Review Article

Are dentists involved in the treatment of obesity?

Mohamed Y. Kharma[1,2], Ghassan Aws[3], Bassel Tarakji[4]

[1]Department Oral Maxillofacial Surgery, Dental School, Aleppo University, Aleppo, Syria, [2]Departments of Oral Maxillofacial Surgery, [3]Oral Science and [4]Oral Medicine, Al-Farabi Colleges, KSA

Corresponding author (email: <mykharma@hotmail.com>)
Prof. Mohamed Y. Kharma, Al-Farabi Colleges, Jeddah, KSA.

Received: 01-03-16 Accepted: 11-05-16 Published: 30-05-16

Abstract

The morbidity and mortality associated with being overweight or obese have been known to the medical profession to be related with an increased risk of associated diseases. This article provides an overview of obesity and addresses possible strategies for the management of this important public health concern. This narrative review sheds light on the problem of obesity and the necessity of professional oral health care to work in partnership with the medical team for managing obesity. In this regard, general dental practitioners should at least reinforce their knowledge regarding obesity and understand their potential role in the treatment and management of obese patients.

Key words: *Dentist, jaw wiring, obesity, overweight*

INTRODUCTION

Obesity is a complex disorder involving a multifactorial disease which is now considered to be a major public health concern around the world. Obesity is defined as a medical condition in which excess body fat accumulates with a negative effect on health;[1] this may be the result of imbalance between energy intake and expenditure along with different factors such as genetic, environmental, and psychosocial factors.[1]

Body mass index (BMI) is proposed by the World Health Organization to measure the weight status. It osis the ratio of an individual's weight in kilogram divided by the square of his height in meters; a BMI of 18.5–24.99 kg/m^2 is classified as normal, 25–29.99 km/m^2 as overweight, and over 30 kg/m^2 as obese.[1]

PREVALENCE OF OBESITY

The prevalence of obesity is increasing globally tobecome an epidemic in many developed and developing countries.[2,3] Overall, 37.4% of adults were reported to be obese in 2010, which is expected to reach 51.1% of US adults by 2030.[4] The prevalence of obesity in England was 19.1% in the age of 10–11 years.[5]

The incidence of Childhood obesity and adolescent obesity is also rising worldwide,[6] with increase from 4.2% in 1990 to 6.7% in 2010.[7] This figure is expected to reach 9.1% (~60 million) in 2020 with an increased prevalence of obesity-related disorders.[8]

Around the world, there are a total of 155 million children (one in 10) who are overweight, and 30–40 million who have been classified as obese.[9]

In Arab countries, in Bahrain, obesity among adolescent girls in the age group 10–13 years is 25%, and in the age group 14–18-year, it has reached up to 38.5%.[10] While in Kuwait 33.3% of boys and 27.8% of girls in 2010 were found to be obese; the risk factors for overweight

Access this article online

Quick Response Code:

Website: www.jispcd.org

DOI: 10.4103/2231-0762.183112

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Kharma MY, Aws G, Tarakji B. Are dentists involved in the treatment of obesity?. J Int Soc Prevent Communit Dent 2016;6:183-8.

and obesity identified in the study were excess caloric intake, lack of physical activities, excessive soft drinks consumption, fast food consumption, and frequent snacking.[11]

The national health survey in 2000 among Omani adults showed that, in the youngest surveyed age group (20–34 years), 36.1% were overweight or obese.[12] In Qatar, the prevalence of being overweight was 28.6% among boys and 18.9% among girls, and that of obesity was 7.9% among boys and 4.7% among girls.[13]

Previous studies from Kingdom of Saudi Arabia (KSA), conducted from 1990 to 1993, have shown an overall prevalence of obesity of 22.1%, and approximately 53% of Saudi adults are either overweight or obese.[14] The prevalence of being overweight was 36.9%. Overweight is significantly more prevalent in males (42.4%) compared to females (31.8%) ($P < 0.0001$). The age-adjusted prevalence of obesity was 35.5% in KSA with an overall prevalence of 35.6% whereas severe (gross) obesity was 3.2%. Females are significantly more obese with a prevalence of 44% than males at 26.4%.[15]

CAUSES OF OBESITY

Obesity is most commonly caused by excessive energy consumption relative to energy expenditure. The etiology of obesity is highly complex and includes genetic, physiological, environmental, psychological, social, and economic factors.[16]

Keith *et al.*[17] identified contributing factors associated with obesity and weight gain that included factors relating to psychotropic medication, diabetic treatment, antihypertensive, steroids hormones, and contraceptive.

Several chronic diseases are associated with obesity, including Type II diabetes, cardiovascular diseases, endometrial cancers, sleep-breathing disorders, and osteoarthritis, which can increase the risk of morbidity and mortality.[18,19] The most common cause for gaining weight in children and adolescents is attributing to overconsumption of sugar-sweetened beverages.[20-22] It is probable that any procedure with influence to reduce the risk factors may participate in minimizing the risk of obesity.[23,24]

PLAN OF TREATMENT

Lifestyle changes

Lifestyle changes that are mandatory to result in weight loss include the following:[25]

- Energy intake (calories from food and drinks) must not exceed the energy output (physical activity)
- Choosing a suitable healthy eating program
- Adopting healthy lifestyle habits.

Healthy eating program

A healthy eating plan provides enough calories for good health, but not so many that can result in weight gain. A healthy eating plan is low in saturated fat, trans fat, cholesterol, sodium (salt), and added sugar. This program can reduce the risk of heart disease and other pathological conditions.

Foods to limit

Foods with high saturated trans fats and cholesterol should be avoided.

Physical activity

Encourage physical activity that trains all the muscles of the body (aerobic, muscle-stretching, etc.).

Behavioral changes

Starting by understand which habits lead to overeating, the next step should be to change these habits.

Weight-loss medicines

Using of weight-loss medicines approved by the Food and Drug Administration (FDA) might be an option for some people not responding to other options of treatment.

Weight-loss surgery

The surgical options include banded gastroplasty and Roux-en-Y gastric bypass. Surgery leads to reducing the amount of food and liquids the stomach can hold.

IMPLICATIONS OF OBESITY FOR DENTISTRY

Obesity interferes with dental practice, and dentists are acknowledged by the health care team to participate with them. These implications include the following factors:

Ability to develop periodontal diseases and caries

Chronic periodontal disease is diagnosed in obese populations with some evidence that this is not mediated solely by diabetes but by secretion of adipose tissue via chemical inflammatory mediators, which could modify the response of the periodontal tissues

to the oral environment. Dentists must be aware of the causes and the management of this problem.[26] In UK, between 2013 and 2014, decay was a common reason for hospital administration in obese children aged 5–9 years.[27]

Practical considerations

Many dental procedures require the anesthesia of inferior alveolar nerve block. It can be difficult for an obese patient to clearly identify the landmarks through excess of soft tissue for undertaking this type of injection, however, a "lax" tongue retractor can be useful. Moreover, it may be impossible to palpate cervical lymph nodes in a large neck.[28]

In addition, weight screening in the dental office can promote healthy behavior to improve weight and oral health status and reduce systemic and oral health risks.[29] Dentists must notice that children with obesity may have high risk of dental erosion but do not necessarily have higher risk of dental caries than children with normal weight.[30]

Conscious sedation

In case of necessity of treatment under conscious sedation for obese patients, the potential difficulties in airway management and intravenous cannulation should be considered. The provision of inhalation sedation with nitrous oxide during which oxygen levels are maintained at or above 30% may be more appropriate.[25]

Treatment of obesity restriction of food intake

When treating obesity by restriction of food intake, various methods have been proposed to prevent patients from overeating:

- Oral jaw wiring (OJW) or maxilla-mandibular fixation (MMF) have been applied in an effort to control obesity.[31] The main indication for OJW is for stabilizing the jaws after dental or maxillofacial trauma. This technique is simple and can be realized in a dental clinic, and is considered as an integrated approach to obesity. Jaw wiring can performed by dentists, orthodontists, and oral surgeons with the purpose of weight loss in obese individuals; this technique should be applied for a period of 3 months or longer [Figure 1][32]
  Castelnuovo in 1980 reported that all patients at first respond with enthusiasm to the technique of OJW but later most found jaw-wiring difficult to accept;[27] the median rate of lost weight was 3.25 kg in 6 months comparable with that of intestinal bypass surgery. Unfortunately, as soon as the "wiring" was removed, a large majority of the patients regain their weight. Jaw wiring seems to be safe but an ineffective means of controlling weight, especially if applied to the patient with poor motivation and immature personalities.[25] To avoid important complications related to OJW, the patient should be trained to quick-release the intermaxillary fixation to prevent the occurrence of death from the swallowing of vomitus. Until now, this complication has not been reported. The only limitation of OJW is regaining the lost weight. It was concluded that Jaw wiring for 3 months or longer was an unsuitable treatment[31,32]
- Oral appliance: Dentists are involved in the team whose concern regarding the weight loss is not limited to wiring jaws but by interfering with making a retainer-like device that makes obese patients take smaller bites, which is custom-made to fit the roof of the patient's mouth. The idea of this retainer came from the scientific finding that it takes 15–20 min for the brain to signal the stomach that it is full and to stop eating (Fast eaters can intake a lot of calories and slow eaters reduce the amount of caloric intake). The built-in system in the brain controls when we have had enough to eat; this is called satiety. It takes 20 min after eating before one feels satisfied or "full." As a result, eating too fast can lead to ingesting more than we need before the signal of "full" reaches the brain.

Figure 1: Oral jaw wiring

The principle of the appliance is to slow down the eating process by making eating more difficult until the satiety response signal of full is achieved with less amount of food, leading the person to lose weight.

The first design of this appliance is called the dental device system (DDS) [Figure 2]. In reducing the size of

Figure 2: DDS system

Figure 3: SMART device

oral cavity, the patients are training to eating slowly with a small bites until they feel satisfied by the brain signal. It is a gradual behavior modification system that teaches the patient new ways to change their eating habits.

In comparison with a control patient (without retainer), the individuals wearing the retainer device consumed approximately 500 kcal less. DDS system was developed to arrive now to the new device which callaed sensor monitored alimentary restriction therapy (SMART). The only difference is that the SMART device has an electronic component that allows the patient to track the usage on a given day.

The SMART device [Figure 3] is only available in Canada and is consider to be a nonsignificant risk device by the US FDA.

The SMART device does the following:

- Lack of space inside the mouth forces the patient to consume less quantities of food by hard masticating before swallowing
- By reducing the quantity of food intake by spending the time in mastication, it allowed the body's physiological satiety response to start the signal of saturation.

In this regard, not enough data is available regarding the application of oral appliances in the treatment of obesity.

DISCUSSION

A lack of energy balance most often causes overweight and obesity. Although there are genetic, behavioral, and hormonal influences on body weight, obesity occurs when one consumes more calories than they can burn through exercise and normal daily activities. Dentists do not have enough knowledge and training to deal with obesity.

According to the Dean of the University of Pennsylvania "The problem with overeating starts with the mouth and dentists are responsible for caring for the mouth,"[33] However, the question is: Are dentists prepared to oversee the medical needs of obese patients?

Bariatric surgeons accept that dentists are now a member of the medical team for the overweight and obese patients. Dentists must assume their responsibility to prevent an obese patient from reaching that level, which make them candidates for only surgery.

The responsibility of a dental professional is mainly to provide the patient good oral hygiene, and in case of using the appliances, regular check of the teeth, gums, and jaw joints must be done to verify any disease or dysfunction. It is not the dentist's role or responsibility to follow the progress of weight loss.

Dentists should never start the treatment for an obese patient alone unless if the patient transfers from one of the medical community teams for dental management and suitable care without contraindications to provide the patient with a suitable appliance, such as the DDS system, to achieve a behavioral modification.

Dentists should take in consideration when treating an obese, variable factors interfering with the decision of the appropriate plan for treatment; for example, normal temporo mandibular (TM) joint, no mobile teeth, periodontitis, poor oral hygiene, or any past medical history prevents the application of the new appliances.

Dentists also contribute in providing the patient different types of intraoral devices which leads to the patient in consuming less quantity of food by slowing the time of mastication.

Recently, several dental journals warning dentists with different articles that use intraoral devices for the treatment of obesity may be considered outside the practice of dentistry and can be considered as malpractice.

Nonetheless, proper diagnosis is imperative for choosing the treatment to be undertaken by a well-trained professional dentist; the fitting and the application of certain devices could very well have dental health implications, and a dentist may be involved in such services.

In conclusion, dentists are involved in the treatment of obese patients and they should keep in mind the advantages and relative risk of OJW, and a case-by-case selection approach should be followed in cooperation of the medical team. In this regard, general dental practitioners should at least reinforce their knowledge regarding obesity and understand their potential role in the treatment and management of obese patients.

Acknowledgement

This article does not contain any studies with human participants or animals performed by any of the authors.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. World Health Organization. At: www.who.int/mediacentre/factsheets/fs311/en/. [Last accessed on 2011 Sept 28].
2. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999–2008. JAMA 2010;303:235-41.
3. Ogden CL, Yanovski SZ, Carroll MD, Flegal KM. The epidemiology of obesity. Gastroenterology 2007;132:2087-102.
4. Wang Y, Beydoun MA, Liang L, Caballero B, Kumanyika SK. Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. Obesity 2008;16:2323-30.
5. The Health and Social Care Information Centre. Children's Dental Health Survey 2013 Executive Summary. England, Wales and Northern Ireland 2015. Available from http://www.hscic.gov.uk/catalogue/PUB17137/CDHS2013-Data-Quality.pdf. [Last accessed on 2015 Mar 19].
6. Thompson DR, Obarzanek E, Franko DL, Barton BA, Morrison J, Biro FM, *et al.* Childhood overweight and cardiovascular disease risk factors: The national heart, lung, and blood institute growth and health study. J Pediatr 2007;150:18-25.
7. de Onis M, Blössner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. Am J Clin Nutr 2010;92:1257-64.
8. Stamatakis E, Wardle J, Cole TJ. Childhood obesity and overweight prevalence trends in England: Evidence for growing socioeconomic disparities. Int J Obes (Lond) 2010;34:41-7.
9. United Nations Development Program. Human Development Report 2008/2009. New York: UNDP; 2008.
10. al-Mahroos F, Mckeigue PM. High prevalence of diabetes in Bahrainis. Associations with ethnicity and raised plasma cholesterol. Diabetes Care 1998;21:936-42.
11. Ministry of Health. Administration of food and nutrition. Kuwait Nutrition Surveillance System 2005–2010 report; 2010.
12. Osman YF, Muscati SK, Ganguly SS, Khan M, Al-Sharji B. Progression of obesity among Seeb school children in Oman. A preliminary study. Saudi Med J 2004;25:2038-40.
13. Bener A, Kamal AA. Growth patterns of Qatari school children and adolescents aged 6–18 years. J Health Popul Nutr 2005;23:250-8.
14. al-Nuaim AA, Bamgboye EA, al-Rubeaan KA, al-Mazrou Y. Overweight and obesity in Saudi Arabian adult population, role of socio-demographic variables. J Commun Health 1997;22:211-23.
15. Al-Nozha MM, Al-Mazrou YY, Al-Maatouq MA, Arafah MR, Khalil MZ, Khan NB, *et al.* Obesity in Saudi Arabia. Saudi Med J 2005;26:824-9.
16. Wright SM, Aronne LJ. Causes of Obesity. Abdom Imaging 2012;37:730-2.
17. Keith SW, Redden DT, Katzmarzyk PT, Boggiano MM, Hanlon EC, Benca RM, *et al.* Putative contributors to the secular increase in obesity: Exploring the roads less traveled. Int J Obe (Lond) 2006;30:1585-94.
18. Seidell JC. Waist circumference and waist/hip ratio in relation to all-cause mortality, cancer and sleep apnea. Eur J Clin Nutr 2010;64:35-41.
19. Yu JC, Berger P 3rd. Sleep apnea and obesity. S D Med 2011;Spec No: 28-34.
20. Scientific Advisory Committee on Nutrition. Carbohydrates and Health, London; 2015. Available from: https://www.gov.uk/government/publications/sacn-carbohydrates-and-health-report. [Last accessed on 2015 Mar 19].
21. Public Health England. Child obesity and socioeconomic status data factsheet [Internet]. PHE Gateway; 2014. Available from: http://www.noo.org.uk/NOO_about_obesity/inequalities. [Last accessed on 2015 Mar 19].
22. Moynihan PJ, Kelly SA. Effect on caries of restricting sugars intake: Systematic review to inform WHO guidelines. J Dent Res 2014;93:8-18.
23. National Institute for Health and Care Excellence. Oral health: Approaches for local authorities and their partners to improve the oral health of their communities. NICE public health guidance 2014. Available from: https://www.nice.org.uk/guidance/ph55. [Last accessed on 2015 Mar 19].
24. Public health England. The relationship between dental caries and obesity in children: An evidence summary. PHE publications gateway number 2015380 published October 2015.

25. Shukla AP, Buniak WI, Aronne LJ. Treatment of obesity in 2015. J Cardiopulm Rehabil Prev 2015;35:81-92.
26. Levine R. Obesity and oral disease — A challenge for dentistry. Br Dent J 2012;213:453-6.
27. Lempert SM, Froberg K, Christensen LB, Kristensen PL, Heitmann BL. Association between body mass index and caries among children and adolescents. Commun Dent Oral Epidemiol 2014;42:53-60.
28. Barnett J. Obesity and dental care. J Am Dent Assoc 2015;146:6.
29. Ziegler J, Hughes CV. Weighing in on pediatric obesity: Weight screening at the dental visit. J Am Dent Assoc 2016;147:146-50.
30. Tong HJ, Rudolf MC, Muyombwe T, Duggal MS, Balmer R. An investigation into the dental health of children with obesity: An analysis of dental erosion and caries status. Eur Arch Paediatr Dent 2014;15:203-10.
31. Ramsey-Stewart G, Martin L. Jaw wiring in the treatment of morbid obesity. Aust N Z J Surg 1985;55:163-7.
32. Cannell H. Enforced intermaxillary fixation (IMF) as a treatment for obesity. Obes Surg 1992;2:225-230.
33. Rothstein T. The Dental Professional's Role in the Treatment of Morbid Obesity — None! Response to Dr. Moskowitz's editorial entitled "The Limits of Dentistry" published in the December 2004 issue of the NYS Dental Journal.