

BEHAVIORAL FACTORS AND PERIODONTAL DISEASES.**Dr. Shweta Sharma¹, Dr. Himanshu Trivedi^{1*}, Dr. Vivek Kumar Sharma¹ and Prof. N. D. Gupta¹**^{*1}Department of Periodontics and Public Health Dentistry, Dr. Ziauddin Ahmad Dental College, Aligarh Muslim University, Aligarh.***Corresponding Author: Dr. Himanshu Trivedi**

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ABSTRACT

Much periodontal research concentrates on proximal causes such as bacteria and the behavioral and lifestyle aspect of person affecting periodontal health is not addressed. Habits and behaviors to life circumstances affect the immune system and thereby systemic and oral health. Assessment of such risk factors and their management should be a vital part of periodontal therapy.

KEYWORDS: Behavior, Oral health, Periodontitis, Risk factors.**INTRODUCTION**

Although bacterial plaque is the primary etiological agent in pathogenesis of periodontitis, development and progression of this disease is associated with presence of risk factors which implies direct increase in probability of disease occurrence. Lifestyle is the clustering of behaviors and can be viewed as the manner in which social groups translate their objective situation into patterns of behavior.^[1] Personal behavior or lifestyle is an important risk factor associated with periodontal disease. Being a modifiable risk factor, a sound understanding of behavior strongly linked to periodontal disease and how the behavioral factors affect the response of periodontal tissue to pathogens is essential for treatment planning and intervention.

Health related behaviors

Health related behaviors are an expression of the circumstances that condition and constrain an individual's behavior. Behaviors and responses to life circumstances affect the immune system and thereby health and diseases. Immunosuppressive behaviors are oftentimes observed in individuals under stress; such behaviors include smoking, changes in diet, alcohol consumption, caffeine intake, licit and illicit drug use, the neglect of oral hygiene behaviors, bruxism and altered sleeping patterns.^[2] Kaplan considers that there are effects of such behaviors on T-cell numbers, depression of lymphocyte and granulocyte reactions during sleep deprivation and T lymphocyte and helper cells changes in single nutrient deficiencies and in cigarette smokers. This paper will outline some of these lifestyle immunosuppressive behaviors and their role in periodontal disease progression including their importance in treatment outcome.

Various health impairing behavior which affects periodontal disease progression and treatment discussed in this review are:

1. oral-hygiene behavior
2. smoking
3. alcohol consumption
4. Impaired dietary habits
5. Parafunctional habits and disturbed sleeping pattern

Oral-hygiene behavior

Oral hygiene-related behaviour and self care is critical to plaque control in patients with periodontal disease. Lack of good oral hygiene habits has been viewed as periodontal risk factor by public health practitioners since long.^[3] Supragingival plaque removal by various oral hygiene measures including the use of tooth brushes, chewing stick, dental floss and other interdental aids may be one of the ways to limit periodontal diseases.

Toothcleaning behavior is related to levels of routinization and flexibility of daily activities. Abegg et al. observed that high flexibility of working time schedule was related to pattern (high toothcleaning frequency), structure (the use of more toothcleaning aids) and performance (lower levels of dental plaque) of toothcleaning.^[4,5] Those who had more flexible working hours cleaned their teeth more often and more effectively. So, work organization plays an important role in toothcleaning behavior. In addition to work, people who had a less routinized and more flexible day, had higher toothcleaning frequency and cleaned their teeth more effectively than those who had a less flexible and more routinized day.^[4] People with high flexibility in daily activities had better toothcleaning performance than those who had low levels of flexibility. It appears that the choices related to oral health behaviors are

governed by the routines and flexibility of daily life activities.^[4]

Proper toothbrushing is a seemingly simple motor activity and is a part of day to day life. Toothbrushing habit results from a repeated and patterned sequence of behavior over time.^[6] Tooth brushing habit is usually introduced to the early in life during childhood which over time, becomes a common routine and is resistant to change.^[7,8] A large proportion of the population may be mostly unaware of their own toothbrushing behavior. Therefore, whatever method of toothbrushing an individual has been following since childhood, if it is improper, it is very difficult to change. Moreover, Proactive interference i.e., performance of existing habit unconsciously could be a factor silently impeding the learning and adaptation of toothbrushing skills.^[9]

To understand the beliefs underlying brushing and flossing self-care, Health Belief Model (HBM) has been utilized.^[10] The HBM states that perception of severity and susceptibility to inaction and an estimate of the barriers and benefits of behavioral performance influence people's health behaviors. According to the HBM, perceived barriers and self-efficacy are the most important constructs that could predict a health behavior. Also, there is evidence that perceived severity of oral diseases is associated with increased tooth brushing frequency.^[11,12]

Since toothbrushing by itself is relatively ineffective for interproximal plaque removal^[13], regular dental floss use is suggested to facilitate health of interdental gingival tissues.^[14] In older adults, less tooth loss is associated with an increased frequency of toothbrushing and flossing.^[15] In the review by Berchier *et al.*, a trend was observed that indicated a beneficial adjunctive effect of floss on plaque levels.^[16] Furthermore, recent studies have shown that interdental cleaning of teeth with the appropriate aids reduces plaque accumulation and gingivitis and that interdental cleaning is not associated with periodontal pocketing.^[16,17]

According to Bandura, adequate incentives and appropriate skills must be in place for an activity to be performed.^[18] Most people tend to neglect this important habit, as the task is tedious, require meticulousness, as well as good manual skills.^[19] According to studies based on Bandura's theory of self-efficacy^[20], people perform activities they find they can manage but avoid those they believe they are unable to cope with. Patients are known to find flossing difficult, especially where there are tight contact points and therefore interdental cleaning does not readily become an established part of daily oral hygiene. The handheld or finger rolled type of the dental floss was the most commonly used in this environment, which may be attributed to personal preference or ease of use or rather the availability of this type in the markets. Furthermore, Poor awareness and lack of knowledge appeared to be the main reason in not cleaning

interdentally, as observed in a study.^[21] However, patient ability and motivation are also the main problem.

A recent meta-review evidence suggests that interdental brushes are the most effective devices to remove interdental plaque. In addition they are appreciated best by the patients.^[22] Evidence from controlled trial have shown that oral irrigator and wood sticks, do not have an additional effect on visible interdental plaque or gingival index, but do, however, provide an improvement in interdental gingival inflammation by reducing the bleeding tendency.^[23,24]

Regularly repeated tooth cleaning instruction and prophylaxis can stimulate adults to adopt proper oral hygiene habits. A longitudinal study^[25] done with 12 months follow-up, investigating the factors affecting behavioural change outcomes in patients with periodontitis revealed that a successful level of oral hygiene performance, measured as gingival index outcomes, increased for participants treated with the cognitive behavioural intervention and those who reported inter-proximal cleaning had a healthier gingiva. This study correlated with various other studies reporting self-efficacy beliefs to be a strong explanatory factor for both frequency of toothbrushing and flossing and was related to oral hygiene behavior.^[26]

Personal oral hygiene is considered to be essential in the maintenance of patients diagnosed with periodontitis.^[27] Full mouth assessment of the bacterial load must have a pivotal impact in the determination of the risk for disease recurrence. Effective removal of plaque on a daily basis by the patient is critical to the success of periodontal therapy. In patients after systematic periodontal treatment, regular SPT and effective oral hygiene are effective tools to prevent tooth loss and maintain a beneficial outcome on a long-term basis.^[28] Adherence to supportive periodontal therapy is essential to maintain stable periodontium and to improve prognosis. Treatment strategies must be based on individual compliance to plaque control.

Smoking

Public perceptions about tobacco differ widely from the realities of personal risk and social harm.^[29] Cigarette smokers do not perceive themselves at special risk.^[30] This perception promotes initiation and addiction sustains it. Despite the potential negative outcomes, smoking is a common behavior, especially among young people.^[31] Reviews indicate that the smoking behavior of family members and particularly friends greatly influences adolescents to smoke.^[32] In a cross-sectional analyses among students, findings showed that higher depressive mood, low self-esteem and low self-efficacy appeared to be related to enhanced levels of smoking.^[33] Smoking, is an activity engaged in by people in particular circumstances, like after meal, while studying, while driving etc.^[34] In addition, those who experience family conflict and disruption are more likely to be

teenagers smokers.^[35] Educational characteristics such as early school-leaving and poor educational performance are associated with teenage smoking.^[36]

Smokers have both increased prevalence and more severe extent of periodontal disease than in nonsmokers.^[37] The greater severity of periodontal destruction may be due to the increase in the rate of periodontal disease progression.^[38] Various data provide strong support that the risk of developing periodontal disease as measured by clinical attachment loss and alveolar bone loss increases with increased smoking.^[39] Decrease in gingival blood flow, lowered chemotactic and phagocytic capacity of PMNs, lowered IgA, IgG, IgM and suppressor CD8 lymphocytes are found in smokers as compared to non smokers. These differences must be taken in to account by clinician while evaluating periodontal therapy as these factors negatively affect the healing potential of periodontal tissues.

Much of the literature has indicated that smokers affected with periodontitis respond less favorably to both non-surgical and surgical and regenerative periodontal treatments.^[40,41] Tooth of a smoker showed twice the risk of a worsening in its prognosis over a 5-year period of supportive periodontal care with respect to a similar tooth of a nonsmoker.^[42,43] The majority of studies show that gingival grafting for root coverage is less successful in smokers than nonsmokers.^[44,45] The success rate of dental implants has also been shown to be compromised in smokers and smoking is a relative contraindication to dental implant therapy.^[46] These facts are important for treatment planning and are powerful motivating factors for dental health professionals to use in treatment planning and tobacco cessation counseling.

Comparison of the obtained results for various periodontal therapies with those observed in nonsmokers has indicated that both the extent and predictability of the outcomes were significantly reduced with respect to nonsmokers.^[47] It is important to underline that reduced outcomes were observed in smokers even after correcting for the oral hygiene levels of the patients. Studies indicate that refractory periodontitis patients are predominantly smokers (86% to 90%) and chances of a successful treatment outcome (greater than a 50% reduction in the prevalence of deep pockets) were 50% for patients who smoked during periodontal therapy compared to 85% for non-smokers.^[48]

Alcohol intake

Studies of the past decade have suggested a positive association between high alcohol consumption and periodontitis.^[49,50] Greater risk for alcoholism are for, a young adult experiencing peer pressure, low self-esteem, high level of stress, a family or culture where alcohol use is common and accepted, a close relative with alcohol use disorder. Based on the theory of reasoned action, media can be one source of influence on attitudes toward alcohol that in turn affect behavior.^[51] Adolescents learn

behaviors through a process of modeling and imitation^[52], as through alcohol advertisements in which role models are seen engaged in alcohol use.

Several biological effects of alcohol consumption on host defence mechanisms, including decreased inflammatory response and altered cytokine production may explain an association between alcohol and periodontitis.^[53] Alcohol consumption impairs neutrophil, macrophage and T-cell functions, increasing the likelihood of infections. The link between alcohol and health is influenced by several factors such as drinking patterns, amount and type of alcohol consumed and by age and gender. Alcohol drinking may be associated with poor oral hygiene practices, possibly raising periodontitis risk.^[54]

Much attention has been given to smoking as a risk factor of periodontal pathology, relationship between alcoholism and periodontitis has been ignored, although relationship has been found between them. Researchers found that the severity of a regular alcohol user's existing periodontitis correlated incrementally with the frequency of his or her alcohol consumption. These individuals were found to require additional periodontal treatment as well.^[55] Among study participants, drinkers without periodontitis exhibited a higher presence of plaque than their non-drinking counterparts. Study researchers noted that alcohol's drying effect on the mouth may contribute to the formation of plaque. An inverse relationship was found between alcohol consumption and clinical attachment loss in a study which assessed total and type-specific alcohol and periodontitis.^[56] Another study demonstrated significant linear relationship was found between the number of alcoholic drinks consumed weekly and the amount of clinical attachment loss.^[57] A dose-response relationship was suggested by the increased difference in mean clinical attachment loss. Thus regular alcohol consumption can be detrimental to both periodontal disease progression and treatment outcome.

Dietary habits

A significant association between poor overall diet quality and higher periodontitis prevalence has also been reported.^[58] Recently, obesity was found to be significantly associated with higher periodontitis prevalence.^[59] In overweight students, the frequent consumption of fatty foods and infrequent consumption of vegetables were associated with an increased risk of periodontitis.^[60] Snacking behavior i.e, eating in between meals is more harmful because each time tooth will be exposed to acid attack. In a study, it was found that attitudes, subjective norms and perceived control deteriorated and improved in subjects who respectively, deteriorated and improved their intention to avoid sugared snacks.^[61] Moreover, sugar consumption decreased statistically significantly in subjects who improved their intended sugar avoidance. Improved attitude towards sugar avoidance and student's tooth brushing was found in students who improved their oral

knowledge and deteriorated in students who deteriorated their knowledge. Thus positive attitude, perceived control over eating and improved oral knowledge can help in improving behavioral intention to have better diet.

A study examining the cumulative effect of the three health-enhancing behaviors (maintaining healthy weight, eating healthful food and engaging in the recommended level of exercise) on prevalence of periodontitis found that a 1-unit increase in the number of these healthy behaviors is associated with about 16% reduction in the prevalence of periodontitis, independent of major risk factors for periodontitis.^[62]

The mechanism underlying the association between diet quality and periodontitis could be related to the local and/or systemic effect of diet on periodontal health. The type and amount of food consumed has been linked to the development and survival of plaque biofilm, which is the primary etiologic factor for periodontal disease, by providing a direct nutrient source or by altering its surrounding environment.^[63] Moreover, a natural texture diet (i.e., fruits and vegetables) has been suggested to reduce plaque accumulation, while a softer diet may promote plaque accumulation and subsequently contribute to the development of periodontal disease.^[64] The consumption of excessive quantities of refined carbohydrates and softer diets which clings to teeth and therefore predisposing to plaque accumulation at the approximal risk site.^[65]

In recent years, strong evidence has emerged that diets rich in refined carbohydrates and saturated fats are pro-inflammatory, whereas those rich in polyunsaturated fats (fish oils), antioxidant micronutrients (fruits/berries and vegetables) and certain nuts (cashews) are anti-inflammatory.^[66] Antioxidant micronutrients have efficacy in reducing extracellular oxidative stress and intracellular role in the down-regulation of redox-regulated pro-inflammatory gene transcription factors.^[67] Moreover, it was found that dietary supplementation with fruit/vegetable/berry juice powder concentrates, simultaneously with non-surgical periodontal therapy, improved 2-month treatment outcomes. Thus proper diet behavior influences periodontal disease progression as well as periodontal therapy.

Parafunctional oral Habits and Disturbed sleeping pattern

Oral habits are learned patterns of muscle contraction and they are associated with anger, hunger, sleep, tooth eruption and fear. These habits might be lip and nail biting, use of indigenous chewing-stick and bruxism events. These habits are more or less considered to be "nervous habit" and that the frequency and degree of them increase in situations of stress, anxiety or tension. Signs and symptoms of bruxism and parafunctional activity include hypertrophied masseter and temporalis muscles, myocytitis of these same muscles, morning jaw

stiffness, damage to dentoalveolar structure and sensitivity in a tooth or teeth.^[68] Additionally, migraine is associated with parafunctional activity. If these habits are overlooked and not diagnosed by dental professionals, it can negatively affect the oral health.

Habit of clamping and grinding can cause prolonged tension and compression forces which may cause congestion and irritation of the periodontal membrane.^[69] These repeated forces of habit origin can, in time, seriously damage the periodontal membrane, causing periodontal disease, or they may become a secondary factor in an already existing periodontal disease. The patient may be completely unaware of these repeated and sustained forced contacts of the teeth which may slowly damage the periodontal structure.

Work, stress, and active worry aren't the only causes for bruxism. Bruxism can be classified as awake or sleep bruxism. Disturbed sleep habits and a misaligned bite can increase grinding and clenching, inviting bruxism activity even when completely unconscious. In the old and people with sleep apnea, bruxism can reduce the quality of sleep.^[70] For this reason researchers have often classify bruxism as a sleep disorder, as well as a parafunctional habit. Thus, disturbed sleep habit is not only unhealthy for teeth but it can have an impact on overall health.

Bruxism can have unpleasant and harmful effects on both jaw and teeth. Effect of bruxism includes, gingival recession, insomnia, malocclusion, trauma from occlusion. The periodontal manifestation of tooth wear, like occlusal trauma, occurs due to the reduced ability of teeth to withstand the normal forces of mastication due to loss of tooth structure in tooth wear.^[71] Occlusal forces can cause changes in the alveolar bone and periodontal connective tissue both in the presence and in the absence of periodontitis.^[72] These changes can affect tooth mobility and clinical probing depth. Since grinding and clenching lead to overwork of jaw muscles, these behaviours can result in discomfort, headaches and earaches, in addition to slow erosion of teeth. Severe grinding can also be so loud that it may cause disagreeable habit of waking up repeatedly at night. The supervening plaque on occlusal trauma leads to accelerated periodontal breakdown and periodontitis. These periodontal manifestation of parafunctional habits can lead to increase in progression of existing periodontal disease and affect negatively in periodontal therapy

CONCLUSION

This review highlights the importance of lifestyle and behavioral factors in periodontology, making it apparent that a thorough diagnosis of the behavioral factors discussed here is as important as clinical diagnosis. Especially, for gaining better prognosis and treatment outcome of periodontal therapy it is important to diagnose health impairing behavioral aspect of each

patient. Oral health education should focus on improving knowledge and attitudes and removing barriers to daily oral health care. One must aim at identifying and enhancing the psychological features (such as self-efficacy) that characterise dental behaviours. Motivation and education plays crucial role in changing attitude of patient and it should be the initial step in treating any patient.

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