

Review Article:

Oral Manifestations in Obesity and Bariatric Surgery: Narrative Review



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Please cite this article as Tonkaboni A, Pazouki A, Mokhber S, Shirani Gh. Oral Manifestations in Obesity and Bariatric Surgery: Narrative Review. 2021; 10(1):5-8. <http://dx.doi.org/10.32598/ABS.10.1.13>

 <http://dx.doi.org/10.32598/ABS.10.1.13>



Article info:

Received: 01 Jun 2021

Accepted: 20 Jun 2021

Publish: 30 Jun 2021

Keywords:

Bariatric surgery, Oral manifestations

ABSTRACT

Any physiologic or pathologic situation can affect oral and dental health. Obesity and bariatric surgery are associated with different signs and symptoms in the oral cavity. Soft tissue, hard tissue, oral flora, and saliva are changed in these patients, which some interventions are needed to control such changes. Our goal was to review oral manifestations in obese patients who underwent bariatric surgery to attract attention to oral care in these patients.

1. Introduction

Obesity is one of the global increasing noninfectious diseases, which can lead to many complicated metabolic diseases, like hypertension, cardiovascular diseases, and diabetes type 2 [1]. Obesity based on its chronicity and complex nature involves most parts of the body and even the oral cavity [2]. Oral cavity contains soft tissue, hard tissue, and saliva. Tooth caries, periodontitis, and hyposalivation are the most prevalent manifestations in obese patients [3]. It should be con-

sidered that patients may suffer from systemic diseases induced by obesity, as well [3]. Bite force, time of chewing, and frequency of eating are some ignored causes of oral manifestations. [4]. Eating habits, like binge eating disorder and some common medical problems in obese patients induce soft and hard oral tissue manifestations, such as teeth wear, periodontitis, dysgeusia, and periodontitis [5]. Quantitative and qualitative imbalance in the oral flora is introduced as dysbiosis, which can increase the pathogens causing caries or periodontitis in the oral cavity [6]. Bariatric surgery is the main method to control morbid obesity through decreasing food reser-

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voir and gastric emptying, which can induce some oral complications, like teeth caries, periodontitis, teeth wear, xerostomia, or sialorrhea [4, 5, 7-11].

2. Materials and Methods

Medline, Scopus, and SID databases were searched using the keywords, including “obesity”, “bariatric surgery”, “oral manifestations”, and “saliva”. After excluding duplicate papers, we found 68 papers eligible to investigate.

3. Results

We can categorize obesity and bariatric manifestations into four groups, which need oral examination protocols and scheduling follow-ups:

1. Systemic diseases affecting these patients;
2. Lifestyles and habits, leading to oral manifestations;
3. Chronic inflammation secondary to adipose tissue accumulation;
4. Malnutrition-induced manifestation in both obese and patients who underwent bariatric surgery.

4. Discussion

Improvement in inflammation pathways and decreasing insulin resistance are important factors to control most oral problems. There are some controversies about leading factors, some researchers showed that inflammation process food intake pattern can cause oral health problems [4]. Bariatric patients may suffer from deficiencies in the minerals and vitamins, like vitamin B12, A, E, and D, and zinc and calcium [4]. Some researchers showed changes in the taste and smell, which cause these deficiencies. Moreover, too much protein intake is another factor for malabsorption and even liver or kidney disorders [7]. Changes in food intake and macronutrients alter the muscular function and can affect occlusion and bite force [12, 13]. Osteoporosis is also another risk factor for oral hard tissue changes [4].

Saliva is a unique body fluid, which can moisturize, lubricate, and buffer the oral cavity. Nowadays, it is used as a diagnostic marker for physiologic and pathologic situations in our bodies. Some cytokines involved in metabolism can be detected in saliva and can be used as clinical markers. Leptin, cortisol, insulin, ghrelin, acid uric are some markers involved in metabolic and

pathologic changes found in saliva. Some researchers reported different values of the markers in serum, saliva, and gingival tissue. More investigations are needed to show the diversity of each marker [8]. Obesity can activate oxidative stress. Superoxide dismutase, catalase, peroxidases, uric acids, and polyphenols are important antioxidants in saliva. Besides obesity, physical activity can decrease salivary antioxidants. Decreased levels of salivary peroxidase and polyphenol were reported in bariatric patients. In general, reduced stimulated and unstimulated saliva was reported in obese patients and bariatric surgery can only recover the unstimulated saliva. [2, 9]. Gastroesophageal reflux can occur in both obese and bariatric patients; thus, they may experience teeth erosion, which is caused by oral cavity acidity [10-12].

There are several studies indicating a link between body weight changes and oral diseases and the oral flora is not an exception. An increase in the bacterial load in the oral cavity has been reported after bariatric surgery since some species like *porphyromonas gingivalis* has an abrupt increase 6 months after bariatric surgery, and some new species like non-*albicans candida* have emerged in the oral cavity. *Tannerella forsythia*, *Treponema denticola*, and *Prevotella intermedia* are other increased periodontal pathogens in bariatric patients. It should be taken into account that changing in oral flora due to bariatric surgery can occur abruptly six months or one year after bariatric surgery [13]. It is suggested to add dental and oral examinations before and after bariatric surgery through a regular plan based on all these reports [3-5, 11, 14-16].

5. Conclusion

Some specific oral manifestations, like periodontitis and tooth caries, have been reported in both obese patients and patients underwent bariatric surgery; however, a comprehensive insight is needed to design studies to investigate all factors causing oral health problems, like changes in oral flora, salivation, and soft and hard oral tissue changes.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

Funding

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

Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

References

- [1] Monkhouse SJW, Morgan JDT, Norton SA. Complications of bariatric surgery: Presentation and emergency management-a review. *The Annals of The Royal College of Surgeons of England*. 2009; 91(4):280-6. [DOI:10.1308/003588409X392072] [PMID] [PMCID]
- [2] Knaś M, Maciejczyk M, Sawicka K, Hady HR, Niczyporuk M, Ładny JR, et al. Impact of morbid obesity and bariatric surgery on antioxidant/oxidant balance of the unstimulated and stimulated human saliva. *Journal of Oral Pathology & Medicine*. 2016; 45(6):455-64. [DOI:10.1111/jop.12383] [PMID]
- [3] Malik Z. Special needs dental management of the class 3 obese patient. *Case Reports in Dentistry*. 2019; 2019:7976531. [DOI:10.1155/2019/7976531] [PMID] [PMCID]
- [4] da Silva Azevedo ML, Silva NR, da Costa Cunha Mafra CA, Alves Uchoa Lins RD, Dantas EM, de Vasconcelos Gurgel BC, et al. Oral health implications of bariatric surgery in morbidly obese patients: An integrative review. *Obesity Surgery*. 2020; 30(4):1574-9. [DOI:10.1007/s11695-019-04334-0] [PMID]
- [5] Karlsson L, Carlsson J, Jenneborg K, Kjaeldgaard M. Perceived oral health in patients after bariatric surgery using oral health-related quality of life measures. *Clinical and Experimental Dental Research*. 2018; 4(6):230-40. [DOI:10.1002/cre2.134] [PMID] [PMCID]
- [6] Thomas C, Minty M, Canceill T, Loubières P, Azalbert V, Tercé F, et al. Obesity drives an oral microbiota signature of female patients with periodontitis: A pilot study. *Diagnostics*. 2021; 11(5):745. [DOI:10.3390/diagnostics11050745] [PMID] [PMCID]
- [7] Tabesh MR, Maleklou F, Ejtehadi F, Alizadeh Z. Nutrition, physical activity, and prescription of supplements in pre-and post-bariatric surgery patients: A practical guideline. *Obesity Surgery*. 2019; 29(10):3385-400. [DOI:10.1007/s11695-019-04112-y] [PMID]
- [8] Choromańska K, Choromańska B, Dąbrowska E, Bączek W, Myśliwiec P, Dadan J, et al. Saliva of obese patients-is it different? *Postepy Higieny i Medycyny Doswiadczalnej*. 2015; 69:1190-5. [DOI:10.5604/17322693.1176778] [PMID]
- [9] Fejfer K, Buczek P, Niczyporuk M, Ładny JR, Hady HR, Knaś M, et al. Oxidative modification of biomolecules in the nonstimulated and stimulated saliva of patients with morbid obesity treated with bariatric surgery. *BioMed Research International*. 2017; 2017:4923769. [DOI:10.1155/2017/4923769] [PMID] [PMCID]
- [10] Aznar FD, Aznar FD, Lauris JR, Chaim EA, Cazzo E, de Carvalho Sales-Peres SH. Dental wear and tooth loss in morbid obese patients after bariatric surgery. *Brazilian Archives of Digestive Surgery*. 2019; 32(3):e1458. [DOI:10.1590/0102-672020190001e1458] [PMID] [PMCID]
- [11] Castilho AVSS, Foratori-Junior GA, de Carvalho Sales-Peres SH. Bariatric surgery impact on gastroesophageal reflux and dental wear: A systematic review. *Brazilian Archives of Digestive Surgery*. 2019; 32(4):e1466. [DOI:10.1590/0102-672020190001e1466] [PMID] [PMCID]
- [12] Marsicano JA, de Moura Grec PG, Belarmino LB, Ceneviva R, de Carvalho Sales Peres SH. Interfaces between bariatric surgery and oral health: A longitudinal survey. *Acta Cirúrgica Brasileira*. 2011; 26(Suppl 2):79-83. [DOI:10.1590/S0102-86502011000800015] [PMID]
- [13] Balogh B, Somodi S, Tanyi M, Miszti C, Márton I, Kelentey B. Follow-up study of microflora changes in crevicular gingival fluid in obese subjects after bariatric surgery. *Obesity Surgery*. 2020; 30(12):5157-61. [DOI:10.1007/s11695-020-05006-0] [PMID] [PMCID]
- [14] de Moura-Grec PG, Marsicano JA, Rodrigues LM, de Carvalho Sales-Peres SH. Alveolar bone loss and periodontal status in a bariatric patient: A brief review and case report. *European Journal of Gastroenterology & Hepatology*. 2012; 24(1):84-9. [DOI:10.1097/MEG.0b013e32834bebb3] [PMID]
- [15] de Moura-Grec PG, Yamashita JM, Marsicano JA, Ceneviva R, de Souza Leite CV, de Brito GB, et al. Impact of bariatric surgery on oral health conditions: 6-months cohort study. *International Dental Journal*. 2014; 64(3):144-9. [DOI:10.1111/idj.12090] [PMID]
- [16] do Socorro Coêlho Alves M, da Silva FACC, Araújo SG, de Carvalho ACA, Santos AM, de Carvalho ALA. Tooth wear in patients submitted to bariatric surgery. *Brazilian Dental Journal*. 2012; 23(2):160-6. [DOI:10.1590/S0103-64402012000200012] [PMID]

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