

REVIEW ARTICLE



Association of periodontal diseases to anxiety and stress

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Received 12 May 2015;

Accepted 14 June 2015

doi: 10.15713/ins.ijcdmr.78

How to cite the article:

Maryam Abrishami, Zeynab Abdi Zamharir, Sajedeh Ghorbanzadeh, "Association of periodontal diseases to anxiety and stress," Int J Contemp Dent Med Rev, vol.2015, Article ID: 030515, 2015. doi: 10.15713/ins.ijcdmr.78

Abstract

The effect of periodontal diseases is not equal for the people of a same community. There are risk factors in some people making them more sensitive to the disease spread. Getting infected to certain pathogens, cigarette, and uncontrolled diabetes increases the risk of periodontitis. Other factors such as stress, depression, and anxiety are not considered as absolute risk factors, yet. The biological justification for this relationship is that the psychological status and facing with stressors could change the immune response and made the individual more sensitive to the disease spread. The aim of the present article was to review the periodontal relationship with psychological factors of anxiety and stress. The research is conducted using review article method and by searching through keywords such as anxiety, periodontal disease, and stress in PubMed. Most of the published studies are backing up of a positive relationship between periodontitis and socio-psychological factors. Different lifestyles, stressful situation, hormonal changes, dental negligence, bad habits like smoking are considered as predisposing factors of periodontal diseases.

Keywords: Anxiety, depression, periodontal disease, stress

Introduction

Dental plaque inflammatory changes in gum and periodontium are the most prevalent disease in tooth supporting tissues. Gingivitis could be remained for a long time with no progress toward the gum periodontitis. Gingivitis is totally reversible by proper oral hygiene and accurate removal of plaque and germs. Reasons of gingivitis progress toward periodontitis or its lack of progress have not fully identified yet. Like all opportunistic infections, it seems that proliferation and invasion of microorganisms to tissues and most importantly the host response to that infections are the resistance and immune status of definitive factors in getting periodontitis.^[1-6]

Creating totally no plaque in the oral cavity is unavailable and even non-physiological. However, if the amount of plaque accumulation and pathogenic organisms is low and appropriate immune response being provided, we could preserve the health of gingival and periodontal. Some chronic recurrent diseases, like periodontal diseases, have a fluctuation period, namely a progressive trend, which intensifies in some cases and immune response is stimulated during this period, and inflammation is raised.^[7,8] The probable role the stress could play in exacerbation procedures is the subject of an investigation by psychoneuroimmunology.^[9,10]

Stress is a term that is always redefined in the scientific study of diseases, but it never considered as a definitive factor of etiology and inflammatory disease progress. It is stated that stress is defensive response of a living creature against forces, which exert on body simultaneously and in the case that these forces last more than the capacity range of adaptive mechanisms, it leads to debilitating diseases and finally death. He also declared that stress related central mechanisms are activation of the adrenal-pituitary axis. The occurrence of adaptive disease symptoms, which originates from chronic, severe, and often uncontrolled stresses, is usually controlled in the body of living creatures by the autonomic nervous system. The disease caused as a result of chronic inflammatory changes.^[11-14]

The relation between immune system components is explained by LeResche and Dworkin, completely. They show the effect of stress and corticotropin-releasing hormone (CRH) on allergic responses and inflammatory immunity through the activation of glucocorticoids - catecholamines and environmental release of CRH and change in main cytokines.^[2] On the other hand, the relationship between the neuroendocrine hypothalamic pituitary-adrenal axis and the inflammatory immune system is such that regulated through the feedback loop of inflammatory immune response.^[15] Chrousos and Gold described the relationship between stress

and environmental and central responses for maintaining physiologic homeostasis.^[16]

In fact, stress either in the basic level of rest or in increased level, could have anti-inflammatory or inflammatory effect on impacted tissues based on existence or absence of different kinds of especial immune cell receptors.^[17]

Since stress is indispensable part of our lives and its role has been identified in some inflammatory diseases such as rheumatoid arthritis and lupus, and the process of periodontal diseases like this type of problems, we decided to review the role of stress on periodontal diseases.

Materials and Methods

The study was conducted using review article method. Related articles were collected with keywords including anxiety, periodontal diseases, and stress in PubMed. Articles were found in this field and were investigated in terms of methodology, objective, indexes, measurement, variables, definitions, periodontal disease, anxiety, stress, research method, statistical analyses, and discussion.

Results

Various studies have sought to plan the current concepts of stress, in a way that based on existing evidences, they could indicate the relationship between stress and periodontal.^[15,17] Regarding the amount of pressure and psychological, social, and economic stresses, which is imposed on all members of a community, we decided to evaluate the relationship between stress and anxiety with periodontal diseases.

According to studies conducted in the field of stress and periodontitis connection, the probable mechanisms, through which depression and anxiety could affect periodontal disease is as follows:

- 1- Hormonal and neural changes due to psychological stress that affecting the immune system.
- 2- Changes in health care behaviors.
- 3- Bad habits like smoking.

These factors lead to the formation of vicious cycle and progress of periodontal inflammation intensity. Behavioral and emotional responses of an individual to the process of progressive periodontal disease are also another type of socio-psychological stressors.^[1] Moreover, studies supported the hypothesis that patients with stress and anxiety have a vicious cycle and the accumulation of plaques increase the risk of disease.^[17,18] According to an *in vitro* study, investigating the effect of catecholamines on subgingival plaque microorganisms, Roberts *et al.* and Moss *et al.* concluded that various organisms of microbial complexes have different developmental responses to noradrenaline, among which *Actinomyces naeslundii*, *Eikenella*, and *Campylobacter* have 49.4, 43.3, and 79.9% growth increase, respectively. Change in subgingival plaque, in response to stress-driven changes, has a significant role in etiology and pathogen of periodontal diseases.^[4,19]

The positive relationship of the amount of plaque index with depression and anxiety has been identified, and one of the reasons could be poor hygiene in people with depression and anxiety.^[6] These people are more frequent than normal individuals in gum bleeding and referring to the dentist.^[20] Moreover, depression and anxiety cause physical problems, the decline in life quality, and periodontitis that this type of depression is a photogenic factor in periodontitis.^[21] Other studies approved the exacerbation of inflammation, which is caused by the simultaneous existence of depression and physical problem signs.^[22] Obesity along with anxiety is considered as gum problem and periodontitis.^[23] Those with overweight show higher smoking rate, depression and anxiety, and lower level of life satisfactions.^[23] Large numbers of overweight women indicate more areas and teeth with pocket depth (PD) of more than 6 millimeters and clinical attachment loss of more than 5 mm 13. Patients with average PD of 3 mm and bleeding on probing of more than 25% have higher dental anxiety and lower self-confidence.^[23] Analyses illustrated that anxiety has a positive relationship with the increase in PD, while life satisfaction has a positive relationship with flossing. Finally, it can be said that there is a relationship between psychological indicators and periodontitis and body mass index.^[23,24] On the other hand, there are no strong evidences to prove the relationship between depression, anxiety, and hopelessness with periodontitis and one the reasons could be small statistical population,^[11,18,25] but some authors illustrated the positive relationship between number of tooth loss and amount of depression.

Dental stress is considered as a direct factor in oral health.^[26-28] Eitner *et al.*^[26] conducted an epidemiological study in 2006 to investigate the prevalence of pattern of dental stress-related oral disease in young soldiers. The intensity and frequency of dental stress have been assessed, and its correlation evaluated with clinical findings. Totally, 374 soldiers were forcibly sent for check-up, and psychological factors were collected based on dental anxiety scale (DAS) and fear criterion GaFa (Gatchell). Most patients got the score of D3, 4MF for dental status and community periodontal index of CPITN treatment needs for periodontal status. Totally, 32 people (8.6%) get DAS score of 13 or 14 for anxiety while 4.6% get DAS score of more than 15, extremely anxious. The highest DAS score was measured in 19-29 years old patients. Anxious patients had more skin lesions. CPITN had no significant difference in the two groups. About 89.2% of people with less anxiety and 79.6% of anxious patients were sent for regular dental check-up. Therefore, one out of 10 people experienced high dental anxiety. Due to the direct effect of anxiety in oral health, it should be investigated in dental treating protocols and behavioral treatments.

In another study, performed to find a relationship between self-control and self-confidence and oral health behaviors in students, analyses have shown that healthy teeth and gums, as a dependent variable is strongly related to the levels of self-confidence.^[24]

Deinzer *et al.* assessed the effect of academic stressors on gum inflammation in various studies. In these researches, it is shown

that the gum health in proportion to basic levels in experimental groups, who passed a period of academic examinations has a remarkable difference compared to their peers' control group, who did not experience these examinations.^[29] Moreover, these stresses cause changes in the amount of interleukin (IL)-1B, which could contribute to the destruction of periodontal tissues. Those who passed the academic tests have explicitly illustrated upper levels of IL-1B and gingivitis.^[6,29,30] He also concluded that socio-psychological stress would lead to indifference to hygiene and increase of plaque accumulation.^[31]

Many researches are supporting the hypothesis that, life experiences are significantly definitive factors at the beginning and during the life in creating gingivitis in youth,^[32] and periodontitis in older ages. However, no evidences have been found to show the relationship between psychological stress in children and infection to gingivitis and periodontitis.^[33,34]

Problems arising from life, different levels of life quality, occupation, and anxiety and depression play an important role in periodontal diseases.^[35-37] In addition, a positive relationship has been found between periodontitis and age, male, smoking, and education.^[36] In clinical observations and various other epidemiologic studies, it was realized that unpleasant life experiences, especially in cases with depression are related to the development of periodontal disease.^[22,38]

In contrast to previous study methods of chronic diseases, in which the only effective factor is not considered in a single time interval, in new method of study, namely life course approach, it is believed that the negative factors and their consequences are accumulated during the life. In life course approach, instead of considering the current lifestyle emphasize is on socially biological experiences in different period of lives or programming hypothesis declaring that environmental events and conditions during embryonic and infancy period plan the risk of catching disease in future life. Furthermore, the role of socioeconomic in childhood period can affect oral health behaviors and the level of oral health in other periods of life.

Other studies have also been conducted on the impact of different ways of dealing with stress on periodontal disease. We evaluated the patterns applied by individual for coping with stress and their reactions in specific stressful situations, and periodontal clinical parameter of clinical attachment loss (CAL) has been selected. The result was that patients with high defensive coping characteristic had higher CAL.^[39]

Various conducted studies in China and Austria indicated that depression and inability in coping with life problems increase the risk of periodontal diseases. Anxiety and depression cause gum inflammation, but it could not justify the lack of dental care.^[21,27]

In general, most of the published studies advocate a positive relationship between periodontitis and socio-economic status, personal factors, anxiety, depression, and life stress. Different methods have been used in different projects for achieving psychological and periodontitis factors. Psychological variables were usually measured by criteria announced by patients, themselves. Hence, they may also contain wrong information or may cause bias, which is an unstable situation in clinical

phenomenon studied. The demographic arrangement, people under study, age, gender, educational level, race, controlling potential confounding variables, cigarette, and oral health status are completely different in studies. However, results illustrated that the main mechanisms, which make a patient vulnerable to gingivitis and periodontitis through psychological factors include:

1. Behavioral mechanisms that are intensifying factors of periodontal disease in lifestyle, such as indifference to oral hygiene, changes in diet, an increase in smoking.
2. Direct pathophysiologic effects on host defense as an interruption in the relationship between psychological factors and periodontal disease need more consideration.^[40]

Conclusion

According to the obtained results, we can conclude that those who are more vulnerable to stressful conditions and suffer more from depression and anxiety symptoms during their life, hormonal changes and negligence in regulating oral health and getting used to bad habits like smoking could cause periodontal diseases.

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