Association between bariatric surgery and tooth decay: a literature review.

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Corresponding Author:
Dr. Mariana Aiolfi,
Trainee teacher, General Pathology - Medicine School - UniFOA - University of Volta Redonda - Brazil

Submitting Author:
Prof. Sergio E Cury,
DDS PhD, Oral Pathology - UniFOA - University of Volta Redonda, 27.310-060 - Brazil

Other Authors:
Dr. Walter Manuel Nobrega Júnior,
Trainee teacher, General Pathology - Medicine School - UniFOA - University of Volta Redonda - Brazil
Prof. Marcelo Cavaliere,
Professor, Biological Sciences - Medicine School - UniFOA - Brazil
Prof. Albino Torres,
MDS PhD, Pediatrics - Medicine School - UniFOA - University of Volta Redonda - Brazil
Prof. Loreley Luderer,
MDS PhD, General Pathology - Medicine School - UniFOA - Brazil

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Association between bariatric surgery and tooth decay: a literature review.

Author(s): Aiolfi M, Nobrega Júnior W, Cavaliere M, Torres A, Luderer L, Cury SE

Abstract

The obesity and overweight affects together, an estimated one-sixth of the world population. At first, the treatment is behavioral and clinical, however, these treatments become difficult due to low patient compliance across the long time needed to obtain more meaningful results. Bariatric surgery then emerged as a plausible and successful option for optimizing weight loss in severely obese patients whose initial treatment has failed and that meet the indication criteria. However, some types of this group of operations entail, in the long term changes in the body.

OBJECTIVE: The aim of this study is to conduct a literature review in order to know the association between bariatric surgery and tooth decay.

CONCLUSION: It is possible that the patient undergoing bariatric surgery, has increased their risk of developing dental caries and subsequent carious lesions, mainly due to changes occurring in oral physiology, associated with behavioral changes imposed by the treatment, requiring however, larger studies so that such risk is justified.

Introduction

Obesity and overweight affect together an estimated one sixth of the world population. The overweight degree is evaluated, in general, through the Body Mass Index (BMI) which is calculated by dividing weight in kg by height squared in meters (AVIDOR et al., 2007).

The high BMI is directly proportional to the increased risk of comorbidity and mortality, and death from this disease with the second largest contingent among the preventable, second only to smoking (BORDALO et al., 2010).

In the last two decades, there was a striking increase in the prevalence of obesity worldwide. In the United States it is estimated that 5.9% of the population are carriers of severe obesity. Treatment at first is clinical and behavioral, with the adoption of diets promote nutritional education, physical exercise or by pharmacologic therapy (Orlistat, Sibutramine, etc.) (Sabiston, et al., 2003). However, these treatments become difficult due to poor patient compliance opposite the long time required to obtain more meaningful results. Bariatric surgery then emerged as a plausible and successful option for optimizing weight loss in severely obese patients whose initial treatment has failed and that meet the indication criteria. However, some types of this group of operations entail, in the long term, in the deficiency of certain vitamins and ions, such as vitamins B complex, vitamin D, fluoride and phosphate and the onset of clinical conditions of these characteristics deficits, such as pernicious anemia, hypocalcemia, and osteoporosis (GOLDMAN; CECIL, 2014).

The aim of this study is to conduct a literature review in order to know the association between bariatric surgery and tooth decay.

To perform the literature review, articles were consulted in Portuguese and English, contained in Scielo databases, PubMed and Google Scholar.

Literature Review

There are several surgical techniques to perform bariatric surgeries that are divided into restrictive and mixed. The restrictive surgeries are those where the modified single organ is the stomach, which aim to result in a reduction of space for food within the gastric cavity, thus with a small amount of food the patient will have the feeling of satiety (SILVESTRE et al. 2012).

The most common restrictive bariatric surgeries are: vertical banded gastroplasty, gastric banding adjustable video and intragastric balloon.

Vertical banded gastroplasty is a restrictive operation technique, simple, fast, with low rates of complications and mortality, consists of making a suture in the region of the cardia via laparoscopy, creating a small gastric reservoir with a capacity of approximately 20 ml whose flow is regulated by a polypropylene ring. The ring is placed in the outlet orifice, making the slower emptying of this small chamber. It occurs therefore mechanical restriction to food intake and delay in gastric emptying, causing a feeling of satiety with small food intake (MILIONE et al., 2005).

Adjustable Gastric Banding is the introduction of a
The placement of the intragastric balloon is an endoscopic procedure, and is recognized as restrictive use therapeutic method, used as an aid in preoperative preparation to other bariatric procedures. It is a closed silicone prosthesis that is placed in the stomach endoscopically, with the patient under deep sedation. The prosthesis becomes spherical after filling with physiological saline and methylene blue. It is filled to a capacity determined by the physician gastroenterologist (from 450 to 700 ml) according to the anatomy of the patient and by the endoscopic evaluation of the dimensions and capacity of the gastric lumen. The maximum residence time in the stomach balloon is six months and the estimated weight loss of 13 to 20 kg, with down of 5 to 9 kg / m² BMI (GALLORO et al., 1999).

Already the joint surgery, in addition to the stomach, the intestines of the patient is also changed and besides the restrictive factor that triggers the sensation of satiety with a small amount of food, there is also a malabsorptive factor, which is achieved by decreasing the absorption site of nutrients in the small intestine. The best-known mixed techniques are: biliopancreatic diversion with distal gastrectomy (Scopinaro surgery) and gastrojejunual shunt Y-de-Roux4,10 (Fobi-Capella Surgery) (SILVESTRE et al, 2012.).

The biliopancreatic derivation with distal gastrectomy consists in reducing gastric capacity, eliminating the pyloric control of gastric emptying and malabsorption provided by the bypass most of the small intestine, where they are taken about two and a half meters intestine (which on average presents seven meters). Therefore, the enzymes that allow the absorption of nutrients are replaced restricted action. The removal of the distal stomach reduces the risk of gastric ulcer. The patient spends in need of control in the intake of protein and calcium in order to prevent bone diseases, as well as the intake of fat, which worsen the odor of their gas and feces (AVIDOR, et al., 2007).

The gastrojejunual shunt Y-de-Roux4,10 (Fobi-Capella Surgery) is the most commonly performed bariatric surgery in the world. It consists in reducing gastric capacity to a volume of approximately 20 ml. The remaining stomach, and the duodenum and the early jejunum 50 cm, are permanently deleted from the alimentary tract. The small gastric pouch is then anastomosed to an isolated jejunal loop in Y (hence the name, and the surgeon Roux creator of the technique) and their limited emptying by a silicone ring placed 5.5 cm distal to the esophagogastric junction and 1 5 cm proximal to gastrojejunal anastomosis, reducing the diameter of the gastric lumen to 12 mm. The secretions from the stomach and duodenum with exclusion of flow into the jejunum anastomosis by a 100 cm to 159 cm below the reservoir distance will depend on the patient’s BMI. With this technique occurs early stimulation of the satiety center and the improvement of the metabolic syndrome cycle. The effectiveness of the technique is 75% decrease of the initial body weight excess (CAPELLA et al, 1991: ZEVE et al., 2012).

Finally, the bariatric Consensus understood that other surgical procedures and techniques for the control of obesity related not the same, show no current indication for use, or are under study. Such techniques lack solid scientific documentation to enable their achievement outside of research protocols properly regulated by the National Council of Ethics in Research (CONEP) in accordance with Resolution 196 of 1996 of the National Board of Health or another that replaces it or complement it (SBCBM, 2008).

Despite the efficiency of bariatric surgery in the category weight loss, a series of consequences can be observed in the health of the patient postoperatively, among them we can highlight the deficiency of iron micronutrients, calcium, folic acid (vitamin B12) and other vitamins due the restriction of food intake and / or reduction of the areas of absorption of nutrients (BORDALO et al., 2011).

Lack of iron in the postoperative period is more common after -disabsortivos restrictive procedures, especially in women. The absorption of iron is impaired due to decreased production or availability of gastric acid and surgical bypass the duodenum and proximal jejunum - the primary sites of iron absorption (SANCHES et al., 2007).

The supplement of calcium and vitamin D has been recommended for the majority of weight loss therapies aimed at preventing bone resorption since its deficiency manifests clinically as osteomalacia, secondary hyperparathyroidism and osteoporosis. Vitamin D is necessary to ensure a good skeletal function, enhance immunity, prevent cancer and maintain cardiovascular health. A deficiency of vitamin D and calcium if left untreated result in symptoms such as broken teeth, back pain, seizures and osteoporosis (BORDALO et al, 2010; BORDALO et al., 2011).
After bariatric surgery deficiency of fat-soluble vitamins (A, D, E, K) manifest slowly. The first symptom of vitamin A deficiency is night blindness, followed by keratinization of epithelial tissues of the eyes (xerophthalmia), lungs, gastrointestinal tract and reduced mucous secretion; there is increased susceptibility to infection. Deficiencies in vitamin K causes hemorrhagic syndrome, but they are rare because the intestinal flora produces appreciable quantities of Vitamin K2. The main function of vitamin E is to serve as an antioxidant (SOTTI; Fatel, 2011).

After bariatric surgery vitamin B12 deficiency has often been reported, which can lead to macrocytic anemia (low red blood cell production and decreased oxygen carrying ability) (ROCHA, 2012). Folic acid deficiency is directly linked to vitamin B12 deficiency and can manifest as macrocytic anemia, leukopenia, thrombocytopenia, glossitis or megaloblastic marrow. Often people with this deficiency have forgetfulness, irritability, hostility and even paranoid behavior (BORDALO et al., 2011).

Besides the shortage of nutrients, there are also metabolic, neurological and psychological consequences (SANCHES et al., 2007).

The beriberi (due to lack of vitamin B1) may have neurological manifestations (central or peripheral) and cardiovascular. The initial symptoms are fatigue, irritability, memory loss, chest pain, anorexia, abdominal discomfort and constipation. The wet beriberi occurs in thiamine deficiency prevalence of cardiovascular disease. Usually manifests in patients with high caloric intake and strenuous physical activity. Its main manifestations are cardiomegaly, cardiomyopathy, congestive heart failure, peripheral edema, tachycardia (ALVES et al, 2006; RAVELLI et al, 2007; BORDALO et al, 2010; BORDALO et al, 2011).

Dry beriberi is the peripheral neurological syndrome. It is more common in patients with caloric restriction and relative inactivity. It is characterized by sensory and motor abnormalities. Usually manifests as pain, numbness and loss of reflexes. Begins with tingling in the toes, burning feet, cramps in the calves and leg pain. The continued deficiency leads to loss of vibratory and positional sense of the fingers, atrophy of the calf and foot drop. The legs are more affected than the upper limbs (ALVES et al, 2006; RAVELLI et al., 2007).

In the central nervous system occurs Wernicke-Korsakoff syndrome. The Korsakoff’s psychosis is the alteration of recent memory, confabulation and reduced learning. The Wernicke encephalopathy is nystagmus triad progressing to ophthalmpoplegia, ataxia and confusion that, if left untreated, can progress to coma and death (ALVES et al., 2006; RAVELLI et al., 2007; BORDALO et al., 2010; BORDALO et al., 2011).

The lack of vitamin B12 can also lead to further haematological disorders (decreased hemoglobin and low platelet counts), neurological (progressive damage of the central and peripheral nervous system that are manifested with polyneuritis, memory deficits, cognitive dysfunction, dementia and depressive disorders) and cardiovascular (ROCHA, 2012; BORDALO et al., 2010).

Some bariatric surgery may produce adverse effects such as gastro-esophageal reflux, nausea, vomiting, malnutrition, anemia, dehydration, deficiencies of vitamins and minerals (calcium, iron, folic acid, vitamin B12 and D) among others (arasaki et al., 2005; Suter et al, 2006; SHIKORA; KIM; Tarnoff, 2007). In large part, this is due to dysfunctional eating habits, such as overeating, eating too fast or not chewing food properly (HAGUE; BAECHLE, 2008; MARSICANO et al., 2011).

Side effects of bariatric surgery may be reflected in the oral cavity and can cause changes in oral health (ARASAKI et al., 2005; MANDEL; DA SILVA, 2008), such as tooth decay, gum disease, dry mouth and dentin hypersensitivity (GREENWAY; GREENWAY, 2000; Marsicano et al., 2011).

According to Larsen (1990), bariatric surgery may affect oral health due to a decrease in pH caused by the high frequency of sugar intake as well as gastro-esophageal reflux disease (GERD). GERD is a chronic condition resulting from backflow of gastroduodenal contents (particularly hydrochloric acid present in the gastric juice) to the esophagus and / or adjacent bodies such as the mouth. The pH of gastric juice is about 1.2, and a potential risk for the demineralization of teeth, which have a critical pH around 5.5, to occur dental apatite dissolution.

Furthermore, patients have decreased production of saliva (MANDEL; DA SILVA, 2008), partially due to low absorption of nutrients in the gut, which in turn may facilitate mineral dissolution (HEILING et al. 2006, BARBOSA et al., 2009).

In addition, the oral health of bariatric patients still depends on a number of behavioral changes (HAGUE; BAECHLE, 2008). Thus, the fact of having to eat more often during the day means that there is need for special attention to hygiene to prevent dental problems such as tooth decay. In this situation the bacteria that cause mouth diseases are favorable conditions...
Dental caries is a disease considered to be the most common in childhood and can be avoided. People in general are susceptible to illness throughout his life (FEATHERSTONE, 2000; FEJERSKOV; KIDD, 2003; PITTS, 2004; QADRI et al., 2014). It is a multifactorial disease whose etiology is related to the presence of a board composed of cariogenic bacteria that can metabolize sugars such as sucrose. Mediated by the presence of mouth saliva that has among other features the ability to provide the dental enamel calcium and phosphorus, substances responsible for the equilibration process of mineral loss from teeth. As a result of this metabolism, organic acids are produced as lactic acid, which in turn can cause localized demineralization of tooth tissues (KIDD; FEJERSKOV, 2004; SELWITZ; ISMAIL; PITTS, 2007; TAKAHASHI; NYVAD, 2008).

In daily practice, refers generally to dental caries, as represented by a lesion or cavity in the tooth surface deteriorating, however, more accurately represents the sequel to an advanced process from a pre-established disease (THYLSTRUP; FEJERSKOV, 1994).

Cardozo et al. (2014) conducted a study on the impact of bariatric surgery on oral health. The authors studied 39 patients treated between the years 2009 and 2011 in Porto Alegre, Rio Grande do Sul, Brazil. They concluded that the oral health of patients improved after the procedure, not reporting any increase in the occurrence of caries.

**Discussion**

With the overwhelming increase in obesity worldwide and the difficulty of losing weight quickly only with diet and exercise, bariatric surgery has emerged as an option for those who could not or did not want to undergo will regimented academy and feeding caloric restriction (SABISTON et al., 2003). However, after surgery it is not that simple and, in the long run, can lead to deficiency of certain vitamins and ions such as B vitamins, fluoride, calcium and phosphate and consequently anemia and osteoporosis and hypocalcemia (GOLDMAN; CECIL, 2005).

According Arasaki (2005), bariatric surgery can cause reflections in the oral cavity, such a dental caries, periodontal disease, dry mouth and dentin hypersensitivity, impairing oral health. Bariatric surgery can also have harmful side effects such a oral health decreased pH caused by high frequency sugar intake and gastro-oesophageal reflux (Larsen, 1990). In addition, patients have decreased saliva production (MANDEL; DA SILVA, 2008). This decrease salivary promotes the reduction in supply of calcium and phosphorus to the tooth enamel (PITTS, 2007; TAKAHASHI; NYVAD, 2008), which can lead to the appearance of carious lesion.

Observing the changes of summation involving oral physiology in the literature, such as calcium and phosphorus deficiency, pH modification salivary and the reduction of its flow (LARSEN, 1990; PITTS, 2007; MANDEL; DA SILVA, 2008; TAKAHASHI; NYVAD, 2008), associated with greater attention to the hygiene of the oral cavity, resulting from behavioral changes imposed due mainly to the need of the times that increase the individual needs to eat during the day (HEILING et al., 2006; HAGUE; BEACHLE, 2008; MOORISH-GREC et al., 2012), leads us to believe in the existence of growth carious lesions in patients undergoing treatment. However, in counterpart, the study Cardoso et al., (2014) held in Brazil, did not report any increase in relation to the disease, resulting in the need for further studies on the subject.

**Conclusion**

After review of the proposed literature, we concluded that it is possible that the patient undergoing bariatric surgery, has increased their risk of developing dental caries and subsequent carious lesions, mainly due to changes occurring in oral physiology, associated with behavioral changes imposed the controller, requiring however, more studies so that such risk is justified.

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