UNIVERSIDADE FEDERAL DA BAHIA
FACULDADE DE MEDICINA DA BAHIA

PROGRAMA DE PÓS-GRADUAÇÃO
EM MEDICINA E SAÚDE

ISIS HENRIQUES DE ALMEIDA BASTOS

INFLUÊNCIA DA OBESIDADE E DO SEU TRATAMENTO CIRÚRGICO NA SAÚDE BUCAL

DISSERTAÇÃO DE MESTRADO

Salvador
2018

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Dissertação apresentada ao Programa de Pós-graduação em Medicina e Saúde da Faculdade de Medicina da Bahia da Universidade Federal da Bahia, como requisito parcial para a obtenção do título de Mestre em Medicina e Saúde.

Orientadora: Prof[a] Dr[a] Carla Hilário da Cunha Daltro
Coorientadora: Prof[a] Dr[a] Elisângela de Jesus Campos

Salvador
2018

B327 Bastos, Isis Henriques de Almeida
Influência da obesidade e do seu tratamento cirúrgico na saúde bucal / Isis Henriques de Almeida Bastos. -- Salvador, 2018.
115 f. : il

Orientadora: Carla Hilário da Cunha Daltro.
Coorientadora: Elisângela de Jesus Campos.
Dissertação (Mestrado - Programa de Pós-graduação em Medicina e Saúde) -- Universidade Federal da Bahia, Faculdade de Medicina da Bahia, 2018.

1. Obesidade. 2. Cirurgia bariátrica. 3. Saúde bucal. 4. Erosão dentária. 5. Cárie dentária. I. Daltro, Carla Hilário da Cunha. II. Campos, Elisângela de Jesus. III. Título.

CDU 616-056 25

ISIS HENRIQUES DE ALMEIDA BASTOS

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Dissertação de autoria de Isis Henriques de Almeida Bastos intitulada Influência da Obesidade e do seu Tratamento Cirúrgico na Saúde Bucal, apresentada a Universidade Federal da Bahia, como requisito parcial para a obtenção do título de Mestre em Medicina e Saúde.

Salvador, 19 de junho de 2018

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Dedico esta dissertação aos meus pais, Hélio Bastos e Marilene Bastos, e ao meu irmão, Hoton Bastos.

AGRADECIMENTOS

A minha Orientadora, Profª Drª Carla Daltro, pela confiança depositada em mim para a realização desta pesquisa. Agradeço pela atenção, dedicação, disponibilidade, paciência e ensinamentos.

À Prof Drª Elisângela Campos, pela coorientação, disponibilidade, dedicação, apoio e amizade. Obrigada por acreditar em mim desde a graduação.

À Prof Drª Gabriela Martins pelo carinho, auxílio, apoio e contribuições neste trabalho.

A todos os participantes desta pesquisa, minha gratidão por terem acreditado e contribuído para que este estudo fosse possível.

A todo o corpo docente do Programa de Pós-graduação em Medicina e Saúde da Universidade Federal da Bahia por cada ensinamento e ao corpo técnico administrativo por viabilizar todas às demandas acadêmicas.

A toda equipe do Núcleo de Tratamento e Cirurgia da Obesidade pela oportunidade de poder realizar a pesquisa no serviço, acolhimento, ajuda e colaboração.

À equipe de Periodontia do Instituto Prime pelo atendimento à paciente deste estudo.

Aos meus pais, Hélio Bastos e Marilene Bastos, por acreditarem em mim e nos meus sonhos. Obrigada por todo apoio, amor, carinho e compreensão.

Ao meu irmão Hoton Bastos pelo carinho, amor e incentivo.

Às amigas Mónica Narváez, Ludy Vargas e María Arriaga pela amizade e companheirismo.

À CAPES pela concessão de bolsa durante o período do mestrado.

“É do buscar e não do achar que nasce o que eu não conhecia.” Clarice Lispector

RESUMO

A obesidade está associada a várias comorbidades, distúrbios metabólicos e possivelmente com alterações bucais. A cirurgia bariátrica é uma modalidade terapêutica para esta condição, que resulta em perda de peso significativa e sustentável, entretanto efeitos adversos podem ocorrer e repercutir na cavidade bucal. **Objetivo:** identificar as características relacionadas à saúde bucal de um grupo de pacientes obesos antes e após a realização da cirurgia bariátrica. **Métodos:** estudo de coorte realizado com indivíduos obesos encaminhados para cirurgia bariátrica em um centro privado para tratamento da obesidade em Salvador, Bahia. O instrumento de pesquisa, questionário aplicado sob a forma de entrevista, investigou dados sociodemográficos, história médica e odontológica, hábitos alimentares e de higiene bucal. Além disso, foi realizada a revisão dos prontuários médicos dos pacientes. As entrevistas foram realizadas antes e 5-7 meses após a cirurgia bariátrica. **Resultados:** 103 pacientes foram incluídos no estudo, 83 (80,6%) do sexo feminino, mediana da idade foi 37,0 (32,0-43,0) anos e do índice de massa corporal 39,4 (37,2-42,8) Kg/m^2 no pré-operatório e 29,2 (27,3-32,0) Kg/m^2 no pós-operatório. Os hábitos de higiene bucal foram semelhantes antes e após a cirurgia bariátrica ($p < 0,05$), exceto a frequência do uso do fio dental que melhorou após a cirurgia ($p = 0,039$). Em relação aos fatores de risco para erosão dentária, houve aumento após a cirurgia dos relatos de vômitos frequentes ($p < 0,001$) e dos relatos de consumo diário de frutas ácidas ($p < 0,001$), entretanto houve redução no consumo frequente de bebidas ácidas ($p = 0,002$). Quanto ao consumo de sacarose, fator de risco para cárie dentária, houve redução ($p < 0,001$). Também foi observado aumento dos relatos da halitose ($p = 0,002$), xerostomia ($p < 0,001$) e dificuldade para deglutir ($p < 0,001$) após a cirurgia. **Conclusão:** os indivíduos obesos apresentaram fatores de risco para doenças bucais, entretanto esses fatores foram diferentes antes e após a cirurgia bariátrica. A avaliação e acompanhamento odontológicos são essenciais para a prevenção de complicações bucais nos períodos pré e pós-operatório e promoção da saúde bucal.

Palavras-chave: obesidade; cirurgia bariátrica; saúde bucal; erosão dentária; cárie dentária; xerostomia.

ABSTRACT

Obesity is associated with several comorbidities, metabolic disorders, and apparently with oral alterations. Bariatric surgery is a therapeutic modality for this condition that results in significant and sustainable weight loss, however adverse effects may occur, and have repercussions on the oral cavity. **Objective:** to identify the characteristics related to oral health in a group of obese patients before and after bariatric surgery**. Methods:** a cohort study was conducted in obese individuals referred for bariatric surgery at a private center for the treatment of obesity in Salvador, Bahia. The research instrument was a questionnaire applied as an interview, which investigated socio-demographic data, medical and dental history, and eating and oral hygiene habits. Moreover, the medical records of the patients were reviewed. The interviews were performed before and 5-7 months after bariatric surgery. **Results:** 103 patients were included in the study, 83 (80.6%) female, the median age was 37.0 (32.0-43.0) years and the median body mass index was 39.4 (37.2-42.8) Kg/m^2 in the preoperative period and 29.2 (27.3-32.0) Kg/m^2 in the postoperative period. Oral hygiene habits were similar before and after bariatric surgery ($p < 0.05$), except for the flossing frequency that improved after surgery ($p = 0.039$). Regarding the risk factors for tooth erosion, there was increase after surgery in the reports of frequent vomiting ($p < 0.001$) and in reports of daily consumption of acidic fruits ($p < 0.001$), but there was a reduction in the frequent consumption of acidic beverages ($p = 0.002$). In relation to the consumption of sucrose, risk factor for dental caries, there was reduction ($p < 0.001$). There was also an increase in reports of halitosis ($p = 0.002$), xerostomia ($p < 0.001$) and difficulty swallowing ($p < 0.001$) after surgery. **Conclusion:** obese individuals presented risk factors for oral diseases; however these factors were different before and after bariatric surgery. Dental evaluation and follow-up are essential for the prevention of oral complications in the pre and postoperative periods and promotion of oral health.

Keywords: obesity; bariatric surgery; oral health; tooth erosion; dental caries; xerostomia.

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LISTA DE ABREVIATURAS E SIGLAS

BS	Bariatric surgery
DMFT	Decayed, Missing and Filled Permanente Teeth
DH	Dentin hypersensitivity
GBI	Gingival Bleeding Index
PSR	Periodontal Screening and Recording
BMI	Body mass index
RYGB	Roux-en-Y gastric bypass technique
PTH	Parathyroid hormone
T3	Triiodothyronine
T4	Thyroxine
TSH	Thyrotropic hormone
SCTG	Subepithelial connective tissue grafting
WHO	World Health Organization

SUMÁRIO

1 INTRODUÇÃO

A obesidade é definida como o acúmulo de tecido adiposo que ocasiona prejuízo à saúde do indivíduo. A prevalência mundial de sobrepeso e obesidade tem aumentado de forma acelerada desde a década de 80, passando de 6,4% em 1980 para 12% em 2008[1] e para 39% em 2016, sendo 13% da população mundial adulta obesa[2]. Atualmente, a obesidade é considerada um problema de saúde pública. O seu tratamento e controle representam desafios para a equipe multidisciplinar envolvida no cuidado ao paciente obeso.

De etiologia multifatorial, a obesidade é uma doença crônica, que inclui aspectos ambientais, socioeconômicos, culturais, comportamentais, psicossociais, endócrinos e genéticos. Além disso, está associada a diversas patologias como diabetes tipo 2, doenças cardiovasculares, distúrbios respiratórios do sono, entre outras. Além do efeito sistêmico, a literatura tem sugerido uma possível relação entre obesidade e saúde bucal. O estado pró-inflamatório característico dos indivíduos obesos tem sido relacionado como possível fator modificador da doença periodontal.

A cirurgia bariátrica é uma opção terapêutica para indivíduos com obesidade classe II, associada à comorbidade grave, ou obesidade classe III, sem sucesso com as outras formas de tratamento. Efeitos adversos decorrentes desse tratamento podem repercutir na cavidade bucal, por exemplo: vômitos frequentes proporcionam o contato do ácido clorídrico do estômago com os dentes, o que pode levar à desmineralização e causar hipersensibilidade dentinária.

Por outro lado, a cirurgia bariátrica melhora condições sistêmicas como o diabetes e a hipertensão arterial, consequentemente, isso reduz o uso de medicamentos que podem interferir no fluxo salivar. Além disso, esse tratamento promove modificações psicológicas positivas na autoestima do indivíduo interferindo diretamente no autocuidado. Desse modo, esses fatores podem beneficiar a saúde bucal.

O número de estudos referentes às manifestações bucais da obesidade tem aumentado nos últimos anos, no entanto, a literatura sobre a saúde bucal de

pacientes obesos encaminhados para a cirurgia bariátrica e após a realização da mesma ainda é restrita e os resultados não são conclusivos.

O Brasil é o segundo país do mundo em número de cirurgias bariátricas, com mais de 95.000 operações por ano, atrás apenas dos Estados Unidos. O crescimento no número de operações nos últimos dez anos foi de 300%[3]. Dessa forma, o número de indivíduos que irão realizar a cirurgia bariátrica ou com histórico de cirurgia bariátrica vem aumentado, tornando mandatória a realização de estudos sobre a saúde bucal dessa população.

A cirurgia bariátrica requer uma abordagem multidisciplinar para que benefícios sejam proporcionados aos pacientes. Do ponto de vista odontológico, o acompanhamento pré e pós-operatório dos pacientes permite conhecer as características relacionadas à saúde bucal prevenindo a ocorrência de complicações odontológicas após a cirurgia. Os pacientes que irão realizar a cirurgia bariátrica são acompanhados por uma equipe multiprofissional, entretanto a participação do cirurgião dentista está condicionada ao perfil de cada serviço.

Diante do exposto, o objetivo da presente dissertação foi identificar as características relacionadas à saúde bucal de um grupo de pacientes obesos antes e após a realização da cirurgia bariátrica em um serviço de atendimento particular para tratamento da obesidade na cidade de Salvador-Bahia.

2 OBJETIVOS

2.1 OBJETIVO PRIMÁRIO

Identificar as características relacionadas à saúde bucal de um grupo de pacientes obesos antes e após a realização da cirurgia bariátrica.

2.2 OBJETIVOS SECUNDÁRIOS

1. Descrever os hábitos de higiene bucal de pacientes obesos antes e após a cirurgia bariátrica.
2. Descrever os hábitos dietéticos e alimentares de pacientes obesos antes e após a cirurgia bariátrica.
3. Identificar o risco de cárie e de erosão dentária em pacientes obesos antes e após a cirurgia bariátrica.

3 RESULTADOS

3.1 ARTIGO 1 – Association between bariatric surgery and oral health: a review

3.2 ARTIGO 2 – Prevalence of risk factors for oral diseases in obese subjects referred for bariatric surgery

3.3 ARTIGO 3 – Bariatric surgery and oral health: a cohort study

3.4 ARTIGO 4 – Surgical periodontal treatment of a patient with dentin hypersensitivity after bariatric surgery: a case report

Artigo nº 1

Association between bariatric surgery and oral health: a review

Obesity Research & Clinical Practice

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Title: Association between bariatric surgery and oral health: a review

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Conflict of Interest The authors declare that they have no conflicts of interest.

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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ABSTRACT

Bariatric surgery is a treatment for obesity that results in significant and sustainable weight loss; however, it may cause adverse effects. In view of the increase in the number of bariatric surgeries performed, it is important to investigate its relationship with oral health. The aim of the present study was to review the literature regarding the relationship between oral health and bariatric surgery in obese individuals. A search of articles published up to July 2017 was performed in the Medline/PubMed, LILACS, BBO, and Web of Science databases. The search used a combination of descriptors related to obesity, bariatric surgery, and oral health. Seventy-three studies were identified in database search. Of these, 31 were included in this review. The oral changes investigated in subjects who underwent bariatric surgery presented in the literature were as follows: dental caries, tooth wear/tooth erosion, hypersensitivity, periodontal disease, hyposalivation, halitosis, modifications of chewing function, and changes in oral soft tissue. The evaluated studies showed methodological controversy in relation to the study design, follow-up period, sample size, and assessed clinical parameters, which made study comparison difficult. There is no consensus in the literature regarding the relationship between oral health and bariatric surgery in obese individuals. More prospective studies should be conducted to better study this association.

Key words: obesity; bariatric surgery; oral health; tooth erosion; dental caries.

Title: Association between bariatric surgery and oral health: a review

INTRODUCTION

Obesity is a form of malnutrition associated with many health problems resulting in considerable morbidity and mortality[1-4]. Its prevalence has steadily increased in developed countries since the early 1980s and in developing countries since the 1990s[5].

Bariatric surgery (BS) has emerged as an effective treatment for morbid obesity (≥40 kg/m^2)[3,6] and, depending on the type of anatomical changes in the gastrointestinal tract, it may influence appetite, eating behavior, glucose homeostasis, and lipid metabolism[3]. In addition, malnutrition, anemia, vitamin and mineral deficiencies (iron, cooper, calcium, folic acid, vitamin B_1, vitamin B_{12}, and vitamin D), food intolerance, gastroesophageal reflux, nausea, vomiting, and dehydration, among others, are frequently observed[1,4,7,8,9].

The oral cavity is part of the digestive system; therefore, adverse effects of BS may have repercussions on the oral cavity[4]. Dental caries, periodontal diseases, dentin hypersensitivity, tooth erosion, and xerostomy have been reported[4,7,10,11,12]. However, Cardoso et al. (2014) described oral health improvement in patients undergoing BS[13].

This study aimed to review the literature regarding the relationship between oral health and BS in obese individuals.

MATERIALS AND METHODS

An electronic search of articles published up to July 2017 was performed in the Medline/PubMed, LILACS, BBO, and Web of Science databases. All study designs were included, and no language restrictions were applied to any search. The keywords were searched in DeCs and MeSH; keywords and free text terms were used in the following search strategy: (obesity OR obes* OR "body weight" OR overweight OR BMI OR "body mass index" OR "morbid obesity" OR "morbidly obese") AND ("bariatric surgery" OR gastroplasty OR bariatric* OR "gastric bypass" OR "bariatric surgery procedure") AND ("oral health" OR "dental caries" OR "dental decay" OR "tooth decay" OR "dental erosion" OR "tooth erosion" OR "periodontal disease*" OR gingiv* OR periodont*) in the title or abstract. The search strategy was customized as appropriate before application to each database. In addition, hand searching was performed by checking bibliographic references in order to identify any study not found in the searched databases. The articles were selected by their titles and abstracts, and an assessment of the full articles was performed.

RESULTS

The search resulted in 73 studies. After application of exclusion criteria, 31 studies were selected (Figure 1).

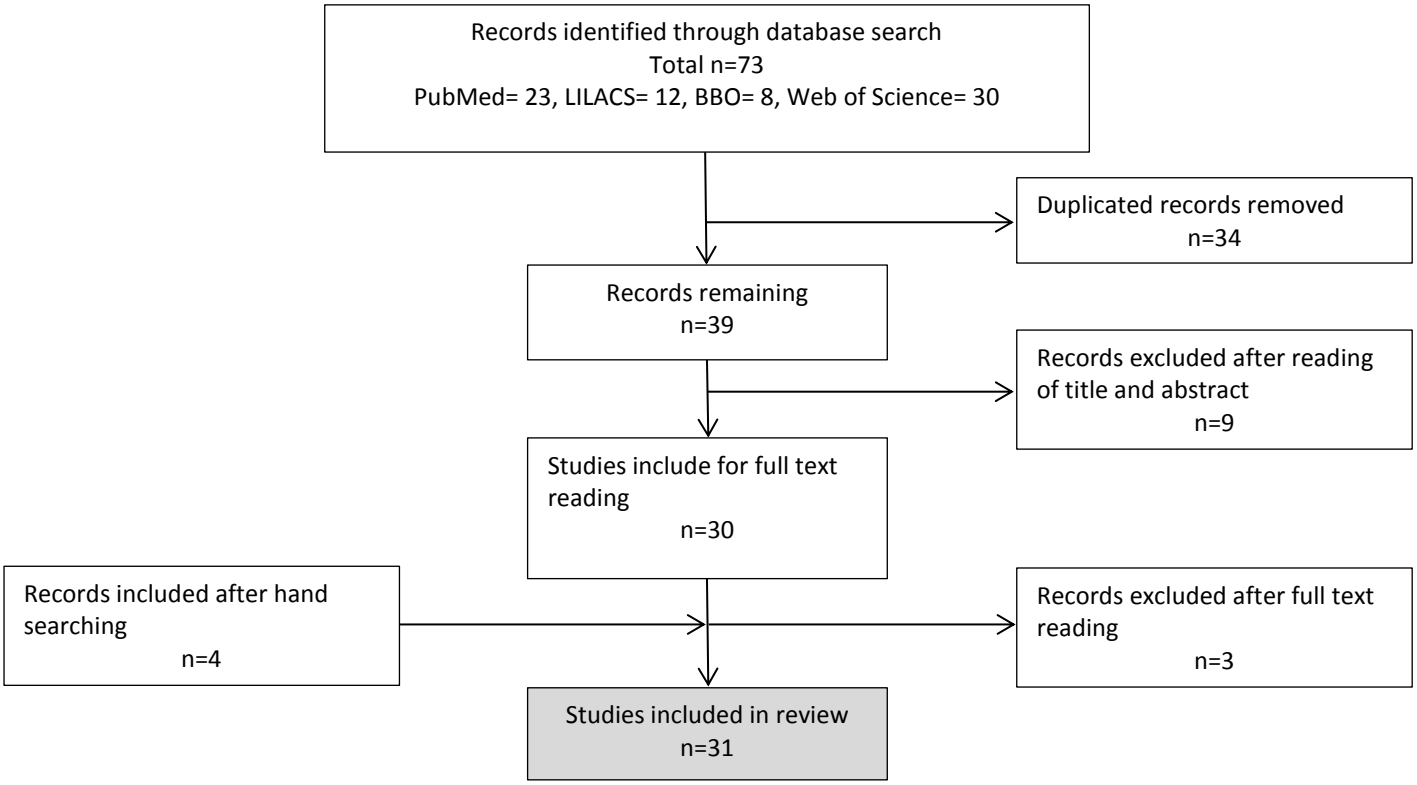

Figure 1 - Flowchart of search results.

The date of publication ranged from 2000 to 2017 (Figure 2), with the most part of manuscripts being published in 2012.

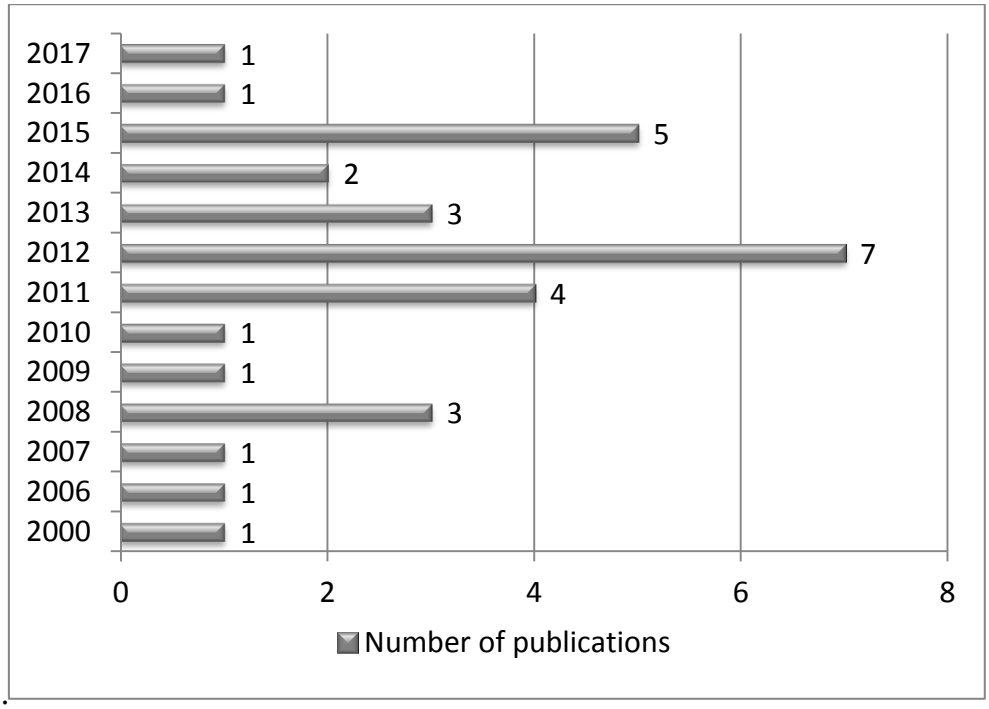

Figure 2 - Manuscript distribution according to year of publication.

The studies addressed the following themes on oral health in descending order of number of studies: periodontal disease, salivary flow rate, dental caries, tooth erosion, hypersensitivity, changes in oral soft tissue, halitosis, and chewing function (Figure 3). A summary of the included studies is presented in Table 1.

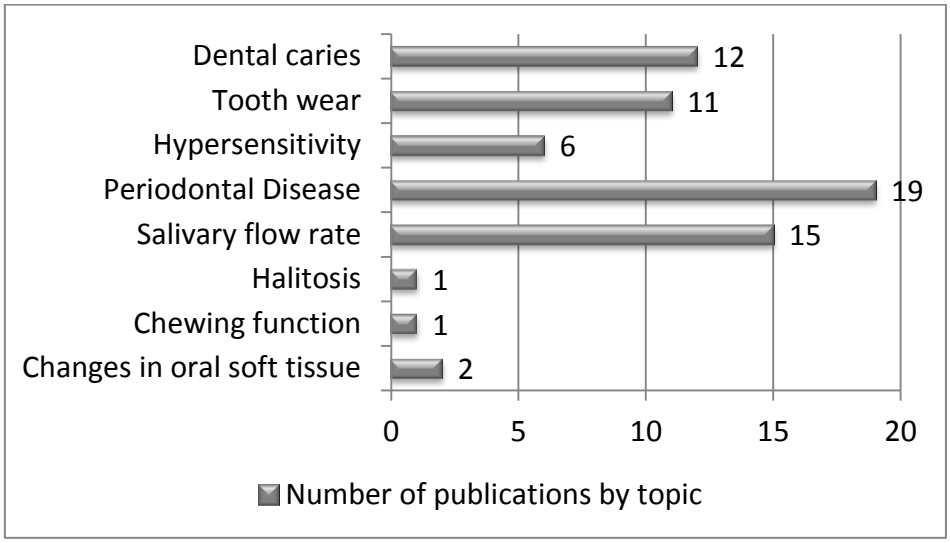

Figure 3 - Number of publications that address the topic of oral health.

DISCUSSION

This review indicated that the available information is limited and that there is controversy in the literature regarding the relationship between oral health and BS. The studies evaluated revealed methodological controversy in relation to the study design, follow-up period, sample size, and assessment of clinical parameters, which made study comparison difficult.

DENTAL CARIES

Dental caries is the localized destruction of susceptible dental hard tissues by acids produced by bacterial fermentation of dietary carbohydrates. The disease process is initiated within the bacterial biofilm that covers a tooth surface[14]. Bariatric patients have a smaller stomach volume and the need for smaller, more frequent meals/snacks throughout the day, which may increase the risk for dental caries[10]. If oral hygiene is not carried out adequately, the conditions will be favorable for cariogenic bacteria development[2,14].

A significant increase in the occurrence of dental caries after undergoing gastric bypass surgery has been reported[4,10,15]. Marsicano et al. (2011) observed that, after six months of BS, 25% of patients presented more decayed teeth compared to the number of decayed teeth before BS[4]. Heling et al. (2006) observed that, of 113 patients who had undergone surgery,

37% reported eating more sweet foods after surgery and only 20% reported improvement in oral hygiene[7]. Hashizume et al. (2015) observed that salivary levels of sugar-dependent microorganisms, *Streptococcus mutans and Streptococcus sobrinus*, increased following BS in morbidly obese patients, and this observation may explain the results described above[16].

On the contrary, Cardozo et al. (2014) observed no difference in the mean of surfaces that exhibited non-cavitated and cavitated carious lesions between baseline and six months after BS[13]. A cross-sectional study found no difference in the decayed, missing, and filled teeth (DMFT) index between patients who had undergone BS and those who were referred for BS[17]. Similar results were found when it was compared the DMFT Brazilian index with the patients who had undergone BS[18]. Controversially, a prospective study by Moreira et al. (2011) observed a decrease of 57.7% (p=0.037) in the decayed component and a 20% increase (p=0.005) in the filled component of the DMFT after 12 months of BS compared to baseline[19]. Therefore, these studies showed no consensus on the results described in relation to dental caries.

TOOTH WEAR/ TOOTH EROSION

Tooth wear is a general term that can be defined as the surface loss of hard dental tissues from a distinct process, without bacterial involvement. Tooth wear has been subdivided into the following categories: attrition, abrasion, abfraction, and erosion[20-22].

Some degree of tooth wear is observed in obese individuals and individuals who have undergone BS; this is more predominant in the latter group[4,23,24]. Marsicano et al. (2012) found similar tooth wear for both groups[17]; however, some studies have observed worse tooth wear after BS[4,24]. In the studies included in this review, the frequency of tooth wear in patients undergoing BS ranged from 63.3% to 100%[4,17,23,25]. It is also important to note that tooth wear may be caused by tooth attrition due to anxiety, which may be present in morbidly obese subjects before BS, and may continue after BS[24]. Therefore, attrition can be defined as the loss of hard dental tissues resulting from toot-to-tooth contact, without the involvement of other substances[20-22]. The use of different clinical diagnostic methods for tooth wear made study comparison difficult.

Among tooth wear, tooth erosion was reported to be the most commonly found condition in subjects who underwent BS[7,23], and was associated with frequent vomiting[7]. The studies revealed a frequency of vomiting ranging from 47.8% to 79%[4,7,23,25], most commonly caused by dysfunctional eating habits such as overeating, eating too fast, or insufficient chewing of

food[9]. This is a risk factor for tooth erosion, because the contact of gastric acid leads to irreversible loss of hard dental tissues [4,23,26].

HYPERSENSITIVITY

Tooth wear can expose dentinal tubules, which may cause dental hypersensitivity (DH)[17]. The symptoms of DH are a sharp, short pain arising from exposed dentin to external stimuli[7,27].

There are few studies investigating DH in obese candidates for BS and subjects who underwent BS. A cross-sectional study noted that 37% of participants reported greater DH after BS[7]. These data are in agreement with a cohort study that observed that there were significantly increased reports of hypersensitive teeth at one year (42.3%, p=0.012) and two years (34.6%, p=0.048) after BS compared to before BS (11.5%)[28]. In addition, Heling et al. (2006) found significant associations between increased DH and both vomiting (p=0.013) and indigestion (p=0.021)[7]. Symptoms of DH were also described in two case reports of bariatric patients[11,29].

PERIODONTAL DISEASE

Periodontal health has also been investigated in obese individuals and individuals who have undergone BS. The literature reports that the excess adipose tissue is related to immune and inflammatory systemic alterations, being able to manifest in the oral cavity through the periodontal disease[12,30,31]. However, a systemic inflammation resolution due to BS does not seem to affect the course of periodontal disease[12]. Some studies have observed an increased prevalence or worse severity of periodontal disease after BS in relation to the preoperative period[4,12,24,32].

According to de Moura-Grec et al. (2014), unsatisfactory periodontal conditions in obese patients who underwent BS may be one reason for the oral condition worsening in the months following BS[24]. In addition, bariatric patients may become nutrient deficient and prone to periodontal disease[26,28] . In a case report, alveolar bone loss was identified via cone beam computed tomography in a two-year follow-up of a patient who underwent BS[33]. A review of the literature regarding the impact of obesity surgery on bone metabolism concluded that bone loss frequently occurs after BS[34].

However, a cohort study found that the periodontal pocket and attachment loss remained unchanged during a one-year follow-up, but the weight loss after BS was associated with increased gingival bleeding[35]. In cross-sectional studies, Pataro et al. (2012) found no difference in periodontal pocket, attachment loss, and gingival bleeding between obese

patients and patients who underwent surgery, but the prevalence of periodontitis was different[32]. Marsicano et al. (2012) obtained different findings; they did not note a difference in the prevalence of periodontal disease, but there was a difference in pocket depth[17]. The relationship among obesity, BS, and periodontal disease is unclear. Moreover, the studies used different methodologies and approaches to present the findings, which made comparison of results difficult.

SALIVARY FLOW RATE

Saliva has many functions that are important in promoting and maintaining oral health, such as lubrication, digestion, anti-microbial roles, protection against plaque build-up, and acting as a buffer agent to protect against acids, such as from acidic drinks and vomiting[16,26]. Thus, changes affecting the salivary flow rate may influence its composition and compromise its functions.

Reduced salivary flow rate has been observed in obese patients[4,17,19,24,28,33]. A study reported reduced salivary flow rate in a group of obese BS candidates as well as in a group of subjects who underwent BS[17], similar to a cohort study that noted this condition before BS and six months after BS[24]. However, in a few other studies, a change was observed from low to normal flow rate at three months[19], six months[4], one year[28], and two years[33] after BS. On the other hand, two studies noted normal stimulated salivary flow rate in obese patients before BS[13,16]; however, six months after BS, one noted improvement[13] and the other did not find a difference[16].

In most studies, the candidates for BS presented reduced salivary flow rate, and normal values were observed at different postoperative times. After bariatric procedures, dehydration may occur, mainly due to decreased fluid intake, which contributes to xerostomia, and consequently may increase caries activity, periodontal disease, and tooth wear[4,9,10]. On the other hand, a significant reduction in the number of medications used following BS, due to the improvement of pathologies such as hypertension and diabetes, might explain the increase in stimulated salivary flow rate, and the reduction in dry mouth sensation[13].

HALITOSIS

In this review, only one study evaluating halitosis in BS candidates and subjects who underwent BS was found. No difference was found in the frequency of halitosis between the

two groups; the study suggests that no significant association exists between halitosis and Roux-en-Y gastric bypass[36]. More studies are needed to verify if there is a relationship between BS and halitosis.

MODIFICATIONS OF CHEWING FUNCTION

Only one study was found on modification of chewing function before and after BS. This study evaluated obese patients differing in dental status, and observed that after BS, all obese patients, regardless of dental status, improved their chewing kinematics, complying with the suggestion that foods should be better chewed after BS[37].

CHANGES IN ORAL SOFT TISSUE

Two case reports were found about changes in soft tissue in subjects who had undergone BS. One was about parotid gland hypertrophy[38], and the other was about palatal ulcers[39]; both cases were related to severe episodes of vomiting after BS. The former was a case of a patient who had undergone BS 26 years earlier and did not reduce the amount of her meals, because of the satisfaction that she gets from eating. One year after BS, the patient began to induce emesis 3 to 4 times a day for 25 years, which could cause an enlargement of the parotid gland[38]. This case report draws attention to the psychological factors of these patients. The latter reports the case of a patient who developed bilateral ulcers of the palate after intense vomiting due to tightening of gastric band[39]. Both cases show the importance of monitoring patients after BS to prevent the occurrence of oral complications.

CONCLUSION

There is no consensus in the literature regarding the relationship between oral health and BS in obese individuals. The evaluated studies presented different methodologies, which made it difficult to compare them. In addition, most of the selected studies are cross-sectional studies, case reports, or literature reviews; more prospective cohort studies should be conducted to better study this association.

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Table 1- Characteristics of included studies.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Greenway and Greenway, 2000[15], United States, **Case-control**	To confirm the association of root surface caries with JI bypass and explore the mechanisms by which it occurs.	Phase I: 18 who had already undergone BS (average of 10 years after), and 5 control patients. Phase II: n=8, four who underwent BS 25 to 30 years previously, and four healthy controls. Type of surgery: JI bypass	Phase I: Patients were asked the number of root surface cavities they had experienced per year after BS, and an equal period of time before BS. Stimulated saliva for measurement of chloride level, bicarbonate level, and pH. Phase II: three 2-minute saliva samples stimulated for measurement of volume.	Root surface caries are more frequent after JI bypass ($p<0.01$). This may be due to decreased saliva flow ($p<0.02$) and a reduced salivary buffering capacity ($p<0.05$).
Heling et al., 2006[7], Israel, **Cross-sectional**	To investigate the self-assessment of bariatric patients regarding their dental health status.	n=113 (had already undergone BS 1-10 years previously), 21-66 years old, type of surgery: SRVG or LAGB.	Mailed questionnaire.	Vomiting as being a frequent phenomenon after BS (79%); 37% reported greater DH after BS. Significant associations were found between reported DH and vomiting ($p=0.013$), and between DH and indigestion ($p=0.021$).
Archer-Dubon, esquivel-Pedraza, Ramírez-Anguiano, 2007[39], Mexico, **Case report**	To report the unusual case of a patient who developed bilateral ulcers of the palate after intense vomiting caused by tightening of her gastric band.	55-year-old woman who had undergone LAGB	Oral clinical examination. An upper gastrointestinal series and panendoscopy. Biopsy and cultures of palatal ulcers. Routine laboratory analyses.	The patient developed extensive palatal ulcers after intense vomiting due to severe gastric pouch outlet occlusion caused by over-tightening of her gastric band. The diagnosis was traumatic ulcers. Healing of the ulcers, the remission of vomiting and nausea, and a confection of a protective palatal denture were necessary. At 3 weeks the ulcers had healed completely.
Mandel and da Silva, 2008[38], United States, **Case report**	To describe a patient who engaged in self-induced vomiting after BS performed 26 years earlier.	44-year-old woman who had undergone BS 26 years ago.	Clinical examination, stimulated right and left parotid salivary volumes were measured with a Carlsen-Crittenden collector, and a computed tomography scan of parotid glands.	Chronic stimulation from constant multiple emetic episodes over 25 years could have caused parotid hypertrophy. The diagnosis was vomiting-induced parotid hypertrophy.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Hague and Baechle, 2008[10], United Stated, **Case report**	To describe a patient with a significant increase in dental caries after undergoing gastric bypass surgery.	48-year-old woman who underwent RYGB 5 years ago.	Oral examination, dental radiographs, PI, salivary test (stimulated and at rest salivary flow rate, pH, and buffering capacity). Dietary, bacterial, and salivary risk assessments.	Saliva production was low; very low buffering ability; PI and cariogenicity were high, caries activity increased after surgery. It lends support to the hypothesis that bariatric patients may be at an increased risk for dental caries.
da Silva, 2008[18], Brazil, **Cross-sectional**	To analyze the oral health condition of patients submitted to BS, verifying the caries prevalence, the need of dental prosthesis and the self-perception of the oral health of patients relate to the life quality.	n=57 (who had already undergone BS), mean age 40.1 years.	Questionnaire, oral clinical examination. Oral conditions evaluated: dental caries (DMFT), prosthesis necessity, OHIP-14 (questionnaire of self-perception of oral health).	DMFT=21.1, similar to the presented by the southeastern and national populations; 87.7% of the patients needed some kind of dental prosthesis. The total score of OHIP-14 (p=0.049) corroborated the improvement of the oral health perception by postsurgical time. The greater the postoperative time the greater the perception of oral health related to quality of life motivated by the improvement in self-esteem and quality of life.
Gonçalves et al., 2009[25], Brazil, **Cross-sectional**	To evaluate the oral health of patients who were submitted to the surgical procedure.	n=30 (had already undergone BS ≥6 months previously), 19-64 years old.	Questionnaire via interview and oral examination to investigate periodontal condition (GBI, PSR); caries (DMFT); saliva flow rate.	DMFT: 9.9 ± 6 teeth; presence of periodontal pockets (30%); presence of dental erosion (63.3%); report of vomiting episodes (64%). Frequent hyposalivation and low occurrence of gingival bleeding and decayed teeth were observed. Elevated DMFT was associated mainly with past history of disease (items F and M).
Barbosa et a., 2010[27], Brazil, **Literature review**	To present a summary of dental manifestations in bariatric patients.	Not applicable.	Without information.	The data indicate that recommended postsurgical meal patterns and gastric reflux might increase the risk for dental lesions, particularly in the presence of other risk factors, such as consumption of sweet-tasting foods and acidic beverages.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Marsicano et al., 2011[4], Brazil, **Prospective cohort**	To verify oral alterations in patients before and after BS, identify the occurrence of dental caries, periodontal diseases, and dental wear, and to correlate oral health with quality of life in these patients.	Obese subjects before BS (n=54), and 3 months (n=24) and 6 months (n=16) after BS; 40.5±9.7 years old. Type of surgery: RGYB.	Oral examination to evaluate: caries (DMFT); periodontal condition (CPI), tooth wear (DWI) and stimulated salivary flow. OIDP questionnaire to assess the impact of oral health on quality of life.	The prevalence of periodontal diseases increased in the two periods of evaluation after BS when compared to before BS, and salivary flow rates were 0.8±0.5 ml/min, 0.9±0.5 ml/min, and 1.1±0.5 ml/min respectively ($p>0.05$). After BS, patients showed an increase in the occurrence of dental caries ($p=0.004$) and in the severity of tooth wear ($p=0.012$); however, these alterations in oral health status did not influence the quality of life.
Moravec and Boyd, 2011[11], United States, **Case report**	This report provides dental professionals with an overview of dental considerations to enhance their ability to provide bariatric patients with high quality preventive care and non–surgical periodontal therapy, as prescribed.	54-year-old man who had undergone gastric lap band surgery 9 years ago.	Oral examination, dental radiographs, caries risk assessment and diet recall, oral hygiene instruction, monitoring and periodontal maintenance once every 3 months, fluoride therapy, and nutrition counseling.	Generalized moderate chronic periodontitis; GBI: 39.8%; PI: 100%; DH. It is hypothesized that the severity of GER contributed to generalized occlusal erosion, dentin hypersensitivity, and dental caries based on the high incidence of GER in obesity and post–gastric lap band surgery
Moreira et al., 2011[19], Brazil, **Transversal and prospective follow-up**	To evaluate the effect of post-surgery weight loss over alterations in the nutritional status and the oral cavity.	n=101 (transversal), 39.9±9.2 years old. n=16 (prospective follow-up), 43.6±10.5 years old, Type of surgery: RGYB.	Oral examination: dental caries (DMFT index), saliva flow rate and buffer capacity. Prospective follow-up, evaluation: before BS, 1st, 3rd, 6th, and 12th months post-surgery.	Individuals with a BMI≥30 kg/m^2 had higher DMFT index. DMFT decreased ($p=0.037$) with the number of decayed teeth and increased with the number of filled teeth ($p=0.005$) at 12 months compared to before BS. Salivary flow decreased ($p=0.044$) at the 1st month and increased ($p=0.006$) at the 3rd month compared to before BS, attaining normal level. Buffer capacity decreased ($p<0.001$) in the 6th month.
Godlewski et al., 2011[37], France, **Prospective cohort**	To compare modification of chewing function before and after BS in three groups of obese patients differing in dental status.	n=46 obese women, 41.9 ±11.3 years old, three groups: n=23 FD; n=15 PD; n=8 DW. Type of surgery: RGYB.	Chewing time, number of chewing cycles, chewing frequency, and the median particle-size distribution of the pre-swallowed bolus were measured. Evaluation before and 3 months after BS.	Before BS, the PD and DW groups exhibited greater mean of number of chewing cycles and chewing time than the FD group ($p<0.05$) and produced a bolus with higher granulometry ($p<0.05$) than the FD group. After BS, chewing time and number of chewing cycles increased for all groups. The resulting changes in bolus granulometry observed depended on both food and dental status.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
de Moura-Grec et al., 2012[33], Brazil, **Brief review and case report**	To review the effects of obesity surgery on oral health and to present a case report of the periodontal condition of an obese woman who underwent BS.	51-year-old woman, evaluation before BS and follow-up of 2 years.	Search of studies related to BS and oral health in PubMed. Case report: BMI, stimulated salivary flow, and PPD, bone loss with CBCT. Evaluation: before, 1 year, and 2 years after BS.	In the review, the oral health problems found were dental wear, periodontal diseases, xerostomia, and dental caries. Case report: salivary flow increased in 2 years changing from low to normal, and the mean probing depth increased ($p<0.001$). The difference of bone loss with CBCT between 1 and 2 years was 0.93 mm, which was greater 2 years after BS ($p=0.006$).
Alves et al., 2012[23], Brazil, **Cross-sectioned epidemiological study**	To determine the prevalence of tooth wear as well as the level of risk in a sample of bariatric patients from a Brazilian public hospital.	n=125, 3 categories: n=41 bariatric group (≥6 months after BS); n=42 obese group (waiting list for BS); n=42 control group; 16-70 years old.	Questionnaire and oral examination using BEWE scoring system.	The bariatric patients showed the highest prevalence of NCDL, reflux, and vomiting, and the highest level of risk with regard to NCDL when compared with the other groups. However, reflux and vomiting did not seem to influence the appearance of NCDL positively ($p>0.05$). Irrespective of the group, no association between reflux, vomiting, and NCDL was found.
Lakkis et al., 2012[40], United States, **Clinical trial**	To assess whether significant weight loss by BS improves the response to non-surgical periodontal therapy.	n=30 (obese patients with chronic periodontitis): 2 groups: n=15 BS group, and n=15 patients (control) who did not have BS, nor lost weight. 47.1 (±11.5) years old.	All participants received nonsurgical periodontal therapy. PPD, CAL, BOP, GI, and PI were measured at baseline and at 4 to 6 weeks after the periodontal treatment.	The BS group had a greater improvement in mean PPD, CAL, and GI compared with the control group ($p=0.007$, $p=0.03$, and $p=0.001$, respectively). The reduction in the percentage of BOP sites was higher in the BS compared with the control group ($p= 0.001$). The results show a better response to non-surgical periodontal therapy in participants who had undergone BS.
Marsicano et al., 2012[17], Brazil, **Cross-sectional**	To compare the prevalence of dental caries, periodontal diseases and dental wear in bariatric patients and morbidly obese patients and to correlate the conditions of oral health with saliva flow.	n= 102, 2 groups: 52 BS group (16.9 ±20.7 months) and 50 obese candidates for BS. 37.6±10.0 years old. Type of surgery: RGYB	Clinical examinations with regard to dental caries (DMFT), periodontal condition (CPI), dental wear (DWI) and saliva flow (stimulated saliva).	Bariatric patients showed a prevalence of oral diseases similar to that of obese patients; nevertheless, there was a more prevalent condition of periodontal pockets in bariatric patients ($p=0.02$). Presence of periodontal pockets was associated with patients who had undergone BS (OR=3.29; $p<.039$). All patients had some degree of dental wear, the majority of patients presented hyposalivation.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
de Moura-Grec et al., 2012[2], Brazil, **Literature review**	To identify the postoperative consequences of BS and to verify its repercussions on oral health.	Not applicable	Virtual Library of Health was used (BIREME), and included articles published in the last ten years.	Chronicle reflux and nutritional deficiency are complications of BS, which may impact the oral cavity, and cause diseases such as tooth erosion, bone loss, and dental caries. It was also found that the posited impact of systemic disease control makes the patients less vulnerable to complications related to oral health.
Netto et al., 2012[28], Brazil, **Prospective cohort**	To investigate the influence of RYGB surgery on vitamin C and MPO levels and disease development in the oral cavity.	n=52; 2 groups: n=26 (control/ eutrophic subjects), n=26 (bariatric group). Type of surgery: RGYB.	Questionnaire via interview. The serum concentrations of vitamin C, MPO, stimulated saliva flow, and buffering capacity were evaluated. The participants did not undergo a clinical periodontal examination. Assessment in the basal period, at 12 and 24 months after BS, control group was assessed only once.	One year after BS, there were increased reports of episodes of vomiting ($p<0.001$) and dental hypersensitivity ($p=0.012$). Two years after BS, saliva flow increased ($p<0.001$), it was also detected a reduction in serum vitamin C ($p<0.001$) and MPO values were higher than in the basal period ($p=0.032$). The results demonstrated that vitamin C deficiency and increased vomiting after RYGB for morbid obesity may contribute to increased periodontal disease.
Pataro et al., 2012[32], Brazil, **Cross-sectional**	To determine the association between periodontal status and being overweight/obese in pre-BS and post-BS populations of Brazil.	n=345, 3 groups: n=133 preoperative group, n=72 postoperative ≤6 months group, and n=140 post-surgery >6 months group; 18-60 years old.	Complete periodontal examination: PPD, CAL, BOP, suppuration. Individuals were examined only once. Medical records.	Differences in periodontal condition were observed in individuals at different times of the BS, showing a high prevalence of periodontitis at both preoperative and postoperative follow-up. There was a statistically significant difference in the prevalence of periodontitis among the preoperative group (70.7%), the postoperative ≤6 months group (91. 7%), and post-surgery >6 months group (77.9%) ($p=0.040$).
Patiño et al., 2013[29], Brazil, **Case report**	To determine oral changes following BS.	2 cases: 29-year-old man, BMI 53, underwent RYGB; 42-year-old woman, BMI 42, underwent RYGB, follow-up of 2 years.	Oral examination. Analysis of hemoglobin and hematocrit, vitamin B12, folic acid, iron, and calcium were also evaluated.	Dietary complications (frequent vomiting), nutrient deficiencies (iron, vitamin B12, calcium, folic acid, and zinc) and xerostomia, dental caries, sensitivity, and periodontal diseases were seen in both cases.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Souza et al., 2013[36], Brazil, **Case-control**	To assess and compare the occurrence of halitosis among patients before and after RYBG and verify its relationship with the salivary flow rate, tongue coating index, and plaque index.	n=62; two groups: n=31 (group control/BS candidates), n=31 (group case /had already undergone RYBG).	Questionnaire, oral clinical examination. Halitosis was measured using an organoleptic scale and a portable sulfide monitor (Halimeter). Unstimulated saliva flow rate, tongue coating index, and PI were assessed.	No difference was found in the prevalence of halitosis between the two groups (p=0.48). Only the salivary flow rate was reduced in the control group compared with the case group (p=0.02). No statistical difference was found between the average concentrations of volatile sulfur compound and the average tongue coating index and PI values in groups. Data suggest that no significant association exists between halitosis and RYGB.
Weideman and Heuberger, 2013[26], United States, **Literature review**	This review examines the effects of BS and its impact on periodontal disease.	Not applicable	Without information.	The synergistic relationship between BS and proper dietary patterns is necessary to prevent periodontal disease. The nutrient deficiencies caused by improper dietary habits of the bariatric patient need continued research with emphasis on oral health.
Cardozo et al., 2014[13], Brazil, **Prospective cohort**	To investigate the association between BS and changes in the oral health status of patients with morbid obesity.	n= 39, evaluation 1 day prior to the surgery and 6 months after its completion. 27-64 years old. Type of surgery: RGYB.	Questionnaires; oral examinations: dental caries (ICDAS system); stimulated salivary flow and salivary flow at rest.	The mean number of total surfaces with non-cavitated carious and mean number of total surfaces with cavitated lesions before and after BS were not statistically different. Dry mouth sensation decreased (p<0.01), and the stimulated salivary flow increased (p=0.004) after BS. The oral health of patients who underwent BS improved; moreover, the sensation of dry mouth decreased.
de Moura-Grec et al., 2014[24], Brazil, **Prospective cohort**	To verify periodontal conditions and changes in dental wear after BS.	n=200, n=51 (control group/ non-obese subjects), n=90 (before RYGB), n=59 (6 months after RYGB). Evaluation before BS and 6 months after. 38.90±10.13 years old. Type of surgery: RGYB.	Oral examinations: dental wear (DWI), periodontal condition (PPD, CAL, presence of calculus, and BOP). Stimulated salivary flow was evaluated, and BMI, C-reactive protein and glucose levels were obtained from medical files.	The percentage of surfaces with dental wear in dentine was higher after BS (p=0.002), while dental wear in enamel decreased (p=0.019). There was a slight increase in salivary flow (p>0.05). There was increased prevalence of periodontal pockets (p= 0.022) and mean pocket depth increased (p<0.001). There was no statistical difference in BOP. BS may improve systemic conditions. However, it had a negative impact on oral health conditions because of an increase in periodontal disease and dental wear.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Sales-Peres et al., 2015[12], Brazil, **Prospective cohort**	To investigate whether significant weight loss by RYGB would decrease the presence of periodontopathogenic bacteria and periodontal diseases in morbidly obese patients in a 12-month follow-up.	n=50 morbidly obese patients, 38.90 (±10.13) years old; Type of surgery: RGYB.	Medical records. Oral examination: GI, calculus index, PPD, and CAL. Detection of the bacteria (*Porphyromonas gingivalis, Tannerella forsythia, Treponema denticola, and Prevotella intermedia*) of crevicular fluid. Three evaluations: pre-operative, and 6 months and 12 months postoperative.	All clinical variables for the periodontal conditions assessed indicated a worse condition between pre-operative and 6 months, and there was a slight improvement between 6 and 12 months. The periodontal disease increased in severity and *P. gingivalis* levels increased after BS.
Hashizume et al., 2015[16], Brazil, **Prospective cohort**	To evaluate the salivary conditions of morbidly obese patients prior to BS and 6 months after BS.	n=27, 33-61 years old; evaluation prior to and 6 months after BS. Type of surgery: RGYB.	Questionnaire via interview, and oral examinations. Stimulated salivary flow rate, pH, buffering capacity, and microbial levels of mutans streptococci, *Lactobacillus* spp., and *Candida albicans* were analyzed from saliva.	Values of all salivary variables before and after BS were within the normal range, except for the level of *C. albicans*, which was elevated at both times. An increase in the level of mutans streptococci was observed after BS ($p<0.05$).
Cummings and Pratt, 2015[41], United States, **Literature review**	To describe the most common bariatric procedures performed in the United States. It focuses on the nutritional and oral complications that can occur.	Not applicable	Without information.	Nutritional and anatomic changes after BS may increase the risk of select oral complications and diseases.
Jaiswal et al., 2015[42], India, **Prospective cohort**	To verify alterations in periodontal status in patients before and after BS, and to evaluate if a correlation exists between diet modification, oral prophylaxis, and periodontal status of these patients.	n=224 obese subjects with diagnosis of periodontitis classified as mean clinical attachment loss of >2mm, and more than 20 teeth present. 18-64 years old.	Patients were advised diet modification with supragingival scaling and oral health care regime after BS with a 6 month follow- up. Completed periodontal examination prior to and 6 months after BS.	The results revealed a reduction in the bleeding score, plaque, and mean GI after BS ($p<0.001$). At baseline and after BS measurements, there were no statistical difference in CAL and in PPD. Fibrous diet along with good periodontal care can help to improve the oral hygiene status of patients undergoing BS.

Author/year, country, study designer	Purpose	Sample characteristics	Methods	Main findings
Freitas, 2015[43], Brazil, **Prospective longitudinal observational study**	To evaluate the periodontal conditions and oral hygiene, quality of life, and overall satisfaction with life in diabetic and non-diabetic obese patients undergoing BS.	n=150, 3 groups: n=50 G1; n=50 G2; n=50 G3; evaluation after six (G1 n=18, G2 n=34) and 12 months (G1 n=10, G2 n=15).	Questionnaire OHIP-14, medical records, oral examinations: BOP, PPD, CAL, PI, gingivitis, periodontitis, tooth loss, and Satisfaction with Life Scale. G1 and G2 were evaluated before and six and 12 months after BS.	After BS, there was improvement in oral hygiene and increase in life satisfaction independent of the group, and there were no differences in the other variables analyzed.
Pataro et al., 2016[44], Brazil, **Cross-sectional**	To evaluate the oral and stomach presence of certain target periodontal pathogens and *H. pylori* in BS-treated obese individuals.	n=154, 4 groups: n=40 (BS group with periodontitis), n=39 (BS group without periodontitis), n=35 (control group- obese subjects with periodontitis), n= 40 (control group- obese without periodontitis); 18-65 years old. Type of surgery: RGYB.	Oral pathogens *Porphyromonas gingivalis, Aggregatibacter actinomycetemcomitans, Parvimonas micra, Treponema denticola, Tannerella forsythia, Campylobacter rectus,* and *Helicobacter pylori* were detected by a polymerase chain reaction technique. Oral examination: PPD, CAL, BOP, and PI.	Stomach biopsies revealed the high frequency of five oral species in both candidates for BS (91.6%) and the bariatric (83.3%) groups. Obese individuals had high levels of periodontopathogens and *H. pylori* in their mouths and stomachs. In the stomach, nearly all periodontal pathogens were present at significantly lower levels in the bariatric group. BS had an inverse effect on the oral and stomach microbial profiles, revealing higher oral and lower stomach bacterial levels.
Sales-Peres et al., 2017[35], Brazil, **Prospective cohort**	To explore whether weight loss after BS was associated with changes in periodontal measures over 12 months.	n=110 morbidly obese patients who had periodontal data in at least 2 of the 3 examinations: (baseline n=110 and 6 months n=90 or 12 months n=110 after BS); 20-60 years old. Type of surgery: RGYB.	Medical records and a full-mouth periodontal examination: PPD, CAL, and BOP, evaluation at baseline and 6 and 12 months after surgery.	The findings suggest that weight loss was associated with increased gingival bleeding, showing a peak at 6 months after BS. Periodontal pocketing and attachment loss remained unchanged during the 12 months. BMI was negatively associated with the rate of change in the proportion of sites with BOP. The greater the BMI loss, the higher the proportion of sites with BOP, particularly 6 months after BS. BMI was not associated with baseline PPD and CAL or rates of changes in these periodontal outcomes.

JI: Jejunoileal, BS: bariatric surgery; SRVG: Silastic ring vertical gastroplasty; LAGB: laparoscopic adjustable gastric banding; DH: dental hypersensitivity; RYGB: Roux-en-Y gastric bypass; PI: Plaque index; DMFT: Decayed, Missing and Filled Teeth Index; GBI: Gingival Bleeding Index; PSR: Periodontal Screening and Recording; CPI: community periodontal index; DWI: dental wear index; GER: gastroesophageal reflux; BMI: body mass index; FD: fully dentate; PD: Partially dentate without partial dentures; DW: Partial and complete denture wearers; PPD: probing pocket depth; CBCT: cone beam computed tomography; NCDL: noncarious dental lesion; CAL: Clinical attachment level; BOP: Bleeding on probing; GI: Gingival index; MPO: myeloperoxidase; G1: diabetic obese subjects group; G2: non-diabetic obese group; G3: eutrophic group.

Artigo nº 2

Prevalence of risk factors for oral diseases in obese subjects referred for bariatric surgery

The Journal of the American Dental Association

Aceito

Carta de aceite da revista

The Journal of the American Dental Association

Decision Letter (106-18.R1)

From: glickm@buffalo.edu

To: isis.henriques@hotmail.com

CC:

Subject: JADA - Decision on Manuscript ID 106-18.R1

Body: 31-Jul-2018

Dear Dr. Bastos:

It is a pleasure to accept your revised manuscript entitled "Prevalence of Risk Factors for Oral Diseases in Obese Subjects Referred for Bariatric Surgery" in its current form for publication in The Journal of the American Dental Association.

The Journal reserves the right to edit all submitted manuscripts and illustrative material to fit JADA's style and format. Once your article has been accepted for publication, it will be typeset and copyedited by JADA's publisher, Elsevier. You will receive a proof from Elsevier to review for accuracy. This will be your final opportunity to make any changes to your article.

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Thank you for your fine contribution. On behalf of the editors of The Journal of the American Dental Association, we look forward to your continued contributions to The Journal.

Respectfully,
Dr. Michael Glick
Editor, The Journal of the American Dental Association

Date Sent: 31-Jul-2018

Prevalence of Risk Factors for Oral Diseases in Obese Subjects Referred for Bariatric Surgery

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Conflict of Interest The authors declare that they have no conflicts of interest.

Title: **Prevalence of Risk Factors for Oral Diseases in Obese Subjects Referred for Bariatric Surgery**

Abstract

Background: Obesity is a risk factor for several chronic diseases, and scientific evidence suggests an association between obesity and oral diseases. This study estimated the prevalence of risk factors for dental caries, dental erosion, and periodontal disease in a group of obese subjects referred for bariatric surgery. **Methods:** Obese individuals who were referred for bariatric surgery in a private center for treatment of obesity were invited to participate in this study. They answered a questionnaire about socio-demographic data, general and oral health histories, dietary habits, and oral health behavior. **Results:** A total of 255 subjects were evaluated; 200 (78.4%) were women, the median (interquartile range) age was 36.0 (30.0-43.0) years, and body mass index was 39.7 (37.6-43.5) kg/m^2. A high prevalence of risk factors for dental erosion was observed; 78.4% of subjects daily consumed acidic foods, and 92.2% daily consumed acidic beverages. With respect to risk factors for dental caries, 38.5% of subjects reported high sucrose intake, and 59.6% preferred sweet beverages and foods with sucrose. Almost 13% of subjects reported to have or have had dental mobility, and 59.6% reported to have or have had gingival bleeding, suggesting a history of periodontal disease. **Conclusion:** Obese subjects referred for bariatric surgery are exposed to risks of oral diseases and should be evaluated by a dentist. **Practical Implications:** Knowing the risk factors for oral diseases of these individuals is important to raise awareness about these risk factors, as well as to prevent complications in the oral cavity.

Keywords: caries; obesity; oral health; dental erosion

Prevalence of Risk Factors for Oral Diseases in Obese Subjects Referred for Bariatric Surgery

Introduction

Obesity is a risk factor for several chronic diseases, most notably hypertension, type 2 diabetes, dyslipidemia, and coronary heart disease.[1,2] There is growing interest on the relationship between obesity and oral health. Scientific evidence suggests an association between obesity and oral diseases, such as tooth erosion, xerostomia, dentin hypersensitivity, and oral infectious diseases (periodontitis and dental caries).[1,3-6] This relationship occurs in two directions[4] Oral infectious diseases have an impact on the ability to eat, leading to changes in the diet that displace nutrient-dense foods and favor softer foods rich in sugars and saturated fats that promote obesity.[4] On the other hand, obesity is often marked by an unbalanced diet rich in sugars that stimulate the growth of cariogenic bacteria and favor the development of caries lesions.[6] Moreover, the inflammatory state observed in obesity is proposed as a mechanism to explain a positive association between obesity and periodontal disease.[7-9]

In both periodontal disease and dental caries, the pathological process is initiated within the bacterial biofilm that covers the tooth surface, and this process is related to poor oral health behaviors.[6,10] Park et al. identified that poor oral health behaviors were positively associated with general obesity, abdominal obesity, and a high percentage of body fat, and that inflammation may be the causative factor for this association since poor oral health behavior and a low frequency of tooth brushing may increase inflammation.[11]

It is necessary to identify risk factors for oral diseases in obese subjects in order to prevent them. Thus, the present study aimed to estimate the prevalence of risk factors for dental

caries, dental erosion, and periodontal disease in a group of obese subjects referred for bariatric surgery.

Materials and Methods

Population and Sample

Obese individuals who were referred for bariatric surgery to a private center for the treatment of obesity in Salvador, Bahia, Brazil, were invited to participate in this study from November 2015 to November 2016. The inclusion criteria were an age of 18 years or more, having an ability to understand and respond to the questionnaire, and having a body mass index (BMI) (calculated as weight in kilograms divided by height in meters squared) of ≥40 kg/m^2 or ≥35 kg/m^2 associated with obesity-related comorbidities. The sample was divided into two groups according to the BMI: morbidly (BMI ≥40 kg/m²) and non-morbidly (BMI 35-40 kg/m²) obese groups.[12]

This study was approved by the Research Ethics Committee of Nutrition School of the Federal University of Bahia (protocol 1.296.169, approved on October 26, 2015), and all subjects provided free and informed consents.

Study Design

Cross-sectional.

Measurements

A single interviewer administered to subjects a questionnaire on socio-demographic data, general and oral health histories, dietary habits, and oral health behavior. When eating habits were evaluated, frequent consumption was considered as consuming the food or the beverage at least once a day, and the frequency of acidic fruits consumption constituted eating acidic fruits.

Medical records were reviewed to obtain information about the general health and BMI of the subjects. Esophagitis was diagnosed by digestive endoscopy. Dysglycemia was defined as any change in glucose tolerance (pre-diabetes and diabetes).[13]

Statistics

Data were analyzed by means of Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA). The categorical variables are expressed as frequencies and percentages, and the continuous variables are expressed as medians with interquartile ranges. The groups were compared using the Mann Whitney test or chi-square test. $p < 0.05$ was considered statistically significant.

Results

A total of 255 subjects aged 18-71 years agreed to participate in the study. The characteristics of the study subjects are summarized in Table 1.

With respect to oral health behaviors, no statistically significant difference was observed between the morbidly and non-morbidly obese groups, except for flossing frequency (Table 2).

Table 2 shows oral health care and the difficulties in performing personal hygiene in obese subjects.

Nineteen (8%) subjects reported that their weights had already caused embarrassment in dental offices. Some of them mentioned a fear of breaking a dental chair after sitting on it, and others reported feeling discomfort in the reception room due to other people's reaction to their weight. The frequencies of these events were higher in the morbidly obese group; however, it was not statistically significant (p=0.563).

The eating habits of all subjects are represented in Figure 1, which shows a high risk of dental erosion and caries.

Discussion

This study identified risk factors for dental caries, periodontal disease, and dental erosion in a group of obese patients referred for bariatric surgery, and there was no difference between the morbidly and non-morbidly obese groups. Oral health behavior, oral health characteristics, and eating habits, but not flossing frequency, were observed to be similar between the groups. General health and oral health share similar causal and behavior mechanisms.[14] Both dental caries and obesity are diseases with multifactorial etiology related to dietary intake.[2] They share common influences, such as diet, lifestyle, genetic, and socio-economic factors.[15] Their pathogenesis has been found to be associated with increased frequency of snacking and consumption of foods and drinks which contain high levels of sugars and fermentable carbohydrates.[16]

This study revealed a high frequency of non-use of dental floss, high sucrose intake, and high meal frequency, which are risk factors for caries. However, there is no consensus in the literature on the association between obesity and dental caries. Modéer et al.[2] studied obese and normal weight adolescents and noted an association between obesity and dental caries; similar results were reported by Isaksson (2013), who studied obese and normal weight adults.[17] Nevertheless, studies comparing obese and normal weight children,[18] obese and non-obese adults,[3] and morbidly obese and normal-weight individuals[19] did not observe differences in dental caries rate. Considering these conflicting results, obesity alone cannot be used as a predictor of dental decay; nevertheless, poor oral health is often found in obese people,[4] and poor oral health is a known risk factor for dental caries.[10]

In addition to dental caries, an association has been suggested between periodontal disease and obesity. The results of a systematic review provided an evidence that there is an association between obesity and periodontal infection[20], and these data corroborate with those reported by previous studies.[11,19,21] Castilhos et al. did not find this association, but they

identified that a marker of systemic inflammation, C-reactive protein was a mediator of the association between gingivitis and obesity, suggesting that low-grade systemic inflammation due to obesity may triggers increased local inflammatory response to external stimuli such as dental plaque.[22] In the present study, most subjects reported to have or have had gingival bleeding, which may indicate periodontal disease. In addition, the study identified a low frequency of flossing, which is a risk factor for periodontal disease because it leads to bacterial plaque accumulation, and consequently inflammation of the periodontium.

Some patients had dysglycemia or even diabetes. Diabetes mellitus is a risk factor for the impairment of periodontal health,[23] and obesity is considered a major risk factor for diabetes.[1,2,23] Hyperglycemia seems to cause structural alterations in the periodontal tissues and impairment of the immune cells response.[19] In addition, current evidence shows poorer glycemic control contributes to poorer periodontal health.[23]

Dental erosion is a multifactorial condition, in which the interplay of chemical, biological, and behavioral factors results in a loss of tooth substance with non-bacterial acidic solution. One etiological factor for dental erosion is the acid from extrinsic sources. Frequent consumption of acidic foodstuffs and beverages has been implicated in the increasing risk of dental erosion.[24] In the present study, most subjects had high consumption of acidic foods and beverages. In addition, a considerable percentage of patients had esophagitis or symptoms suggestive of gastroesophageal reflux, which is another etiological factor for dental erosion and is recognized as an obesity-related co-morbidity.[25]

Although there is no consensus in the literature about the association between obesity and dental caries, periodontal disease, tooth erosion, and the self-reported dental complaints of obese patients, it should be emphasized that these oral diseases and dental complaints may be secondary to risk factors present in dietary practices and oral hygiene habits of obese individuals.

The current study identified risk factors for dental caries, periodontal disease, and dental erosion in obese subjects referred for bariatric surgery. These subjects should be evaluated by a dentist to prevent complications in the oral cavity, to treat oral pathologies when present and to provide guidance about risk factors for caries, erosion, and periodontal disease. The limitation of this study is that oral examinations of the subjects were not performed. However, it was still possible to identify risk factors that should be investigated in obese subjects.

Conclusions

Dentists can minimize risks of infections and eliminate foci of infection in the oral cavities of obese patients who are undergoing bariatric surgery. Thus, the participation of dentists in the multidisciplinary team that provides assistance to obese patients is important. Oral health care should be included in the health promotion strategies in obese patients.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Statement Informed consent was obtained from all participants in the study.

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Table 1. Socio-demographic and general health characteristics of 255 obese subjects, Salvador, Bahia, Brazil, 2016.

Characteristics	n Total (%) 255 (100%)	Non-morbid obesity 137 (53.7%)	Morbid obesity 118 (46.3%)	*p*-value
Sex				
Female	200 (78.4)	119 (86.9)	81 (68.6)	**< 0.001**
Male	55 (21.6)	18 (13.1)	37 (31.4)	
Age (years)†	36.0 (30.0-43.0)	37.0 (32.0-43.5)	35.0 (28.0-42.0)	0.080
Ethnicity				
Black	67 (26.3)	35 (25.5)	32 (27.1)	
Mixed	127 (49.8)	70 (51.1)	57 (48.3)	0.906
White	61 (23.9)	32 (23.4)	29 (24.6)	
Marital status				
With partner	123 (48.4)	64 (46.7)	59 (50.0)	0.601
Without partner	132 (51.6)	73 (53.3)	59 (50.0)	
Education				
Incomplete high school	15 (5.9)	4 (2.9)	11 (9.3)	**0.030**
Complete high school	240 (94.1)	133 (97.1)	107 (90.7)	
Personal income†‡	2.3 (1.0-4.6)	2.7 (1.3-5.0)	2.0 (1.0-4.6)	0.344
Smoking	9 (3.5)	6 (4.4)	3 (2.5)	0.428
General health				
BMI (Kg/m^2)†	39.7 (37.6-43.5)	37.8 (36.5-38.7)	43.8 (41.7-46.6)	**< 0.001**
Diabetes	27 (10.6)	15 (10.9)	12 (10.2)	0.840
Reported gastroesophageal reflux	85 (33.3)	52 (38.0)	33 (28.0)	0.092
Esophagitis (n=236)	72 (28.2)	43 (31.9)	29 (28.7)	0.604
Dysglycemia (>100 mg/dl) (n=152)	34 (13.3)	17 (20.5)	17 (24.6)	0.540

†Median (interquartile range).
‡Median of minimum wage number

Table 2. Oral health care of 255 obese subjects, Salvador, Bahia, Brazil, 2016.

Characteristics	n Total (%) 255 (100%)	Non-morbid obesity 137 (53.7%)	Morbid obesity 118 (46.3%)	*p*-value
Self-perception of oral health				
Excellent/ good	125 (49.0)	70 (51.1)	55 (46.6)	0.762
Reasonable	102 (40.0)	53 (38.7)	49 (41.5)	
Bad/ very bad	28 (11.0)	14 (10.2)	14 (11.9)	
Last dental visit				
More than 1 year ago	73 (28.6)	35 (25.5)	38 (32.2)	0.241
0-1 year ago	182 (71.4)	102 (74.5)	80 (67.8)	
Brushing frequency				
≤2 times per day	104 (40.8)	52 (38.0)	52 (44.1)	0.322
≥3 times per day	151 (59.2)	85 (62.0)	66 (55.9)	
Flossing frequency				
Does not use	110 (43.1)	51 (37.2)	59 (50.0)	**0.040**
≥1 time per day	145 (56.9)	86 (62.8)	59 (50.0)	
Mouthwash frequency				
Does not use	149 (58.4)	78 (56.9)	71 (60.2)	0.601
≥1 time per day	106 (41.6)	59 (43.1)	47 (39.8)	
Reported difficulty in brushing the posterior teeth because of the cheek	53 (20.8)	32 (23.4)	21 (17.8)	0.275
Reported that weight has already caused embarrassment in the dental office	19 (7.5)	9 (6.6)	10 (8.5)	0.563
Reported tooth loss number †	1 (0-3)	1 (0 -3)	1 (0-4)	0.978
Reported to have/have had dental mobility	33 (12.9)	17 (12.4)	16 (13.6)	0.785
Reported to have/have had gingival bleeding	152(59.6)	89 (65.0)	63 (53.4)	0.060
Reported to have/have had hypersensitivity	159 (62.4)	87 (63.5)	72 (61.0)	0.683
Reported bad breath	49 (19.2)	28 (20.4)	21 (17.8)	0.593
Xerostomia	43 (16.9)	23 (16.8)	20 (16.9)	0.973
Reported using toothbrush with hard bristles in the last 6 months	73 (28.6)	39 (28.7)	34 (29.1)	0.947
Reported brushing immediately after eating	67 (26.3)	41 (29.9)	26 (22.0)	0.153
Reported needing dental treatment	193 (75.7)	102 (74.5)	91 (77.1)	0.621

† Median (interquartile range).

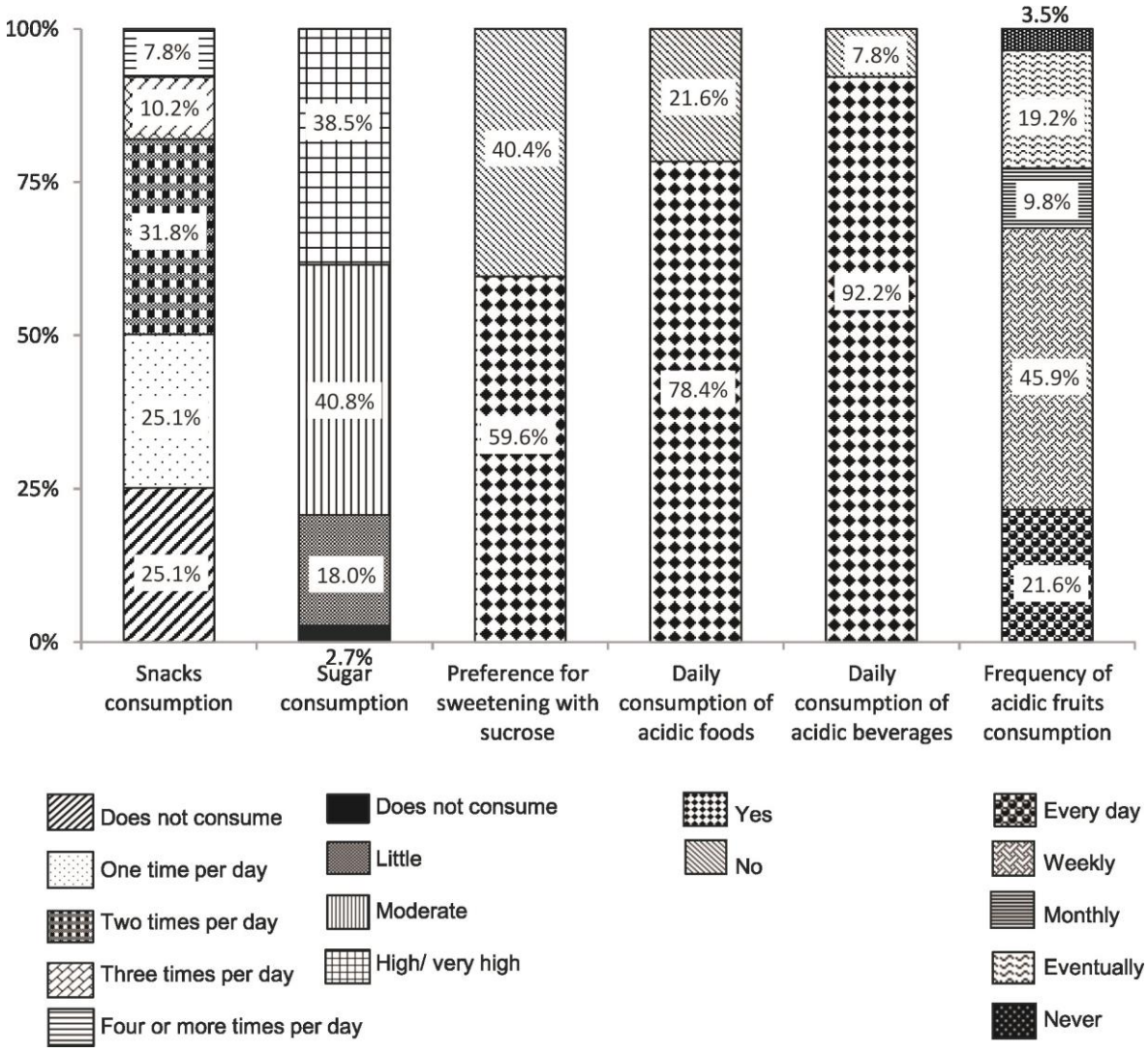

Figure 1. Food habits of 255 obese subjects referred for bariatric surgery, Salvador, Bahia, Brazil, 2016.

Artigo nº 3

Bariatric surgery and oral health: a cohort study

Acta Odontologica Scandinavica

Submetido

Carta do Editor referente à submissão do artigo

Acta Odontologica Scandinavica

Preview

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Subject: Acta Odontologica Scandinavica SODE-2018-0231

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Date Sent: 23-May-2018

Title: **Bariatric surgery and oral health: a cohort study**

Authors

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Conflict of Interest The authors declare that they have no conflicts of interest.

Title: **Bariatric surgery and oral health: a cohort study**

Abstract

Objective: To investigate the influence of bariatric surgery on the oral health of obese individuals. **Material and methods:** A prospective cohort study was conducted at a private center for treatment of obesity. Obese individuals who underwent bariatric surgery were evaluated before and 5-7 months after bariatric surgery. A questionnaire about socio-demographic data, general and oral health histories, dietary habits, and oral health behavior was applied. **Results:** The sample was composed of 103 participants; it was observed that oral health behaviors were similar before and after bariatric surgery ($p>0.05$); however, the flossing frequency improved after surgery ($p=0.039$). There was an increase in report of frequent vomiting ($p<0.001$), halitosis ($p=0.002$), xerostomia ($p<0.001$), and difficulty swallowing ($p<0.001$), and a decrease of reported dentine hypersensitivity ($p=0.001$) after bariatric surgery. Moreover, there were some reports of changes in the soft tissues of the oral cavity after this surgery, and the eating habits changed. **Conclusion:** The possible complications of bariatric surgery may have effects on oral health. Obese individuals presented risk factors for oral diseases before and after bariatric surgery, but these risk factors were different.

Keywords: obesity; bariatric surgery; oral health; dental caries; tooth erosion.

Title: Bariatric surgery and oral health: a cohort study

Introduction

The prevalence of overweight and obesity has increased rapidly in the world [1,2]. Worldwide nearly 2 billion adults were overweight, of these, more than half a billion were obese in 2016 [3]. Thus, the high prevalence of overweight and obesity, together with associated comorbidities, become a global public health problem [1].

Bariatric surgery (BS) is an effective treatment for morbid obesity. It results in meaningful and sustainable weight loss outcomes and improvement in obesity-related comorbidities [4,5]. However, BS modifies dramatically the gastrointestinal anatomy, physiology and eating habits, which may result in the development of nutritional or gastrointestinal complications [4], as well as, effect on the oral cavity [6].

In the literature, oral complications that may be related to the effects of BS have been reported, such as xerostomia, tooth erosion, periodontal disease and dentin hypersensitivity [6-12]. However, in literature there is little information available and there is no consensus, then it is necessary to know more about the oral health of obese patients before and after this surgical procedure.

In view of the above, the aim of this article is to investigate the influence of BS on the oral health of obese individuals.

Materials and Methods

This prospective cohort study was conducted at a private center for treatment of obesity in Salvador, Bahia, Brazil from November 2015 to June 2017, in which obese individuals recommended for BS were invited to participate. The follow-up time was 6 months; the evaluations were performed two times, before BS and 5-7 months after BS. All participants underwent BS using the Roux-en-Y gastric bypass technique. Patient inclusion criteria were

being 18 years or older, having an ability to understand and answer the questionnaire, and having body mass index (BMI) ≥40 Kg/m^2 or ≥35 Kg/m^2 with obesity-related comorbidities.

All participants provided free and informed consents, and the study was approved by the Research Ethics Committee from Nutrition School of the Federal University of Bahia (protocol 1.296.169, approved on October 26th, 2015).

The data were obtained from a questionnaire on socio-demographic data, general and oral health histories, dietary habits, and oral health behavior, applied before and after BS by a single interviewer. Review of medical records was performed to obtain information on general health and BMI. Dysglycemia was defined as any change in glucose tolerance (pre-diabetes and diabetes) [13]. The personal income was expressed as median of number of Brazil's minimum wage received per month.

The Statistical Package for the Social Sciences (SPSS) version 16.0 was applied for statistical analysis. The categorical variables are presented as simple absolute frequencies and percentages, and the continuous variables are presented as medians and interquartile ranges. For comparison of data before and after BS, Wilcoxon test was used with continuous variables, and Mc Nemar test with categorical variables. A p value of < 0.05 was considered statistically significant.

Results

This study included 103 participants, of them 83 (80.6%) were female, the median age was 37.0 (32.0-43.0) years, and ranged from 18 to 66 years. The majority of participants (52.4%) declared themselves mixed, almost all patients (96.1%) had completed high school, and the median personal income was 2.5 (1.1-5.0) minimum wage number. The reasons for undergoing BS reported by participants are presented in Figure 1.

Table 1 shows the general health characteristics of the participants before and after BS. Oral health behaviors and eating habits before and after BS are exposed in Table 2. In general, the majority of participants had good oral hygiene habits in the preoperative period, and they were maintained or improved in the postoperative period.

In relation to the postoperative period, the majority of the participants reported use of multivitamin supplement (74.8%), use of another type of supplement (61.2%), and do physical exercise (78.6%). Twenty seven (25.2%) patients reported being accompanied by a psychologist.

As regards changes in the soft tissues of the oral cavity in postoperative period, five (4.9%) participants reported red lesions, three (2.9%) white lesions, 19 (18.4%) aphthous ulcer, one (1.0%) herpes, ten (9.7%) lip peeling, one (1.0%) atrophy of the tongue papillae, and six (5.8%) angular cheilitis.

Discussion

This study found that oral health behaviors were similar before and after BS, but the flossing frequency improved after BS. In relation to oral health, the report of halitosis, xerostomia, and difficulty swallowing increased, and the report of dentine hypersensitivity decreased, as well as, there were some reports of changes in the soft tissues of the oral cavity after BS. There were also changes in eating habits, regarding the frequency of snacks, and consumption of acidic beverages and fruits.

Maintaining oral health behavior after BS was also observed by other studies [10,14]. Proper oral hygiene is important to prevent dental caries and periodontal disease [15]. A systematic review suggested that patients who have undergone BS have a greater risk for dental caries [16]. After BS, the volume of the stomach is reduced, it is need smaller, and more frequent meals throughout the day [8]. Thus, it increases the frequency of exposure to the bacterial

substrate (fermentable carbohydrates), and consequently increases the risk for dental caries [8,15]. Moreover, a cohort study observed a significant increase in the level of mutans streptococci, cariogenic microorganisms, in saliva of obese subjects six months after BS [17]. The cariogenic bacteria metabolize the fermentable carbohydrates generate as by-product organic acids that may demineralize the dental hard tissue, and cause dental caries [15]. On the other hand, in this study there was a decrease in the consumption of sugars after BS, which reduces the risk for dental caries.

Oral hygiene also plays a role in the etiopathogenesis of periodontal disease, which is a destructive infectious-inflammatory disease that affects the tooth-supporting tissues [18]. Some studies have observed worsening of the severity of periodontal disease after BS [11,19] while other studies have not found it [9,20]. Netto et al. (2012) [10] observed no change after BS in the report of gingival bleeding and dental mobility, which are signs of periodontal disease. The present study also noted no change in the report of dental mobility, but the frequency of reporting of gingival bleeding reduced after BS, which may be justified by the increase in the flossing rate and the improvement of diabetes, a risk factor for periodontal disease [18].

The BS changes the gastrointestinal tract and dietary habits that may lead to some complications [4,7,12]. Dehydration is a postoperative complication that may occur in these patients [4,8]. A smaller gastric capacity in restrictive procedures provokes difficulty in drinking the needed volume of fluids; in addition, the watery stool, vomiting and diarrhea cause loss of fluid [4].

In the oral cavity, the dehydration may cause reduction in salivary flow rate [8]. This study observed an increase in the report of xerostomia after BS. Evaluating the salivary flow rate, a cohort study found low rate before and after BS [19]. On the other hand, other cohort studies [10,14] noted a significant improvement in the salivary flow rate, which may be explained by

reduction in the number of medications used after BS, some of them interfere with salivary flow. The present study also found significant reduction in number of medications per day. Dehydration may also be associated with lip peeling, change in the soft tissues that was reported by part of participants after the surgery.

Another possible adverse effect of BS is vomiting [4,7,10]. It is a risk factor for tooth erosion, because gastric acid in contact with the tooth lead to demineralization of the hard dental tissues [21]. This investigation found an increase in the frequency of vomiting after BS, a finding that corroborates with other studies [7,9,10,22], and an increase in consumption of acidic fruit daily. On the contrary, the frequent consumption of acidic beverages, another risk factor for tooth erosion [21], significantly reduced, which may be explained by changes in eating habits, that are healthier after BS.

One of the benefits that may occur after BS is the improvement of gastro esophageal reflux, condition which has been related to obesity [23]. In this study, there was a reduction in report of gastroesophageal reflux after BS. Despite this, the report of frequent vomiting after BS increased, but it does not represent the majority of participants, this result may be related to dysfunctional eating habits that can cause vomiting, such as overeating, eating too fast or not chewing food well [4]. The improvement of gastroesophageal reflux and the reduction of frequent consumption of acidic beverages may have contributed to decrease the report of dentin hypersensitivity. Because these facts provide that the teeth are less exposed to acids, which cause tooth erosion, exposure of the dentinal tubule, and consequently dentin hypersensitivity.

Furthermore, in the present study, the report of halitosis increased after BS, which may be associated with a low-carbohydrate diet and dehydration. The former leads to oxidation of fatty acids from adipose tissue to energy production, releasing as product ketone bodies that may cause ketone breath [24]. The latter may lead to hyposalivation, thus the saliva becomes

more viscous, the self-cleaning function of the saliva is impaired and there is proliferation of Gram-negative bacteria, responsible for higher volatile Sulphur compounds production [25,26]. Differently, a case-control study found no difference in the prevalence of halitosis among BS candidates and individual who had undergone BS, but the participants' postoperative time was not specified [22].

Vitamin and mineral deficiencies may also occur after BS [4], thus, it should be noted that some vitamin and mineral deficiencies may lead to changes in the soft tissues of the oral cavity, such as glossitis, angular cheilitis, atrophy of the lingual papillae, and others [27]. In this study, few patients reported changes in soft tissues of the oral cavity after the procedure. The majority of the participants were taking a dietary supplement and following the prescribed diet.

This longitudinal study had some limitations, oral examination was not performed, and the follow-up time was short, some oral changes require more time to manifest in the oral cavity and to be perceptible. Despite this, it was found that obese individuals presented risk factors for dental caries and dental erosion both before and after BS, but these risk factors were different. Moreover, reports of oral changes was identified that need to be investigated.

Conclusions

BS provides benefits to the health of obese individuals; however, healthcare professionals should be aware of the possible complications of this procedure and its effects on oral health. After BS, obese individuals may present other risk factors for oral diseases; therefore, these patients should be monitored by the dentist in the preoperative and postoperative periods in order to promote oral health.

Compliance with Ethical Standards

Disclosure of interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Statement Informed consent was obtained from all participants in the study.

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Table 1. General health data of 103 subjects at baseline and after bariatric surgery, Salvador, Bahia, Brazil, 2017.

Variables	**Preoperative** n (%)	**Postoperative** n (%)	***p*- value**
BMI (Kg/m^2)*	39.4 (37.2-42.8)	29.2 (27.3-32.0)	< **0.001**
Reported gastroesophageal reflux	36 (35.0)	10 (9.7)	< **0.001**
Reported vomiting frequently	3 (2.9)	23 (22.3)	< **0.001**
Number of medications per day* (n=98)	1.0 (0.0-2.0)	0.0 (0.0-1.0)	< **0.001**
Dysglycemia (>100 mg/dl) (n=56)	14 (25.0)	3 (5.4)	**0.001**

*Median (interquartile range).

Table 2. Oral health behaviors and eating habits of 103 obese subjects at baseline and after bariatric surgery, Salvador, Bahia, Brazil, 2017.

Variables	**Preoperative** n (%)	**Postoperative** n (%)	***p*- value**
Self-perception of oral health			
Good	94 (91.3)	96 (93.2)	0.687
Bad	9 (8.7)	7 (6.8)	
Last dental visit			
more than 1 year ago	27 (26.2)	25 (24.3)	0.832
0-1 year ago	76 (73.8)	78 (75.7)	
Brushing frequency			
≤2 times per day	42 (40.8)	39 (37.9)	0.629
≥3 times per day	61 (59.2)	64 (62.1)	
Flossing frequency			
It does not use	44 (42.7)	36 (35.0)	**0.039**
≥1 time per day	59 (57.3)	67 (65.0)	
Mouthwash frequency			
It does not use	63 (61.2)	61 (59.2)	0.860
≥1 time per day	40 (38.8)	42 (40.8)	
Reported dental mobility	3 (2.9)	2 (1.9)	1.000
Reported gingival bleeding	24 (23.3)	23 (22.3)	1.000
Reported dentine hypersensitivity	44 (42.7)	25 (24.3)	**0.001**
Reported halitosis	17 (16.5)	36 (35.0)	**0.002**
Reported xerostomia	16 (15.5)	47 (45.6)	**<0.001**
Reported difficulty swallowing	2 (1.9)	24 (23.3)	**<0.001**
Reported brushing immediately after eating	23 (22.3)	36 (35.0)	**0.015**
Reported to snack three or more times per day	11 (10.7)	42 (40.8)	**<0.001**
Frequent consumption of acidic foods	79 (76.7)	66 (64.1)	0.060
Frequent consumption of acidic beverages	95 (92.2)	79 (76.7)	**0.002**
Consumption of acidic fruit daily	22 (21.4)	44 (42.7)	**<0.001**
Reported needing dental treatment	75 (72.8)	66 (64.1)	0.108
Self-classification of sugar consumption			
It does not consume/ little	25 (24.3)	84 (81.6)	**<0.001**
Moderate/ high	78 (75.7)	19 (18.4)	
Sweetened more frequently with sucrose	49 (47.6)	18 (17.5)	**<0.001**

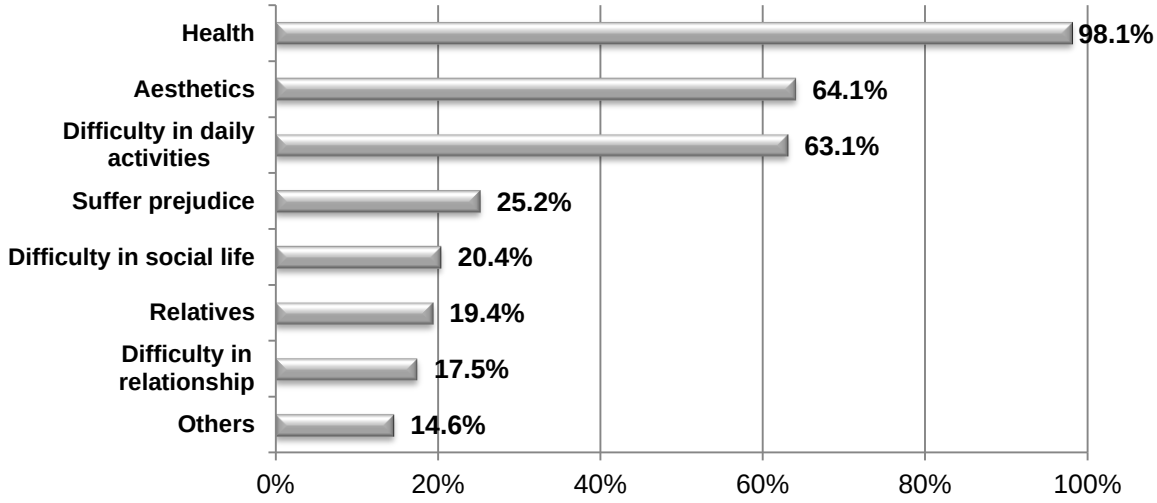

Figure1. Reasons for undergoing bariatric surgery reported by participants, Salvador, Bahia, Brazil. 2017.

Artigo nº 4

Surgical periodontal treatment of a patient with dentin hypersensitivity after bariatric surgery: a case report

General Dentistry

Aceito

Carta de Aceite da revista

General Dentistry

Decision Letter (GD-2017-0142.R1)

From: generaldentistry@agd.org

To: isis.henriques@hotmail.com, isishenriquesab@gmail.com

CC:

Subject: General Dentistry - Decision on Manuscript ID GD-2017-0142.R1

Body: 04-Dec-2017

Dear Dr. Bastos,

Thank you for the submission of your manuscript, "Surgical periodontal treatment of a patient with dentin hypersensitivity after bariatric surgery: a case report," to General Dentistry. It has been evaluated by the reviewers and we are pleased to inform you that it has been accepted for publication in General Dentistry.

Our editorial staff will contact you once we have assigned a publication date to begin the editorial process. You will be given the opportunity to review the edited manuscript before it goes to print. If you are unable to return your review by the date requested, we will re-assign the manuscript to a future issue, although not necessarily the subsequent issue. To this end, it is essential to keep the AGD informed of any change of address and/or telephone in addition to plans to be out of the country for an extended period.

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Thank you again for your contribution to General Dentistry. Your article will help us to maintain the journal's commitment to providing general dentists with the knowledge needed to provide the best possible patient care.

For further inquiries please contact Rebecca Palmer at rebecca.palmer@agd.org.

Sincerely,

Timothy F. Kosinski, DDS, MAGD
Associate Editor

Date Sent: 04-Dec-2017

TITLE: **Surgical periodontal treatment of a patient with dentin hypersensitivity after bariatric surgery: a case report**

AUTHORS

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ABSTRACT

The aim of this study was to report the clinical case of a patient with severe symptoms of dentin hypersensitivity after bariatric surgery. A 40-year-old woman with a complaint of hypersensitivity in all teeth, after bariatric surgery due to morbid obesity, was referred to a dental studies center. Upon physical examination, the patient showed multiple gingival recessions, associated with pain symptoms that were characteristic of dentin hypersensitivity. Periodontal surgery was performed using coronal flap displacement techniques associated with subepithelial connective tissue grafting and tunnel-type subepithelial connective tissue grafting at the sites of gingival recession and at sites of dentin hypersensitivity resulting in improvement/regression of the pain symptoms. Patients undergoing bariatric surgery should be monitored by a dental surgeon because they may develop oral health-related complications. The dental surgeon should be included as a member of the bariatric surgery team to help prevent and treat dental related complications.

Keywords: Bariatric surgery, Dentin hypersensitivity, Gingival recession, Oral health, Surgical flap.

Main Text

INTRODUCTION

Dentin hypersensitivity (DH) is defined as an acute, short-lived, well-localized pain, resulting from dentin exposure to chemical, volatile, thermal, tactile, or osmotic stimuli, which cannot be attributed to another form of defect or dental pathology[1,2].

DH is a clinical condition associated with pain symptoms related to dental erosion, abrasion, attrition and abfraction (non-carious cervical lesions) and gingival recession. The primary cause of DH is loss of tooth crown enamel or dental root exposure due to gingival recession[2,3,4,5].

Dental enamel may be lost due to abrasion caused by aggressive or incorrect brushing. Excessive consumption of acidic foods or gastroesophageal reflux may also lead to dental erosion. Bruxim and other forms of oral parafunctional behavior may lead to attrition as well[3,5,6]. Frequent intake of acidic foods and beverages or contact between gastric acid and the teeth, which may occur in gastroesophageal reflux disease, may cause dental erosion leading to dentinal tubule exposure and, therefore, DH[3,5]. Conversely, gingival recession may result from inadequate brushing and periodontal disease. The cementum covering the root may be easily removed, resulting in dentin exposure and DH when the tooth root is exposed to the oral cavity environment[5].

The worldwide prevalence of DH affects a large part of the population, ranging from 8% to 57%[2], including individuals in the age group from 20 to 50 years. DH is most prevalent among women and in people aged 30-40 years[4].

DH will most likely become an increasingly common problem with increasing lifespans of population with functional natural dentition with vital or minimally restored teeth prone to tooth wear[7]. Furthermore, the healthy but erosive lifestyle adopted by the young adult population is leading to an increase in tooth wear and DH[8].

DH may affect all teeth; however, its location is closely related to etiological factors. It is found primarily in the permanent canines and premolars of both dental arches, primarily affecting the cervical area of the vestibular side of the teeth[9]. DH distribution is remarkably consistent, preferentially overlapping with gingival recession, thereby suggesting that gingival recession is the main cause of dentin exposure and a key predisposing factor for DH[10]. Non-carious cervical lesions may have different characteristics, including small, polished sides on the cusps in cases of dental attrition, or rounded or V-shaped defects of the cervical area of the vestibular side in cases of dental abrasion or abfraction. In cases of erosion, lesions may also appear as concave defects on the bilateral free sides[6].

After diagnosing the cause of DH, its treatment may involve not only dental measures, but also the adoption of medical care towards controlling its cause. This study reports the clinical case of a patient with severe DH symptoms after bariatric surgery (BS).

CASE PRESENTATION

A 40-year-old, non-smoking female patient who presented with hypersensitivity in all teeth was referred for a dental evaluation at a dental studies center in Salvador, Bahia – Prime Institute (Instituto Prime). The medical history included morbid obesity with a 43.5 Kg/m^2 body mass index (BMI), hepatic steatosis, cervical arthrosis, shoulder and wrist tendonitis, and a diet rich in carbohydrates and acidic foods and beverages before performing BS using the Roux-en-Y gastric bypass technique (RYGB) in 2011, 4 years and 7 months before the present dental evaluation. The patient complained of vomiting, daily for eight months, which started 30 days after the BS, when she began eating solid food again. After 8 months, the occurrence of vomiting gradually decreased and eventually ceased. The patient adopted healthy behavioral and dietary habits according to the advice of a multidisciplinary team

comprising a surgeon, nutritionist, psychologist, physiotherapist, and speech therapist and achieved a BMI of 29.7 kg/m^2 at five months, 20.6 kg/m^2 at one year, and 24.5 kg/m^2 five years after the BS. The patient reported that DH was always experienced at tooth 46, albeit it became worse and affected all teeth after the BS. The patient had not dental exams performed prior to the BS.

Upon clinical dental examination, the patient showed satisfactory oral hygiene; absence of carious lesions; type IV gingival biotype; Miller class I gingival recessions at teeth 14, 15, 16, 23, 24, 25, 26, 35, and 36 and Miller class IV gingival recessions at teeth 34, 33, 31, 41, 42, and 43, associated with pain symptoms typical of DH; and a gingival bleeding index of 76.56%. Radiographic examinations did not reveal alterations in the alveolar bone crest at teeth 14, 15, 16, 17, 18, 24, 25, 26, 27, 28, 34, 35, 36, 37, 38, 44, 45, 46, 47, 48 (Fig 1). The figure 2 shows the study model (Fig 2). The dental history showed treatment failure with toothpastes specific for DH and endodontic treatment in healthy tooth 41 for DH. The occlusal and vestibular sides of the upper and lower molars showed dental wear. The patient had normal results in all laboratory tests (blood count and glycated hemoglobin, parathyroid hormone (PTH), triiodothyronine (T3), thyroxine (T4), thyrotropic hormone (TSH), total and fraction cholesterol, and vitamin and mineral levels) with the exception of vitamin C and 25-hydroxyvitamin D levels, which were below the lower limit of the method.

Plaque-associated gingivitis without local factors and DH was diagnosed in the patient. The proposed treatment plan was vitamin supplementation and subepithelial connective tissue grafting (SCTG) at gingival recession sites.

Periodontal surgery was performed in four sextants (1, 3, 4 and 5) (Fig 3A), at sites of gingival recession and complaint of DH, at different times. The surgical technique of coronal flap displacement combined with SCTG was used in sextants 1, 3, and 5, wherein a horizontal incision at the bases of the papillae and intrasulcular incision with partial flap were made (Fig

3B). In sextant 5, however, which had recessions with poor root coverage prognosis, an envelope flap with coronal displacement was performed. The tunnel-type SCTG technique was used in sextant 4, wherein an intrasulcular incision was made without separating the more coronal, vestibular, and lingual areas of the interdental papillae, thereby creating a supraperiosteal tunnel. The papillae were preserved and no relaxing incisions were made in both techniques (Fig 3B).

In both techniques, scaling, root planning, and washing with saline were performed on the root surfaces. Then, a segment of the suture thread envelope was trimmed to the desired graft size to map the receptor area and to obtain the desired graft size in the donor area (Fig 3C). The donor tissue was collected from the inner area of a palatal flap guided by the map (Fig 3D). The palate epithelium was positioned and sutured and connective tissue graft was placed in the receptor area (Fig 3E), pressed, and sutured with 5-0 nylon suture thread. In the tunnel-type SCTG, the graft was guided by the tunnel, using a detacher, and was carried by the suture thread and stabilized with a suspensory suture. In the coronal flap displacement combined with SCTG, the mucosal flap was positioned coronally, through the suspensory suture, thereby covering the graft (Fig 3F).

The following medications were prescribed for postoperative period: 500-mg azithromycin, 20-mg prednisone, 500-mg paracetamol with 7.5-mg codeine phosphate, and 0.12% chlorhexidine gluconate.

Additional gains of keratinized mucosa, root surface coverage, and significant DH reduction in all operative sites were observed in the postoperative follow-up (Fig 4 and 5).

DISCUSSION

DH is described in the dental literature as a condition caused by dentinal tubule exposure to the oral cavity. The process is chronic and no characteristic symptom has been identified in

the early stages[3]. This phenomenon has been associated with obese patients with gastroesophageal reflux disease, which has been recognized as an obesity-related comorbidity[11,12]. In gastroesophageal reflux, hydrochloric acid passes from the stomach into the esophagus reaching the oral cavity, and may cause dental erosion[13]. Gastroesophageal reflux may result from an increased intra-abdominal, intragastric, and negative inspiratory intrathoracic pressure[14]. It may also be caused by mechanical separation between the lower esophageal sphincter and the compression caused by the diaphragmatic crura, which may be observed in obese people[15].

Surgical treatment of obesity and the incidence of DH are related, because DH is sometimes associated with vomiting induced by BS[13]. The Roux-en-Y gastric bypass surgical technique has been the most commonly performed weight loss procedure in Brazil and worldwide in the last decade[16]. This technique involves two mechanisms, namely, nutrient malabsorption and stomach size restriction[17]. Nutrient malabsorption combined with limited intake may contribute to vitamin deficiency, including B_{12}, E, and C. The lack of vitamin C may hinder collagen formation and, subsequently, tooth and gum tissue repair, thereby triggering gingival bleeding and changing dental mobility. Furthermore, vomiting is one of the complications reported by patients in the postoperative follow-up of BS[13,17,18,19].

A 12-month prospective study investigated whether weight loss after BS (RYGB) was associated with changes in periodontal measures. It concluded that weight loss was associated with increased gingival bleeding, showing a peak at 6 months after BS. It was noted that periodontal pocketing and attachment loss remained unchanged during the study period[20]. However, other 12-month prospective study observed that almost all periodontal conditions evaluated (probing pocket depth, clinical attachment level and bleeding index) worsened in 6 months after BS (RYGB), except for the calculus. There was a slight improvement between 6 and 12 months after BS[21].

A longitudinal study with 24-month follow-up of individuals subjected to BS using the RYGB technique showed that the number of vomiting episodes, severity of DH, and reports of pain and gingival bleeding significantly increased 12 months after BS. At 24 months postoperation, DH and myeloperoxidase (an inflammatory marker) significantly increased and serum vitamin C significantly decreased in comparison with the baseline[18]. In the present case report, the patient had vitamin C deficiency, frequent vomiting, gingival bleeding, and increased DH severity after BS.

Heling et al. (2006)[13] examined 113 patients who had undergone BS using the vertical gastrectomy or adjustable gastric banding techniques, with a 5-year mean postoperative time, similar to the postoperative time of the present case report. Self-evaluation of the oral health status of these patients showed that 79% of the patients reported frequent vomiting and 37% reported DH that worsened after BS, whose severity increased over time. Furthermore, self-evaluation of oral health status showed a positive and significant association between vomiting and DH in the postoperative period. The results from Heling's study also corroborate the findings reported in the present case report. Vomiting is an adverse effect of BS, resulting in the introduction of gastric acid in the mouth, which may lead to dental erosion. This condition was also identified in the present case report[13,22]. Dental erosion, DH, and periodontal disease were also observed in another case report of a 54-year-old individual who underwent BS in 2002 and later presented with gastroesophageal reflux[23].

A cohort study evaluated the oral health conditions before and 6 months after BS. It was observed an increase in periodontal disease and in dental wear. The enamel wear present before the BS began to affect the dentine 6 months after BS[24]. Dental wear was identified on molars in present case report.

DH may result due to prolonged episodes of vomiting. In addition, DH may also develop due to gingival recession, which exposes the dentinal tubules to the oral cavity[2]. Gingival

recession is defined as the apical displacement of the gingival margin from the cementum-enamel junction resulting in root exposure[25]. Gingival recession may lead to DH, pain, aesthetic discomfort, gingival bleeding, and plaque retention, although DH is often the main symptom[25,26]. In the present case report, the patient had gingival recession, DH, and there were sites with clinical attachment loss equal to 7- and 8- mm, most likely caused by traumatic tooth brushing, leading to Miller class I and IV gingival recession in those sites.

DH complications may cause great discomfort in the oral cavity, even leading to emotional and behavioral changes when coping with these complications. Thus, DH may significantly affect the quality of life as dietary choices often become limited, including avoiding refrigerated foods and beverages; oral hygiene may be prevented and aesthetics may be adversely affected as well[5,8,9].

The clinical case reported herein shows an unusual progression of DH after BS. The patient had exacerbated pain symptoms, which required performing endodontic treatment in unit 41 before periodontal surgical treatment. After dental and laboratory clinical examination, the diagnosis of DH caused by gingival recession and dental wear was established and adequate treatment could be performed by SCTG periodontal surgery.

Both techniques applied in this case report are considered adequate treatment for gingival recession in the literature. A systematic review was conducted to investigate which treatment modality is recommended to improve root coverage for patients with gingival recession. It was concluded that treatment of recession defects is best achieved with a coronally advanced flap combined with a connective tissue graft[27]. In relation to the tunnel-type SCTG technique, a randomized clinical trial demonstrated that both coronally advanced flap and tunnel technique with the additional use of SCTG can result in optimal clinical outcomes in the treatment of single and multiple gingival recessions[28].

DH treatment and defect coverage predictability become key objectives in periodontal treatment[29]. Surgical root coverage procedures may cover exposed dentin and root surfaces. However, based on evidence currently available, the efficacy of surgical root coverage procedures in reducing DH is variable and unpredictable[26]. The study by De Oliveira et al. (2013)[29] directly assessed the effect of surgical defect coverage on DH treatment, observing a significant decrease in DH, a gain in gingival parameters after surgical treatment, and improved quality of life of patients. Those findings corroborate the results from the present case report, wherein the SCTG performed resulted in root surface coverage and reduced DH.

CONCLUSION

In this case report, oral conditions were identified that may be consequences or become worse related to obesity and BS. Clinical evidence demonstrates the need to note the medical history of obese patients, whether submitted to BS or not, once the systemic condition of these patients may cause repercussions on the oral cavity, as DH which can be treated successfully by root coverage techniques. The dental surgeon should be included in the multidisciplinary team involved in obesity treatment towards maintaining and promoting the oral health of those individuals.

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FIGURES

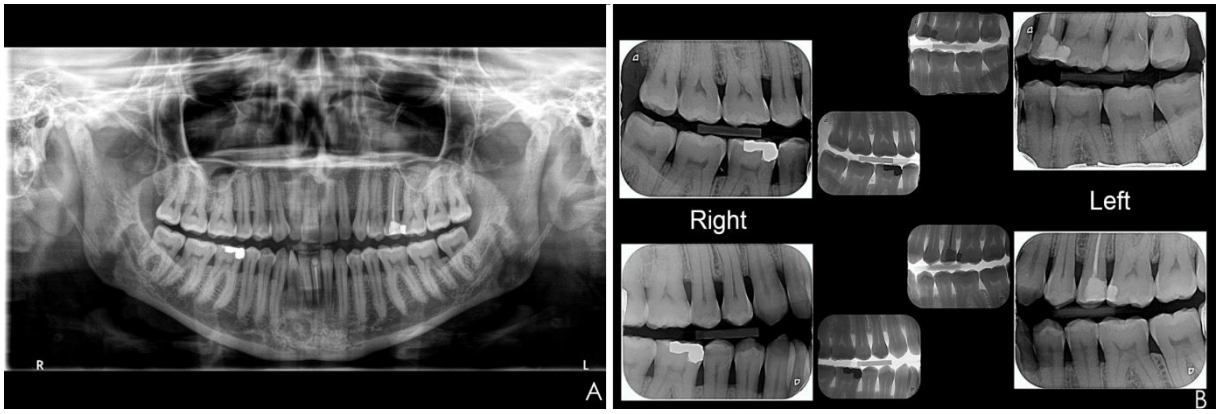

Fig 1. Radiographic images: (A) Panoramic radiography; (B) Bitewing radiographs.

Fig 2. Study model.

Fig 3. Surgical technique of coronal flap displacement associated with subepithelial connective tissue grafting: (A) Preoperative view of sextant 3; (B) intrasulcular and papilla base incision; (C) Graft mapping; (D) Connective tissue removal from the palatal area; (E) Graft positioning; (F) Stabilized and sutured flap.

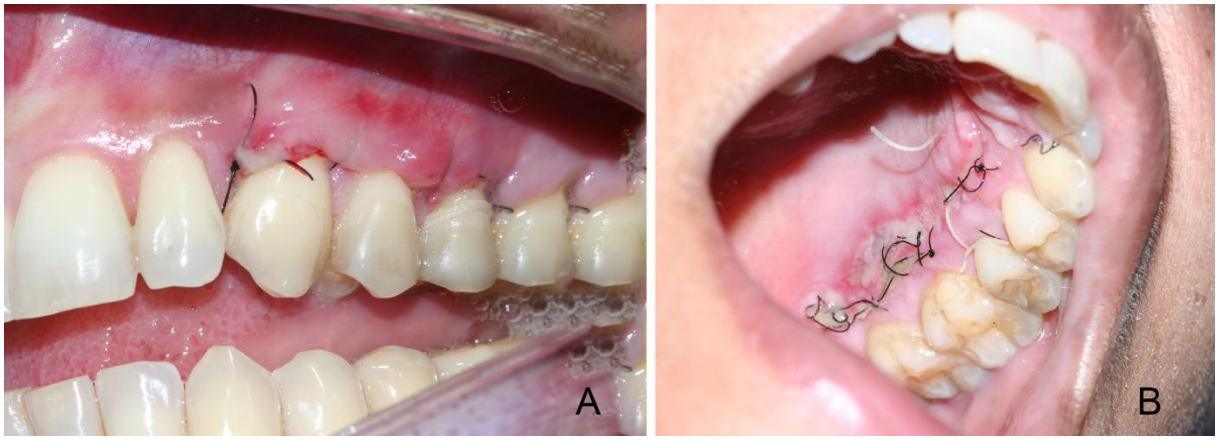

Fig 4. 8-day postoperative images of sextant 3: (A) vestibular view (receptor area); (B) palatine view (donor area).

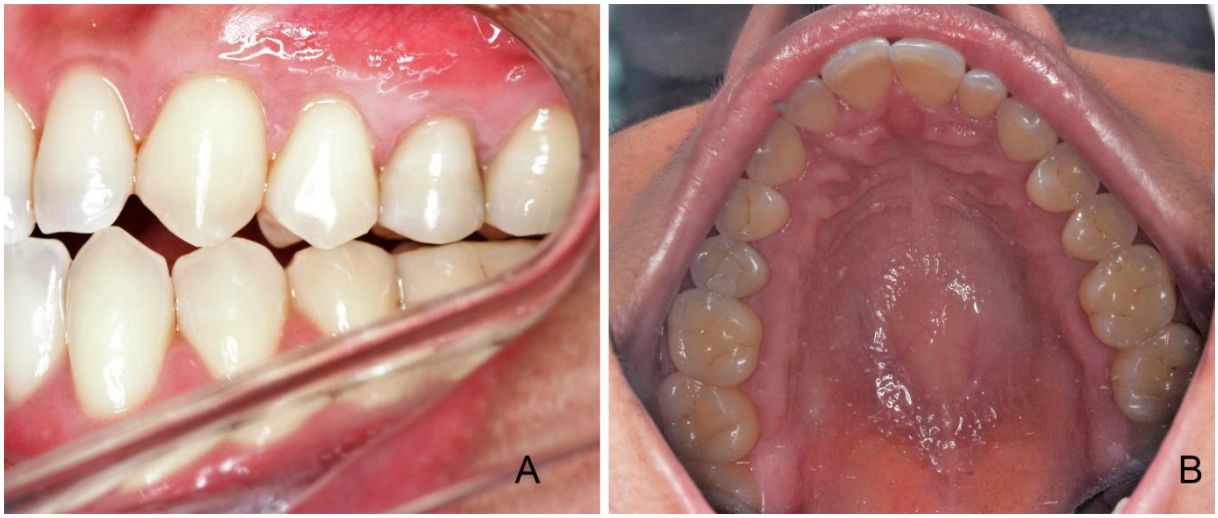

Fig 5. 6-month postoperative images of sextant 3: (A) Vestibular view (receptor area); (B) palatine view (donor area).

4 DISCUSSÃO

A revisão da literatura relativa à associação entre saúde bucal e cirurgia bariátrica identificou resultados controversos, não havendo consenso quanto a essa relação. No grupo estudado foi observado que indivíduos obesos encaminhados para cirurgia bariátrica apresentaram fatores de risco para complicações bucais antes e após a realização da cirurgia bariátrica, o que foi evidenciado no caso clínico relatado.

A saúde bucal, de acordo com os estudos revistos, é influenciada e passa por modificações após a realização da cirurgia bariátrica. Os resultados do presente estudo demonstraram que o perfil de risco para cárie dentária, erosão dentária e doença periodontal pode ser modificado pela cirurgia e por isso não deve ser negligenciado.

A equipe multidisciplinar que presta assistência aos pacientes obesos e/ou submetidos à cirurgia bariátrica precisa estar atenta não só aos fatores de risco sistêmicos, mas também bucais, a fim de evitar complicações na saúde bucal no período pós-operatório. No relato de caso descrito, como em outros estudos[4-7] foi observada hipersensibilidade dentinária após a cirurgia bariátrica, o que confirma a necessidade de controle e acompanhamento dos efeitos adversos desse tratamento cirúrgico.

Dessa forma, a participação do cirurgião dentista na equipe multidisciplinar envolvida no tratamento cirúrgico da obesidade nos períodos pré-operatório e pós-operatório se faz necessária objetivando orientar, prevenir e tratar complicações odontológicas, além de promover e manter a saúde bucal.

O estudo da obesidade e do seu tratamento tem sido objeto de interesse e resultado em publicações que abordam diferentes aspectos do tema, contudo não há homogeneidade entre os métodos empregados. O presente estudo apresenta limitações, uma vez que a amostra pertenceu a apenas um centro de referência para o tratamento cirúrgico da obesidade e não foi possível realizar o exame clínico-odontológico, em função dos recursos físicos do serviço.

A realização desse estudo proporcionou a idealização e planejamento de novos estudos, e assim dar-se-á prosseguimento a essa linha de pesquisa. Baseado nos fatores de risco identificados neste estudo e nos dados encontrados na literatura, planeja-se o início de um novo projeto de pesquisa, que visa executar exame clínico-odontológico e investigar manifestações bucais antes e após a realização da cirurgia bariátrica. Ainda há muitas lacunas na literatura sobre esse tema, e muito a ser investigado.

A divulgação dos resultados encontrados neste estudo por meio da publicação dos artigos e apresentações em eventos científicos serve de alerta aos profissionais de saúde para a possível relação entre obesidade, cirurgia bariátrica e saúde bucal. Consequentemente, contribuirá para uma abordagem mais ampla nesses pacientes antes e após a cirurgia bariátrica, favorecendo o sucesso do tratamento.

5 CONCLUSÃO/ CONSIDERAÇÕES FINAIS

Pacientes obesos apresentaram fatores de risco para doenças bucais antes e após a realização da cirurgia bariátrica, contudo esses fatores de riscos foram diferentes. Não foi observada diferença nos hábitos de higiene bucal antes e após a cirurgia bariátrica, exceto para a frequência do uso do fio dental, que melhorou após a cirurgia. Foi observado aumento dos relatos de halitose, xerostomia e dificuldade para deglutir após a cirurgia bariátrica, bem como os relatos de algumas alterações bucais no período pós-operatório. Desse modo, os profissionais de saúde devem estar atentos às possíveis complicações da cirurgia bariátrica e possíveis efeitos na cavidade bucal.

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ANEXOS

ANEXO A – Parecer do Comitê de Ética em Pesquisa

ESCOLA DE NUTRIÇÃO DA UNIVERSIDADE FEDERAL DA BAHIA/ ENUFBA

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: OBESIDADE E SAÚDE BUCAL DE PACIENTES ADULTOS

Pesquisador: CARLA HILARIO DA CUNHA DALTRO

Área Temática:

Versão: 1

CAAE: 50083715.4.0000.5023

Instituição Proponente: Escola de Nutrição da Universidade Federal da Bahia/ ENUFBA

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 1.296.169

Apresentação do Projeto:

A cirurgia bariátrica é atualmente a modalidade terapêutica que resulta em perda de peso significativa e sustentável, porém, pode produzir efeitos adversos que se manifestam também na cavidade oral. Considerando a importância da adoção de cuidados com a saúde bucal do paciente obeso, antes e após a realização da cirurgia bariátrica,a identificação das condições de saúde sistêmica e odontológica, dos hábitos de higiene bucal, alimentares e comportamentais imprescindíveis para prevenir e/ou evitar a progressão de doenças na cavidade oral,este estudo tem como objetivo,identificar as características relacionadas à saúde bucal de um grupo de obesos graves, antes e após a realização da cirurgia bariátrica. Trata-se de um estudo observacional, tipo coorte prospectiva conduzida no Núcleo de Tratamento e Cirurgia da Obesidade. O instrumento de pesquisa será um questionário aplicado antes, após 6 meses e 12 meses da cirurgia bariátrica, também serão obtidos dados dos prontuários dos pacientes. Espera-se que essa investigação permita conhecer e compreender melhor o impacto dessa doença e do seu tratamento na cavidade oral, contribuindo para proporcionar uma melhor qualidade de vida para esses pacientes, além de gerar hipóteses para estudos futuros.

Objetivo da Pesquisa:

Objetivo Primário: Identificar as características relacionadas à saúde bucal de um grupo de obesos

Endereço: Av. Araújo Pinho nº 32
Bairro: Canela **CEP:** 40.110-150
UF: BA **Município:** SALVADOR
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graves antes e após a realização da cirurgia bariátrica.

Objetivo Secundário: 1. Descrever os hábitos de higiene bucal de obesos graves antes e após a cirurgia bariátrica. 2. Descrever os hábitos dietéticos e alimentares de obesos graves antes e após a realização da cirurgia bariátrica. 3. Identificar o risco de cárie e de erosão dentária de obesos graves antes e após a cirurgia bariátrica. 4. Descrever as alterações de tecidos moles relatadas pelos obesos graves antes e após a realização da cirurgia bariátrica.

Avaliação dos Riscos e Benefícios:

Riscos: Como a presente pesquisa será realizada mediante a aplicação de um questionário, não há implicação em risco físico. O único risco possível se refere ao vazamento de dados dos participantes da pesquisa, que será minimizado pelo uso de código de registro dos participantes. Visto que se trata de risco mínimo, não estão previstas indenizações e/ou ressarcimentos. Benefícios: Os pacientes serão orientados quanto a saúde bucal e caso seja detectado qualquer alteração o mesmo será encaminhado a profissional competente. Além disso, as informações geradas deverão contribuir para uma melhor compreensão das condições da saúde bucal de pacientes obesos e para a adoção de medidas preventivas e de abordagem precoce.

Comentários e Considerações sobre a Pesquisa:

A execução desta proposta poderá contribuir para o conhecimento sobre a obesidade e a saúde bucal de pacientes adultos contribuindo para proporcionar uma melhor qualidade de vida para esses pacientes. Além disso, poderá ainda a fortalecer as discussões e a implantação de ações voltadas para este público. O estudo está muito bem desenhado, Pesquisa relevante e exequível.A metodologia proposta bem como os critérios de inclusão e exclusão e cronograma são compatíveis com os objetivos propostos no projeto.

Considerações sobre os Termos de apresentação obrigatória:

As declarações apresentadas são condizentes com as Resoluções que norteiam a pesquisa envolvendo seres humanos. Os pesquisadores envolvidos com o desenvolvimento do projeto apresentam declarações de compromisso com o desenvolvimento do projeto em consonância com a Resolução 466/12 CNS/MS, bem como com o compromisso com a confidencialidade.

O TCLE apresentado possui uma linguagem clara e acessível aos participantes da pesquisa e atende ao disposto na resolução 466/12 CNS/MS contendo todas as informações necessárias ao esclarecimento do participante sobre a pesquisa bem como os contatos para a retirada de duvidas sobre o processo.

ESCOLA DE NUTRIÇÃO DA UNIVERSIDADE FEDERAL DA BAHIA/ ENUFBA

Recomendações:

Recomendamos ao pesquisador atenção aos prazos de encaminhamento dos relatórios parcial e/ou final. Informamos que de acordo com a Resolução CNS/MS 466/12 o pesquisador responsável deverá enviar ao CEPNUT o relatório de atividades final e/ou parcial anualmente a contar da data de aprovação do projeto.

Conclusões ou Pendências e Lista de Inadequações:

Após a análise com vista à Resolução 466/12 CNS/MS o CEPNUT considera o projeto como APROVADO para execução, tendo em vista que apresenta benefícios potenciais a serem gerados com sua aplicação e representa risco mínimo aos sujeitos da pesquisa tendo respeitado os princípios da autonomia dos participantes da pesquisa, da beneficência, não maleficência, justiça e equidade.

Considerações Finais a critério do CEP:

Colegiado acompanha parecer do relator

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_596710.pdf	02/10/2015 12:53:11		Aceito
Folha de Rosto	Folha_de_rosto.pdf	02/10/2015 09:31:31	Isis Henriques de Almeida Bastos	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	termo_de_consentimento_livre_e_esclarecido_apendice_3.pdf	02/10/2015 09:29:13	Isis Henriques de Almeida Bastos	Aceito
Outros	Questionario_pos_operatorio_apendice_2.pdf	02/10/2015 09:27:50	Isis Henriques de Almeida Bastos	Aceito
Outros	Questionario_pre_operatorio_apendice_1.pdf	02/10/2015 09:25:49	Isis Henriques de Almeida Bastos	Aceito
Outros	Carta_de_anuencia.pdf	02/10/2015 09:20:22	Isis Henriques de Almeida Bastos	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.pdf	02/10/2015 09:14:54	Isis Henriques de Almeida Bastos	Aceito

ESCOLA DE NUTRIÇÃO DA UNIVERSIDADE FEDERAL DA BAHIA/ ENUFBA

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

SALVADOR, 26 de Outubro de 2015

Assinado por:
Vilson Caetano de Sousa Júnior
(Coordenador)

Endereço: Av. Araújo Pinho nº 32
Bairro: Canela **CEP:** 40.110-150
UF: BA **Município:** SALVADOR
Telefone: (71)3283-7704 **Fax:** (71)3283-7710 **E-mail:** cepnut@ufba.br

ANEXO B – Termo de Consentimento Livre e Esclarecido

Universidade Federal da Bahia

Projeto: Obesidade e saúde bucal de pacientes adultos

Termo de Consentimento Livre e Esclarecido

Introdução

Eu, a Profª Drª. Carla Daltro, médica endocrinologista e professora da Universidade Federal da Bahia, e a Drª. Isis Bastos, cirurgiã-dentista, estamos realizando um trabalho científico sobre saúde bucal de pacientes obesos antes e após a realização da cirurgia bariátrica e para isso gostaríamos de contar com a sua ajuda.

Você está sendo convidado(a) a participar de uma pesquisa. Antes de decidir, é importante que você entenda o porquê da realização desta pesquisa e o que ela envolve. Por favor, dedique um tempo para ler cuidadosamente as informações seguintes e, se preferir, discuta com seus familiares, amigos ou com seu médico. Se você desejar, pode levar este material para casa para pensar melhor. Pergunte-nos se houver qualquer coisa que não esteja clara ou se precisar de mais informações.

Para ser lido para ou por todos os participantes do estudo

As informações a seguir descrevem o estudo e seus direitos como participante. Além do que foi aqui esclarecido, o entrevistador poderá responder qualquer questão que você tenha referente ao estudo. Por favor, leia ou ouça com atenção e sempre que achar necessário interrompa para perguntar.

Justificativa

Autores têm sugerido que os indivíduos obesos e submetidos à cirurgia bariátrica podem apresentar, além dos sintomas clássicos, manifestações bucais e dentais. Considerando a importância da adoção de cuidados com a saúde bucal do paciente obeso, antes e após a realização da cirurgia bariátrica, com vistas à promoção de saúde bucal, a identificação das condições de saúde sistêmica e odontológica, os hábitos de higiene bucal, os hábitos alimentares e comportamentais é imprescindível para prevenir e/ou evitar a progressão de doenças nos tecidos duros e moles da cavidade oral, tornando relevante a realização do presente estudo.

Objetivo do estudo

Identificar as características relacionadas à saúde bucal de um grupo de obesos graves antes e após a realização da cirurgia bariátrica.

Procedimentos

Sua participação consiste em responder a um questionário, composto por questões relacionadas à sua saúde geral, saúde bucal e dieta, antes, 6 meses após e 12 meses após a realização da cirurgia bariátrica.

Riscos que se pode ter

Como a presente pesquisa será realizada pela aplicação de questionário, isso não implica em risco físico, ou seja, é um instrumento de risco mínimo. Desta forma, não estão previstas indenizações e ressarcimentos.

Benefícios que se pode ter

Participando dessa pesquisa você estará contribuindo para obtermos informações sobre a saúde bucal dos indivíduos submetidos à cirurgia bariátrica e estará contribuindo para a elaboração de um trabalho científico que poderá proporcionar benefícios futuros à sociedade. Além disso, sendo detectado qualquer problema você receberá a devida orientação e encaminhamento. Os benefícios esperados serão traduzidos na obtenção de informações que possam contribuir para uma melhoria na qualidade do atendimento aos pacientes.

Garantia de resposta a qualquer pergunta

A qualquer momento, você poderá fazer perguntas sobre esta pesquisa com a garantia de que estas serão respondidas.

Liberdade de abandonar a pesquisa sem prejuízo para si

A qualquer momento você poderá entrar em contato com os pesquisadores responsáveis por este estudo e pedir que os seus dados sejam retirados do mesmo. A concordância ou não em participar deste estudo, não irá alterar de nenhuma maneira o seu tratamento.

Garantia de privacidade

Os dados obtidos neste estudo serão apresentados em congressos e eventos da comunidade científica e poderão ser publicados em revistas especializadas. No entanto, **a sua identidade nunca será revelada**.

Você receberá uma via desse documento assinado por um dos pesquisadores responsáveis e por você.

Contato: As dúvidas não esclarecidas ou o não cumprimento do que foi acordado podem ser informados aos responsáveis pela pesquisa, Drª Isis Bastos (71)9168-8958 / (71)9948-3800ou e Drª Carla Daltro (71)8201-1084.

Universidade Federal da Bahia
Projeto: Obesidade e saúde bucal de pacientes adultos

Termo de Consentimento Livre e Esclarecido

Por este instrumento particular declaro, para fins éticos e legais, que eu (nome)....., concordo, em absoluta consciência, em participar deste estudo através da aplicação de um questionário, sem nenhum prejuízo para mim, e cujos resultados serão utilizados na pesquisa intitulada: "Obesidade e saúde bucal de pacientes adultos", realizada pela Profª. Drª. Carla Daltro e Drª. Isis Bastos, nos termos abaixo relacionados:

1. Esclareço que recebi todas as informações sobre minha participação nesta pesquisa, possuindo plena liberdade em retirar meu consentimento de participar da referida pesquisa a qualquer momento, sem prejuízo financeiro, hierárquico ou de qualquer natureza;

2. Este projeto foi aprovado pelo Comitê de Ética e Pesquisa em Seres Humanos da Escola de Nutrição da Universidade Federal da Bahia (CEP-ENUFBA) e caso queira esclarecer alguma dúvida seguem os contatos dos pesquisadores e do CEP-ENUFBA: Profa. Dra. Carla Daltro (71)8201-1084, Dra. Isis Bastos (71)9948-3800/9168-8958 e 3283-7704.

Por estar de pleno acordo com o teor do presente termo, assino abaixo o mesmo.

Salvador, ..., de ..... de 20__

Digital

.....
Assinatura do Voluntário

.....
Assinatura do Pesquisador

ANEXO C – Termo de Consentimento Livre e Esclarecido do Relato de Caso

Prontuário nº _____.
Nome _____
RG. nº. _____ CPF _____ Sexo _____
Data de Nascimento _____ Estado Civil _____
Endereço _____
Fone _____ Celular: _____
Em caso de emergência entrar em contato com: _____
Telefone: _____ Indicado por: _____

TERMO DE INFORMAÇÕES E CONSENTIMENTO

Abaixo assinado, dou pleno consentimento a Equipe do Instituto Prime por intermédio de seus professores e alunos dentistas registrados e qualificados para realizar o tratamento odontológico proposto em documento anexo. Reconheço que deverei comparecer nesta instituição nos dias e horários marcados, estando ciente que possíveis atrasos e cancelamentos de última hora poderão ocorrer. Estou ciente que me apresentaram alternativas de tratamento, sendo que a que me foi proposta e aceita foi a que melhor atende as minhas expectativas e possibilidades financeiras.

Os implantes são feitos de um metal chamado Titânio. Este metal além de oferecer resistência mecânica, que é a característica de um metal, tem ainda a propriedade denominada biocompatibilidade que significa que este é bem aceito pelo organismo como se fosse parte do mesmo, portanto não desenvolvem nenhum tipo de rejeição. O índice de sucesso dos implantes está em torno de 95% dos casos, sendo sempre importante informar que 3 a 6% dos casos podem sofrer insucessos. Fui informado que o tratamento depende de fatores biológicos e da resposta de cicatrização de cada indivíduo, que podem ocorrer acidentes, complicações e sequelas nos trans e pós operatórios como: Infecção, hemorragia, edema, sensação de formigamento transitória ou permanente, dor e desconforto na área operada. Nas cirurgias de enxerto o período de recuperação varia de acordo com a região operada, a extensão do defeito e da área a ser reconstituída e o índice de sucesso pode ser menor.

Autorizo de forma livre e voluntária a realização do trabalho e terapêutica que me foram apresentados, dos quais recebi explicações claras, simples e compreendi os propósitos, riscos e custos, além de saber que os tratamentos seguem os adequados princípios técnicos, científicos e reconhecidos pela odontologia. Devido às características próprias da Implantodontia, o tratamento até a fase final, ou seja, do início da fase cirúrgica até a instalação da prótese pode levar até dois anos para ser concluído, ou em casos de enxerto esse prazo pode ser ainda maior.

Fui informado que após o final do meu tratamento, o sucesso a longo prazo depende de um rigoroso controle de higienização e manutenção. É sugerido atender ao programa de manutenção periódica estabelecido de acordo com cada caso especificamente. Estou ciente que este programa de manutenção quando realizado no Instituto Prime, não é gratuito e que apresenta um valor informado no início do meu tratamento.

O paciente não pagará pelos honorários profissionais dos cirurgiões-dentistas que executarão o trabalho proposto, porém será responsável pelo pagamento de todo o material relacionado com as cirurgias, tais como: implantes, enxertos ósseos, membranas, Biomateriais. O paciente deverá também arcar com todas as despesas relacionadas com componentes das próteses e pelos trabalhos laboratoriais relacionados com prótese sobre implantes e sobre dentes. O paciente permite a realização de fotografias com finalidades científicas e didáticas desde que resguardada a privacidade durante todo o atendimento e não devendo ser exposta suas condições bucais desnecessariamente a público leigo. Declaro que fui informado que posso discordar e desistir do tratamento em andamento, tendo que me manifestar por escrito, assumindo todos os riscos e consequências que possam prejudicar a minha saúde bucal e a do tratamento já efetuado, eximindo a instituição, alunos e professores de quaisquer responsabilidades. O curso oferece a confecção e acompanhamento até a entrega final da prótese e mantém acompanhamento por mais seis meses de seu término para possíveis ajustes. No entanto as manutenções após esse prazo serão realizadas sobre as condições mencionadas acima, no quarto parágrafo deste documento.

Salvador, _____ de 2015

_____

Assinatura do paciente

ANEXO D – Questionário do período pré-operatório

Universidade Federal da Bahia
Projeto: Obesidade e saúde bucal de pacientes adultos

QUESTIONÁRIO
PRÉ-OPERATÓRIO
IDENTIFICAÇÃO

Prontuário/NTCO:_____					N° paciente:_____
Nome:					
Endereço:					
Bairro: _____ Cidade: _____ Estado: _____ CEP: _____					
Tel.: _____ Cel.: _____ Naturalidade: _____					
Nacionalidade: _____ Sexo: ( ) M ( ) F Data: ____/____/____					
Estado Civil: _____ Data de nascimento: ____/____/____ Idade: _____ anos _____ meses					
Escolaridade: _____ Profissão: _____					
Cor/ Raça:	( ) Branca	( ) Preta	( ) Amarela	( ) Parda	( ) Indígena
Renda Mensal:	Número de salários mínimos: _____				

HISTÓRIA MÉDICA

1. Previsão da data da cirurgia bariátrica: ____/____/____	2. Por qual motivo o/a Sr(a) quer realizar a cirurgia bariátrica? (pode ser escolhida mais de uma resposta) ( ) Estética ( ) Saúde ( ) Dificuldade em realizar as atividades diárias ( ) Familiares ( ) Por sofrer preconceito ( ) Dificuldade com o convívio social ( ) Dificuldade no relacionamento ( ) Outros: _____

3. Tem alergia?	( ) Alimento: Qual? _____	( ) Medicamento: Qual? _____	( ) Não sabe

4. O/a Sr(a) tem refluxo gastroesofágico (DRGE)?	( ) Não	( ) Não sabe	( ) Sim Há quanto tempo você sente os sintomas? _____

5. **Em algum período da sua vida**, o/a Sr(a) fez algum exame para o diagnóstico do refluxo?	( ) Não	( ) Sim

6. Quais os exames de investigação diagnóstica para o refluxo o/a Sr(a) já fez?	( ) nenhum exame	( ) ultra-sonografia para estudo de RGE
	( ) EREED	( ) endoscopia digestiva alta
	( ) pHmetria e manometria	

7. O/a Sr(a) apresentou/ apresenta episódios de vômitos frequentes?	( ) Não	( ) Sim

8. Se o/a Sr(a). respondeu SIM à pergunta n.7, qual era/ é a frequência dos episódios de vômitos?
( ) Nunca ( ) Ocasionalmente
( ) Diariamente _____vezes/dia ( ) Raramente
( ) Semanalmente _____vezes/semana

9. Se o/a Sr(a). respondeu SIM à pergunta n.7, os vômitos eram induzidos ou involuntários?	( ) Não se aplica	( ) Induzidos	( ) Involuntários

10. Se o/a Sr(a). respondeu SIM à pergunta n.7, quais os sinais/sintomas apresentados?	( ) regurgitações pós-alimentares	( ) vômitos persistentes	( ) vômitos não persistentes	( ) náuseas
	( ) anorexia	( ) sialorréia	( ) distensão abdominal	( ) apneia
	( ) engasgos	( ) tosse	( ) soluços	( ) dispnéia
	( ) hematêmese	( ) melena	( ) cianose	( ) azia
	( ) perda de peso		( ) dor no estômago	( ) nenhum

11. Se o/a Sr(a). respondeu SIM à pergunta n.7, quais as medicações ou medidas anti-refluxo o/a Sr(a) já fez:	( ) nenhum tratamento		( ) fracionamento da dieta	
	( ) elevação da cabeceira		( ) espessamento da dieta	
	( ) antiácidos		( ) outra:_____	
	( ) pró-cinéticos	( ) domperidona	( ) bromoprida	( ) metoclorpramida
	( ) outra: _____			
12.O/a Sr(a) apresenta algumas dessas enfermidades:	( ) pneumopatia	( ) cardiopatia	( ) diabetes	( ) hepatopatia
	( ) neuropatia	( ) anemia falciforme	( ) síndrome genética	( ) nenhuma
	( ) outra:			

AVALIAÇÃO DA HIGIENE BUCAL

13. Como o/a Sr(a) classifica a sua saúde bucal?	( ) Excelente	( ) Boa	( ) Razoável	( ) Ruim	( ) Péssima
14. Última visita ao cirurgião-dentista?	( ) Nunca foi ao CD	( ) Menos de 1ano	( ) entre 1 e 2 anos	( ) entre 2 e 3 anos	( ) há mais de 3 anos
Perguntas referentes aos últimos 6 meses:					
15. Frequência de visita(s) ao dentista:	( ) Não frequentou		( ) Sim Quantas vezes?_____		
16. Motivo da última visita ao dentista:	( ) Ainda não visitou	Motivo:_____			
17. Frequência diária de escovação:	( ) Não escova	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
18. Intervalo de troca da escova:	( ) a cada mês	( ) a cada 3 meses	( ) a cada ano	( ) Outro: _____	( ) Não lembra
19. Orientação da escovação:	( ) Não recebeu	( ) Médico	( ) Dentista	( ) Outro: _____	
20. Frequência diária de utilização do fio dental:	( ) Não usa	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
21. Frequência diária de utilização de enxaguatório bucal:	( ) Não usa	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
22. O/a Sr(a) tem tido dificuldade em escovar os dentes posteriores por causa da sua bochecha?				( ) Não	( ) Sim
23. O/a Sr(a) usa aparelho ortodôntico?				( ) Não	( ) Sim ( ) Móvel ( ) Fixo
24.O creme dental que o/a Sr(a) usa foi indicado pelo seu dentista?				( ) Não	( ) Sim
25. A escova dental que o/a Sr(a) usa foi indicada pelo seu dentista?				( ) Não	( ) Sim
26. A TV/mídia tem influenciado na escolha do creme dental que o/a Sr(a) usa?				( ) Não	( ) Sim
27. O/a Sr(a) sabe o nome do creme dental que o/a Sr(a) está usando?				( ) Não	( ) Sim Qual:_____
28. O creme dental que o/a Sr(a) usa é fluoretado?				( ) Não	( ) Sim / ( ) Não sabe
29. O/a Sr(a) regularmente usa creme dental para sensibilidade?				( ) Não	( ) Sim Qual:_____
30. O/a Sr(a) regularmente usa creme dental para clarear os dentes?				( ) Não	( ) Sim Qual:_____
31. **Em algum período da sua vida**, o seu peso já causou algum constrangimento no consultório odontológico?				( ) Não	( ) Sim Qual:_____

HISTÓRIA ODONTOLÓGICA

Em algum momento da sua vida:					
32. A estética dos seus dentes interferiu/ interfere no seu convívio social?	( ) Não sei	( ) Não afeta	( ) Afeta pouco	( ) Afeta regularmente	( ) Afeta muito
		Quando?_____			
33. O/a Sr(a) perdeu algum dente?	( ) Não	( ) Sim Quantos?_____ Motivo:_____			
34. Seus dentes apresentaram/ apresentam mobilidade?	( ) Não	( ) Sim Quantos?_____			
	( ) Não lembra	Quando?_____			
35. O/a Sr(a) usa prótese dentária?	( ) Não	( ) Sim ( ) Móvel ( ) Fixa			
36. Se o/a Sr(a) respondeu SIM à pergunta anterior, **nos últimos 6 meses**, ela interferiu na sua alimentação?	( ) Não se aplica	( ) Não	( ) Sim		
37. O/a Sr(a) fez implante dentário?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
38. O/a Sr(a) fez clareamento dentário?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
39. A sua gengiva apresentou/ apresenta sangramento?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
40. Se o/a Sr(a) respondeu SIM à pergunta anterior, em quais momentos?	( ) Quando usava fio dental ( ) Quando comia alguns alimentos ( ) Outros:_____	( ) Espontaneamente/ sem causa ( ) Quando escovava os dentes			
41. **Nos últimos 6 meses**, durante as refeições, o/a Sr(a) sentiu dor e/ou percebeu sangramento?	( ) Nunca	( ) Raramente	( ) Às vezes	( ) Freqüentemente	( ) Sempre
42. O/a Sr(a) teve/ tem sensibilidade nos dentes?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
43. O/a Sr(a) já teve algumas dessas lesões na boca: ( ) Áreas vermelhas ( ) Aftas ( ) Herpes ( ) Outros:_____ ( ) Áreas brancas ( ) Câncer ( ) Nódulos					
44. O/a Sr(a) observou que a sua língua tem/ teve uma aparência lisa e avermelhada?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
45. O/a Sr(a) sentiu/ sente descamação, vermelhidão, fissuras e desconforto nos cantos da boca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
46. O/a Sr(a) sentiu/ sente ardência/queimação na boca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
47. O/a Sr(a) sentiu/ sente que tem mau hálito?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
48. O/a Sr(a) sentiu/ sente a sua boca seca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
49. O/a Sr(a) sentiu/ sente dificuldade para engolir os alimentos?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
50. O/a Sr(a) rangeu/ range os dentes (Bruxismo)?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
51. Quando o/a Sr(a) estava/ está nervoso(a), o/a Sr(a) apertava/ aperta os dentes com força?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			

52. Ao acordar, o/a Sr(a) sentiu/ sente dores na região dos maxilares?	( ) Não	( ) Sim
	( ) Não lembra	Quando?_____

Perguntas referentes aos últimos 6 meses:					
53. Como o/a Sr(a) classifica o seu consumo de açúcar:	( ) Não consome	( ) Pequeno	( ) Moderado	( ) Alto	( ) Muito alto
54. O/a Sr(a) adoçou as bebidas/ alimentos que consumiu com maior freqüência com o açúcar comum (sacarose) ou adoçante?			( ) Açúcar comum (sacarose)		( ) Adoçante
55. Qual a consistência de alimentos o/a Sr(a) preferiu?	( ) Líquidos	( ) Pastosos	( ) Sólidos		( ) Fibrosos
56. O/a Sr(a) considera que necessita de tratamento odontológico?			( ) Não		( ) Sim

AVALIAÇÃO SOBRE RISCO DE EROSÃO DENTÁRIA

Perguntas referentes aos últimos 6 meses:					
57. Frequência diária de lanches:	( ) Não realiza	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) mais de 3x/dia
58. O/a Sr(a) ingeriu alimentos ácidos frequentemente?				( ) Não	( ) Sim
59. O/a Sr(a) ingeriu bebidas ácidas frequentemente (suco de frutas e refrigerantes)?				( ) Não	( ) Sim
60. O/a Sr(a) ingeriu bebidas ácidas frequentemente **com canudo** (suco de frutas e refrigerantes)?					
61. O/a Sr(a) ingeriu bebidas esportivas frequentemente (ex.: Gatorade)?				( ) Não	( ) Sim
62. Com que frequência o/a Sr(a) consumiu frutas ácidas?	( ) Diariamente	( ) Semanalmente	( ) Mensalmente	( ) Eventualmente	( ) Nunca
63. O/a Sr(a) escovou os seus dentes imediatamente após se alimentar?				( ) Não	( ) Sim
64. O/a Sr(a) utilizou escova dental de cerdas duras?				( ) Não	( ) Sim
65. O/a Sr(a) escovou os dentes por um período muito longo?				( ) Não	( ) Sim
66.Os seus dentes apresentaram uma aparência semelhante a vidro ou são transparentes, amarelados, arredondados, lisos ou brilhantes com pequenas trincas?				( ) Não	( ) Sim

Adaptado de Campos EJ. Avaliação estomatológica em pacientes pediátricos transplantados hepáticos acompanhados no serviço de gastroenterologia pediátrica do Complexo HUPES-CPPHO da Universidade Federal da Bahia. 2013. 101f. Tese (Doutorado) – Faculdade de Medicina, Universidade Federal da Bahia, Salvador, 2013.

ANEXO E – Questionário do período pós-operatório

Universidade Federal da Bahia
Projeto: Obesidade e saúde bucal de pacientes adultos

QUESTIONÁRIO
PÓS-OPERATÓRIO: ( ) 6M ( ) 12 M
IDENTIFICAÇÃO

Prontuário/NTCO:_____					N° paciente:_____
Nome: _____					
Endereço: _____					
Bairro: _____ Cidade: _____ Estado: _____ CEP: _____					
Tel.: _____ Cel.: _____ Naturalidade: _____					
Nacionalidade: _____ Sexo: ( ) M ( ) F Data: _____/_____/_____					
Estado Civil: _____ Data de nascimento: _____/_____/_____ Idade: _____ anos _____ meses					
Escolaridade: _____ Profissão: _____					
Cor/ Raça:	( ) Branca	( ) Preta	( ) Amarela	( ) Parda	( ) Indígena
Renda Mensal:	Número de salários mínimos: _____				

HISTÓRIA MÉDICA

1. Há quanto tempo o/a Sr(a) fez a cirurgia bariátrica:_____ 1.1 Data da cirurgia bariátrica: ____/____/_____ 1.2 Idade ao realizar a cirurgia: _____anos_____meses	2. Por qual motivo o/a Sr(a) realizou a cirurgia bariátrica? (pode ser escolhida mais de uma resposta) ( ) Estética ( ) Saúde ( ) Dificuldade em realizar as atividades diárias ( ) Familiares ( ) Por sofrer preconceito ( ) Dificuldade com o convívio social ( ) Dificuldade no relacionamento ( ) Outros:_____

3. Tem alergia?	( ) Alimento: Qual?_____	( ) Medicamento: Qual?_____	( ) Não sabe

Perguntas referentes aos últimos 6 meses:

4. O/a Sr(a) teve refluxo gastro-esofágico (RGE)?	( ) Não	( ) Não sabe	( ) Sim Há quanto tempo você sente os sintomas?_____

5. **Nos últimos 6 meses**, o/a Sr(a) fez algum exame para o diagnóstico do refluxo?	( ) Não	( ) Sim

6. Quais os exames de investigação diagnóstica para o refluxo o/a Sr(a) fez nesse período?	( ) nenhum exame	( ) ultra-sonografia para estudo de RGE
	( ) EREED	( ) endoscopia digestiva alta
	( ) pHmetria	

7. O/a Sr(a) apresentou episódios de vômitos frequentemente?	( ) Não	( ) Sim

8. Se o/a Sr(a) respondeu SIM à pergunta n.7, qual era a frequência dos episódios de vômitos?
( ) Nunca ( ) Ocasionalmente
( ) Diariamente _____vezes/dia ( ) Raramente
( ) Semanalmente _____vezes/semana

9. Se o/a Sr(a) respondeu SIM à pergunta n.7, os vômitos eram induzidos ou involuntários?	( ) Não se aplica	( ) Induzidos	( ) Involuntários

10. Se o/a Sr(a) respondeu SIM à pergunta n.7, quais os sinais/sintomas apresentados?	( ) regurgitações pós-alimentares	( ) vômitos persistentes	( ) vômitos não persistentes	( ) náuseas
	( ) anorexia	( ) sialorréia	( ) distensão abdominal	( ) apnéia
	( ) engasgos	( ) tosse	( ) soluços	( ) dispnéia
	( ) hematêmese	( ) melena	( ) cianose	( ) azia
	( ) perda de peso		( ) dor no estômago	( ) nenhum

11. Se o/a Sr(a) respondeu SIM à pergunta n.7, quais as medicações ou medidas anti-refluxo o/a Sr(a) fez:	( ) nenhum tratamento		( ) fracionamento da dieta	
	( ) elevação da cabeceira		( ) espessamento da dieta	
	( ) antiácidos		( ) outra:_____	
	( ) pró-cinéticos	( ) domperidona	( ) bromoprida	( ) metoclorpramida
	( ) outra: _____			
12.O/a Sr(a) apresenta algumas dessas enfermidades:	( ) pneumopatia	( ) cardiopatia	( ) diabetes	( ) hepatopatia
	( ) neuropatia	( ) anemia falciforme	( ) síndrome genética	( ) nenhuma
	( ) outra:			

AVALIAÇÃO DA HIGIENE BUCAL

13. Como o/a Sr(a) classifica a sua saúde bucal?	( ) Excelente	( ) Boa	( ) Razoável	( ) Ruim	( ) Péssima
14. Última visita ao cirurgião-dentista?	( ) Nunca foi ao CD	( ) Menos de 1ano	( ) entre 1 e 2 anos	( ) entre 2 e 3 anos	( ) há mais de 3 anos
Perguntas referentes aos últimos 6 meses:					
15. Frequência de visita(s) ao dentista:	( ) Não frequentou		( ) Sim Quantas vezes?_____		
16. Motivo da última visita ao dentista:	( ) Ainda não visitou	Motivo:_____			
17. Frequência diária de escovação:	( ) Não escova	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
18. Intervalo de troca da escova:	( ) a cada mês	( ) a cada 3 meses	( ) a cada ano	( ) Outro: _____	( ) Não lembra
19. Orientação da escovação:	( ) Não recebeu	( ) Médico	( ) Dentista	( ) Outro: _____	
20. Frequência diária de utilização do fio dental:	( ) Não usa	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
21. Frequência diária de utilização de enxaguatório bucal:	( ) Não usa	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) Mais de 3x/dia
22. O/a Sr(a) tem tido dificuldade em escovar os dentes posteriores por causa da sua bochecha?				( ) Não	( ) Sim
23. O/a Sr(a) usa aparelho ortodôntico?				( ) Não	( ) Sim ( ) Móvel ( ) Fixo
24.O creme dental que o/a Sr(a) usa foi indicado pelo seu dentista?				( ) Não	( ) Sim
25. A escova dental que o/a Sr(a) usa foi indicada pelo seu dentista?				( ) Não	( ) Sim
26. A TV/mídia tem influenciado na escolha do creme dental que o/a Sr(a) usa?				( ) Não	( ) Sim
27. O/a Sr(a) sabe o nome do creme dental que o/a Sr(a) está usando?				( ) Não	( ) Sim Qual:_____
28. O creme dental que o/a Sr(a) usa é fluoretado?				( ) Não	( ) Sim ( ) Não sabe
29. O/a Sr(a) regularmente usa creme dental para sensibilidade?				( ) Não	( ) Sim Qual:_____
30. O/a Sr(a) regularmente usa creme dental para clarear os dentes?				( ) Não	( ) Sim Qual:_____
31. O seu peso causou algum constrangimento no consultório odontológico?				( ) Não	( ) Sim Qual:_____

HISTÓRIA ODONTOLÓGICA

Perguntas referentes aos últimos 6 meses:					
32. A estética dos seus dentes interferiu no seu convívio social?	( ) Não sei	( ) Não afeta	( ) Afeta pouco	( ) Afeta regularmente	( ) Afeta muito
		Quando?_____			
33. O/a Sr(a) perdeu algum dente?	( ) Não	( ) Sim Quantos?_____ Motivo:_____			
34. Seus dentes apresentaram mobilidade?	( ) Não	( ) Sim Quantos?_____			
	( ) Não lembra	Quando?_____			
35. O/a Sr(a) usa prótese dentária?	( ) Não	( ) Sim ( ) Móvel ( ) Fixa			
36. Se o/a Sr(a). respondeu SIM à pergunta anterior , **nos últimos 6 meses**, ela interferiu na sua alimentação?	( ) Não se aplica	( ) Não	( ) Sim		
37. O/a Sr(a) fez implante dentário?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
38. O/a Sr(a) fez clareamento dentário?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
39. A sua gengiva apresentou sangramento?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
40. Se o/a Sr(a) respondeu SIM à pergunta anterior , em quais momentos?	( ) Quando usava fio dental ( ) Espontaneamente/ sem causa ( ) Quando comia alguns alimentos ( ) Quando escovava os dentes ( ) Outros:_____				
41. Durante as refeições, o/a Sr(a) sentiu dor e/ou percebeu sangramento?	( ) Nunca	( ) Raramente	( ) Às vezes	( ) Freqüentemente	( ) Sempre
42. O/a Sr(a) teve sensibilidade nos dentes?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
43. O/a Sr(a) teve algumas dessas lesões na boca: ( ) Áreas vermelhas ( ) Aftas ( ) Herpes ( ) Outros:_____ ( ) Áreas brancas ( ) Câncer ( ) Nódulos					
44. O/a Sr(a) observou que a sua língua tinha uma aparência lisa e avermelhada?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
45. O/a Sr(a) sentiu descamação, vermelhidão, fissuras e desconforto nos cantos da boca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
46. O/a Sr(a) sentiu ardência/queimação na boca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
47. O/a Sr(a) sentiu que tem mau hálito?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
48. O/a Sr(a) sentiu a sua boca seca?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
49. O/a Sr(a) sentiu dificuldade para engolir os alimentos?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
50. O/a Sr(a) rangeu os dentes (Bruxismo)?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			
51. Quando o/a Sr(a) estava nervoso(a), o/a Sr(a) apertava os dentes com força?	( ) Não	( ) Sim			
	( ) Não lembra	Quando?_____			

52. Ao acordar, o/a Sr(a) sentiu dores na região dos maxilares?	( ) Não ( ) Não lembra		( ) Sim Quando?_____		
53. Como o/a Sr(a) classifica o seu consumo de açúcar:	( ) Não consome	( ) Pequeno	( ) Moderado	( ) Alto	( ) Muito alto
54. O/a Sr(a) adoçou as bebidas/ alimentos que consumiu com maior freqüência com o açúcar comum (sacarose) ou adoçante?			( ) Açúcar comum (sacarose)		( ) Adoçante
55. Qual a consistência de alimentos o/a Sr(a) preferiu?	( ) Líquidos	( ) Pastosos	( ) Sólidos		( ) Fibrosos
56. O/a Sr(a) considera que necessita de tratamento odontológico?			( ) Não		( ) Sim

AVALIAÇÃO SOBRE RISCO DE EROSÃO DENTÁRIA

Perguntas referentes aos últimos 6 meses:					
57. Frequência diária de lanches:	( ) Não realiza	( ) 1x/dia	( ) 2x/dia	( ) 3x/dia	( ) mais de 3x/dia
58. O/a Sr(a) ingeriu alimentos ácidos frequentemente?				( ) Não	( ) Sim
59. O/a Sr(a) ingeriu bebidas ácidas frequentemente (suco de frutas e refrigerantes)?				( ) Não	( ) Sim
60. O/a Sr(a) ingeriu bebidas ácidas frequentemente com **canudo** (suco de frutas e refrigerantes)?					
61. O/a Sr(a) ingeriu bebidas esportivas frequentemente (ex.: Gatorade)?				( ) Não	( ) Sim
62. Com que frequência o/a Sr(a) consumiu frutas ácidas?	( ) Diariamente	( ) Semanalmente	( ) Mensalmente	( ) Eventualmente	( ) Nunca
63. O/a Sr(a) escovou os seus dentes imediatamente após se alimentar?				( ) Não	( ) Sim
64. O/a Sr(a) utilizou escova dental de cerdas duras?				( ) Não	( ) Sim
65. O/a Sr(a) escovou os dentes por um período muito longo?				( ) Não	( ) Sim
66.Os seus dentes apresentaram uma aparência semelhante a vidro ou são transparentes, amarelados, arredondados, lisos ou brilhantes com pequenas trincas?				( ) Não	( ) Sim

Adaptado de Campos EJ. Avaliação estomatológica em pacientes pediátricos transplantados hepáticos acompanhados no serviço de gastroenterologia pediátrica do Complexo HUPES-CPPHO da Universidade Federal da Bahia. 2013. 101f. Tese (Doutorado) – Faculdade de Medicina, Universidade Federal da Bahia, Salvador, 2013.

ANEXO F – Resumos Publicados em Anais de Congressos

Evento: XXI World Congress of International Federation for the Surgery of Obesity & Metabolic Disorders.

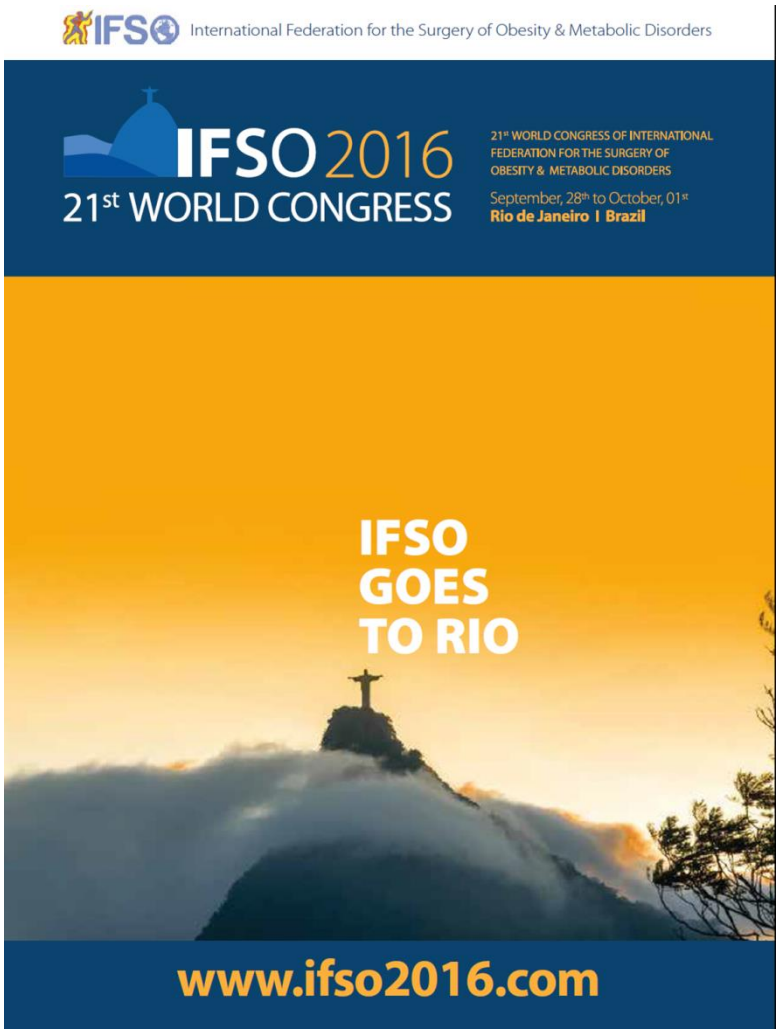
Local: Rio de Janeiro, Brasil.

Data: 01/10/2016

Periódico que publicou o resumo: Obesity Surgery. **Fator de Impacto:** 3,947.

Citação:

Bastos, IHA; Campos, EJ; Martins, GB; Daltro, CS; Alves, ES; Daltro, C. Risk factors for dental caries and dental erosion of obese subjects. In: 21st World Congress of International Federation for the Surgery of Obesity & Metabolic Disorders, 2016, Rio de Janeiro. Obesity Surgery. New York: Springer Link, August 2016. v. 26 (Suppl1). p. 1-691.



complications from persistent vomiting to increased oral intake capacity and recovery of lost weight. Revisional surgery, taking down the sylastic constriction ring and gastric pouch re-sizing may be necessary in these cases, to prevent from vomiting and weight regain.
In this video, a ring removal surgery, along with lateral resection of the gastrich pouch is performed.

Keywords: ring removal; gastric by-pass; revisional surgery

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RISK FACTORS FOR DENTAL CARIES AND DENTAL EROSION OF OBESE SUBJECTS

Author Bastos, IHA 1;
Co-Author(s) Campos, EJ 1; Martins, GB 1; Daltro, CS 1; Alves, ES 1; Daltro, C 1;

1 - UFBA;

Introduction: obesity has been reported to have an impact on health status generally, including some aspects of oral health. Objective: the aim of this study was to describe risk factors for dental caries and dental erosion of an obese patients group referred for bariatric surgery. Methods: all patients referred for bariatric surgery in a private center for treatment of obesity in Salvador, Bahia, Brazil, were invited to participate. The subjects answered a questionnaire based on personal data, dietary habits, and oral health behavior. Results: a total of 176 participants were included in this study, 81.3% (n=143) were female, the average age was 37.18 (±10.05), and the body mass index mean was 40.79 (±4.73). Eighty-seven subjects (49.5%) evaluated their oral health negatively and 77.3% (n=136) reported needing dental treatment. Sixty-eight patients (38.6%) reported gastroesophageal reflux disease. In addition, 76.7% (n=135) of participants often consume acid food and 92% (n=162) acid beverages, resulting in risk of dental erosion. The majority of participants consume sucrose, 38% (n= 67) classified their consumption as high or very high, and 42% (n=74) moderate, moreover, 58.5% (n=103) prefer to sweeten beverages and food with sucrose, demonstrating caries risk. Half of patients have a snack two or more times per day, consequently it increases the frequency of exposure to risk factors for caries. Conclusion: risk factors were identified for oral disease in this population. Although more studies need to be conducted to investigate the relationship between obesity and oral disease.

Keywords: Obesity; Oral Health; Risk Factors

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RISK FACTORS FOR THE DEVELOPMENT OF INCISIONAL HERNIAS AFTER BARIATRIC SURGERY: PRELIMINARY STUDY

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1 - Hospital Santa Rita - Contagem / MG; 2 - Escola de Enfermagem da Universidade Federal de Minas Gerais; 3 - Unifenas - Belo Horizonte / MG; 4 - Universidade Federal de Minas Gerais; 5 - Universidade Federal de Juiz de Fora;

Introduction: One of the late complications of bariatric surgery is the weakening of the abdominal wall or scars;

Evento: XXII World Congress of International Federation for the Surgery of Obesity & Metabolic Disorders.

Local: Londres, Inglaterra.

Data: 31/08/2017

Periódico que publicou o resumo: Obesity Surgery. **Fator de Impacto:** 3,947.

Citação:

Bastos, IHA; Rios, AP; Martins, GB; Campos, EJ; Daltro, C. Risk factors for dental caries and dental erosion in subjects who underwent bariatric surgery. In: 22st World Congress of International Federation for the Surgery of Obesity & Metabolic Disorders, 2017, London. Obesity Surgery. New York: Springer Link, July 2017. v. 27 (Suppl1). p. 1-1253.

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RISK FACTORS FOR DENTAL CARIES AND DENTAL EROSION IN SUBJECTS WHO UNDERWENT BARIATRIC SURGERY

Integrated Health/Multidisciplinary care

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Introduction

There are few studies evaluating oral health in individuals undergoing bariatric surgery, so many questions about this subject remain unanswered.

Objectives

This study aimed to describe risk factors for dental caries and dental erosion in subjects who underwent bariatric surgery.

Methods

Individuals with 6-7 months of post-operative of bariatric surgery were invited to participate in a private center for treatment of obesity in Salvador, Bahia, Brazil. A questionnaire was applied in the form of an interview investigating about clinical and demographics data, dietary habits and oral health behavior. Continuous variables were described by mean and standard deviation and categorical by percentage.

Results

Eighty one patients were evaluated, 65 (80.2%) were female. The average (SD) of age and body mass index were 37.5 (9.2) years and 30.2 (4.6) kg/m^2 respectively. Fifty-one subjects (63.0%) considered excellent/good their oral health and 48 (59.3%) reported needing dental treatment. Nineteen patients (23.5%) reported that they vomited frequently after bariatric surgery, 51 (63.0%) often consume acid food and 61 (75.3%) acid beverages, which reveal risk of dental erosion. Moreover, 40 (49.4%) reported xerostomia and 69 (85.1%) snack frequency $\geq$2x/day, which may boost the erosion process. Conversely, 66 (81.5%) of participants reported to consume little or no sucrose and 66 (81.5%) prefer to sweeten beverages and food with sweetener or not sweeten, factors which may decrease the caries risk.

Conclusion

Changes in lifestyle after bariatric surgery may represent risks on oral health and should be investigated by health professionals who take care of these patients.