Review Article

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Risk Factors for Periodontal Disease: A Review

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ABSTRACT

Background: At present, several possible risk factors for the initiation and progression of periodontitis have been identified: age, gender, plaque, calculus, existing attachment loss. A consistent finding appears to be genetic predisposition for the development of the disease. Periodontal Diseases are infections, which are associated with specific pathogenic bacteria that colonize the subgingival area. Initiation and progression of periodontal infections are clearly modified by local and systemic conditions called risk factors. The local factors include pre-existing disease as evidenced by deep probing depths and plaque retention areas associated with defective restorations. Systemic risk factors recently have been identified by large epidemiologic studies using multifactorial statistical analyses to correct for confounding or associated co-risk factors.

Keywords: Periodontal Disease, risk factors, plaque.

INTRODUCTION

Periodontitis is one of the most ubiquitous diseases and is characterized by the destruction of connective tissue and dental bone support following an inflammatory host response secondary to infection by periodontal bacteria [1, 2] Children and adolescents can have any of the several forms of periodontitis such as aggressive periodontitis, chronic periodontitis, and periodontitis as a manifestation of systemic diseases [3,4,5] It is of utmost importance to provide a clear analysis of the evidence supporting the important role of risk factors in determining the differences between individuals in susceptibility to periodontal disease and gain a deeper understanding of the role of risk factors in order to incorporate risk-factor modification in the management of periodontal disease.

RISK TERMINOLOGY

A risk factor can be defined as an occurrence or characteristic that has been associated with the increased rate of a subsequently occurring disease. It is important to make the distinction that risk factors are associated with a disease but do not necessarily cause the disease. Risk factors may be modifiable or non-modifiable.

Modifiable risk factors are usually environmental or behavioral in nature whereas non-modifiable risk factors are usually intrinsic to the individual and therefore not easily changed. Non-modifiable risk factors are also known as determinants.

RISK FACTORS FOR PERIODONTAL DISEASE

MODIFIABLE RISK FACTORS

MICROORGANISMS AND PERIODONTAL DISEASE

The subgingival microflora in periodontitis can harbor hundreds of bacterial species but only a small number has been associated with the progression of disease and considered etiologically important. Subgingival plaque from deepened periodontal pockets is dominated by gram-negative anaerobic rods and spirochetes [6,7]. Strong evidence has implicated Porphyromonas gingivalis and

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Aggregatibacter actinomycetemcomitans [8,9] to the pathogenesis of adult periodontitis.

TOBACCO SMOKING

Smoking cigarettes, the source of more than 4,000 toxins, is a major risk factor for all-cause mortality, cardiovascular disease, various cancers, and several chronic diseases[10]. Smoking leads to peripheral vasoconstriction probably associated with low doses of nicotine. Vasoconstriction can lead to reduced gingival bleeding and can cause the observation of less gingivitis and reduced gingival bleeding in smokers compared with nonsmokers. An association between acute necrotizing ulcerative gingivitis and tobacco smoking was reported in 1947.[11] The importance of cigarette smoking as a risk factor for periodontal disease is supported by: (i) consistency of results across many studies; (ii) strength of the association; (iii) dose–response of the association; (iv) temporal sequence of smoking and periodontal disease; and (v) biologic plausibility.[12]

DIABETES MELLITUS.

Patients with undiagnosed or poorly controlled diabetes mellitus type 1 or type 2 are at higher risk for periodontal disease. There are many studies that demonstrate an association between diabetes and an increased susceptibility to oral infections including periodontal disease [13-16]. Most well-controlled diabetic patients can maintain periodontal health and will respond favorably to periodontal therapy.

CARDIOVASCULAR DISEASE.

High concentrations of cholesterol and the action of oral bacteria in the process of atherosclerosis or the participation of acute-phase proteins that may increase in chronic periodontitis includes some of the mechanism.

Periodontitis is associated with the increase in the level of C- reactive protein and fibrinogen irrespective of coronary diseases. Furthermore, there is evidence that suggests that the increase in the levels of systemic markers of inflammation, such as the C-reactive protein (CRP) and interleukin-6 (IL- 6), is associated with cardiovascular diseases [17].

STRESS

Traumatic life events, such as loss of a spouse, increased the risk of periodontal disease, but individuals with the ability to cope with this stressful stimulus have reduced the role of the traumatic life event in the progression of periodontal disease. Stress can also result in a decrease in the production of proinflammatory cytokines as a result of the release of neuropeptides from sensory nerve fibers. These neuropeptides can modulate the activity of the immune system, leading to more tissue destruction.

OBESITY

Obesity is an emerging major public health problem, as the prevalence of obesity and overweight has trebled since the 1980s. Overweight and obesity are defined by measures such as body mass index, waist: hip ratio, waist circumference, body weight, and body-weight changes.

Younger people may have different dietary patterns than older study participants. Research in dietary trends in adolescent's ages from 11 to 18 reveals a significant decrease in raw fruit and nonpotato vegetables, which are sources of vitamin C. In addition, adolescents have decreased their calcium intake and increased their intake of soft drinks and non citrus juices. This is important to oral health because low dietary intake of calcium and vitamin C has been associated with periodontal disease.[18]

NON MODIFIABLE RISK FACTORS

OSTEOPOROSIS

Osteoporosis is a systemic disorder characterized by reduced bone-mineral density throughout the skeletal system, including the jaws. Osteoporosis increases the risk for fracture, particularly hip fractures, which in the elderly doubles the risk of death in the first 12 years after fracture The main risk factor for osteoporosis in women is menopause, which is associated with reduced estrogen production that results in increased bone resorption.[19]

HOST RESPONSE.

The bacterial components such as lipopolysaccharides and cytokines activate the

macrophages to produce cytokines such as interleukin (IL)-1 and tumor necrosis factor (TNF). These cytokines activate the fibroblasts that reside in the periodontal tissues to the matrix metalloproteinases (MMPs), a plasminogen activator, which can activate plasmin. Plasmin, in turn, can activate some other types of latent MMPs, while tissue inhibitors of metalloproteinases (TIMPs) can inactivate the active MMPs. Among susceptible individuals, the prolonged and excessive bacterial promotions of the MMPs induce the enhanced degradation of collagen, which is a primary component of the periodontal matrix.

PREGNANCY

Periodontal diseases have been shown to increase the risk of adverse pregnancy outcomes such as premature birth and low birth weight. [20] Uterine contractions are stimulated by oxytocin, which is produced by the hypothalamus and by prostaglandins produced by the placenta. This process normally occurs in the third trimester and leads to birth. However, chronic infection can stimulate the inflammatory process, which leads to elevated amniotic levels of prostaglandins, TNF alfa, Interleukin-1 and -6. These mediators then lead to premature rupture of membranes and pre-term labor.

CONCLUSION

Risk factors work to change the susceptibility or resistance of individuals to the disease. The modification of these risk factors plays a strategic role in the management of periodontal disease, accepting of course that some, such as race or genetics, cannot be changed. The identification of high-risk patients is therefore essential in the ultimate management and treatment of periodontal diseases. As periodontal disease is multifactorial, effective disease management requires a clear understanding of all the associated risk factors.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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