

Bruxism and Cardio Vascular Diseases: A Cross-Sectional Study

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ABSTRACT

INTRODUCTION: Bruxism is a parafunctional activity with unclear etiology. Psychological stress might be involved. The aim of this observational study was to compare the prevalence of bruxism between cardiopathic patients and non-cardiopathic patients.

SUBJECTS AND METHODS: The population study was based on 120 patients divided in 2 groups: Cardiopathic patients (Test-group; $n = 60$) and Non-Cardiopathic patients (Control-group; $n = 60$). All the patients included in the study were screened for bruxism with the "tooth wear Index" (TWI). The TWI value was supposed to be higher or equal to 2 for the 50% of the teeth to define the diagnosis of bruxism. The prevalence of bruxism was calculated and compared in

both groups.

RESULTS: In the Test-group, 55 out of 60 cardiopathic patients were bruxist, with a prevalence of 91,67%. In the Control-group, 17 out of 60 non cardiopathic patients were bruxist with a prevalence of 28.33% (Figure 1).

CONCLUSION: Cardiopathic patients showed a higher prevalence of bruxism than non-cardiopathic patients. Further prospective studies are needed to evaluate the relation occurring between the two conditions.

Key words: Bruxism; Cardio vascular disease; Sleep bruxism; Awake bruxism; Comparative cohort study; Prevalence; Oral medicine

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INTRODUCTION

Bruxism is a parafunction of the masticatory muscles with gnashing or grinding of teeth^[1]. According to the criteria proposed by the American Academy of Sleep Medicine (AASM), there are two distinct forms of bruxism: *daytime* bruxism or *awake* bruxism (AB), and *nighttime* bruxism or *sleep* bruxism (SB)^[2]. Signs and symptoms of bruxism may include teeth wear, higher risk of dental fracture, tired jaw muscle, and headache^[3].

In a recent systematic review, Manfredini and co-workers (2013) reported that the prevalence of AB ranged between 22% and 31% of the adult population, while the prevalence of SB was around 13%^[4]. The prevalence of bruxism is greater among females and smokers and it has been associated to stressful lifetime periods^[5].

However, the etiology of bruxism is controversial and it might be multifactorial^[6]. Several risk factors have been suggested, including peripheral (morphological) factors and central (pathophysiological and psychological) factors^[7]. Among psychological factors, stress and anxiety have been implicated in the etiology of bruxism for decades because of their capability to stimulate the central nervous system

(CNS) and the rhythmic masticatory area^[8-10].

The sustained activation of the sympathetic nervous system associated to chronic psychological stress might encourage epidemiological studies on the relation between bruxism and other conditions related to stress^[11]. Among those conditions cardiovascular disease probably accounts for the one with the most studied association with stress. An extensive recent literature established that psychosocial factors contribute significantly to the pathogenesis of cardiovascular disorders (CAD)^[12]. Psychological stress increases the likelihood of blood clotting and down regulates the immune response favoring the onset of atherosclerosis. Furthermore, stressful situations promote unhealthy life habits such as the alcohol and tobacco abuse which have been associated both to CAD and bruxism^[13-14].

The aim of the present observational study was to compare the prevalence of bruxism among cardiopath and non-cardiopath patients.

MATERIALS AND METHODS

One hundred twenty patients were recruited for the present observational study at the Versilia General Hospital (Lido di Camaiore, Lu, Italy). The study was conducted in accordance with the Helsinki declaration of 2008. Each patient included in the study was asked to sign an informed written consent, anonymousness, voluntariness of participation, absence of risk, sponsors, conflicts of interest and incentives for the responding subjects and was asked to fill in a specific anamnestic questionnaire.

The study population consisted of 120 patients divided in two groups (Table 1): (1) Test group: sixty patients hospitalized in the Cardiology Unit with a pre-existent cardiovascular event history (myocardial infarction, angina pectoris, ischemic stroke, cardiomyopathy, heart arrhythmia, valvular heart disease, thromboembolic disease). (2) Control group: sixty patients recruited at the Stomatology Unit of the same hospital without positive anamnesis for cardiovascular disease.

Inclusion criteria were: (1) All consecutive patients aged between 35 to 70 referred to the Cardiology or Stomatology Unit; (2) Smoking habits < 5 cigarettes/day.

Exclusion criteria were: (1) Pregnancy; (2) Conditions requiring antibiotic prophylaxis or any other therapies; (3) Other systemic pathologies except for cardiovascular disease; (4) Other sleep disorders except for bruxism; (5) Orthodontic therapy during the study; (6) Severe psychiatric disorders; (7) Severe physical handicaps; (8) Diagnosed carcinoma; (9) Immunosuppressive therapy within 6 months; (10) Radiotherapy within 12 months; (11) Bisphosphonate therapy within 12 months.

Clinical evaluation

All the patients included in the study received a complete dental check-up and they were screened for bruxism by means of the "tooth wear Index" (TWI)^[15].

TWI is a generic index to measure the tooth wear and it ranges from 0 to 4 depending on the extension and depth of lost substance on different tooth surfaces (Table 2)^[16].

A mean TWI value higher or equal to 2 for the 50% of the teeth defined the diagnosis of bruxism for a single patient^[17].

Statistical analysis

Data were collected in a statistical software in order to perform descriptive analysis. The Logit Odds Ratio and the Yates's corrected version of Pearson's chi-squared-test were used to compare the

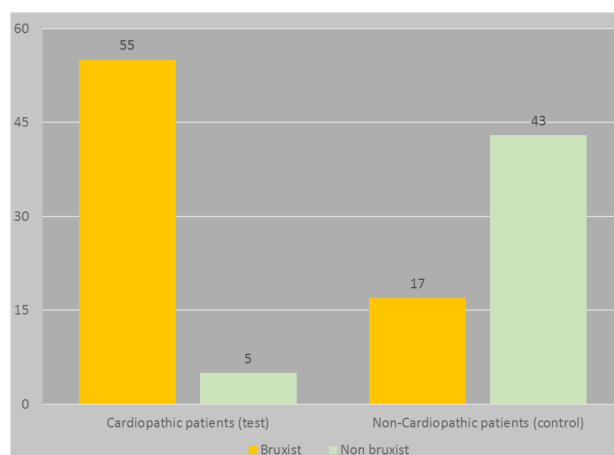


Figure 1 Prevalence of bruxism in both groups: Test-group (Cardiopathic patients) and Control-group (Non-cardiopathic patients).

prevalence of bruxism between the two groups. The level of statistical significance was set at 0.05 for all analysis.

RESULTS

A total of 120 (90 males and 30 females) patients were enrolled in this study: 60 non-cardiopathic patients (Control-group) and 60 cardiopathic patients (Test-group).

The mean age was 52.2 ± 6.34 years with no significant differences between the two groups.

The male/female proportion was 16 females and 44 males in the Control-group while 14 females and 46 males in Test-group. The sex distribution was significantly different within each group, but homogeneous between the two groups.

In the Test-group 55 out of 60 cardiopathic patients were bruxist with a prevalence of 91.67%.

In the Control-group 17 out of 60 non cardiopathic patients were bruxist with a prevalence of 28.33% (Figure 1).

The Yates's corrected version of Pearson's chi-squared-test showed a significant difference in bruxism prevalence between the two groups (p -value > 0.01).

Cardiopathic patients were 3.24 (Logit OR) times more likely to be bruxist than non-cardiopathic patients (27.82 OR) (Table 3) with a IC = 95%.

DISCUSSION

The present observational study aimed to evaluate the prevalence of bruxism among patients with positive history for CVD and to compare it to the one of healthy patients.

The measurement of bruxism is difficult and it is often quantified with indirect techniques such as the evaluation of tooth wear or patient's self-reported bruxism episodes. In fact, the association of bruxism with other conditions such as cardiovascular disease has been poorly investigated and most of the studies reported contradictory outcomes. Furthermore, there is still lack of epidemiological studies on this issue.

The current goal of the American Heart Association is to reduce the deaths from CVDs and stroke by 20% and, contextually, to increase CVH by 20% within 2020, preventing risk factors and related pathologies^[18-19]. Therefore, it is important to push the research towards the identification and the treatment of CVD risk factors in order to prevent cardiovascular adverse events.

Nashed and co-workers (2012) highlighted a correlation between

sleep bruxism and high blood pressure, even with a small sample size^[20-21].

Furthermore, Atilgan and co-workers (2011) reported an association between bruxism and intima-media thickness of the bilateral carotid arteries suggesting the need of future studies to evaluate this association^[22].

The present study agreed with the results of Atilgan, reporting a greater prevalence of bruxism among patients with a positive history for cardiovascular disease. The 91.67% of the test group (55 out of 60 cardiopathic patients) were diagnosed with bruxism. On the contrary, only the 28.33% of the control group (17 out of 60 non-cardiopathic patients) presented bruxism.

The measure of association used in the present analysis was the odds ratio. The odds ratio (OR) or its logit defines how much it is needed to multiply the odds of being bruxist for a non-cardiopathic to obtain the odds of being bruxist for a cardiopathic. If the OR was greater than 1, then being bruxist” was considered to be “associated” with being cardiopathic. According to the odds ratio analysis of the present study the two conditions were related. The analysis was controlled for confounding factors such as: age, correlated pathologies, use of medication or drugs, smoking habits, and other sleep disorders.

Although these results would not be sufficient to establish that

CVD is a contributing cause of bruxism or vice versa, it could be that the association is due to a third property, “C”, which is a contributing cause of both bruxism and CVDs. This is the “confounding” effect, in this case, could be the stress. However, longitudinal studies will be needed to establish whether bruxism is an independent risk factor for CVDs or vice versa.

CONCLUSIONS

Finding from the present study showed that the prevalence of bruxism is significantly greater in cardiopathic patients than in non-cardiopathic patients. Further prospective studies conducted over a higher number of patients and followed for a long period will be necessary in order to establish a direct correlation between those two conditions.

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Table 1 Description of population of the study, divided in 2 groups.

	Bruxist	Non-Bruxist	Total population
Test-group (Cardiopathic patients)	55 (91%)	5 (9%)	60
Control-group (Non-cardiopathic patients)	17 (28%)	43 (72%)	60
Total population	72	48	120

Table 2 Tooth Wear Index.

Score	Surface	Criterion
0	BLOI	No loss of enamel surface characteristics
	C	No change of colour
1	BLOI	Loss of enamel surface characteristics
	C	Minimal loss of contour
2	BLO	Enamel loss just exposing dentine < 1/3 of the surface
	I	Enamel loss just exposing dentine
	C	Defect less than 1 mm deep
3	BLO	Enamel loss just exposing dentine < 1/3 of the surface
	I	Enamel loss and substantial dentine loss
	C	Defect less than 1-2 mm deep
4	BLO	Complete enamel loss, or pulp exposure or 2° dentine exposure
	I	Pulp exposure or 2° dentine exposure
	C	Defect more than 2mm deep, or pulp exposure or 2° dentine exposure

Surface: B: buccal; L: lingual; O: occlusal; I: incisal; C: cervical.

Table 3 The table reports prevalence findings (percentage) of bruxism among the two groups. The measure of association used was the odds ratio.

Prevalence Analysis	
Bruxism among cardiopathic patients	91.67%
Bruxism among non-cardiopathic patients	28.33%
Measures of Association	
Odds ratio (OR)	27.82
Logit (OR)	3.24
95 % CI	9.5056 - 81.4415

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