 2013; Motta et al., 2014). For statistical analyses, all variables were dichotomized (yes/no).

## **Oral health evaluation**

### ***Questionnaire assessment***

Initially, a pre-test assessment of the questionnaire was conducted in to determine the understandability of the questions and the reliability of the

instrument applied. Three instruments were used: a Brazilian version of the Oral Health Impact Profile (OHIP-14) (Almeida et al., 2004); the Athlete's Quality of Life Questionnaire (AQoLQ) (Cunha et al., 2008); and a Brazilian version of the Athlete's Burnout Questionnaire (ABQ) (Pires et al., 2006). A new convenience sample (athletes who did not participate in the study) was obtained (n = 5). The test-retest reliability analysis requires that the conditions of the subjects remain stable between the two administrations of the questionnaire. The second application of the questionnaire, two weeks later, was performed after asking the athletes whether their condition had changed since the recruitment. In this pre-test study, the interviewer was trained in the reading and intonation of each question and choice of answers for each of the three instruments. It is worth mentioning that the interviewer was trained for a period of six hours to apply the questionnaires. The trainer was a researcher who had previously mastered this type of methodology. The interviewer adapted the ABQ wording, using minor word substitution (e.g., changing "sports" to "football"), to be specific for the sport practiced.

#### ***Oral health-related quality of life (OHRQoL) assessment***

The assessment of the OHRQoL was performed using the validated Brazilian version of the Oral Health Impact Profile (OHIP-14) (Almeida et al., 2004) questionnaire in a face-to-face interview. One dental assistant who was blind to the clinical oral examinations performed interviews. The OHIP-14 was constructed with 14 questions (overall) distributed in seven domains (subscales) with two questions each: functional limitation, physical pain, psychological discomfort, physical limitation, psychological limitation, social limitation and disability. Response categories of OHIP-14 were coded on a five-point scale: 0=Never; 1= Almost never; 2=Sometimes; 3=Almost always; 4=Always. The final value of the OHIP-14 questionnaire was obtained by summing the values of the 14 responses. The results for each individual questionnaire may vary from 0 to 56, with the higher values indicating a poorer quality of oral health and a lower satisfaction index related to the individual's quality of life.

#### ***Sport's related quality of life (SRQoL) assessment***

The sport's related quality of life assessment was performed using the validated version of the AQoLQ (Cunha et al., 2008) in a face-to-face interview. The AQoLQ was constructed with 14 questions grouped into five dimensions: emotional state of the athlete; basic conditions for health; social relationships in the sports environment; planning and periodization of sports training; and signs and symptoms of overtraining. The AQoLQ response categories were coded on a five-point scale: 0 = no influence; 1 = little influence; 2 = moderate influence; 3 = lots of influence; 4 = total influence.

The final value of the AQoLQ questionnaire was obtained by summing the values of the 14 responses. The result for each individual can range from 0 to 56, and the higher values indicate a greater impact on the athlete's quality of life.

### ***Athlete's Burnout Syndrome assessment***

The evaluation of Burnout syndrome was performed using the Brazilian validated version of the Athlete Burnout Questionnaire (ABQ) (Pires et al., 2006) in a face-to-face interview. The ABQ was constructed with 15 items that evaluate the frequency of feelings related to Burnout. Each item refers to a subscale or construct of the Burnout manifestation in athletes (Raedeke, 1997): physical and emotional exhaustion; reduced sense of sports accomplishment and devaluation of the sports modality. The ABQ response categories were given on a five-point scale: 1 = almost never; 2 = rarely; 3 = sometimes; 4 = frequently; 5 = almost always. The question 1 and 14 are reverse recorded (five-point scale: 5 = almost never; 4 = rarely; 3 = sometimes; 2 = frequently; 1 = almost always). The results were attributed to each subscale, obtained from the arithmetic mean of the responses given to the five items corresponding to each dimension of Burnout, and to a total Burnout value calculated by the arithmetic mean of all 15 items of the instrument as proposed by the authors of the psychometric instrument (Raedeke & Smith, 2001). The result for each individual can range from 15 to 75, and the higher values indicate a greater chance for risk of Burnout syndrome. We considered athletes with low, moderate and high risk of Burnout syndrome athletes that scored less than 26, from 26 to 49 and above from 50 points respectively. Considering each dimension, we considered athletes with low, moderate and high risk of Burnout syndrome athletes that pointed less than 6, from 6 to 10 and above from 11 points.

### ***Data analysis and management***

The data were analyzed using IBM SPSS (Statistical Package for Social Science, USA) v.23.0. The level of significance was set at 5% ( $p < 0.05$ ). The psychometric properties were assessed for internal consistency and test-retest reliability. Internal consistency reliability was assessed by means of Cronbach's Alpha, and test-retest reliability by means of the Intraclass Correlation Coefficient (ICC).

Since an ordinal scale was used in these questionnaires, the normality of the sample was initially assessed using the Kolmogorov-Smirnov test. The relationship variables between sociodemographic, oral health, OHRQoL, AQoLQ and Burnout risk were obtained. For the test of hypotheses, considering the categorical variables, Fisher's exact test was applied. The comparison between two or more groups (High risk, Moderate risk, Low risk)

was made with ANOVA (analysis of variance) with one factor, followed by the Tukey post-hoc test for the quantitative variables. The confidence level was 0.05 for error  $\alpha$  and power 0.80, and the tests were assumed to be two-sided.

## RESULTS

Initially, 45 athletes were contacted. A total of 34 male athletes (positive joined rate, 75,5%) (Figure 1) were included and the mean age were 22.35 ( $\pm 4.72$ ) years. The main factors for exclusion were the use of orthodontic appliances ( $n=6$ ) and missed clinical examination visits ( $n=5$ ).

In this study, we applied three previously-tested instruments. We confirmed the validity (Cronbach's Alpha ABQ and AQoLQ=0.90 and for OHIP-14=0.80) and the reliability (ICC ABQ=0.92; AQoLQ=0.80 and OHIP-14=0.90) of all instruments applied in the present population.

Regarding total scale, no athletes were found to be at high risk of Burnout. Only moderate (79.4%) and low risk (20.6%) athletes were identified, with the majority being at moderate risk. When the subscales were evaluated, the domain "Reduced sense of accomplishment" and "Emotional/physical exhaustion" presented respectively 67.6% and 61.8% of athletes in the high-risk group to present Burnout syndrome (table I).

Table II presents the data obtained from the general characterization of the athletes (age, ethnicity, economic status and education level) and clinical examination (dental sensitivity, bruxism, teeth clenching, dental caries, periodontal disease, dental erosion, dental trauma and malocclusion). These variables were not associated with Burnout risk ( $p>0.05$ ).

Considering scales and subscales of OHRQoL and SRQoL instruments, no association was observed with risk of presenting Burnout syndrome ( $p>0.05$ ) (Table III).

## DISCUSSION

The OHRQoL is an important tool for evaluating the health of the athlete, since injuries related to sports can impact the patient beyond the physical presentation of the injury or illness (Valovich McLeod et al., 2009). Burnout syndrome in athletes is associated with negative effects, such as performance impairment, decreased and depressed moods, and, potentially, withdrawal from sports (Gustafsson et al., 2011). To the best of our knowledge no study was conducted showing the relationship between oral health, quality of life, and indicators of Burnout syndrome in athletes, therefore justifying our study. This study evaluated three hypotheses: OHS, OHRQoL, and SRQoL may be related to Burnout syndrome. All hypotheses have been refuted in this study. These data suggest the need for further studies with athletes from

other sports relating these characteristics to Burnout syndrome to assess whether there is actually any data to relate.

In soccer players, the most common oral health problems were related to dental caries, gingivitis, malocclusion and dental trauma (Gay-Escoda et al., 2011). Study with triathletes, found higher prevalence of dental caries in athletes who trained several times during a week and an association between sport and dental erosion (Frese et al., 2015). In this study, the most common oral condition was dental erosion and malocclusion, followed by the presence of dental caries.

Previous studies (Goyal et al., 2013; Oliveira et al., 2015) have reported that periodontal disease may be related to physical and emotional health. However, findings from this research have shown that OHS, including periodontal disease was not a risk indicator for Burnout. The direct association between periodontal disease and stress has not yet been proven. The reasons for this could be due there was not enough athletes to show any possible effect or periodontal disease does not have an effect.

The ABQ was the instrument used to detect the risk of Burnout in this study. The Brazilian version (Pires et al., 2006) was adapted for two hundred athletes of twelve sports. Five of the sports were categorized as collective (soccer, futsal, volleyball, handball and basketball) and seven were categorized as individual sports (boxing, taekwondo, judo, swimming, triathlon, Olympic gymnastics and athletics). Even though it was validated in the Portuguese language for the present sample, it proved to also be valid and reliable for football. The estimated internal consistency observed in the present investigation was consistent with the previous adaptation from the Brazilian version (Pires et al., 2006). ABQ has been recognized as the most appropriate instrument for the evaluation of Burnout syndrome in athletes, it is also the questionnaire used in the most current and relevant research in the area, such as the investigations in tennis players (Martinent & Decret, 2015) and in athletes of football and basketball (Torrado et al., 2016). An additional advantage of this questionnaire is that was free of charge.

While the results of this research highlight that most athletes are grouped in the moderate risk group for Burnout. It is possible to relate that these athletes may be experiencing a high level of stress as the result of competition leading to Burnout syndrome as presented by Cresswell and Eklund (2004). It is conceivable that sports devaluation and financial difficulties are examples of factors that cause athletes to present Burnout syndrome (Creswell & Eklund, 2004). Because the athletes in this sample are from sports that are not very well known in Brazil, the athletes may not have suffered so much pressure as to unleash this associated stress. Another point is, if a sport is not a very popular in Brazil, it may not have many



sponsorships, therefore the athletes do not make a living from the sport and engage in other professions, which diminishes the dedication to the sport.

Most studies on Burnout in athletes originate from the perspective of stress, which shows that Burnout syndrome is a response to chronic stress (Raedeke, 1997). The regular and continuous practice of sports activities can favor the reduction of the level of stress, improving the psychological state (Rosenbloom & Bahns, 2006). The estimated internal consistency observed in the present investigation was consistent with previous reports from AQoLQ questionnaire (Cunha et al., 2008). The findings of this research demonstrated that SRQoL is not an indicator of Burnout in football athletes.

The instruments that evaluate OHRQoL are used to cover the psychosocial effects of oral complications, developing a holistic approach to patient care (Antunes et al., 2012). Routine sporting practice may expose athletes to the onset of numerous oral diseases (D'ercole et al., 2016). There are studies (Frese et al., 2015; Needleman et al., 2015; Souza et al., 2012) that have evaluated whether oral health affects the performance of the athlete, but the literature is scarce when it comes to studies that evaluate OHRQoL in athletes. In this study, from the three instruments used to indicate the risk of Burnout, only OHIP-14 has never been applied in athletes. It has shown good internal consistency, so we suggest the use of this instrument to detect the quality of life of athletes. The OHRQoL in athletes was not related to the risk of Burnout in this research.

The findings of this study should be interpreted taking into consideration some limitations. The sample size can be considered a limitation. Although the authors contacted all the athletes on the football team, some needed to be excluded due to the eligibility criteria. Further studies using a larger sample size are suggested to evaluate OHRQoL in athletes.

Although there were indications of a high prevalence of dental erosion and malocclusion in sports athletes, the presence of both OHRQoL and SRQoL and confirmation of consistency and reproducibility of the instruments used in athletes (OHIP-14, AQoLQ and ABQ), it is not possible to extrapolate the results of the present study, since the hypothesis of a relationship with Burnout syndrome was not confirmed. This fact can be due to a great limitation imposed by the casuistry. However, due to the fact that the samples are not probabilistic, the detection of these parameters proposed in this research for this specific group (athletes) can initially help in the prevention and the creation of strategies to deal with problems and tensions that can happen with the athletes, which may be oral, psychological and even physical changes.

## CONCLUSIONS

This study provided evidence that OHS, OHRQoL and SRQoL are not indicators of Burnout syndrome in football athletes.

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**Table I.** Frequency and mean distribution of (a) reduced sense of accomplishment; (b) devaluation; (c) emotional/physical exhaustion in football athletes considering the Burnout Risk.

Dimension	Distribution	All group	Low <sup>a</sup>	Moderate <sup>b</sup>	High <sup>c</sup>
<b>Total scale</b>	n (%)	34 (100)	7 (20.6)	27 (79.4)	0 (0)
<b>Variation (0-75)</b>	Mean (SD)	32.2 (6.9)	21.9 (2.4)	34.9 (4.7)	0
	CI	-	-	29.8-34.6	
	p-value	-	-	*p<0.001	
<b>Reduced sense of accomplishment*</b>	n (%)	34 (100)	0 (0)	11 (32.4)	23 (67.6)
<b>Variation (0-25)</b>	Mean (SD)	12.3 (3.4)	0	8.2 (1.3)	14.3 (2.1)
	IC	-	-	11.1-13.5	
	p-value	-	-	*p<0.001	
<b>Devaluation</b>	n (%)	34 (100)	4 (11.8)	23 (67.6)	7 (20.6)
<b>Variation (0-25)</b>	Mean (SD)	8.3 (2.7)	5.0 (0.1)	7.6 (1.4)	12.7 (1.3)
	CI	-	-	7.4-9.3	
	p-value	-	**p<0.01 ; ***AxB p<0.001; ***AxC p=0.002; ***BxC p=0.002		
<b>Emotional/physical exhaustion.</b>	n (%)	34 (100)	1 (2.9)	12 (35.3)	21 (61.8)
<b>Variation (0-25)</b>	Mean (SD)	11.6 (3.3)	5.0 (0.1)	8.9 (1.2)	13.4 (2.6)
	CI	-	-	10.4-12.7	
	p-value	-	-	***p<0.001 #	

For values reported as mean and standard deviation (SD) \*Student's t-test; \*\*One-way ANOVA test and \*\*\*Tukey post-hoc test  
#post hoc test are not performed because at least one group has fewer than two case

**Table II.** Distribution of sample characterization and oral health status and its relation to Burnout Risk (Low and Moderate).

VARIABLES	Total scale				Reduced sense of accomplishment				Devaluation				Emotional/physical exhaustion.			
	Total n(%)	LOW (n=7)	MODERATE (n=27)	P value	MODERATE (n=11)	HIGH (n=23)	P value	LOW (n=4)	MODERATE (n=25)	HIGH (n=7)	P value	LOW (n=1)	MODERATE (n=12)	HIGH (n=21)	P value	
<b>SAMPLE CHARACTERIZATION</b>																
Mean Age (SD)	22.35(4.7)	23.0(8.1)	22.2(3.6)	0.26	23.0(6.4)	22.0(3.8)	0.45	21.0(2.9)	22.3(5.2)	23.1(4.0)	0.78	24(0)	22.3(6.8)	22.3(3.4)	0.94	
<b>Ethnicity (%) **</b>																
Caucasian	3088.2 (411.8)	723.3 (90)	2376.7 (4100.0)	0.56	1106.7 (0)	1963.3 (4100.0)	0.28	413.3 (0)	1963.3 (4100.0)	723.3 (0)	0.33	163.3 (0)	1033.3 (250.0)	1963.3 (250.0)	0.77	
<b>Mixeddescent Economic status (%) **</b>																
A.B	1328.2 (2161.8)	430.8 (314.3)	898.2 (1885.7)	0.39	538.5 (628.6)	861.3 (1871.4)	0.54	215.4 (29.5)	753.8 (1676.2)	430.8 (314.3)	0.38	0(0)	861.5 (419.0)	538.5 (1676.2)	0.03	
<b>Educational level (%) **</b>																
< 9 years of education	617.6 (2882.4)	233.3 (217.9)	406.7 (2382.1)	0.58	333.3 (32.1)	406.7 (1967.9)	0.95	116.7 (310.7)	406.7 (1967.9)	116.7 (621.4)	0.90	0(0)	406.7 (828.6)	333.3 (1967.9)	0.20	
<b>ORAL HEALTH STATUS</b>																
<b>Dental sensitivity (%) **</b>																
Yes	1852.9 (318.8)	422.2 (181.8)	1477.8 (1381.3)	1.00	527.8 (637.5)	1372.2 (1062.5)	0.71	211.1 (212.5)	1372.2 (1062.5)	316.7 (425.0)	0.81	0(0)	738.9 (531.2)	1161.1 (1062.5)	0.53	
<b>Bruxism (%) **</b>																
Yes	1029.4 (2470.6)	330.0 (416.7)	770.0 (2083.3)	0.29	330.0 (833.3)	770.0 (1696.7)	1.00	110.0 (312.5)	770.0 (1696.7)	220.0 (520.8)	0.97	110.0 (0)	330.0 (937.5)	600.0 (1562.5)	0.28	
<b>Tooth clenching (%) **</b>																
Yes	1047.1 (1852.9)	212.5 (227.8)	1487.5 (1372.2)	0.40	212.5 (950.0)	1487.5 (900.0)	0.03	16.2 (316.7)	1275.0 (1161.1)	318.8 (422.2)	0.58	0(0)	531.2 (738.9)	1168.8 (1055.6)	0.53	
<b>Dental caries (%) **</b>																
Yes	2976.5 (823.5)	415.4 (37.5)	2294.0 (562.5)	0.32	623.1 (562.5)	2976.5 (37.5)	0.03	311.5 (112.5)	1765.4 (675.0)	623.1 (112.5)	0.81	163.8 (0)	934.6 (37.5)	1961.5 (562.5)	0.85	
<b>Periodontal disease (%) **</b>																
Yes	1852.9 (316.7)	425.0 (316.7)	1275.0 (1583.3)	0.08	531.2 (633.3)	1168.8 (1967.7)	1.00	212.5 (211.1)	1168.8 (1296.7)	318.8 (422.2)	0.96	0(0)	850.0 (422.2)	850.0 (1372.2)	0.18	
<b>Dental erosion (%) **</b>																
Yes	2885.3 (514.7)	724.1 (0)	2275.0 (5100.0)	0.56	1107.9 (0)	1862.1 (5100.0)	0.15	413.8 (0)	1965.5 (480.0)	420.7 (120.0)	0.66	163.4 (0)	1241.4 (0)	1955.2 (5100.0)	0.16	
<b>Dental trauma (%) **</b>																
Yes	1441.2 (2058.8)	321.4 (420.0)	1178.6 (1880.0)	1.00	537.5 (630.0)	964.3 (1470.0)	0.72	17.1 (315.0)	964.3 (1470.0)	428.6 (315.0)	0.54	171.1 (0)	428.6 (840.0)	964.3 (1200.0)	0.41	
<b>Malocclusion (%) **</b>																
Yes	2985.3 (514.7)	517.2 (249.0)	2482.8 (393.0)	0.27	931.0 (249)	2095.0 (393.0)	0.69	413.8 (0)	1862.1 (5100.0)	724.1 (0)	0.24	163.4 (0)	1034.5 (249.0)	1862.1 (393.0)	0.89	

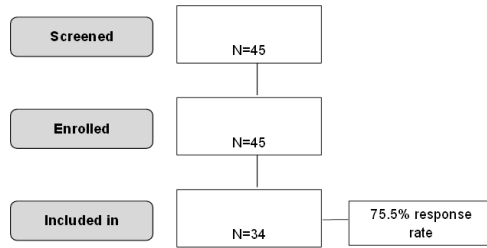
For values reported as mean and standard deviation (SD); \*Student's t-test; for values reported as frequency, \*\*Fisher's exact test

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**Table III.** Burnout risk according OHRQoL and SRQoL considering scales and subscales.

Variables	Total scale				Reduced sense of accomplishment				Devaluation				Emotional/physical exhaustion			
	Total Mean (SD)	LOW (n=7)	MODERATE (n=27)	P-value*	MODERATE (n=11)	HIGH (n=23)	P-value*	LOW (n=0)	MODERATE (n=23)	HIGH (n=7)	P-value**	LOW (n=1)	MODERATE (n=12)	HIGH (n=21)	P-value**	
<b>OHRQoL</b>																
Total scale	2.70(3.98)	3.00(6.27)	2.74(3.32)	0.88	2.45(5.02)	2.95(3.49)	0.73	1.25(1.50)	2.91(4.22)	3.28(4.34)	0.62	1.00(0)	2.41(5.05)	3.00(3.43)	0.81	
Functional limitation (0-8)	0.00(0.34)	0.28(0.75)	0.00	0.36	0.18(0.60)	0.00	0.34	0.00	0.08(0.41)	0.00	0.89	0.00	0.16(0.57)	0.00	0.41	
Physical pain (0-8)	1.12(1.55)	1.14(2.27)	1.11(1.37)	0.96	1.00(1.94)	1.17(1.37)	0.76	0.75(0.95)	1.08(1.70)	1.42(1.29)	0.71	0.00	1.16(1.99)	1.14(1.31)	0.77	
Psychological discomfort (0-8)	0.76(1.30)	0.57(1.13)	0.81(1.36)	0.67	0.45(0.93)	0.91(1.44)	0.34	0.25(0.50)	0.69(1.01)	1.28(2.21)	0.32	1.00(0)	0.33(0.88)	1.00(1.48)	0.37	
Physical disability (0-8)	0.15(0.43)	0.43(0.79)	0.07(0.27)	0.29	0.27(0.64)	0.08(0.28)	0.38	0.25(0.50)	0.17(0.49)	0.00	0.55	0.00	0.25(0.62)	0.00(0.30)	0.59	
Psychological disability (0-8)	0.56(1.23)	0.43(1.13)	0.50(1.28)	0.76	0.45(1.03)	0.00(1.33)	0.73	0.00	0.65(1.26)	0.57(1.51)	0.60	0.00	0.41(0.99)	0.00(1.29)	0.78	
Social disability (0-8)	0.09(0.38)	0.14(0.38)	0.07(0.38)	0.68	0.09(0.39)	0.08(0.41)	0.97	0.00	0.13(0.45)	0.00	0.80	0.00	0.08(0.28)	0.00(0.43)	0.97	
Handicap (0-8)	0.00(0.24)	0.00	0.00	0.47	0.00	0.08(0.28)	0.16	0.00	0.08(0.28)	0.00	0.78	0.00	0.00	0.00(0.30)	0.54	
<b>SRQoL</b>																
Total scale	43.64(7.17)	39.14(10.25)	44.81(5.85)	0.20	41.72(9.43)	44.50(5.83)	0.28	47.25(4.99)	43.47(7.96)	42.14(5.17)	0.40	42.00(0)	40.91(9.58)	45.28(5.19)	0.24	
Signs and symptoms of overtraining	12.44(3.43)	10.43(5.74)	12.96(2.46)	0.29	11.45(4.88)	12.91(2.48)	0.36	14.75(1.50)	12.04(3.83)	12.42(2.43)	0.32	16.00(0)	11.00(4.67)	13.09(2.27)	0.14	
Basic health conditions	9.97(2.00)	8.86(2.85)	10.26(1.68)	0.25	9.30(2.57)	10.26(1.65)	0.31	10.50(1.73)	10.13(2.11)	9.14(1.77)	0.43	12.00(0)	9.00(2.48)	10.42(1.50)	0.08	
Social relationship in the sports environment	10.67(1.51)	9.71(1.89)	10.92(1.33)	0.15	10.27(1.73)	10.80(1.39)	0.28	10.25(2.06)	10.82(1.40)	10.42(1.71)	0.77	8.00(0)	10.33(1.61)	11.00(1.34)	0.09	
Emotional state of the athlete	5.67(1.53)	5.28(1.60)	5.78(1.53)	0.46	5.63(1.74)	5.68(1.45)	0.91	6.50(1.73)	5.47(1.56)	5.85(1.34)	0.44	4.00(0)	5.58(1.56)	5.80(1.53)	0.51	
Planning and periodization of sports training	4.88(1.83)	4.80(1.40)	4.80(1.95)	0.97	5.00(1.18)	4.82(2.10)	0.76	5.25(0.95)	5.00(2.02)	4.28(1.60)	0.60	2.00(0)	5.00(1.70)	4.95(1.88)	0.29	

Values reported as mean and standard deviation (SD); \*Student's t-test; \*\*One-way ANOVA test.



**Figure 1.** Strobe diagram describing participant flow.