http://dx.doi.org/10.1590/1981-86372020000005720180020

| ORIGINAL

Oral conditions and the impact on quality of life of morbidly obese and bariatric patients

Condições bucais e o impacto na qualidade de vida de pacientes obesos mórbidos e bariátricos

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ABSTRACT

Objective: The aim was to evaluate the prevalence of dental caries, periodontal disease and edentulism in morbidly obese and bariatric patients, and to verify the oral health impact on quality of life. **Methods**: We evaluated 33 morbidly obese patients (G1) and 50 patients submitted to bariatric surgery (G2). The DMFT, CPI, prosthetic status and prosthetic need for edentulism were used to analyze oral conditions. The impact of oral health on quality of life was assessed using the OIDP questionnaire. **Results**: CPOD were G1: 9.0±7.0 and G2: 13.3±8.0 (p= 0.020). The dental calculus was the worst periodontal condition G1: 72.7% and G2: 80.0% (p= 0.752). The majority of G1 and G2 patients did not use (p = 0.878) and did not need (p= 0.132) dental prosthesis. The mean of OIDP was G1: 11.2±23.8 and G2: 14.16±23.8 (p= 0.089). **Conclusion**: It concluded that bariatric patients have a higher prevalence of dental caries and the need for dental prostheses is related to the impact of oral health on the quality of life of obese patients.

Indexing terms: Bariatric surgery. Dental caries. Obesity. Oral health. Periodontal diseases.

RESUMO

***Objetivo**: Objetivou-se avaliar prevalência de cárie, doença periodontal e edentulismo em pacientes obesos mórbidos e bariátricos e verificar o impacto da saúde bucal na qualidade de vida. **Métodos**: Avaliou-se 33 pacientes obesos mórbidos (G1) e 50 pacientes submetidos à cirurgia bariátrica (G2). Os índices CPOD, IPC, uso e necessidade de prótese foram utilizados para analisar as condições bucais. O impacto da saúde bucal na qualidade de vida foi avaliado através do questionário OIDP. **Resultados**: CPOD foi G1:9,0±7,0 e G2:13,3±8,0 (p=0,020). O cálculo dentário foi a pior condição periodontal G1:72,7% e G2:80.,0% (p=0,752). A maioria dos*

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How to cite this article

Prado RL, Santos NDM, Silva KE, Rodrigues MC, Tagutti JYT, Marsicano JA. Oral health of obese and bariatric patients. RGO, Rev Gaúch Odontol. 2020;68: e20200057. http://dx.doi.org/10.1590/1981-86372020000005720180020

pacientes do G1 e G2 não usavam (p=0,878) e não necessitavam (p=0,132) de prótese dentária. A média do OIDP foi G1:11,2±23,8 e G2:14,16±23,8 (p=0,089). ***Conclusão****: Conclui-se que os pacientes bariátricos apresentam maior prevalência de cárie dentária e a necessidade de prótese dentária está relacionada com impacto da saúde bucal na qualidade de vida dos pacientes obesos.*

Termos de indexação: *Cirurgia bariátrica. Cárie dentária. Saúde bucal. Doenças periodontais. Obesidade.*

INTRODUCTION

Obesity is considered a chronic inflammatory disease, and prevalence and severity are increasing rapidly in both developed and developing countries, becoming an epidemic worldwide and nowadays considered a public health problem [1]. A research carried out in the national territory verify that in Brazil, in 2010, 15% of the adult population was obese [2].

Etiological factors related to obesity include genetic, social, biological, nutritional and behavioral factors. The imbalance between food intake (calories) and decrease of energy expenditure (physical inactivity) causes excessive fat accumulation resulting in obesity and consequently health problems that are known as comorbidities [3]. Comorbidities related to obesity are dyslipidemia, type 2 diabetes, apnea, among others. Thus, obesity is part of the metabolic syndrome, which is defined as an interrelation between certain diseases, such as hypertension, hyperglycemia, dyslipidemia, arteriosclerosis, cardiovascular diseases, and visceral obesity. A proinflammatory and procoagulant state can also coexist in metabolic syndrome, with an increase in C-reactive protein (CRP) which is an inflammatory marker [4-13].

Recent studies suggest that chronic low-grade inflammation provoked by obesity, is directly involved not only in the pathogenesis of comorbidities and complications, but also in oral health, such as periodontal disease, because it alters the host immune response [6,8,9,14,15]. Periodontal disease is an inflammatory and multifactorial disease that attacks the supporting tissues, consisting of periodontal ligament, gingiva, cementum, and alveolar bone. The loss of these tissues can lead to the loss of teeth. Scientific evidence has shown that periodontal disease increases inflammatory markers (proinflammatory cytokines, tumor-alpha factors and CRP), as well as these markers are also found in obese and insulin-resistant people. There is an interrelation between the mechanism of periodontal disease and systemic and metabolic diseases, and the conditions can mutually worsen. Some studies also suggest an association between obesity and alveolar bone loss [4,5,7,8,14,15].

As periodontal disease, dental caries is a multifactorial disease and is interdependent on diet and etiological factors [16]. The change in diet, substituting a healthy diet based on natural foods for industrialized products with a high caloric (carbohydrates) caused the increase of several diseases prevalence, such as obesity and tooth decay [17]. The consumption of foods rich in sugars, mainly sucrose, which are more synthesized by cariogenic bacteria and converted into acids, favor the demineralization process, which without good oral hygiene leads to the formation of carious lesions [16]. Like periodontal disease, dental caries can cause tooth loss [17].

Total or partial edentulism is a condition that induces difficulty in chewing and consequently in the absorption of nutrients, therefore these individuals prefer an easy-to-chew diet with a predominance of carbohydrates which can result in an obesity person. Studies evidence that patients who have undergone oral rehabilitation have had a considerable positive change in chewing pattern and oral conditions, which can contribute to weight loss in obese patients [18].

Weight loss becomes important to reduce the consequences of obesity and comorbidities on the quality of life of these patients, and also on their oral health [19]. Treatments for obesity may be non-surgical, such the use of medications, physical exercise and nutritional intervention. There is also the most aggressive and invasive treatment, which are the bariatric surgeries indicated for the most severe cases of the disease [7]. The bariatric surgery indication depends on the assessment of the patient's systemic condition and one of the criteria is to have grade III obesity or grade II obesity associated with comorbidities [7,11,20-22].

The increase of morbid obesity prevalence in the population raised the number of bariatric surgeries performed to eliminate excess body mass, improving both the systemic health and the lifestyle of these patients. However, it is also known that bariatric surgery can cause some side effects that influence the individual's oral health, such as eating disorders, reduced bone density, gastroesophageal reflux [7,11,23-28].

This study aimed identify the prevalence of oral conditions in bariatric and morbidly obese patients and verify the impact of oral health on quality of life.

METHODS

This cross-sectional observational study analyzed the prevalence of dental caries, periodontal diseases, edentulism and salivary flow and verified the impact of these conditions on the quality of life of patients.

This research was approved by the Human Research Ethics Committee of Unoeste (CAAE 596576 16.0.0000.5515).

The sample was composed by obese and undergone bariatric surgery patients under treatment at Bariatric Surgery Clinic of Hospital Santa Casa de Misericórdia de Presidente Prudente. These patients were divided in two groups: G1 – 33 obeses morbid patients and G2- 50 undergone bariatric surgery patients.

The inclusion and exclusion criterias of patients in the sample were: authorization by signing the Informed Consent Form; have indication for bariatric surgery or having undergone bariatric surgery; not have suffered irradiation; not have autoimmune diseases; not have systemic infections; and not have used antibiotics or anti-inflammatory drugs in the last 3 months.

The investigations covered the period from November 2016 to April 2017. Oral examinations were performed at the Bariatric Surgery Clinic in the hospital by a previously calibrated team (Kappa- DMFT:0.53; CPI:0,88; prosthetic status and prosthetic need for edentulism:1.00).

To evaluate dental caries the DMFT index was adopted, considering the dental caries stories of decayed, missing and filled teeth [29].

The periodontal condition was established by Community Periodontal Index (CPI) [29] according to presence of gingival bleeding, calculus and periodontal pockets. The mouth was divided into sextants defined by the teeth 17 and 16, 11, 26 and 27, 46 and 47, 31, 36 and 37.

The use of upper and lower dental prosthesis was evaluated according to the criteria not to use prosthesis, use fixed prosthesis, use removable partial prosthesis, association of fixed prosthesis and removable prosthesis [29]. For the analysis for prosthetic need, the criteria used were no needed for dental prosthesis, need fixed unit prosthesis, need multiple fixed or removable prosthesis, need single and/or multiple combination and need total prosthesis [29].

The assessment of saliva flow was performed by collecting stimulated saliva for five minutes, being considered normal values above 1mL/min and values below of this as hyposalivation [30].

The frequency and severity of the Oral Impact on Daily Performance (OIDP) [31] in lives of patients were assessed through eight daily performances classified as physical (eating and enjoying food; speaking and pronouncing words clearly; cleaning teeth), psychological (sleeping and relaxing; smiling, laughing and showing teeth without embarrassment; maintaining a normal emotional state without getting irritated) and social (working, playing the social role and having satisfaction in social gatherings).

The descriptive statistical analysis used absolute and relative frequencies. Mann Whitney tests were used to verify the difference between the groups evaluated and Spearman's correlation to verify the correlation between the variables analyzed. The significance level adopted was 5%.

RESULTS

The age mean for obese group (G1) was 43.4±13.4 and for undergone bariatric surgery patients group (G2) was 45.1±10.1 (p=0.456). In relation to sex, 87.8% of G1 patients and 82.0% of G2 patients were female.

The mean of BMI for G1 was 41.4±15.0 kg/m2 and for G2 was 33.7±6.8 kg/m2 (p=0.000). In relation to BMI classification, 51.4% of G1 patients presented obese class III, while 32.0% of G2 patients still presented obese class I.

In relation to DMFT, it was verified a statistical difference between groups (p=0.020), being the mean of DFMT 9.0±7.0 to G1 and to 13.3±8.0 to G2 (table 1). In relation to DMFT compounds, the missing compound was greater in G2 (p=0.002).

Regarding periodontal disease, most patients presented worse dental calculus conditions in both G1 (68.6%) and G2 (80.0%), being that only 14.3% of G1 and 16.0% of G2 not present periodontal alteration (table 2). There was no significant difference between the groups (p = 0.752) in relation to the CPI.

Table 1. Mean and standard deviation of teeth according to DMFT compounds by G1 and G2 groups.

	DMFT		Healthy		Decayed		Filled		Missing	
G1	9.0	±7.0	15.0	±9.7	1.1	±1.6	6,8	±5.7	0.6	±4.0
G2	13.3	±8.0	12.7	±8.7	1.5	±2.4	6,9	±4.6	4.5	±7.7

Table 2. The worst periodontal condition according to CPI periodontal conditions by groups.

	Healthy		Gingival bleeding		Calculus		Periodontal pocket	
	n	%	n	%	n	%	n	%
G1	5	14.3	0	0.0	24	68.6	4	11.4
G2	8	16.0	0	0.0	40	80.0	4	6.0

Table 3. Percentage of patients according to use and need of dental prosthesis to G1 and G2 groups.

	G1		G2	
	Upper	Lower	Upper	Lower
Not use prosthesis	65.7	80.0	66.0	90.0
FP	5.7	2.9	8.0	4.0
RPP	14.3	5.7	18.0	4.0
Association of FP+RPP	0.0	0.0	2.0	0.0
TP	8.6	5.7	6.0	2.0
No needed	71.1	62.9	66.0	88.0
Unit FP	5.7	0.0	0.0	2.0
Multiple FP or RPP	8.6	28.6	32.0	52.0
Combination of FP+ RPP	0.0	0.0	0.0	0.0
TP	2.9	2.9	2.0	2.0
No information	0.0	0.0	0.0	0.0

*FP- fixed prosthesis; RPP- removable partial prothesis; TP- total prothesis.

With respect to the use of dental prosthesis, 30.3% of patients in G1 and 32.0% of patients in G2 used some type of dental prosthesis (table 3). As to the need of dental prosthetic, 71.1% and 62.9% of patients in G1 and 66.0% and 88.0% of patients in G2 did not need to use any type of upper and lower dental prosthetic respectively. There was no significant difference between the groups regarding the use (p=0.878) and need (p=0.132) of dental prosthesis.

About the amount of saliva, the mean salivary flow was 0.7±0.4 mL/min and 1.0±0.9 mL/min for G1 and g2 groups respectively. There was no significant difference between the groups in relation to the stimulated salivary flow (p = 0.227).

There was a negative correlation between salivary flow and the use of dental prosthesis (r=-0.356; p=0.049) for obese patients, which was not verified for patients undergone bariatric surgery (r=0.020; p=0.893). There was no correlation between salivary flow and dental caries for G1 (r=-0.073; p=0.695) and for G2 (r=-0.009; p=0.948) and periodontal disease for G1 (r=-0.006; p=0.973) and for G2 (r=-0.064; p=0.660).

The impact of oral conditions on the daily life of patients in G1 was 11.2±23.8, with 34.0% of patients reporting some impact of oral health on quality of life. In G2, the impact of oral health on quality of life and daily activities was 14.2±23.8, being that only 7.0% of patients related that oral health has an impact on their quality of life.

Regarding the evaluated oral conditions, only the need for dental prosthesis in obese patients had an impact on the daily performance of activities ($r = 0.409$; $p = 0.016$).

DISCUSSION

The most invasive treatment for obesity is bariatric surgery, that excludes considerable extension of the small intestine from absorbing food via which results in malabsorption of nutrients [7]. Dysfunctional eating habits, that could be acquired after bariatric surgery, cause some complications and side effects that influence the oral health of individuals, leading to the appearance of dental caries [11,32]. The diminution of bone mineral density, due the reduction of nutrients absorption [7], could lead to a change in the sustaining periodontium [4,11,32]. Gastroesophageal reflux caused by ring could provoke dental wear (dental erosion) and up to saliva flow reduction [7,11,32].

Dental caries is a multifactorial disease provoked mainly by a cariogenic diet and aggravated by inadequate oral hygiene, which causes an imbalance in the process of demineralization and remineralization. This increase in DMFT in patients undergoing bariatric surgery may be related to the increase in the frequency of meals eaten by these patients and thus may enhance the formation of dental plaque, which is an etiological factor in dental caries. Due to the reduction in the size of the stomach, these patients must eat small and frequent meals, this frequent feeding increases the risk of developing dental caries [11].

Despite the fact that bariatric patients have a higher DMFT when compared to obese patients, the sample in this study had a lower DMFT than other studies [11,32], and in relation to the DMFT components, there was a higher prevalence in the healthy component, disagreeing with the study de Marsicano et al. [11] who found a higher incidence of dental caries in bariatric patients. The patients of this study also had reduced DMFT when compared to data from the epidemiological survey carried out in Brazil, in 2010 [33], that for the population of the interior of the Southeast region, obtained the DMFT index 16.64.

Both dental caries and periodontal disease are multifactorial diseases that have a trigger dental plaque. In the study, there was a high prevalence of dental calculus in both G1 and G2 (CPI), that indicates the presence of bacterial plaque, which may be related to the high DMFT index.

Periodontal disease, being a chronic inflammatory disease, is directly involved in the pathogenesis of obesity [4,5]. The inflammation markers that act in obesity are the same that act in periodontal disease. In this study, the worst periodontal condition found was the dental calculus for G1 and G2 as well as in another study [32], that also found dental calculus as the worst condition. Although a previous study found an association between obesity and the severity of periodontal disease (periodontal pocket) due to high CRP rates [30], in this research it was found that obese patients had the presence of a dental calculus as the worst periodontal condition. When compared to the survey carried out in the Southeast region by SB-Brasil 2010 [33], which verified the presence of dental calculus in 35% of the population of the interior of the Southeast region, it was found that in this study there was a greater presence of dental calculus both in obese patients as in patients undergoing bariatric surgery.

Periodontal disease in these patients could be related to decreased bone density, which directly affects the supporting tissues, which may lead to worsen periodontal disease [10,24]. There is evidence between bone loss and bariatric surgery, due to the disabsorptive characteristics of the surgery, which favor the non-absorption of nutrients, such as vitamin B12 and D, iron, folic acid and calcium, however in the study this association was not proven this association, because the worst condition found was not periodontal pocket, but the presence of dental calculus, which, like dental caries, has its appearance due to the increased frequency of feeding after surgery, which favors the accumulation of dental plaque [11,32].

Regarding the use of dental prostheses, most patients who used prostheses used removable partial prostheses, as in SB-Brasil 2010 [33]. When evaluated the greatest need found, it was also that of removable prosthesis with 32.0% higher and 52.0% lower, when compared to SB-Brasil 2010, the need for removable prosthesis was 39.0% higher and 5.0% lower [33]. In the preoperative period, it is necessary for obese patients with need of a prosthesis to be rehabilitated to improve their masticatory capacity, because when there are edentulous areas, the formation of the bolus is impaired, causing difficulty in reducing weight [11, 18]. The absence of teeth has a strong impact on quality of life of patients, in addition to causing functional damage, impairing the psychological and social aspects of patients, as these

patients have difficulty relaxing, are embarrassed due to loss of aesthetics, feel restricted to certain types of food, and lose the desire to socialize [18] as observed in obese patients who showed a correlation between the need for dental prosthesis and the impact of oral health on the performance of daily activities.

Just as food intake is reduced in bariatric patients, water intake is inadequate, which contributes to the development of hyposalivation, which can increase the prevalence of dental caries and periodontal disease. Saliva has a protective function for both oral tissues and the body in general, it has a digestive and excretory role, because it facilitates chewing, acts on the surface of the teeth, favoring the removal of food trapped in this region [11]. G1 patients showed hyposalivation.

The benefits for the patient who undergoes bariatric surgery are many, as they present an improvement in the quality of life [11]. In this study, most patients in both G1 and G2 did not find that their oral condition had a major impact on their quality of life.

CONCLUSION

It can be concluded that patients who underwent bariatric surgery had worse oral health conditions, mainly related to dental caries, when compared with obese patients. And it verified the impact of oral health on the quality of life of obese patients who needed dental prosthesis.

Collaborators

RL PRADO, conception and design of the study, statistical analysis, important critical review of the manuscript for intellectual content and final approval of the version to be published. NDM SANTOS, study design, data acquisition, manuscript writing and final approval of the version to be published. KE SILVA, MC RODRIGUES and JYT TAGUTI, study design, data acquisition, manuscript writing and final approval of the version to be published. JA MARSICANO, conception and design of the study, data acquisition, statistical analysis, writing of the manuscript, critical review of the manuscript for important intellectual content and final approval of the version to be published.

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Received on: 4/2/2019
Final version resubmitted on: 15/6/2019
Approved on: 26/7/2019