

# Epidemiological Triad

## I. Host Factors

1. **Age:** Chronic destructive periodontal disease has been associated with older age groups (>40 years).
2. **Sex:** It is more common in males than in females.
3. **Race:** Blacks are more affected than the whites.
4. **Intraoral variations:** Gingivitis is more seen on the interproximal areas than the buccal and lingual areas. The upper arch shows more gingivitis compared to the lower arch (except lingual). On the facial aspect, upper 1<sup>st</sup> and 2<sup>nd</sup> molars are more prone to gingivitis followed by the lower anteriors and least is the lower 2<sup>nd</sup> premolar. On the lingual aspect, lower 1<sup>st</sup> and 2<sup>nd</sup> molars are the most prone to gingivitis, followed by lower premolar and the least are the upper anteriors. Gingivitis is more often seen on the right arch than on the left arch.<sup>4</sup>

*Severity of bone loss:* Incisor and molar areas are more severely involved than canine and premolar areas. Maxillary teeth experience more bone loss compared to the mandible (except anterior). Interproximally bone loss is higher than the facial and lingual. Severely affected are lower centrals and laterals and upper molars.

5. **Endocrine changes:** Puberty, menstruation and pregnancy, hyperthyroidism, hyperparathyroidism increase the chances of gingivitis.
6. **Traumatic occlusion:** Sharp cusp acts as ‘plungers’ and lead to periodontitis.
7. **Food impaction:** Food impaction causes chronic gingivitis which if let to continue lead to periodontal disease.
8. **Tooth position:** Irregular alignment makes it difficult to keep these areas clean. Sometimes the roots approach each other too closely. This may allow for insufficient intervening alveolar support resulting in early pocket formation.
9. **Occupational habits:** Occupational habits like thread biting, holding nails between teeth, etc. can have traumatic effects on the

periodontium.

10. **Neuroses:** Bruxism, lip, cheek and nail biting also have traumatic effects on the periodontium.
11. **Use of tobacco:** The components present in tobacco lower the tissue resistance and increase susceptibility to gingivitis and periodontal diseases.
12. **Misuse of toothbrush:** Improper use of toothbrush may not only cause abrasion or recession of the gingival tissues but may also irritate already inflamed tissues.
13. **Concomitant disease:** There is a tendency towards alveolar bone destruction in patients with uncontrolled diabetes. Heavy metal poisoning may accentuate gingivitis. Acute monocytic leukaemia, pernicious anaemia cause gingivitis.
14. **Income:** Periodontal disease increases with decrease in income.
15. **Education:** Severity of periodontal disease and level of education are inversely related.

## II. Agent Factors

1. Plaque
2. Calculus

**Dental plaque:** It is the primary aetiologic factor for periodontal disease. It is defined as soft deposits that form the biofilm adhering to the tooth surface or other hard surfaces in the oral cavity, including removable and fixed restorations. Disruption of balance between plaque bacteria and host results in periodontal disease.

Dental plaque is divided into supragingival and subgingival plaques.

Marginal plaque is responsible for gingivitis whereas supragingival and tooth associated subgingival plaque is responsible for calculus and root caries.

Tissue associated subgingival plaque is responsible for periodontitis. 1 gram of plaque contains  $2 \times 10^{11}$  bacteria. It also contains epithelial cells and macrophages embedded in an organic and inorganic matrix.

Organic and inorganic materials are derived from saliva, crevicular fluid

and bacterial products.

Accumulation of plaque is found to be more on gingival one-third of the tooth surface, cracks, pits and fissures, overhanging restorations and around malaligned teeth. The rate of formation and location vary according to the oral hygiene practices, diet, salivary composition and rate of flow.

**Calculus:** Calculus is an adherent calcified mass that forms on the surface of natural teeth and dental prosthesis. It consists of mineralized plaque.

*Calculus would be divided into:*

1. *Supragingival calculus:* It is white or whitish yellow in colour. It is found to be maximum in the upper 1<sup>st</sup> molars, followed by the lower central and laterals and least in the upper anteriors. It can be easily detached.
2. *Subgingival calculus:* It is dark brown or greenish black in colour. It is found to be maximum in lower central and laterals followed by upper 1<sup>st</sup> molar, upper anteriors, and upper 2<sup>nd</sup> molars. It is found to be least in lower 1<sup>st</sup> and 2<sup>nd</sup> premolars, and lower 3<sup>rd</sup> molar.

Calculus provides a fixed nidus for the continued accumulation of plaque.

### **III. Environmental Factors**

1. **Geographic variations:** Periodontal diseases are found to be high in Chile, Jordan, India, Malaysia, Ceylon. It is found to be intermediate in US (blacks), Columbia, Ethiopia, and Ecuador and low in US (whites), primitive Eskimos of Alaska. Underdeveloped and dentist deprived areas have increased scores for periodontal diseases.
2. **Nutrition:** Avitaminosis C, niacin deficiency show higher prevalence for periodontal diseases. ICNND (International Committee on Nutrition for National Defence) said that there is no consistent association between periodontal disease and nutrition items. Trend towards a higher prevalence and severity of periodontal were found in areas with protein malnutrition and vitamin A deficiency. Nutrition is a secondary factor.
3. **Degree of urbanization:** Rural population seems to suffer more from periodontal diseases compared to urban population.

4. **Stress:** Stress is said to predispose to acute necrotising ulcerative gingivitis and is often seen in military groups and in exam going students.

**Table 8.2: Prevalence of periodontal disease in India**

Year	Reference	Age (in years)	Sample size	Clinical parameters	Results/findings
2009	Kumar TS, Dagli RJ et al <sup>(7)</sup> Oral health status and practices of dentate Bhil adult tribes in Southern Rajasthan	15-54 yrs	1590 male subjects	• OHI-S-CPITN	<ul style="list-style-type: none"> <li>• Debris, calculus and OHI-S increased with age</li> <li>• Shallow pockets were prevalent (40%) in 35-44 years age</li> <li>• Deep pockets were common (11%) in older individuals</li> </ul>
2009	Parmar G, Sangwan P et al <sup>(8)</sup> Oral hygiene status of arecanut and tobacco chewers and nonchewers	Mean age 32.5±0.7 years (chewers) 30.4±0.8 years (nonchewers)	365 subjects (168 chewers and 197 nonchewers)	• CHI-S • Clinical examination for ulcers and burns, etc.	• Periodontal pockets and gingival lesion and gum recession was significantly higher in chewers
2009	Das UM, Beena JP et al <sup>(9)</sup> Oral health status of 6 and 12 years old school going children in Bengaluru	6 years and 12 years	430 subjects (229—6 years old, 201—12 years old)	<ul style="list-style-type: none"> <li>• Periodontal condition by CPITN</li> <li>• Malocclusion by WHO criteria</li> <li>• Caries by dentition status and treatment need</li> </ul>	<ul style="list-style-type: none"> <li>• Highly significant difference with respective periodontal disease</li> <li>• No significant difference for dental caries</li> </ul>
2009	Jain M, Mathur A et al <sup>(10)</sup> Oral health status of mentally disabled subjects in India	12-30 years	225 mentally retarded subjects	• OHI-S • CPITN • DMFT	• Oral health status of mentally retarded population was poor and influenced by cause of disability, IQ level and parents education
2009	Kumar S, Sharma J et al <sup>(11)</sup> Determinants for oral hygiene and periodontal status among mentally disturbed children and adolescents	—	171 mentally retarded subjects	• OHI-S • CPITN • DMFT	• Oral health status of mentally retarded population was poor and influenced by causes of disability, IQ level and parents education
2009	Doshi D, Ramapuram J et al <sup>(12)</sup> Periodontal status of HIV positive patients	—	52 HIV positive 52 controls	• OHI-S • Plaque index	<ul style="list-style-type: none"> <li>• CHI-S was significantly different in HIV positive</li> <li>• Plaque index was not significantly different in HIV positive</li> </ul>