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A Review on General Outline of Periodontitis

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Abstract: Periodontitis (gum disease) is a serious gum infection that damages the soft tissues and bones supporting the teeth. The earlier stage of periodontitis is gingivitis in which gums becomes swollen, red and may bleed.

Untreated gingivitis can advanced to periodontitis and in this stage, gums can pull away from the tooth, bone can be lost, and the teeth may loosen or fall out.

Poor hygiene, plaque formation and ongoing gum inflammation are main causes of periodontitis. Non-surgical and surgical treatments are available to treat periodontitis.

Keywords: gingivitis, periodontitis, gums, poor hygiene.

I. INTRODUCTION

Approximately 75% of the adult population is suffering with mild periodontitis disease (gingivitis) and 20-30% experiences a severe destructive form of periodontitis (chronic periodontitis). In 2015, Globally 538 million people were estimated to be affected with periodontitis.[1].

- 1) Periodontitis is the inflammation of periodontium (the tissues that support the teeth). The periodontium consist of four tissues:
 - a) *Gingiva*: Gum tissue
 - b) *Cementum*: Outer layer of the roots of teeth.
 - c) *Alveolar Bone*: Bony sockets into which the teeth are anchored and
 - d) *Periodontal Ligaments*: The connective tissue fibers that run/present between the cementum.
- 2) Periodontitis disease is mainly due to bacteria present in the mouth which infect the tissues around the teeth. There are some factors which triggers the disease which are smoking, diabetes, HIV/AIDS, family history and certain medications [2]. This is diagnosed by examining the gum tissues around the teeth both visually and with a probe and X-rays looking for bone loss around the teeth [3][4].
- 3) Periodontitis may be treated with good oral hygiene (daily brushing and flossing) and regular professional teeth cleaning [2]. In some cases, antibiotics or dental surgery may be recommended [5].

II. CLASSIFICATION

A. 1999 classification: [6]

The 1999 classification system classify periodontitis diseases into 7 categories:

- 1) Gingivitis
- 2) Chronic Periodontitis
- 3) Aggressive periodontitis
- 4) Periodontitis as a manifestation of systemic disease
- 5) Necrotizing ulcerative gingivitis/periodontitis
- 6) Abscesses of the periodontium
- 7) Combined periodontic-endodontic lesions

In above mentioned categories, 2-6 are termed as destructive periodontitis disease, the damage is essentially irreversible.

III. 2017 CLASSIFICATION [7]

Periodontitis diseases reclassified into 4 categories:

- A. Chronic Periodontitis
- B. Aggressive Periodontitis (localized and generalized),
- C. Necrotizing periodontitis and
- D. Periodontitis as a manifestation of systemic disease.

IV. FORMS OF PERIODONTITIS

- 1) Necrotizing periodontal disease
 - a) Necrotizing gingivitis
 - b) Necrotizing periodontitis
 - c) Necrotizing stomatitis
- 2) Periodontitis as a manifestation of systemic disease
- 3) Periodontitis
 - a) *Stages*: Based on severity and complexity, periodontitis is divided into 4 stages. These are:
 - Stage I: Initial periodontitis
 - Stage II: Moderate periodontitis
 - Stage III: Severe periodontitis with potential for additional tooth loss
 - Stage IV: Severe periodontitis with potential for loss of the dentition
 - b) *Extent and Distribution*
 - Localized
 - Generalized
 - Molar incisor-distribution
 - c) *Grades*
 - Grade A: Rate of progression is slow
 - Grade B: moderate rate of progression
 - Grade C: Rapid rate of progression

V. SYMPTOMS

- 1) Swollen or puffy gums
- 2) Bright red, dusky red or purplish gums
- 3) Gums that feel tender when touched
- 4) Gums that bleed easily
- 5) Pink-tinged toothbrush after brushing
- 6) Spitting out blood when brushing or flossing your teeth
- 7) Bad breath
- 8) Pus between your teeth and gums
- 9) Loose teeth or loss of teeth
- 10) Painful chewing
- 11) New spaces developing between your teeth
- 12) Gums that pull away from your teeth (recede), making your teeth look longer than normal
- 13) A change in the way your teeth fit together when you bite

VI. MECHANISM

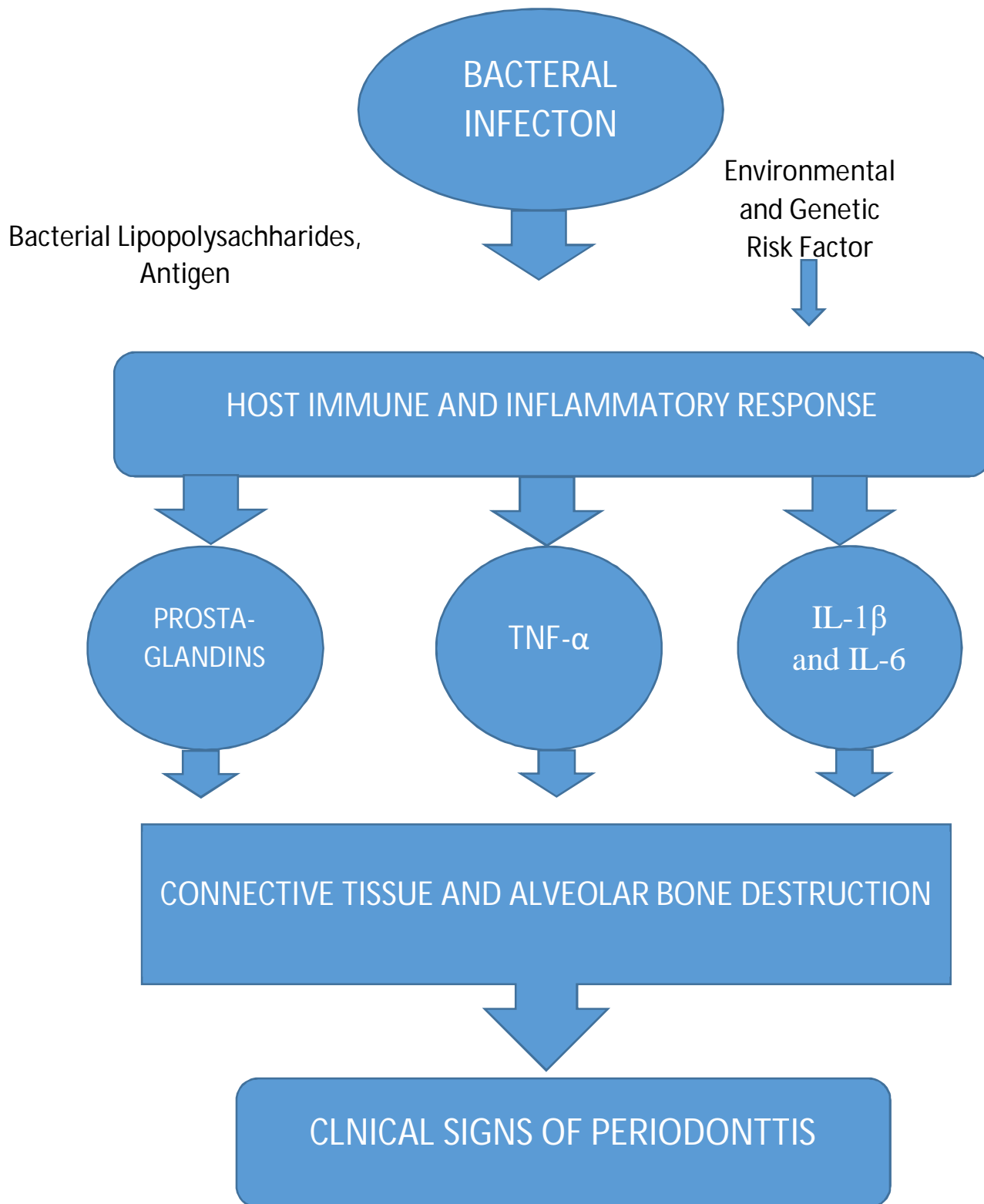


Figure 1. Mechanism for periodontitis

Microbes (For example-*Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Treponema denticola*, *Tannerella forsythia*) disrupt the normal symbiosis between the oral tissues and the oral microbe community. Langerhans cells in the epithelium take up antigens from the microbes, and present them to the immune system. White blood cells move towards the affected tissues and this process in turn activates osteoclasts which begin to destroy bone, and activates matrix metalloproteinases that destroy ligaments. In simple words, periodontal pathogens initiate the disease, but the key destructive events are accomplished by the pretentious response from the host's immune system.[8, 9]

VII. CAUSES OF PERIODONTITIS [10]

- 1) *Poor Hygiene*: Primary cause of periodontitis is the poor or improper hygiene.
- 2) *Plaque Formation*: Our mouth is full of bacteria. When these bacteria interact with mucus and other particles (like sugar and starches in the food) constantly form sticky, colorless plaque on the teeth. Brushing twice a day or flossing can remove plaque. Plaque can re-form quickly. If it is not removed in early stage then it can proceed towards periodontitis.
- 3) *Conversion Of Plaque To Tartar And Tartar Can Cause Gingivitis Which Proceeds To Periodontitis*: if plaque is not removed then it can harden under gums into tartar. Now this tartar is filled with bacteria and hard to remove. There is no possibility of removal of tartar by simple flossing and brushing. So, there is need for professional cleaning to remove tartar. If not treated then it will proceed towards gingivitis and then periodontitis.
- 4) *Ongoing Gum Inflammation Can Cause Periodontitis*: During gum inflammation, pockets are developed between gums and teeth that fill with plaque, tartar and bacteria. In time, these pockets become deeper, filling with more bacteria. If not treated, these infection can cause loss of bones and tissues and ultimately may lose one or more teeth. Ongoing chronic gum inflammation can affect immune system also.

VIII. RISK FACTORS

Plaque is the primary cause of gum disease. However, other factors can contribute to periodontitis disease. These includes:

- 1) *Hormonal Changes*: hormonal changes during Puberty, Pregnancy, menopause and menstruation make gums more sensitive, which makes it easier to develop gingivitis.
- 2) *Illness*: there are some disease like cancer or HIV that interfere with immune system may affect the condition of gums. Patients with diabetes are at high risk of developing infections, including periodontitis and cavities because diabetes effects the body's ability to use blood sugar.
- 3) *Medications*: some medications may also be responsible for gum disease because they lessen the flow of saliva, which have protective effect on teeth and gums. Drugs like, Dilantin Procardia and Adalat, can cause abnormal growth of gum tissues.
- 4) Inadequate nutrition, including vitamin C deficiency.
- 5) *Bad Habits*: like smoking make it harder for gum tissues to repair itself.
- 6) *Poor Oral Hygiene Habits*: Gingivitis may easily develop if there is habit of not brushing OR flossing on the daily basis.
- 7) *Family History of Dental Diseases*: It may be a contributing factor for the development of gingivitis or periodontitis.

IX. DIAGNOSIS: [10,11,12]

There are several ways to diagnose periodontitis or severity of periodontal disease. These include:

- 1) *Review Medical History*: Medical history of the patient is reviewed to identify the factors that could be contributing to periodontal symptoms. These factors include smoking, taking medicines which causes dry mouth, family history (early tooth loss in parents etc.), psychosocial stress etc.
- 2) *Examine Clinical Features*: These includes
 - a) Presence of plaque and tartar
 - b) Observe for easy Bleeding
 - c) Measure the pocket depth: In healthy mouth, pocket depth is 1-3mm. More than 4mm pocket depth may indicate periodontitis. Pocket depth can be measured by placing a dental probe beside your teeth beneath gumline, usually at several sites throughout patient's mouth.
- 3) *Dental X-Rays*: To check bone loss at the sites where deeper pockets depths etc.

X. TREATMENT: [11, 12]

A. Non-surgical Treatment

- 1) *Scaling*: Scaling removes tartar and bacteria from the tooth surfaces and beneath the gums. Scaling may be done by using instruments, a laser or an ultrasonic device.
- 2) *Root planning*
 - a) Smoothens the root surfaces,
 - b) Discouraging further buildup of tartar and bacteria, and
 - c) Removes bacterial byproducts that contribute to inflammation and delay healing or reattachment of the gum to the tooth surfaces.
- 3) *Antibiotics*: Topical or oral antibiotics are helpful to control bacterial infection. Topical antibiotics can include antibiotic mouth rinses or insertion of gels loaded with antibiotics in the space between your teeth and gums or into pockets after deep cleaning. However, oral antibiotics may be required to completely eliminate infection-causing bacteria.
- 4) Anti-Inflammatory and bone regeneration agents

XI. SURGICAL TREATMENT

A. Flap Surgery (Pocket Reduction Surgery)

Periodontitis makes tiny incision in gum so that a section of gum tissue can be lifted back, exposing the roots for more effective scaling and root planing. Because periodontitis often causes bone loss, the underlying bone may be recontoured before the gum tissue is sutured back in place. After heal, it's easier to clean these areas and maintain healthy gum tissue.

B. Soft Tissue Grafts

When gum tissue loosens, gumline recedes. There may need to have some of the damaged soft tissue reinforced. This is usually done by removing a small amount of tissue from the roof of mouth (palate) and attaching it to the affected site. This can help reduce further gum recession, cover exposed roots and gives teeth a more pleasing appearance.

C. Bone Grafting

When periodontitis has destroyed the bone surrounding the tooth root, then there is need of bone grafting. The graft may be composed of small fragments of patient's own bone, or the bone may be synthetic or donated. The bone graft helps prevent tooth loss by holding the tooth in place. It also serves as a platform for the regrowth of natural bone.

D. Guided Tissue Regeneration

Tissue regeneration allows the regrowth of bone that was destroyed by bacteria. In one approach, a special piece of biocompatible fabric is placed between existing bone and tooth. The material prevents unwanted tissue from entering the healing area, allowing bone to grow back instead.

E. Tissue-stimulating Proteins

The technique involves applying a special gel to a diseased tooth root. This gel contains the same proteins found in developing tooth enamel and stimulates the growth of healthy bone and tissue.

XII. CONCLUSION

Periodontitis is one of the most common oral infections and also a major reason of tooth loss. Chronic periodontitis is a polymicrobial biofilm infection which causes periodontal loss. However, knowing that this disease has multifarious reasons, dentists need to be aware of other factors, local and systemic, that could contribute to the disease process and healing response. The effective approach to reduce periodontitis includes Good plaque control, as well as removal of bacteria, calculus deposits, and granulation tissue by non-surgical and surgical treatments. Early stage diagnosis and evaluating each possible contributing factor is necessary for the management of successful long term periodontal stability.

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