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With Free Companion FAQs on Community Dentistry

Essential Quick Review

Community Dentistry



HIGHLIGHTS

- Supplementary FAQ book containing Definitions, Classifications and Viva-voce
- Diagrams with supporting answers
- Recent question bank of all India universities
- Covers entire undergraduate DCI syllabus

Priya Verma Gupta
Ipseeta Menon

JAYPEE

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CHAPTER 2

Indices in Dental Epidemiology

LONG ESSAYS

Question 1

Define index. What are its ideal requisites along with the criteria for selecting an index?

Answer

An index has been defined as a numerical value describing the relative status of a population on a graduated scale with definite upper and lower limits, which is designed to permit and facilitate comparison with other populations classified by the same criteria and methods (Russel AL).

Ideal Requisites of an Index

Ideally, an index should possess the following properties:

- Clarity, simplicity and objectivity
- Validity
- Reliability
- Quantifiability
- Sensitivity
- Acceptability.

Criteria for Selecting an Index

- It should be easy to use and calculate
- It should allow the examination of many people in a short period of time
- It should require minimum armamentarium and expenditure
- It should define clinical conditions objectively
- It should be as free as possible from subjective interpretation
- It should be highly reproducible in analysing a clinical condition when used by one or more examiners
- It should be amenable to statistical analysis; have validity and reliability
- It should be strongly related numerically to the clinical stages of the specific disease
- It should be equally sensitive throughout the scale, if it relates the severity of a variable
- It should define its components clear and readily understandable in order to faclitate maximum intra-and inter-examiner reproducibility and standardization
- It should be acceptable to the patient while not causing any discomfort.

Question 2

What are the purposes and uses of an index?

Answer

Purposes and Uses of an Index

For Individual Patients

- Provides individual assessment to help a patient recognise an oral problem
- Reveals the degree of effectiveness of present oral hygiene practices
- Motivates the person in preventive and professional care for the elimination and control of oral disease
- Evaluates the success of individual and professional treatment over a period of time by comparing index scores
- Provides a means for personal assessment by the dental hygienist of abilities to educate and motivate individual patients.

In Research

- Determines baseline data before experimental factors are introduced
- Measures the effectiveness of specific agents for the prevention, control or treatment of oral conditions
- Measures the effectiveness of mechanical devices for personal care, such as toothbrushes, interdental cleaning devices or water irrigators.

In Community Health

- Shows the prevalence and trends of incidence of a particular condition occurring within a given population
- Provides baseline data to show existing dental health practices
- Assesses the needs of a community
- Compares the effects of a community program and evaluate the results.

Question 3

Discuss index used for oral hygiene assessment.

Answer

The need to categorise individuals and groups according to their oral hygiene status led to the development of the oral hygiene index (OHI).

Simplified Oral Hygiene Index (OHI-S)

It was proposed by Greene and Vermillion in 1964 as a modification of the OHI.

Purpose

It is used to assess oral cleanliness by estimating the tooth surface covered with debris or calculus.

Components

The OHI-S has two components, the simplified debris index and the simplified calculus index. The two scores may be used separately or may be combined for the OHI-S.

Comparison with OHI

After experience with the OHI, the need for simplification was recognized because of the length of the time required to evaluate debris and calculus, as well as to make subjective decisions on tooth selection.

- Tooth selection: In the OHI, the examiner has to select the tooth with the most debris or calculus in each sextant. The OHI-S assesses six specific teeth, one in each sextant
- Number of surfaces: In the OHI, 12 surfaces are evaluated; only six surfaces are used in the OHI-S
- Scoring: The OHI ranges from 0 to 12; the OHI-S ranges from 0 to 6.

Selection of teeth and surfaces

A. Identify the six specific teeth
- Posterior: The first fully erupted tooth distal to each second premolar is examined. The facial surfaces of the maxillary molars and the lingual surfaces of the mandibular molars are used. Usually, the first molars, the second or third molars may be used
- Anterior: The facial surfaces of the maxillary right and the mandibular left central incisors are used. When either is missing, the opposite central incisor is scored.

B. Extent

A score represents half the circumference of the selected tooth; includes proximal surfaces to the contact areas.

Procedure

Qualification

At least two of the six possible surfaces must have been examined for an individual score to be expressed.

Record debris scores and calculus scores

A. Record debris scores
- Oral debris is the soft foreign matter on the surface of the teeth that consists of bacterial plaque, materia alba and food debris
- Examination: The dental explorer is placed on the incisal third of the tooth and moved towards the gingival third according to the criteria
- Criteria:
  - No debris or stain present
  - Soft debris covering not more than one third of the tooth surface being examined, or the presence of extrinsic stains without debris, regardless of surface area covered
  - Soft debris covering more than one third but not more than two third of the exposed tooth surface. Soft debris covering more than two thirds of the exposed tooth surface.

B. Record calculus scores
- Dental calculus is a hard deposit of inorganic salts composed primarily of calcium carbonate and phosphate mixed with debris, microorganisms and desquamated epithelial cells
- Examination: Use an explorer to supplement visual examination for supra-gingival calculus deposits. Identify subgingival deposits by gently placing a dental explorer into the distal gingival crevice and drawing it subgingivally from the distal contact area to the mesial contact area
- Criteria:
  - No calculus present
  - Supra-gingival calculus covering not more than one-third of the exposed tooth surface being examined
  - Supra-gingival calculus covering more than one-third but not more than two-third of the exposed tooth surface, or the presence of individual flecks of

subgingival calculus around the cervical portion of the tooth
- Supra-gingival calculus covering more than two-thirds of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth.

Scoring

- OHI-S for an individual
  - Determine simplified debris index and simplified calculus index
  - Divided total scores by number of surfaces examined.
- DI-S and CI-S values from 0 to 3.
- Simplified Oral Hygiene Index.
  - Combine the DI-S and CI-S
  - OHI-S value ranges from 0 to 6.

Suggested nominal scale for OHI-S

Rating	*Scores*
Excellent	0
Good	0.1–0.6
Fair	0.7–1.8
Poor	1.9–3.0

Rating	*Scores*
Excellent	0
Good	0.1–1.2
Fair	1.3–3.0
Poor	3.1–6.0

Calculation for an individual

$$DI - S = \frac{\text{Total Debris Score}}{\text{Number of Teeth Scored}}$$

$$CI–S = \frac{\text{Total Calculus Scores}}{\text{Number of Teeth Scored}}$$

OHI-S = DI-S + CI-S

OHI-S groups score

Compute the average of the individual scores by totalling the scores and dividing by the number of individuals.

Question 4

Describe indices used to measure plaque and debris?

Answer

Periodontal Disease Index

The plaque component of the periodontal disease index (PDI) was developed by Sigurd P Ramfjord in 1959. This index was the first one that attempted to use a numerical scale to assess the extent of plaque covering the surface area of a tooth.

Selection of Teeth and Surfaces

The scoring is done on the six teeth selected by Ramfjord like,

16 – Maxillary right first molar
21 – Maxillary left central incisor
24 – Maxillary left first premolar
36 – Mandibular left first molar
41 – Mandibular right central incisor
44 – Mandibular right first premolar

The surfaces scored are the facial, lingual, mesial and distal.

Scoring Criteria

Score	*Criteria*
1	No plaque present
2	Plaque present on some but not all interproximal, buccal and lingual surfaces of the tooth
3	Plaque present on all interproximal, buccal and lingual surfaces, but covering less than one-half of the surfaces
4	Plaque extending over all interproximal, buccal and lingual surfaces, and covering more than one-half of these surfaces
	- Only fully erupted teeth should be scored
	- Missing teeth should not substituted

Calculation

The plaque score per person obtained by totalling all of the individual tooth scores and dividing the number of teeth examined, i.e., plaque score of all individual teeth

$$= \frac{\text{Total Score}}{\text{Number of Teeth Examined}}$$

Uses

- Suitable for longitudinal studies of periodontal disease
- Helpful in a total assessment of periodontal status
- In epidemiological surveys
- Suitable for clinical trials of preventive or therapeutic agents.

Shick and Ash Modification of Plaque Criteria

- Ramfjord's periodontal disease index (PDI) was modified by Shick RA and Ash MM in 1961
- The modified criteria consist of examining the six selected tooth excluding consideration of the interproximal areas of the teeth and restricting the scoring of plaque to the gingival half of the facial and lingual surfaces of the index teeth
- The teeth selected are the same as in the plaque component of Ramfjords periodontal disease index.

Scoring system

Code	*Criteria*
1	Absence if dental plaque
2	Dental plaque in the interproximal areas or at the gingival margin covering less than one-third of the gingival half of the facial or lingual surface of the tooth
3	Dental plaque covering more than 1/3rd but less than 2/3rd of the gingival half of the facial or lingual surface of the tooth
4	Dental plaque covering 2/3 or more of the gingival half of the facial or lingual surface of the tooth

Calculation

The plaque score per person is obtained by totalling all of the individual tooth scores and dividing by the number of teeth examined, i.e. Plaque score of an individual

$$= \frac{\text{Total Score}}{\text{Number of Teeth Examined}}$$

Turesky-Gilmore-Glickman Modification of the Quigley-Hein Plaque Index

- Quigley G and Hein J in 1962 reported a plaque measurement that focused on the gingival third of the tooth surface
- They examined only the facial surfaces of the anterior teeth, using a basic fuchsine mouthwash as a disclosing agent
- A numerical scoring system of 0 to 5 was used. Turesky S, Gilmore ND and Glickman I, modified the Quigley-Hein plaque index in 1970
- This modification of the Quigley-Hein plaque index was done by strengthening the objectivity of Quigley-Hein plaque index criteria by redefining the scores of the gingival third area
- This modification is recognized as a reliable index for measuring plaque, using an estimate of the area of the tooth covered by plaque
- Plaque was assessed on the labial, buccal and lingual surfaces of all the teeth after using a disclosing agent
- This modified technique of scoring plaque on the labial, buccal and lingual surfaces provides a comprehensive method for evaluating anti-plaque procedures such as tooth brushing and flossing, as well as chemical anti-plaque agents
- This index emphasizes the differences in plaque accumulation in the gingival third of the tooth.

Scoring system

Code	*Criteria*
1	No plaque
2	Separate flecks of plaque at the cervical margin of the tooth
3	A thin continuous band of plaque (upto 1 mm) at the cervical margin
4	A band of plaque wider than 1 mm but covering less than 1/3 of the crown of the tooth
5	Plaque covering at least 1/3 but less than 2/3 of the crown
6	Plaque covering 2/3 or more of the crown

Code	*Criteria*
1	No visible debris
2	Debris visible at gingival margin, but discontinuous less than 1 mm in height
3	Debris continuous at gingival margin–greater than 1 mm in height
4	Debris involving entire gingival third of tooth
5	Debris generally scattered over tooth surface

Glass Index

The Glass index was developed by Glass RL in 1965. This index evaluates the presence and extent of debris accumulation, for assessing tooth-brushing efficacy.

Method

- All the teeth present examined. The surfaces examined are the facial (buccal/labial) and lingual surfaces which are scored as a unit
- The criteria for scoring debris according to the Glass criteria are as follows.

Calculation of Glass index score

The debris index score per person is obtained by totalling all the debris scores per tooth and then, dividing by

the number of teeth examined i.e. Plaque score of an individual

$$= \frac{\text{Total debris scores of all teeth examined}}{\text{Total number of teeth examined}}$$

The Glass criteria for scoring debris places more emphasis on the gingival third of the tooth than does the OHI-S and so, the strength of this index is in clinical trials of preventive or therapeutic agents.

In addition to assessing debris, Glass also developed criteria for measuring gingival changes, tooth stain and calculus accumulation.

Plaque Index

It was proposed by Silness and loe in 1964, fully described by Loe in 1967.

Purpose

To assess the thickness of plaque at the gingival area. Hence, it is unique among indices used plaque assessment. It ignores the coronal extent of the plaque.

Selection of teeth

- The entire dentition or selected teeth can be evaluated
- Four gingival areas (disto-facial, facial, mesio-facial, lingual) are examined systematically for each tooth.

Procedure

- Dry the teeth and examine visually using adequate light, mouth mirror and probe or explorer
- Evaluate bacterial plaque on the cervical third; pay no attention to plaque that has extended to the middle or incisal thirds
- Probe to test the surface when no plaque is visible. Pass the probe or explorer across the tooth surface in the cervical third and near the entrance to the sulcus
- When no plaque adheres to the probe tip, the area is scored 0
- When plaque adheres, a score of 1 is assigned
- Use a disclosing agent, if necessary, to assist evaluation for the 0 to 1 scores
- When the PII is used in conjunction with the gingival index (GI), the GI must be complete first because the disclosing agent masks the gingival characteristics
- Include plaque on the surface of the calculus and on dental restorations in the cervical third in the evaluation.

Scoring

Score	*Criteria*
1	No plaque
2	A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be recognized only after application if disclosing agent or by running the explorer across the tooth surface
3	Moderate accumulation of the soft deposits within the gingival pocket that can be seen with the naked eye or on the tooth and gingival margin
4	Abundance of soft matter within the gingival pocket and/or the tooth and gingival margin

A. PII for area:
   Each area (disto-facial, facial, mesio-facial, lingual or palatal) is assigned a score from 0 to 3.

B. PII score for a tooth:
   Scores for each area are totalled and divided by 4.

C. PII for groups of teeth:
   Scores for individual teeth may be grouped and totalled and divided by the number of teeth. For instance, a PII may be determined for specific teeth or groups of teeth. The right side may be compared with the left.

D. PII for the individual
   Add the scores for each tooth and divided by the number of teeth examined. The PII score ranges from 0 to 3.

E. Suggested nominal scale for patient reference

Rating	*Scores*
Excellent	0
Good	0.1–0.9
Fair	1.0–1.9
Poor	2.0–3.0

F. PII for a group
   Add the scores for each member of a group and divide by the number of individuals.

Uses of PII

- Reliable technique for evaluating both mechanical anti-plaque procedure and clinical agents
- Used in longitudinal studies and clinical trial.

Patients Hygiene Performance Index (PHP)

This index was proposed by Podshadley and Haley in 1968. PHP was the first index for purpose of assessments individual performance in removing debris.

Purpose

- To assess the extent of plaque and debris over a tooth surface
- Debris is defined for the PHP index as the foreign material consisting of bacterial plaque, materia alba, and food debris that is loosely attached to tooth surfaces.

Selection of teeth and surfaces

- Teeth examined: 16, 11, 26, 36, 31, 46
- Substitutions: When the first molar is missing, is less than three-fourths erupted, has a full crown, or is broken down, the second molar is used. The third molar is used when the second is missing. The adjacent central incisor is used for a missing incisor
- Surfaces: The facial surfaces of incisors and maxillary molars and the lingual of mandibular molars are examined. These surfaces are the same as those used for the simplified OHI.

Procedure

- Apply disclosing agent. Instruct the patient to swish for 30 seconds and expectorate but not to rinse
- Examination is made using a mouth mirror
- Each tooth surface to be evaluated is subdivided (mentally) into five sections as follows:
  - Vertically: Three divisions—mesial, middle, distal
  - Horizontally: The middle third is subdivided into gingival, middle, and occlusal or incisal thirds.
- Each of the subdivisions is scored for the presence of stained debris as follows:
  - 0 = No debris
  - 1 = Debris definitely present.
- Identify by M when all three molars or both incisors are missing
- Identify by S when a substitute tooth is used.

Scoring

A. Score for individual tooth:

Add the scores for each of the 5 subdivisions. The scores range from 0 to 5.

B. PHP for the individual

Total the scores for the individual teeth and divide by the number of teeth examined. The score ranges 0–5.

C. PHP index for a group

To obtain the average score for a group, total the individual scores and divided by the number of the individuals examined.

Suggested Nominal Scale

Rating	*Scores*
Excellent	0
Good	0.1–1.7
Fair	1.8–3.4
Poor	3.5–5.0

Uses of PHP index

- Assist in motivating changes in oral health habits
- Used to score the patient before and after oral hygiene instruction and at follow up visits
- Used to analyse and evaluate the effectiveness of home care methods that are being used in the program
- Used for individual patient education as educations
- Used for simpler and quick assessment.

Indices Used for Assessment of Calculus

Calculus is defined as a deposit of inorganic salts composed primarily of calcium carbonate and calcium phosphate mixed with food debris, bacteria and desquamated epithelial cells.

There are two main types of dental calculus:

1. Supragingival calculus: White to yellowish brown in colour, found occlusal to the free gingival margin, and visible in the oral cavity. It has hard, clay-like consistency and is easily detached from tooth surface.
2. Subgingival calculus: Denotes deposits apical to the free gingival margin, which are usually light brown to black in colour. Usually found in periodontal pockets and is not visible on routine oral examination.

Indices used to assess calculus are:

- Those that are appropriate for to epidemiologic surveys
- Those that are appropriate for longitudinal studies, with an examination every 3–6 months;
- Those that are used in short-term clinical studies, usually no longer than 6 months.

Question 5

Describe indices used to assess gingival inflammation.

Answer

Papillary-marginal-attachment (PMA) Index

The PMA index was developed by Maury Massler and Schour I. in 1944

The primary impetus, which led to the development of the PMA index in 1944–1947, was the need for some

quantitative method of recording readily—observable inflammatory conditions of the gingivae to replace the gross assessment gingivitis in both children and adults as mild, moderate or severe.

The basic philosophy used in the development of the PMA index is the numbers of gingival units affected were counted rather than the severity of the inflammation.

A gingival unit was divided into three component parts:

1. Papillary gingiva (p)—the gingival portion between the teeth
2. Marginal gingiva (M)—the marginal collar surrounding the teeth, and
3. Attached gingiva (A)—the gingival portion overlying the bony alveolar process.

Method

'P' 0	Normal; no inflammation
1+	Mild papillary engorgement; slight increase in size
2+	Obvious increase in size with spontaneous haemorrhage on pressure
3+	Excessive increase in size with spontaneous haemorrhage
4+	Necrotic papilla
5+	Atrophy and loss of papilla, (through inflammation)
'M' 0	Normal; no inflammation visible
1 +	Engorgement; slight increase in size, no bleeding
2+	Obvious engorgement; bleeding upon pressure
3+	Swollen collar; spontaneous haemorrhage; beginning infiltration into attached gingivae
4+	Necrotic gingivitis
5+	Recession of the free marginal gingivae below the cemento-enamel junction (CEJ) due to inflammatory changes
'A' 0	Normal; pale rose; stippled
1+	Slight engorgement with loss of stippling; changes in colour may or may not be present
2+	Obvious engorgement of attached gingivae with marked increase in redness. Pocket formation present
3+	Advanced periodontitis. Deep pockets evident

The facial surface of the gingiva around a tooth was divided into three gingival units as the papillary gingiva (P), marginal gingivae (M), attached gingiva (A).

The presence or absence of inflammation on each gingival unit was recorded respectively. All the teeth could be assessed in this manner, usually only the maxillary and mandibular incisors, canines and premolars are examined. The idea of using the PMA index is to express the degree of gingivitis for each gingival unit, which is as follows:

Thus, in general, mild gingivitis is confined to the papillary area (P); moderate gingivitis means spread to marginal gingivae, (M); and severe gingivitis is identified by its spread to the attached gingivae, (A).

Scoring Criteria

The degree of gingivitis for each gingival unit scored as follows:

P	Involvement of the papillary gingiva and its severity expressed in scores from 0 to 5
M	Involvement of the marginal gingiva and its severity expressed in scores from 0 to 5
A	Involvement of the attached gingiva and its severity expressed in scores from 0 to 3

Calculation of the index

The number of affected papillary marginal and attached units is counted and the P, M and A numerical values are totalled separately, there added together and expressed numerically as the PMA index score per person.

Uses

- In clinical trials
- On individual patients
- For epidemiologic surveys.

Question 6

Explain about sulcus bleeding index (SBI).

Answer

It was proposed by Muhlemann and Son in 1971. It is a modification of Papillary-Marginal index.

Purpose

To locate areas of gingival sulcus bleeding upon gentle probing and thus recognize and record the presence of early (initial) inflammatory gingival disease.

Areas Examined

Four gingival units are scored systematically for each tooth. The marginal gingiva, (labial and lingual) and the papillary gingival (mesial and distal).

Procedure

- Use standardized lighting while probing each of the four areas
- Hold the probe parallel with the long axis of the tooth for marginal gingival units and direct the probes towards the col are for papillary gingival units

- Wait 30 seconds after probing before scoring apparently healthy gingival units
- Dry the gingiva gently if necessary to observe colour changes clearly.

Criteria

- Bleeding on probing and change in colour and obvious swelling
- Bleeding on probing and obvious swelling
- Bleeding on probing and spontaneous bleeding and change in colour, marked swelling with or without ulceration.

Scoring

- SBI for area: Each of the four gingival units is scored 0 to 5
- SBI for tooth: Scores for the four units are totalled and divided by 4
- SBI for individual: By totalling scores for individual teeth and dividing by the number of teeth, the SBI is determined. Indices range from 0 to 6.

1	Healthy appearance of papillary and marginal gingiva, no bleeding on sulcus probing
2	Apparently healthy papillary and marginal showing no change in colour and no swelling, but bleeding from sulcus on probing
3	Bleeding on probing and change of colour caused by inflammation. No swelling or macroscopic oedema
4	Bleeding on probing and change in colour and slight oedematous swelling

Question 7

Explain gingival index (gi).

Answer

It was proposed by Loe and Silness in 1963.

Purpose

Assess the severity of gingivitis based on colour, consistency and bleeding on probing.

Selection of teeth and gingival areas

All the teeth are examined or selected teeth or selected surface of all teeth or selected teeth.

Areas examined: Four gingival areas are examined (distal, facial, mesial, lingual).

Selected teeth: 16, 12, 24,36,32,44

Procedure

- Teeth and gingiva are dried and are examined under adequate light, using a mouth mirror and probe
- The probe is used to press on the gingiva to determine the degree of firmness
- The probe is used to run along the soft tissue wall near the entrance to gingival sulcus to evaluate bleeding.

Criteria

1	Normal gingiva
2	Mild inflammation: slight oedema, slight change in colour. No bleeding on probing
3	Moderate inflammation: Redness, oedema and glazing. Bleeding on probing
4	Severe inflammation: Marked redness and oedema. Ulceration, tendency to spontaneous bleeding

Scoring

- GI for area: Each of four gingival surfaces is given a score of 0 to 3
- GI for tooth: Scores for each area are totalled and divided by 4
- GI for groups of teeth: Scores for individual teeth may be grouped and totalled, and divided by the number of teeth
- GI for the individual: By totalling scores and dividing by the number of teeth examined the gingival index is determined.

Rating	*Score*
Excellent (normal health tissue)	0
Good	0.1–0.9
Fair	1.0–1.9
Poor	2.0–3.0

Uses

- Use to determine the prevalence and severity of gingivitis in epidemiological survey
- For assessment of gingivitis severity in individuals
- Used in controlled clinical trials of preventive or therapeutic agents.

Question 8

Explain about indices used for assessment of periodontal disease.

Answer

Periodontal Index (PI)

- It was introduced by Russell AL in year 1956. It estimates periodontal disease by measuring the gingivitis, periodontal pocket and masticatory function
- Periodontal index is a composite index because it records both the reversible changes due to gingivitis and the

more destructive and presumable irreversible changes brought by deeper periodontal disease.

Purpose

To assess and score the periodontal disease status of populations.

Method

- All the teeth examined
- All of the tissue circumscribing a tooth is considered a scoring or gingival unit and is assessed for gingival inflammation and periodontal involvement.

Instruments used

- Each tooth is examined using a mouth mirror and explorer with adequate illumination
- (In the original examination, a Jacquette scaler and chip blower were used to define the presence of periodontal pockets). At present, a periodontal probe is used.

Scoring Criteria

Clinical condition	PI Score	Stages of disease
Clinically normal supportive tissues	0–0.2	
Simple gingivitis	0.3–0.9	
Beginning destructive periodontal disease	0.7–1.9	Reversible
Established destructive periodontal disease	1.6–5.0	Irreversible
Terminal disease	3.8–8.0	Irreversible

Calculation

Each tooth is assigned a score from 0 (no disease) to 8 (severe disease with loss of function).

$$\text{Individual score} = \frac{\text{Sum of individual}}{\text{Number of teeth present}}$$

$$\text{Average score} = \frac{\text{Total of individual score}}{\text{Number of individual examined}}$$

Interpretation

Scoring	Criteria	Additional Radiographic Features
'0' Negative	There is neither overt inflammation in the investing tissues nor loss of function caused by destruction of supporting tissues	Radiographic appearance is normal
'1' Mild gingivitis	There is an overt area of inflammation in the free gingiva that does not circumscribe the tooth	
'2' Gingivitis	Inflammation completely circumscribes the tooth (but there is no apparent break in epithelial attachment)	
'4'		There is early notch like resorption of alveolar crest
'6' Gingivitis with pocket formation		There is horizontal bone loss involving the entire alveolar crest, upto half of the length of the tooth root
'8' Advanced destruction with loss of masticatory function		There is advanced bone loss involving more than one-half of the length of tooth root, or a definite infra-bony pocket with widening of periodontal ligament. There may be root resorption or rarefaction at apex
Rule: When in doubt assign lesser score.		

Why breakdown of scores?

Initially bone loss was recorded by radiographs. Grading can be given in a sequence if radiographs are taken. Clinical signs and symptoms are taken form 0–8. It is difficult to differentiate clinically from one stage to another and hence let to the breakdown of scores.

Disadvantages

- Subjective variation
- Underestimates the actual condition, if tooth is already lost due to periodontal disease
- Overlapping of scores
- Scoring is not continuous.

Uses

- Used in epidemiological surveys
- More data can be assembled
- Used international health survey.

Periodontal Disease Index (PDI)

It was introduced by Ramfjord in 1959.

The PDI is a clinician's modification of Russell's periodontal index for epidemiological surveys of periodontal disease. The PDI combines the evaluation of gingival status with the probed attachment level. Although not a part of PDI, a calculus index and plaque index have usually been included when making a survey.

Purpose

- To assess the prevalence and severity of gingivitis and periodontitis and to show the periodontal status of an individual or a group
- To provide accurate basis for incidence and longitudinal studies of periodontal disease
- To provide a meaningful basis for periodontal therapy
- To provide an accurate recordings for clinical trials of preventive and therapeutic procedures
- To provide data for assessment of correlation with factors of potential significance in aetiology of periodontal disease.

Selection of Teeth

For short-term clinical trials and where a limited number of patients are available, one may concern all of the teeth in the mouth but otherwise,

Six teeth are used to represent the six segments of the dentition i.e.

6	14
41	6

Only fully erupted teeth are scored. Substitutions are not made for missing teeth.

Instruments

To obtain consistent readings Michigan probe No. 0 font is used.

Procedure

Determine gingival status

- Under standardized light, dry the gingiva with cotton to observe colour and form
- Apply gentle pressure with the probe to determine consistency
- When the colour change definitely indicates the presence of inflammation, the consistency is not checked.

Scoring Criteria

1	Absence of signs of inflammation
2	Mild-to-moderate inflammatory gingival changes, not extending around tooth
3	Mild-to-moderately severe gingivitis extending all around the tooth
4	Severe gingivitis characterized by marked redness, swelling, tendency to bleed and ulceration, not necessarily extending around the tooth

Calculation

$$\text{Individual score} = \frac{\textit{Add the scores for all examined teeth}}{\textit{Total number of teeth examined}}$$

Determine crevice depth from CEJ

- Instrument used
  - To obtain consistent readings, a probe is needed. Here, a Michigan probe No. 0 is used.
- Location of measurements
  - Two measurements: When two measurements are made, they are at the middle of the facial surface and at the facial aspect of the mesial contact area with the side of the probe held touching both teeth.
  - Four measurements: Originally, four measurements were used, i.e. facial, lingual, distal and mesial. It was later found that no significant loss in accuracy resulted from using only two measurements. Four measurements are still used.

Procedure

- Locate the CEJ with probe tip and measure the distance form gingival margin
- When calculus interferes, scaling is performed
- Apply probe to measure the pocket depth from gingival margin to attached periodontal tissue and subtract the distance to the CEJ.
- When there is apparent recession, the direct reading from the CEJ can be measured.

Scoring criteria

- Gingival index
- A score is given when the pocket of any 2 or 4 recorded areas extend apically to the CEJ not more than 3 mm but including 3 mm
- When the pocket depth of any of the 2 or 4 recorded areas extend apically to the CEJ from 3 mm to 6 mm inclusive
- When the pocket depth of any of the 2 or 4 recorded areas extend apically more than 6 mm form the CEJ.

Calculations $\frac{\textit{Add scores of individual teeth}}{\textit{Number of teeth examined}}$

Score ranging from 0 to 6.

Calculus Component of the Periodontal Disease Index

- A calculus index was described by Sigurd P Ramfjord in 1959 as one of the components of his PDI
- The calculus component of the PDI assesses the presence and extends of calculus of six index teeth.

Teeth and Surfaces Examined

- The six index teeth selected for scoring calculus are:
  1. 16—Maxillary right first molar.
  2. 21—Maxillary left central incisor.
  3. 24—Maxillary left first bicuspid.
  4. 36—Mandibular left first molar.
  5. 41—Mandibular right central incisor.
  6. 44—Mandibular right first bicuspid.
- The facial (buccal/labial) and lingual surfaces of the six index teeth are examined.

Method

- The presence and extent of calculus on the facial and lingual surfaces of the six index teeth are evaluated using a mouth mirror and a dental explorer and/or a periodontal probe
- The scoring of calculus is done according to the following criteria.

Criteria

1	Absence of calculus.
2	Supragingival calculus expanding only slightly below the free gingival margin (not more than 1 mm)
3	Moderate amount of supragingival and subgingival calculus or subgingival calculus alone
4	An abundance of supragingival and subgingival calculus

Calculation of the Index

- The calculus score per tooth is totalled and then divided by the number of teeth examined to yield the calculus score per person
- The calculus component of PDI also has a high degree of examiner reproducibility and also can be performed quickly.

Uses

- Epidemiologic surveys
- Longitudinal studies in periodontal diseases.

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Priya Verma Gupta is an experienced pedodontist, currently working as Professor at Divya Jyoti College of Dental Sciences and Research, Modinagar, Ghaziabad, Uttar Pradesh, India. She has keen interest in academics and has many international and national publications to her credit. She has so far authored several books and has contributed actively to other medical and dental textbooks as a co-author as well as contributor. Currently, she is associated with the editorial board of Journal of Indian Medical Gazette and Jaypee's International Journal of Clinical Pediatric Dentistry.



Ipseeta Menon is presently working as Reader, Department of Public Health Dentistry, in ITS Dental College, Ghaziabad, Uttar Pradesh, India. She completed BDS in 1998 from Bangalore University and MDS in 2009 from Rohilkhand University, Bareilly. She has attended and presented papers in many national Conferences. She was a key participant in "National Oral Health Survey, to estimate Dental Health & Manpower & Disease Prevalence in urban and rural India" as a part of the Delhi/NCR team held in 2010. She has many national and international publications to her credit. She is in the editorial board for many national journals, and reviewer for reputed international journals.



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