



REVIEW ARTICLE

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A review on the current dental treatment practices in adults and adolescents with obesity

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Abstract

Obesity is a disease characterized by abnormal fat increase and its prevalence is increasing globally. Excessive and malnutrition habits, insufficient physical activity, and numerous genetic, environmental, socio-cultural and psychological factors are effective in the etiology of obesity. Obesity is associated with various systemic diseases such as high blood pressure, coronary heart diseases, and respiratory diseases. Obesity may also cause oral diseases such as tooth cavity, loss of teeth, periodontitis, xerostomia, traumatic tooth injuries, bruxism, and dental erosion. Some risk factors related to diet are determinant in the correlation between obesity and oral diseases. With the increasing prevalence of obesity, dentists encounter individuals with obesity more often in clinics. Dental clinics should be designed suitable for the treatments of individuals with obesity in terms of accessibility, the comfort of waiting rooms, the ergonomic structure of units. Comorbid systemic diseases in individuals with obesity, and drugs used to require some specific approaches in conservative and surgical treatments. Dentists should perform dental treatments considering the effect of obesity on oral and dental health. This study aimed to examine dental treatment practices in adults and adolescents with obesity in line with the literature.

Keywords: Dental treatment, obesity, oral health.

Introduction

Obesity is a chronic condition induced by the imbalance between energy intake and consumption and affects developed and developing countries [1]. The prevalence of obesity is increasing in Turkey as well as in the world. More than 2.8 million people in the world lose their lives due to overweight and obese each year [2].

Body mass index (BMI), waist circumference, hip circumference, waist circumference-hip circumference ratio, and skinfold thickness methods are used in the diagnosis of obesity. BMI, which is most commonly used in the diagnosis of obesity as an easy and reliable method, is calculated by dividing the weight by the square of height [3]. Obesity classification based on BMI is given in Table 1.

Table 1. Obesity classification based on BMI [4]

Obesity classification	BMI (kg/m ²)
Underweight	<18.5 kg/m ²
Normal weight	18.5-24.9 kg/m ²
Overweight (preobese)	25.0-29.9 kg/m ²
Class 1 obese (high)	30.0-34.9 kg/m ²
Class 2 obese (very high)	35.0-39.9 kg/m ²
Class 3 obese (extremely high)	>40 kg/m ²

Excessive and malnutrition habits and insufficient physical activity are regarded as the most important reason for the development of obesity. Additionally, numerous genetic, environmental, psychological, sociocultural factors are effective in the etiology of obesity [5].

More than 140 gene domains related to obesity are determined in human genetic studies. These gene domains explain why obesity is observed in some individuals who live in the same environment, who has the same nutrition habits and physical activity insufficiencies while it is not observed in some others [6]. Antipsychotics, antidepressants, antihistamines, antidiabetics,

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antihypertensives, antiepileptics, and steroids among the drugs used by individuals also affect the development of obesity [7].

Obesity is a risk factor for chronic conditions such as type II diabetes, high blood pressure, cancer, osteoarthritis, cardiovascular diseases, respiratory system diseases [8]. Similar to adults with obesity, conditions such as high blood pressure, diabetes, asthma, and cardiovascular diseases can also occur in adolescents with obesity [9, 10]. Stigmatization of individuals with obesity with their weights may cause psychological problems such as losing self-respect, depression, lack of self-confidence, withdrawal from social life.

Obesity negatively affects general health as well as oral and dental health. Previous studies have shown that there is a correlation between obesity and oral diseases such as tooth cavity, periodontitis, xerostomia, dentin sensitivity [1, 11].

Prevention from obesity is quite important to prevent the complications induced by obesity on oral and dental health and general health before they develop. In the case of the development of obesity that could not be prevented, nonsurgical treatments should be preferred in the primary treatment of obesity. Nonsurgical treatment approaches include medical nutrition therapy, exercising, behavior change, and pharmacological therapies [12]. On the other hand, surgical treatments are preferred for the treatment of patients with morbid obesity who do not respond to medical treatment [13]. With weight loss in obesity treatment, improvements in systemic diseases such as high blood pressure, diabetes, and cholesterol, and oral and dental health are observed [14, 15].

The review aims to reveal the current dental treatment practices in adults and adolescents with obesity in line with the literature.

Oral and Dental Health in Individuals with Obesity

Obesity is a predisposing factor for oral diseases such as tooth cavity, periodontitis, loss of teeth, dental erosion, bruxism, and xerostomia [16]. Some common risk factors related to diet are determinants in the correlation between obesity and oral diseases [2]. An increase in oral diseases and obesity risk due to heavy carbohydrate consumption is observed [17].

Tooth Cavity in Individuals with Obesity

Monosaccharide and disaccharide sugars commonly consumed in the diet are the main reasons for a tooth cavity. While the main common cause of obesity and tooth decay is a carbohydrate-rich diet, xerostomia, lack of oral hygiene, genetic and socioeconomic factors are effective in the development of both diseases [18].

The knowledge of the literature on obesity and tooth cavity is limited. Larsson et al. [19] conducted a study in Sweden with adolescents aged 15 and found that the prevalence of tooth decay was higher among adolescents with obesity than those with normal weight. In the study by Adejumo et al. [20] conducted in Nigeria on individuals with obesity aged between 18-35, there was a significant correlation between high BMI and tooth decay. Östberg et al. [10] conducted a study on individuals with obesity aged between 38 and 77 and found no significant correlation between obesity and tooth decay. While studies that which determined a

correlation between obesity and tooth decay had different results, the effect of obesity in the development of early childhood and adolescent tooth decays is known [21].

Periodontitis in Individuals with Obesity

Obesity is the second most important risk factor following cigarettes for periodontitis [22]. Although the correlation mechanism between obesity and periodontitis is not completely explained, it is reported that cytokines and hormones in adipose tissue play an active role. TNF- α , IL-1, IL-6, IL-8 cytokines secreted from adipose tissue cause an increase in the inflammatory response and affect the pathogenesis of the periodontal disease [23]. Obesity was also found to be correlated with clinical attachment loss, and deep periodontal pocket among the clinical parameters used to determine the periodontal disease status [24].

The latest studies have supported the correlation between obesity and periodontitis. Al-Zahrani et al. [25] found a positive correlation between obesity and periodontitis in young adults aged between 18 and 34. In the study by Dalla Vecchia et al. [26] conducted with 706 individuals in Brazil, it was determined that the rate of periodontitis was higher among women with obesity than women with normal weight. Morita et al. [27] conducted a study with 3590 individuals in Japan and found a positive correlation between obesity and the five-year occurrence incidence of periodontal disease.

Dental Treatment Practices in Individuals with Obesity

Obesity is one of the pathologies that complicate dental treatment practices for dentists. Dental clinics should be designed considering the needs of patients with obesity. Accessing the clinic, the waiting rooms, and dental units should also be suitable for patients with obesity. Weight lifting capacities of the elevators should be high, doors and halls in the clinics should be wide, and armchairs in the waiting rooms should be suitable for patients with obesity.

Standard dental units are produced to carry approximately 140 kg. Bariatric dental units, produced in limited numbers, can carry up to 454 kg. The fact that patients with obesity weigh more than 140 kg can disrupt the seat functions of dental units [28-30]. Dentists' optimal positioning of patients with obesity is also limited. The patients should be treated in a semi-upright position to prevent respiration problems, and one-sided dental treatments should be recommended to prevent post-operative airway problems [28].

Narrow mouth openings and large tongue volumes of patients with obesity complicates the dentists' work during the operation and limit their view. It becomes complicated to provide anesthesia due to the difficulty of determining the mandibular anesthesia site among patients with obesity [28-30]. In the case where anesthesia is not completely provided, the patient may feel pain during the procedure; thus, preventing the successful realization of the dental treatment. The appointment time of patients with obesity should be set longer than the appointment time reserved for the treatment of other patients due to the limitation of their mobility and the difficulty in their dental treatments [29].

Blood pressure measurements should be made before the dental treatment considering the comorbid high blood pressure disease

of patients with obesity. Blood pressure measurements of patients with obesity made with standard sphygmomanometers may give inaccurate high results. To make accurate measurements, the sphygmomanometer cuff should be one-third longer than the arm width of individuals with obesity [31].

Obesity is also associated with the difficulty of third molar tooth extraction difficulty and increasing extraction complications after surgery [32, 33]. In a study that compared BMI and tooth extraction difficulties, it was found that 50% of the surgeries where tooth extraction is very difficult were performed on patients with obesity, and 80% of the surgeries where tooth extraction is easy were performed on patients with normal weight [33]. Dentists should be more conscious about the dental care of patients with obesity to prevent post-operative complications [34].

It is more difficult to establish vascular access in patients with obesity in cases where emergency intervention is required compared to individuals with normal weight [35]. It is also more difficult to provide airway opening and it requires to be experienced [36]. Since standard drug doses are adjusted according to individuals with normal weight, these doses may not be sufficient for patients with obesity [30]. Considering all these, patients with obesity are in greater danger when medical emergency interventions are required [37].

Sibutramine, a drug used in the treatment of obesity, increases blood pressure and heartbeat as well as causing xerostomia. The dentists' use of local anesthetic with epinephrine on patients who use sibutramine increases the effect of the drug on the cardiovascular system [38]. Dentists should be more cautious to use local anesthetic with epinephrine on patients with obesity. To prevent xerostomia, which is another effect of sibutramine, flour applications should be made on patients with obesity, they should be advised to chew sugar-free gums, and optimal oral procedures should be carried out [39].

Since weight loss in individuals with obesity causes positive improvements in oral and dental health, dentists and dietitians should be in cooperation for the treatment of patients with obesity [40].

Conclusion

With the increasing prevalence of obesity in developed and developing countries, the possibility of dentists' encountering patients with obesity increases. Dentists should perform dental treatments considering the effect of obesity on oral and dental health. Due to treatment difficulties and risks among patients with obesity, it is important for the dentists to raise awareness of patients with obesity about oral care, to increase their motivation, and to follow them with control sessions. Designing dental clinics suitable for patients with obesity will increase the dentist's chance of success in treatment by providing the comfort of patients with obesity during the treatment.

Conflict of interests

The authors declare that they have no competing interests.

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References

- Mathus-Vliegen E, Nikkel D, Brand H. Oral aspects of obesity. *Int Dent J*. 2007;57:249-56.
- Suvan J, D' Aiuto F. Assessment and management of oral health in obesity. *Curr Obes Rep*. 2013;2:142-9.
- Köse AGDO, Çanakçı V, Arabacı YDDT. Diş hekimliğinde obez hastalara yaklaşım. *Atatürk Üniv Dişhekim Fak Derg*. 2012;2012:317-24.
- İslamoğlu Y, Koplay M, Sunay S, et al. Obezite ve metabolik sendrom. *Tıp Araş Derg*. 2008;6:168-74.
- Abbas T, Çakır B. Birinci basamakta obeziteye yaklaşım. *Ankara Medl J*. 2012;12:37-41.
- Fall T, Mendelson M, Speliotes EK. Recent advances in human genetics and epigenetics of adiposity: pathway to precision medicine? *Gastroenterology*. 2017;152:1695-706.
- Gadde KM, Martin CK, Berthoud H-R, et al. Obesity: pathophysiology and management. *J Am Coll Cardiol*. 2018;71:69-84.
- Baker JL, Olsen LW, Sørensen TI. Childhood body-mass index and the risk of coronary heart disease in adulthood. *N Eng J Med*. 2007;357:2329-37.
- Hayden C, Bowler JO, Chambers S, et al. Obesity and dental caries in children: a systematic review and meta-analysis. *Community Dent Oral Epidemiol*. 2013;41:289-308.
- Östberg A-L, Bengtsson C, Lissner L, Hakeberg M. Oral health and obesity indicators. *BMC Oral Health*. 2012;12:50.
- Saito T, Shimazaki Y, Kiyohara Y, et al. Relationship between obesity, glucose tolerance, and periodontal disease in Japanese women: the Hisayama study. *J Periodontol Res*. 2005;40:346-53.
- Yaylı NZA, Tunç SK, Talmaç AC, et al. Relationship between obesity and oral health-review. *Dent Med J*. 1:1-11.
- Panel NİoHCD. Gastrointestinal surgery for severe obesity. *Ann Intern Med*. 1991;115:956-61.
- Orzano AJ, Scott JG. Diagnosis and treatment of obesity in adults: an applied evidence-based review. *J Am Board Fam Pract*. 2004;17:359-69.
- Low AK, Bouldin MJ, Sumrall CD, et al. A clinician's approach to medical management of obesity. *J Med Sci*. 2006;331:175-82.
- de Moura-Grec PG, Yamashita JM, Marsicano JA, et al. Impact of bariatric surgery on oral health conditions: 6-months cohort study. *Int Dent J*. 2014;64:144-9.
- Godlewski A, Veyrone J, Nicolas E. Obesity and oral health: risk factors of obese patients in dental practice. *Odonto-stomatologie tropicale= Trop Dent J*. 2008;31:25-32.
- Li L-W, Wong HM, McGrath CP. Longitudinal association between obesity and dental caries in adolescents. *J Pediatr*. 2017;189:149-54. e5.
- Larsson B, Johansson I, Hallmans G, et al. Relationship between dental caries and risk factors for atherosclerosis in Swedish adolescents'. *Community Dent Oral Epidemiol*. 1995;23:205-10.
- Adejumo A, Ogunlade O, Ozeigbe E, et al. Assessment of association between anthropometry and dental caries among nigerian young adults: a case control study. *J Adv Med Pharm Sci*. 2018:1-6.
- Slotwińska SM, Slotwiński R. Host response, obesity, and oral health. *Cent Eur J Immunol*. 2015;40:201.
- Field AE, Coakley EH, Must A, et al. Impact of overweight on the risk of developing common chronic diseases during a 10-year period. *Arch Inter Med*. 2001;161:1581-6.
- Pischon N, Heng N, Bernimoulin J-P, et al. Obesity, inflammation, and periodontal disease. *J Dent Res*. 2007;86:400-9.
- Yuan JCC, Lee DJ, Afshari FS, et al. Dentistry and obesity: a review and current status in US predoctoral dental education. *J Dental Educ*. 2012;76:1129-36.
- Al-Zahrani MS, Bissada NF, Borawski EA. Obesity and periodontal disease in young, middle-aged, and older adults. *J Periodontol*. 2003;74:610-5.
- Dalla Vecchia CF, Susin C, Rösing CK, et al. Overweight and obesity as risk indicators for periodontitis in adults. *J Periodontol*. 2005;76:1721-8.

27. Morita I, Okamoto Y, Yoshii S, et al. Five-year incidence of periodontal disease is related to body mass index. *J Dent Res.* 2011;90:199-202.
28. Chacon GE, Viehweg TL, Ganzberg SI. Management of the obese patient undergoing office-based oral and maxillofacial surgery procedures. *J Oral Maxillofac Surg.* 2004;62:88-93.
29. Marciani RD, Raezer BF, Marciani HL. Obesity and the practice of oral and maxillofacial surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2004;98:10-5.
30. Magliocca KR, Helman JI. Obstructive sleep apnea: diagnosis, medical management and dental implications. *J Am Dent Assoc.* 2005;136:1121-9.
31. Fonseca-Reyes S, de Alba-García JG, Parra-Carrillo JZ, et al. Effect of standard cuff on blood pressure readings in patients with obese arms. How frequent are arms of a 'large circumference'? *Blood pressure monitoring.* 2003;8:101-6.
32. Gbotolorun O, Arotiba G, Ladeinde A. The role of preoperative and intraoperative variables in predicting post operative complications after impacted mandibular third molar exodontia. *Nig QJ Hosp Med.* 2008;18:72-8.
33. Gbotolorun OM, Arotiba GT, Ladeinde AL. Assessment of factors associated with surgical difficulty in impacted mandibular third molar extraction. *J Oral Maxillofac Surg.* 2007;65:1977-83.
34. Kempers KG, Foote JW, DiFlorio-Brennan T. Obesity: Prevalence and considerations in oral and maxillofacial surgery. *J Oral Maxillofac Surg.* 2000;58:137-43.
35. Costantino TG, Parikh AK, Satz WA, et al. Ultrasonography-guided peripheral intravenous access versus traditional approaches in patients with difficult intravenous access. *Ann Emerg Med.* 2005;46:456-61.
36. Adams J, Murphy P. Obesity in anaesthesia and intensive care. *Br J Anaesth.* 2000;85:91-108.
37. Reilly D, Boyle C, Craig D. Obesity and dentistry: a growing problem. *Br Dent J.* 2009;207:171-5.
38. Wynn R. Sibutramine (Meridia)--dental considerations for a new weight control drug. *Gen Dent.* 1998;46:332-5.
39. Boyd LD, Dwyer JT, Papas A. Nutritional implications of xerostomia and rampant caries caused by serotonin reuptake inhibitors: a case study. *Nutr Rev.* 1997;55:362-8.
40. Touger-Decker R, Mobley CC, Association AD. Position of the American Dietetic Association: Oral health and nutrition. *J Acad Nutr Diet.* 2003;103:615.