RISK FACTORS FOR DEVELOPMENT OF PERIODONTAL PATHOLOGY

The main risk factor for periodontal pathology is microorganisms realizing its pathogenic potential in terms of the immune response and environmental conditions. We can say that gum disease develops as a result of a plaque build up because of poor oral hygiene — not brushing and flossing teeth regularly and visiting the dentist.

The current concept concerning the etiology of periodontal disease includes bacterial pathogens, host factors and environmental factors.

Bacterial pathogens. The main cause of periodontal diseases is microorganisms. The oral biofilm consists mainly of microbes and host proteins that adhere to teeth within minutes of a dental oral hygiene procedure. Healthy gingival sulcus has a flora dominated by equal proportions of Gram positive cocci. Over time, the flora changes from predominantly gram-positive to gram-negative, from facultative aerobes to strictly anaerobic species, with more motile forms present. Mature subgingival biofilm takes up to 12 weeks to develop. As biofilm accumulates, gingivitis develops over a period of several days in the presence of periodontal bacteria.

Main periodontopathogens are the next:

– Porphyromonas gingivalis (P.g),

– Prevotella intermedia (P.i),

– Bacteroides forsythus (B.f),

– Treponema denticoula (T.d),

– Aggregatibacter actinomycetemcomitans/previously Actinobacillus actinomycetemcomitans (A.a),

– Fusobacterium nucleatum (F.n),

– Capnocytophaga species (C.sp),

– Tannerella forsythia (T.f),

– Campylobacter rectus (C.r).

In various forms of periodontal disease different microorganisms are prevalent:

1. In case of gingivitis main pathogens are Str. intermedius, Str. sanguis, A. odontolythicus, V. parvula.

2. In patients with mild periodontitis there are the following microorganisms: B. forsythus, Tr. denticoula.

3. In patients with moderate and severe periodontitis there are the following microorganisms: A. actinomycetemcomitans, P. gingivalis, P. intermedia.

It should be noted that no individual is truly biofilm free; there is either a healthy biofilm in place or a pathogenic biofilm contributing to caries and periodontal disease. The supragingival biofilm forms a reservoir for periodontal bacteria and the development of subgingival biofilm. As the biofilm matures, the concentration and virulence of the periodontal bacteria change. Moreover, when plaque is allowed to remain in the periodontal area, it transforms into calculus (commonly known as tartar) which has a mechanical action on periodontal tissues.

Supragingival calculus formation takes place from interactions between tooth surface and plaque. Subgingival calculus involves inflammatory exudates within pockets. It forms more slowly and forms an intimate relationship with the rough root surface. Calculus is always covered with soft plaque and retains toxic bacterial products. The surface texture of calculus promotes plaque accumulation and retention of irritant bacterial deposits. Calculus itself is not capable to initiate periodontal disease. Supra and subgingival calculus vary in their colour, composition and content.

Microorganisms can produce disease directly, by invasion in the tissues, or indirectly by bacterial enzymes and toxins. The inflammatory response in periodontal disease includes the activation of leucocytes, neutrophils, T-lymphocytes and plasma cells and the release of antibodies, lipopolysaccharides and chemical inflammatory mediators. The level of periodontal destruction depends on the balance between destructive and protective inflammatory mediators. While periodontal bacteria are the cause of infective periodontal disease, individual response determines disease progression.

Environmental factors include ecological factors, economical factors and some others. For example, people living in adverse environmental conditions are marked by the worst periodontal condition. People with low socioeconomic status often have the worst periodontal condition due to pure oral hygiene.

Host factors are divided into two groups: oral factors and general factors.

Oral factors include:

Oral Hygiene. Lack of oral hygiene, such as not brushing or flossing regularly, encourages bacterial buildup and plaque formation. It has been accepted for years that the relationship between oral hygiene status and periodontal disease is consistent.

Poorly Contoured Restorations. Poorly contoured restorations (fillings or crowns) provide traps for debris and plaque and can also contribute to periodontitis.

Tooth Structure. Abnormal tooth structure can increase the risk of periodontal disease.

Wisdom Teeth. Wisdom teeth, also called third molars, can be a major breeding ground for the bacteria that cause periodontal disease. Periodontitis can occur in wisdom teeth that have broken through the gum as well as teeth that are impacted (buried). Adolescents and young adults with wisdom teeth should be checked by dentist to prevent periodontal disease.

Traumatic Occlusion. Sharp cusps act as plungers and being a derogatory to periodontal health, leading to periodontitis.

Tooth Malalignment. Gingivitis is more common and more severe around malaligned teeth because they are harder to clean.

Intraoral Distribution. Tooth surfaces most affected by gingivitis or periodontitis are the proximal surfaces. The teeth most severely affected by gingivitis are the molars and lower anteriors. Attachment loss on average is greater in the maxilla than in mandible, and least in canines, mandibular 1st premolars and maxillary central incisor.

Occupational Habits. Habits like thread biting by tailors and holding nails between teeth by carpenters cause trauma to the periodontium leading to periodontitis. Miscellaneous habits like pipe smoking, pencil biting, nut biting, finger nail biting produce traumatic injury to periodontium.

The main general risk factors for periodontal disease include:

1. Age.

2. Smoking or tobacco use.

3. Female hormonal changes.

4. Illnesses such as diabetes or HIV/AIDS, and the medications used to treat some conditions.

5. Genetic factors.

Age. Periodontitis typically occurs as people get older and is most common after age 35.

Smoking. Smoking is the major preventable risk factor for periodontal disease. Smoking can cause bone loss and gum recession even in the absence of periodontal disease. The risk of periodontal disease increases with the number of cigarettes smoked per day. Smoking cigars and pipes carries the same risks as smoking cigarettes.

Risk Factors for Periodontal Infections or Poor Response to Periodontal Therapy

■ Behavioral factors (inadequate biofi lm removal, diet, noncompliance with dental hygiene recommendations)

■ Tobacco use

■ Systemic conditions (diabetes, decreased immune factors, osteoporosis, osteopenia)

■ Hormonal considerations (pregnancy, menopause)

■ Nutritional status

■ Iatrogenic factors (overhangs, open contacts, residual calculus)

■ Genetic factors

Periodontal Disease As a Risk Factor for Systemic Conditions

Current research suggests that the presence of periodontal infection is a contributing factor to a variety of systemic conditions.

■ Infective endocarditis

■ Cardiovascular disease (CVD) and atherosclerosis

■ Diabetes mellitus

■ Respiratory disease

■ Adverse pregnancy outcomes