Epidemiology of Periodontal Disease   **Dr Alhan Ahmed**

Periodontal disease is a pathological condition characterized by abacterial challenge that can instigate a destructive host response leading to periodontal attachment loss.

Gingivitis

Is inflammatory process of the gingiva in which the junctional epithelium, although altered by the disease, remains attached to the tooth at its original level.

Periodontal Diseases

Periodontitis describes a group of inflammatory diseases that affect all the periodontal structures. It results in the destruction of the attachment apparatus and the development of a periodontal pocket, bone loss and ultimately, possible tooth loss. Periodontal diseases affect the supporting structures of teeth, i.e. the gingiva (gums), periodontal ligament, alveolar bone and cementum.

A thin, adherent microbial film on the tooth surfaces, called dental plaque, is the main pathological cause of gingival and periodontal inflammation. Poor oral hygiene, faulty food habits, poor nutrition, presence of metabolic diseases such as diabetes, use of tobacco, etc. are the major contributory factors for periodontal diseases.

CAUSES OF PERIODONTAL DISEASE

Direct Causes

These include poor oral hygiene leading to accumulation of dental plaque and calculus, and traumatic occlusion.

Indirect Factors

• _Food impaction_ is the forceful wedging of food against the gingiva between teeth.

• _Tobacco smoking_ and chewing reduce tissue resistance and increase the susceptibility to periodontal diseases.

• _Faulty restorations_ are probably the most common factors favoring plaque retention. Overhanging filling margins are extremely frequent and result from improper use of matrix bands and failure to polish margins. Badly contoured restorations, may impede effective tooth brushings.

• _Badly designed partial dentures_ can cause tissue irritation, ill-fitting dentures tend to act as foci for plaque accumulation. Tissue borne dentures frequently sink into the mucosa and compress the gingival margins causing inflammation and tissue destruction.

• *Orthodontic appliances* are worn continuously throughout the day and night and if the patient does not clean the appliance thoroughly, plaque accumulation is inevitable.

• *Lack of lip-seal* causes hyperplastic gingivitis in anterior segments, usually the upper incisor regions: Lack of lip seal is frequently associated with mouth breathing.

• *Malnutrition* (deficiency of vitamins and protein) is associated with a higher prevalence of periodontal diseases.

Endocrine disturbances including physiological causes such as puberty, pregnancy, diabetes may aggravate existing periodontal disease.

• *Blood disorders* such as acute monocytic leukemia can lead to periodontal diseases.

• *Malalignment* of the teeth predisposes to plaque retention and interferes with proper plaque removal.

• *Improper brushing technique*, besides resulting in inadequate plaque removal, can also cause gingival recession.

Other Causes

These include low socioeconomic and literacy level, difficult access to an oral health care facility, poor oral health awareness, and lack of oral health insurance. Stress is known to predispose to acute necrotizing ulcerative gingivitis.

RISK FACTORS IN PERIODONTAL DISEASE

Periodontitis is a complex disease entity with a layered and multifactorial etiology. The causative agents implicated in the disease are often not enough to cause the common clinical picture of inflammation, bleeding and ultimately attachment loss (AL). The risk factors associated with periodontal disease
are:

Sociodemographic factors
• Age (older age groups)
• Gender (male)
• Socioeconomic Status (SES)/Education
• Ethnicity / Race (African–American, Asians)

Hereditary or acquired conditions
• Diabetes mellitus
• Cardiovascular disease (CVS)
• Obesity
• HIV/ Immunosuppression
• Osteoporosis /Osteopenia

Behavioral factors
• Tobacco use and cigarette smoking
• Patient compliance (oral hygiene practice and regular dental visits)

Psychological factors

• Stress
• Bruxism
Local risk factors
• Faulty dental restorations
• Untreated dental disease
• Crowding (favors plaque accumulation)
• Furcation

EPIDEMIOLOGY

It is well established that the periodontal disease is initiated by bacterial plaque, but other etiologic factors exist- those which predispose to plaque accumulation and those which modify the inflammatory response. Epidemiology can be studied under:

1. HOST FACTORS

A. Age

There is a consensus that gingivitis increases in children with age.in addition to that periodontal disease increase with age. In most cases the disease progresses slowly and is unlikely to become clinically significant until the fourth decade [adult periodontitis]. It is the most common type of periodontitis and is responsible for advanced destructive disease in middle aged and elderly.

B. Gender

Periodontal disease is more common in males. Numerous studies reported higher periodontal destruction among males compared to the female population. The reasons for these sex differences are not clear, but it is thought to be related to poorer oral hygiene level, which is usually observed among males

C. Race

According to National Health Survey blacks had more periodontal disease than whites.

D. Endocrine Changes

Increase in gingivitis is reported in children as they approach puberty. In females, gingivitis is seen at the time of menstruation and pregnancy. Pathological endocrine changes associated with periodontitis include hyperthyroidism and hyper parathyroidism.

F. Tooth Malalignment

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

G.Restoration

Bacteria accumulate more readily on filled surface, than on tooth surface. A smooth and highly polished filling is easier to clean than a rough surface and hence there is lesser degree of plaque accumulation.

H. Traumatic Occlusion
   Sharp cusp act as plungers and are derogatory to periodontal health, leading to periodontitis.

I. Oral Hygiene
   Poor oral hygiene is a major cause of gingivitis and periodontal Disease.

J. Tobacco
   Smoking and smokeless tobacco are associated with poor periodontal health. They lower the tissue resistance and increase susceptibility to gingivitis and periodontal disease.

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

L. Systemic Factors
   Uncontrolled diabetes and heavy metal poisoning predispose to gingivitis and periodontitis. Acute monocytic leukemia may produce gingival enlargement and ulceration.

M. Socio-economic Status
   High income group have lower periodontal disease rate than the lower income group probably because they have the means and can afford dental treatment.

N. Psychosomatic Factors
   These factors influence the incidence of periodontal disease through multifactorial effects which include: abnormal oral hygiene habits, clenching and bruxism (produce forces that are destructive to periodontium).

2. AGENT FACTORS

   A. Dental Plaque
   Plaque is the soft, non-mineralized, bacterial deposit which forms on teeth that are not adequately cleaned. Once the teeth are cleaned.Tissue damage is caused mainly by penetration of the tissues by various soluble substances produced by plaque bacteria. These toxins have toxic effects on host cells and cause enzymic degradation of tissues ,and stimulation of bone resorption.

B. Calculus
   Mineralization within plaque results in calculus formation. It consists of Inorganic and Organic component. *Organic components* [10–30%] include proteins; carbohydrates; lipids and various non vital microorganisms, predominantly filamentous ones.

Inorganic components [70–90%] are mostly crystalline and amorphous calcium phosphate. It can be *supra gingival* or *sub gingival*. Supra gingival calculus formation takes place from interactions between, tooth surface and plaque. Sub gingival involves inflammatory exudates within pockets. It forms more slowly and forms an intimate relationship with the rough root surface. Calculus is always covered by 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 of initiating periodontal disease.

C. Stains

Stains are produced by the action of chromogenic bacteria on food substances such as tobacco, tea coffee etc. or by metallic particles. These pigments become absorbed by plaque

3. ENVIRONMENTAL FACTORS

A. Food and Nutrition

The influence of nutrition on periodontal disease therefore appears to be exerted mainly at 3 different levels.

1. On the metabolism of the gingival crevice-plaque flora.
2. On the repair process in the connective tissue at local site.
3. On the immunologic response to the microbial antigens.

B. Geographic Distribution

Certain geographic areas throughout the world are associated with more periodontal disease than others. Russell describes population according to whether disease is relatively high, intermediate or relatively low.

C. Urbanization

Periodontal disease is seen less in urban than in rural population particularly at younger ages. This difference could be attributed more to educational background than to rural life.

Preventive of periodontal diseases:

Reduction in the quantity of dental plaque will reduce the severity of gingival inflammation & the probability of destructive periodontal diseases.

Strategies to prevent &control the PD:

1. Promoting self-care oral hygiene practice to reduce dental plaque level in community & a reduction in tobacco use.
2. Detect & treat people with destructive periodontal diseases.
3. Preventive & therapeutic care to individual at special risk(diabetes).