

Indices used for assessment of periodontal disease

There are 4 main areas in periodontal disease for which indices are required:

- a. Plaque or soft deposits on teeth
- b. Calculus
- c. Gingivitis
- d. Periodontal destruction or loss of attachment

Dental plaque → primary etiological factor in periodontal disease, it is a soft deposit resulting from the colonization and growth of micro-organism on the tooth surfaces.

Gingival inflammation → inflammatory process of the gingiva . most form of gingivitis are plaque induced.

Periodontitis → also it is an inflammatory condition of the gingival tissues, characterized by loss of attachment of periodontal ligament and the bone support of tooth.

Calculus → A hard deposit of inorganic salts(minerals) mixed with food debris, bacteria and desquamated epithelial cells. Two main types of dental calculus can be identified according to the location:

- ▶ supra gingival calculus: It extended occlusal to the free gingival margin and visible in oral cavity.
- ▶ sub gingival calculus: deposit apical to the free gingival margin, found in periodontal pockets and not visible on oral examination.

Dental plaque index(PII):**Described by(Silness and Loe 1964)**

▶ used for assessment the thickness of plaque at the gingival area of the tooth.

▶ 4 gingival areas (facial, lingual, mesial and distal) are examined, or selected

surfaces (facial, mesial and lingual).

Index teeth

Only 6 index teeth used for scoring of this index:

1. $\frac{6 \quad 2 \quad 4}{4 \quad 2 \quad 6}$ for permanent teeth.

2. $\frac{E \quad B \quad D}{D \quad B \quad E}$ for primary teeth.

→ No substitution for any missing teeth

Scoring criteria:

- | | |
|---|--|
| 0 | Free of plaque. |
| 1 | No plaque seen by naked eye, a film of plaque adhering to the free gingival margin and adjacent area of the tooth, which can be recognized by running the probe or using disclosing agent. |
| 2 | A thin to moderate accumulation of soft deposits within the gingival pocket or on the tooth gingival margin, which can be seen with naked eye. |
| 3 | abundance of soft matter within the gingival pocket and or on the tooth surface and gingival margin. |

calculation

$$\text{PII} = \frac{\text{Sum of all individual plaque scores}}{\text{Total no. of surfaces examined}} \text{---this for individual}$$

For a group

$$\text{PII} = \frac{\text{total scores of individuals in a group}}{\text{Total no. of individual in a group}}$$

Each of the four surfaces of the teeth (buccal, lingual, mesial and distal) is given a score from 0-3. The scores from the four areas of the tooth are added and divided by four in order to give the plaque index for the tooth.

For example :

surface	16	12	24	36	32	44	Mean
buccal	1	1	2	1	0	0	24/24=1
mesial	2	1	1	1	0	1	
lingual	0	1	2	2	1	1	
distal	1	1	1	1	1	1	

Indices used for measurement of calculus:

Calculus Surface Index (CSI)

- ▶ developed by Ennerver et al in 1961.
- ▶ assess the presence or absence of supra gingival or sub gingival calculus on four or six mandibular incisors, by visual or tactile examination .
- ▶ Each incisor is divided into 4 scoring units.

Calculation of index= total no. of surfaces with calculus is considered the CSI score pre person.

Indices used for measurement of gingival inflammation

Gingival index(GI)

- developed by Loe and Silness in 1963.
- assess the severity of gingivitis and its location in all teeth or selected teeth and in all surfaces or selected surfaces.
- .using blunt explorer probe.
- widely used due to its validity, reliability and easy to use.
- the teeth selected as the index teeth the same of plaque index teeth(PII).

Criteria of GI :

- | | |
|---|--|
| 0 | Absent of inflammation/normal gingiva. |
| 1 | Mild inflammation. Slight change in color , slight edema, no bleeding on probing. |
| 2 | Moderate inflammation , moderat glazing, redness, edema and hypertrophy. Bleeding on probing. |
| 3 | Sever inflammation, marked redness and hypertrophy ulceration. Tendency to spontaneous bleeding. |

Index calculation

$$\text{GI for individual} = \frac{\text{Total scores}}{\text{Total no. of examned surfaces}}$$

$$\bullet \text{group} = \frac{\text{Total scores of all subject}}{\text{Total no. of examned subjects}}$$

●the numerical scores of the gingival index may be associated with varying degree of clinical gingivitis:

Interpretation:

Scores of Index (Gingival scores)	condition
1.1-2.0	Mild gingivitis
1.1-2.0	Moderate gingivitis
2.1-3.0	sever gingivitis

Indices used for measuring periodontal diseases

Periodontal Disease Index (PDI)

● Developed by SIGURD P. RAMFJORD in 1959.

for epidemiological surveys of periodontal disease.

●PDI measure the level of the periodontal attachment related to the cemento enamel junction of teeth.

Teeth examined: (FDI system tooth numbers are in this index:

- 1. Maxillary right first molar - (16)

- 2. Maxillary left central incisor - (21)
- 3. Maxillary left first bicuspid - (24)
- 4. Mandibular left first molar - (36)
- 5. Mandibular right central incisor - (41)
- 6. Mandibular right first bicuspid - (44)

upper	16			21	24	
lower		44	41			36

Component of Periodontal Disease Index:

1. Plaque component of PDI. → was developed by Ramfjord in 1959.

- Use a numerical scale to assess the extent of plaque covering the surface area of tooth.

The scoring is done on the six Ramfjord (index) teeth.

- The surfaces scored are the Facial, lingual, mesial and distal).

Scoring criteria:

- 0 **no plaque present**
- 1 Plaque present on some but not on all interproximal, buccal and lingual surface of the tooth.
- 2 Plaque present on some or all interproximal, buccal and lingual surfaces, covering less than one half of these surfaces.
- 3 Plaque extending over all interproximal, buccal and lingual surfaces, covering more than one half of these surfaces.

Note:

- Only fully erupted teeth should be scored.
- Missing teeth should not be substituted.

Calculation : Plaque Score of an individual = $\frac{\text{Total score}}{\text{No. of teeth examined}}$

2. Calculus component of the Periodontal Disease Index(PDI):

Also this index was described by Ramfjord 1959 as one of the components of PDI, to assess the presence and extent of calculus of 6 index teeth. The facial (buccal/labial) and lingual surfaces of the 6 index teeth are examined.

$$\text{Calculation of the index: } = \frac{\text{Total scores}}{\text{No. of teeth examined}}$$

Criteria of scoring:

- | | |
|---|---|
| 0 | Absence of calculus. |
| 1 | Supra gingival calculus extending only slightly below the free gingival margin(not more than 1 mm). |
| 2 | Moderate amount of supra gingival and sub gingival calculus or sub gingival calculus alone. |
| 3 | An abundance of supra gingival and sub gingival calculus. |

3. Gingival and Periodontal component of Periodontal Disease Index(PDI). Periodontal disease index dose so by combining the assessments of gingivitis and gingival depth on 6 index teeth (Ramfjord teeth).

Criteria of Index:

- | | |
|---|---|
| 0 | absence of sings of inflammation. |
| 1 | 1 Mild to moderate inflammatory gingival change, not extending around the tooth. |
| 2 | Mild to moderate severe gingivitis extending all around the tooth. |
| 3 | Severe gingivitis characterized by marked redness, swelling tendency to bleed and ulcerate. |

Indices used for Treatment Needs Assessment: Community Periodontal Index of Treatment Needs (CPITN):

- developed by WHO (World Health Organization) and F.D.I (Federation Dentaire Internationale) 1982.
- The CPITN is recommended for epidemiological surveys of periodontal health.

- The examination done by special probe(CPITN probe).
- The mouth is divided in to 6 parts (sextant).
- **Index teeth** : the score is identified by examination of specified index teeth.

6	1	6
6	1	6

Criteria of CPI index

- 0 No need for care.
- 1 Gingival bleeding on gentle probing.
- 2 Presence of calculus and other plaque retentive factors.
- 3 Presence of 4 or 5 mm pocket.
- 4 Presence of 6mm or deeper pocket.

Criteria of TN index

- 0 no treatment need.
- 1 A need for improving of personal oral hygiene.
- 2 A need for professional cleaning (scaling and polishing) and requirement for oral hygiene instruction. And for shallow pocket 4-5mm need scaling and root planning.
- 3 Deep pocket 6mm or deeper need deep scaling , root planning and more complex procedure.

Advantages of CPITN:

1. Simplicity.
2. Speed.
3. International uniformity.
4. Records the common treatable conditions like periodontal pockets, gingival inflammation and calculus.

Indices used for dental fluorosis measurement:

- **Dental fluorosis** is hypoplasia or hypo mineralization of tooth enamel or dentine produced by the chronic ingestion of excessive amounts of fluoride during the developing period of teeth. **Dean** in 1931 was discovered that the fluoride in drinking water was the causative agent of dental fluorosis. So that **Dean in 1942** introduced an index for assessment of dental fluorosis known as
- "**Dean's Classification of Dental Fluorosis**" or simply as
- **Dean's Fluorosis Index** which recommended in survey of WHO 1997(world health organization).

Criteria of index.

Normal 0 Enamel (translucent, smooth, glossy and creamy white color).

Questionable (0.5) Enamel discolored(slight aberration from the translucency of normal enamel, ranging from a few white flecks to occasional white spot.

Very mild (1) Small, opaque, paper, white area scattered irregularly over the tooth, but not involving as much as approximately 25% of tooth surface(no more than 1-2 mm of white opacity at the tip of cusps of bicuspid or second molar.

Mild (2) The white opaque areas in the enamel of teeth are more extensive, but not involve as much as 50% of tooth.

Moderate(3) All enamel surfaces of teeth are affected and subject to attrition show wear, brown stains is a disfiguring feature.

Sever(4) All enamel surfaces of teeth are affected and hypoplasia is so marked that general form of the tooth may be affected, discrete pitting, brown stain wide spread teeth often present a corroded like appearance.