

## Obesity: A link between periodontitis and cardiovascular disease

Sir,

The incidence and prevalence of obesity have increased substantially over the past decades in most countries. Obesity is a systemic disease that predisposes to various comorbidities and complications that affect the overall health, most notably hypertension, type 2 diabetes, and chronic heart diseases. Cross-sectional studies suggest that obesity is also associated with oral diseases, particularly chronic inflammatory periodontal diseases.

Obesity is an excess amount of fat in proportion to lean body mass, to the extent that health is impaired.<sup>[1]</sup> The most commonly used measure of body fat is the body mass index (BMI).

Some of the common obesity-related diseases are hypertension and cardiovascular diseases. Overweight and obesity are important determinants of elevated blood pressure. Each 1 kg increase in weight after 18 years of age is associated with 5% increase in risk of hypertension.<sup>[2]</sup> Mechanisms that have been implicated in the development of obesity-related hypertension include increased blood viscosity due to release of plasminogen activator inhibitor-1, increased secretion of angiotensinogen from adipose tissue, and increase in blood volume from increased body mass.

Obesity is an independent risk factor for cardiovascular diseases. Obese persons have an about 1.5-fold increased risk for cardiovascular diseases. Each 2 kg/m<sup>2</sup> lower BMI is associated with a 12% lower risk of ischemic stroke, an 8% lower risk in hemorrhagic stroke, and an 11% lower risk of ischemic heart disease.<sup>[3]</sup>

It has been suggested that obesity is second only to smoking as the strongest risk factor for inflammatory periodontal tissue destruction.<sup>[4]</sup> The immunological activity of adipose tissue may play an important role both in the development of insulin resistance and in periodontal disease. Adipose tissue-derived hormones and cytokines are being suggested to play a role in the development of inflammatory periodontal disease. The first report on the correlation between obesity and periodontal disease appeared in 1977, when Perlstein *et al.* observed histopathologic changes in the periodontium in hereditary obese rats using ligature-induced periodontitis they found alveolar bone resorption to be greater in obese animals compared with non-obese rats.<sup>[5]</sup>

Later on, the hypothesis of obesity as a risk factor for periodontal disease was supported by epidemiological studies. In Saito's study of Japanese adults, increasing

BMI and waist: Hip ratio were associated with an increased risk of periodontitis.<sup>[6]</sup> Al-Zahrani *et al.*<sup>[7]</sup> analyzed data from the Third National Health and Nutrition Examination survey and reported a significant association between measures of body fat and periodontitis in middle-aged or older adults.

Adipose tissue is an inert organ that stores triglycerides. Recent studies have indicated that adipose tissue, especially visceral adipose tissue, secretes numerous bioactive molecules, collectively known as adipokines. Some of these adipokines, such as leptins, stimulate the immune system as they enhance cytokine production and phagocytosis by macrophages.<sup>[8]</sup>

Tumor necrosis factor- $\alpha$  mediates endotoxin-induced injury in various organs, including the periodontal tissues.

Plasminogen activator inhibitor-1 induces the agglutination of blood and increases the risk of ischemic heart diseases. Its similar role in periodontium blood vessels can decrease the blood supply, thereby deteriorating periodontal health.

Periodontitis is a chronic inflammatory disease of periodontal tissues. The main cause for periodontal destruction is the action of various inflammatory mediators, mainly cytokines, produced as a result of host-pathogen interaction. In obese people, the adipose tissue acts as a site for these cytokine formations, thus predisposing them to both periodontal diseases and cardiovascular diseases. It is well known that periodontally treated patients have a lower risk of coronary artery diseases.<sup>[9]</sup>

Dentists must thus be aware of the increasing number of obese people; they can serve to screen and identify patients with obesity. Oral health care professionals should be aware of the significance of obesity as a multiple risk factor for overall health and oral health; the same should be explained to patients and they must be motivated to obtain proper medical assistance if their risk profile dictates more aggressive measures.

**Pavitra Rastogi**

Department of Periodontics,  
F.O.D.S. C.S.M. Medical University, Lucknow, Uttar Pradesh, India

**Address for correspondence:**

Dr. Pavitra Rastogi,  
Department of Periodontics, F.O.D.S. C.S.M. Medical University,  
Lucknow - 226 024, Uttar Pradesh, India.  
E-mail: drpavitrarastogi@rediffmail.com

## REFERENCES

1. Aronne LJ, Segal KR. Adiposity and fat distribution outcome measures: Assessment and clinical implications. *Obes Res* 2002;10:14S-21.
2. Huang Z, Willett WC, Manson JE, Rosner B, Stampfer MJ, Speizer FE, *et al.* Body weight, weight change, and risk for hypertension in women. *Ann Intern Med* 1998;128:81-8.
3. Asia Pacific Cohort Studies Collaboration. Body mass index and cardiovascular disease in the Asia-Pacific Region: An overview of 33 cohorts involving 310 000 participants. *Int J Epidemiol* 2004;33:751-8.
4. Nishida N, Tanaka M, Hayashi N, Nagata H, Takeshita T, Nakayama K, *et al.* Determination of smoking and obesity as periodontitis risks using the classification and regression tree method. *J Periodontol* 2005;76:923-8.
5. Perlstein MI, Bissada NF. Influence of obesity and hypertension on the severity of periodontitis in rats. *Oral Surg Oral Med Oral Pathol* 1977;43:707-19.
6. Saito T, Shimazaki Y, Kiyohara Y, Kato I, Kubo M, Iida M, *et al.* Relationship between obesity, glucose tolerance, and periodontal disease in Japanese women: The Hisayama study. *J Periodontol Res* 2005;40:346-53.
7. Al-Zahrani MS, Bissada NF, Borawskit EA. Obesity and periodontal disease in young, middle-aged, and older adults. *J Periodontol* 2003;74:610-5.
8. Gemmell E, Marshall RI, Seymour GJ. Cytokines and prostaglandins in immune homeostasis and tissue destruction in periodontal disease. *Periodontol* 2000 1997;14:112-43.
9. Rastogi P, Singhal R, Sethi A, Agarwal A, Singh VK, Sethi R. Assessment of the effect of periodontal treatment in patients with coronary artery disease: A pilot survey. *J Cardiovasc Dis Res* 2012;3:124-7.

## Access this article online

## Quick Response Code:



**Website:**  
www.ejgd.org

**DOI:**  
10.4103/2278-9626.112327