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Research Article

RELATIONSHIP BETWEEN THE COMPOSITION OF THE HUMAN BODY AND PERIODONTAL DISEASES

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ABSTRACT

Human obesity may cause periodontitis. Study objective was to examine the relationship between male body composition and periodontal status. Our sample consisted of 300 males aged 30-60, 62 with periodontal disease-free gums, 90 with gingivitis, 78 with initial periodontitis, and 70 with established periodontitis. Besides assessing the body mass index, waist circumference and skeletal muscle and bone mass (body water, body fat, and body composition), we also measured the waist circumference (WC). When age, diabetes history, smoking, physical activity, and socioeconomic status were adjusted for, BMI, WC, and body composition were statistically significantly correlated with periodontitis. These variables (BMI, WC, and body composition parameters) did not change with mild periodontal disease (gingivitis) or initial periodontitis, but did with severe periodontitis. The severity of periodontal disease in men appears to be related to their body composition, although further research is needed to confirm this preliminary finding.

Keywords: - Periodontitis, Muscle, Bone, Fat

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INTRODUCTION

Diabetes, heart disease, cancer, and endocrine and musculoskeletal diseases, among others, are associated with obesity. A subject's risk for cardiovascular disease increases when they have central obesity, a condition or risk factor for metabolic syndrome [1 - 6].

The risk of periodontal disease is also increased when you are overweight or obese. The periodontal disease is characterized by inflammation and bacterial destruction of the periodontal tissues caused by gram-negative anaerobic bacteria. A number of studies have shown that periodontal disease is associated with obesity, an increased body mass index (BMI), and an increased waist circumference [7 - 10].

There was a significant association between metabolic syndrome and periodontitis in a population of women, whereas increased serum resistin, an adipokine released from adipose tissue, was associated with periodontitis [11, 12].

No research has yet examined the relationship between the severity of periodontal disease and body composition, despite a large number of studies examining its effect on obesity. In light of this, the present study was carried out to determine whether body composition influences periodontal disease in males. In this study, the main objective was to investigate the hypothesis that body composition can negatively affect periodontal disease severity. Future studies can evaluate whether these two are related.

METHODS

Analytic cross-sectional research was conducted in the present study. Study participants were men between the ages of 30 and 60 who had been referred to the Faculty of Dentistry for assessment.

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Those excluded had systemic conditions such as diabetes, cardiovascular disorders, or environmental factors such as tobacco use, lack of physical activity, and periodontal treatment within the past three months.

The study consisted of 300 men who met the eligibility criteria. In order to collect and record data on the subjects during the study period, a census procedure was used. In accordance with the Ethics Committee's approval, the design of the study has been approved. Patients were given detailed explanations of the investigation, and they signed informed consent forms.

For the purpose of excluding patients who met the aforementioned exclusion criteria, one of the authors took their clinical histories. Using gingival and plaque indices, as well as methods of measuring attachment loss, periodontal measurements were taken. A score of "1" means that there is bleeding from the gingival margin and visible plaque, while a score of "0" indicates there is no bleeding or visible plaque [13].

For each existing tooth on four surfaces, attachment loss was measured using a Williams periodontal probe, and means were calculated. Following the results of the study, the subjects were divided into four categories.

Group 1: Inflammation of the gingival plaque is negligible (GPI = 0) and there is no loss of attachment. **Group 2:** This is a simple gingivitis with no attachment loss (GPI = 1) and gingival inflammation (GPI = 1). **Group 3:** Periodontitis with gingival inflammation (GPI = 1) and attachment loss of at least 2 mm. Group 4: Defining periodontitis as gingival inflammation with attachment loss exceeding 2 millimeters (GPI = 1).

A kilogram (kg) was measured as the weight, a centimeter (cm) as the height, and a kilogram per square meter as the BMI. At the umbilicus, waist circumferences were measured in centimeters (cm). Bioelectrical impedance analysis (BIA) measures impedance and conductance to determine fat mass and skeletal muscle mass. The conductivity of fat-free mass is greater than that of fat mass due to the fact that fat-free mass is primarily made up of water, proteins, and electrolytes [14]. In order to estimate the mass of bones, skeletal muscles, and body water, resistance and reactance are used. With the Diagnostic Scale-Beurer BG 56, these parameters were measured. A post hoc test was used if statistically significant differences were found between the groups. It was considered significant if the P value was less than 0.05.

RESULTS

In the present study, 300 men participated, of which 31 had healthy periodontal health, 90 had gingivitis, 78 experienced first-time periodontitis, and 70 suffered from established periodontitis. In the four groups, there were no significant differences in age ($P > 0.05$). In a one-way analysis, BMI, waist circumference, body water, fat mass, skeletal muscle mass and bone mass were statistically significant associated with periodontal status among patients with normal periodontium, gingivitis, initial periodontitis, and established periodontitis. Periodontal status is determined by BMI, waist circumference, body water, body fat, and bone and skeletal mass. In spite of mild periodontal disease (gingivitis) and initial periodontitis, there were statistically significant differences only between established periodontitis and periodontal health.

Table 1: A comparison of the normal periodontal status with various stages of periodontitis, as well as related variables

Periodontal status	Variables					
	BMI	Waist circumference	Body water	Body fat	Skeletal muscle	Bone mass
Normal periodontium Gingivitis	0.839	0.399	0.997	0.847	1.001	0.007
Initial periodontitis	0.000	0.000	0.000	0.000	0.000	0.000
Established periodontitis	0.000	0.000	0.000	0.000	0.000	0.002
Gingivitis Initial periodontitis	0.000	0.000	0.000	0.000	0.000	0.159
Established periodontitis	0.000	0.000	0.000	0.000	0.000	0.957
Initial periodontitis	0.269	0.987	0.554	0.719	0.679	0.470
Established periodontitis						

DISCUSSION

After adjusting for age, diabetes history, smoking, physical activity, and socioeconomic status, the purpose of this study was to examine the relationship between periodontal disease and body composition, BMI, and WC in males with periodontal disease. According to the results of a systematic review by Chaffee and Weston, individuals with periodontitis (initial and established forms) had higher BMIs than those with healthy gums [15]. There is a trend of increasing odds of prevalent periodontal disease with increasing body mass index (BMI) among obese individuals and a greater mean clinical attachment loss among obese individuals, according to his study. Periodontitis and BMI were not

associated. Having periodontitis was more likely among obese people with a BMI of 25. Their adjusted odds ratio (OR) was 0.99 (1.206 to 1.220). There may be a discrepancy in the ages of participants. The participants in our study were younger than those in the study in which we participated.

As reported by Khader et al. [17], periodontal patients had a larger waist circumference than healthy or gingivitis patients. According to [17], subjects with high waist circumference were more likely to develop periodontitis. One study found that BMI and WC were significantly correlated with CAL, GI, and CPI in women. CPI and WC were the only variables that had a significant correlation in males. Females who were overweight and obese in the abdominal area were significantly more likely to suffer from periodontal disease than those who were overweight or obese in the abdominal area [18].

As a unique feature of this study, men with different degrees of periodontal disease were assessed for body composition parameters.

It is also common to experience similar changes in the bone and periosteum in other areas other than the mouth. The cause of osteoporosis is reduced osteoid deposition, depletion of osteoblasts, and impaired morphodifferentiation of connective tissue cells to form osteoblasts, not increased osteoclastic activity. Periodontal tissue destruction is also aggravated by protein deficiency, but gingival inflammation is initiated and exacerbated by bacterial plaque infection [22]. Protein deprivation increases the vulnerability of periodontal tissues to breakdown when challenged by bacteria due to a lack of integrity.

There seemed to be an association between periodontal disease and bone mass in the present study. A significant difference was found between subjects in the gingivitis and periodontitis groups with respect to bone mass. In addition to osteoporosis and periodontitis, aging is associated with an increased incidence of these diseases. Osteopenia occurs when bone resorption and formation are out of balance, favoring resorption, resulting in osteoporosis and demineralization. Fractures are more likely to occur in people with osteoporosis because of low bone mass and fragility. There is a major cause of tooth loss and edentulism in adults and that is periodontitis, which is an inflammation of the supporting tissues of the teeth that results in resorption of the alveolar bone [23]. Some studies have examined the relationship between osteopenia and periodontal disease. Bone mineral density and periodontal disease have a significant relationship [24]. Osteoporosis and periodontal disease can be detected and prevented more effectively if health care providers understand this relationship. The importance of increasing dialogue between medical and dental professionals is becoming increasingly evident when it comes to achieving and maintaining optimal patient health. Body posture was tested for its association with periodontal disease, and its causative role cannot be inferred from this study.

CONCLUSION

It appears that severe forms of periodontal disease in males and their body composition are significantly correlated, but further study is necessary to confirm this association.

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