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Dental Indices

A prerequisite for any epidemiological investigation is the ability to quantify the occurrence and severity of the disease.

Measurement is a process of assigning value to characteristics according to a sets of rules this is facilitate through indices, certain methodology and criteria.

Oral indices are essential rules of values, usually numerical, with maximum and minimum units used to describe variables as specific conditions on a graduated scale which use the same criteria and methods to compare specific variables in individuals, samples or population with that same variables as is found in other individual samples or populations.

The main tool of epidemiological studies in dental disease is **Dental index or indices** to find out the **incidence, prevalence and severity,** based on which preventive programs are adopted for their control and prevention.

Definition of Index: An index is defined as a numerical value describing the relative status of population on a graduated scale with definite upper and lower limits, which is designed to permit and facilitate comparison with other population classified by the same criteria and methods.

Objectives of indices:

- To increase our understanding of the disease process, thus helping in control and prevention.
- To discover populations at risk and define the specific problem under investigation.

Ideal **requisites of index:**

1. Clarity, Simplicity and Objectivity.

   ▶ The index should be reasonably easy to apply so that there is no undue time lost during field examination.

The criteria should be clear and unambiguous, with mutually exclusive categories.

2. **Validity.**
   - The index must measure what it is intended to measure.
   - It should correspond with the clinical stages of the disease under study at each point.
3. **Reliability.**
   - The index should measure consistently at different times and under a variety of condition.
4. **Quantifiability.**
   - The index should be amenable to statistical analysis, so that a number that corresponds to a relative position on a scale from zero to upper limit can express the status of a group.
5. **Sensitivity.**
   To detect reasonably small shifts of disease in either direction.
6. **Acceptability.**
   The use of the index should not be painful or demeaning to subject.

Purpose of indices:

- Provide individual assessment to help a patient recognize an oral problem.
- Reveal the degree of effectiveness of present oral hygiene practices.
- Motivate the person in preventive and professional .
- Evaluate the success of professional treatment over a period of time by comparing index scores.

Classification of indices

- Based upon the direction in which their scores can fluctuate:
  1. Irreversible index-» measures conditions that will not change.
     E.g. index measuring dental caries (DMF).
  2. Reversible index-» measures conditions that can be changed.
     E.g. Indices that measure gingival condition.
- Depending upon the extent to which the oral cavity is measured:
  1. Full mouth index-» measure the entire periodontium or dentition .
     E.g. Russell's Periodontal Index (PI).
  2. Simplified Index-e- measure only a representative sample of the dentition.
     E.g. Greene and Vermilion's Oral Hygiene Index-Simplified(OHI-S).
- According to the entity which they measure
  - Disease index++ E.g. D(Decay) portion of the DMF Index.
  - Symptom index-» E.g. Gingival index.
  - Treatment index++ E.g. F(filling) portion of the DMF index.

- Generally there are two types of dental indices:

---+ Measures the number or proportion of people in a population with or without a specific condition at a specific point in time or over an interval of time.

---+ Measures the number of people affected and the severity of a specific condition at a specific time or interval of time.

Indices used for assessment of Oral disease:

I .Dental caries

The need for uniform standard for measuring dental canes prevalence has received increasing attention during recent years.

Definition of dental caries-» A progressive, irreversible, microbial disease affecting the hard tissue of the tooth, resulting in demineralization of the inorganic constituent and dissolution of the organic constituents thereby leading to cavity formation.

DMF(D ..... decay , M ..... missing ,f ..... filling)-+ was introduced by Henry Klein, Carrole E. Palmer and Knutson J. W. in 1938, to determine the prevalence of coronal caries and it is the most universally employed index for measuring dental caries, which is simple, rapid , versatile and based on the fact that the dental hard tissue are not self-healing established caries leaves scar. So that the tooth either remains decayed, extracted or filled, therefore the DMF. index is an *irreversible index* (measure life time dental caries experience).

Procedure Method:

DMF Index -+ for permanent teeth, which is composed of components:

- D -+ describe decay teeth
- M-+ describe missing teeth (due to caries only)
- F --+ describe teeth that have been previously filled as a result of caries involvement

All the 28 permanent teeth are examined except:

1. The third molars.
2. Unerrupted teeth.
3. Congenitally missing and supernumerary teeth.
4. Teeth removed for reasons other than dental caries (orthodontic treatment or impaction).

5. Teeth filled for other reason (fracture, cosmetic purpose or bridge abutment).
6. Primary tooth is retained with permanent successor erupted the permanent tooth is evaluated and the primary tooth is never included in the index.

Identification of dental caries:

1. The tip of explorer can penetrate deep into soft yielding material.
2. Discoloration or loss of translucency or demineralized enamel.
3. There is a softness at the base of the cavity.

Examination method for DMF

- 0---tA tooth can only be counted once, if it has been restored and canes detected, it cannot be counted as decayed and filled, count it has decayed.
- M-t indicates the number of missing permanent teeth due to decay only.
- F-t indicates the number of restored permanent teeth that have been attacked by caries. A tooth may have several fillings it is counted as one tooth, and if the tooth have filling but shows recurrent decay, it is counted as a decayed teeth.

Index calculation

- DMFT Index for permanent teeth (Decay, Missing, Filled, Teeth). LIndividual **DMFT** ⊕D+M+F=DMF

2.Group average -t = $\frac{\text{Total DMF}}{\text{Total number of subjects examined}}$

The maximum possible DMFT score is 32.(range from 0-32)

- DMFS (Decay, Missing, Filled, Surfaces), which is employed to assess each individual surface of each tooth. The principles , rules and criteria of DMFS index is the same as DMFT index only the difference in DMFS index the surface is examined.

Examination of surfaces:

1. Anterior teeth-» examined 4 surfaces (facial, lingual, mesial and distal).
2. Posterior teeth-» examined 5 surfaces (occlusal, facial, lingual, mesial and distal).

• Total surface count for DMFS Index if 28 teeth are examined

Anterior teeth 12 (12x4)=48 surfaces

Posterior teeth 16(16x5)=80 surfaces

Total= 128 surfaces

Calculation of index individual DMFS:

D =Total number of decayed surfaces.

M= Total number of missing surfaces.

F= Total number of filled surfaces.

Scores ofDMFS=D+M+F

Caries indices for primary teeth:

Gruebbel was described (dmf Index) as equivalent index to DMF Index for measuring dental caries in primary teeth.

d= decayed deciduous teeth.

e= deciduous teeth indicated for extraction due to dental caries.

f= restored deciduous teeth which have been decayed without any recurrent decay.

dmf index -+ modified of (dmf index) include dmft index (d=decayed, m=missing and f=filled teeth). the maximum score =20,

dmfs index (d=decayed, m=missmg and f=filled surface) , the maximum score= 88.

df Index-» in this index missing teeth are ignored to getting around the exfoliation problem ,so that index applied to whole teeth as (decayed - filled tooth)—dft index and (decayed—filled surface)-+dfs index.

Mixed dentition

DMFT/DMFS and dmft/dmfs are never added to gather so that each child is given a separated index one for permanent and another for primary teeth.

Index for root surface caries (RCI)

Root caries index was developed by Katz-1979, which is used to derive scores for total root caries .RCI is based on the requirement that gingival recession must occur before root surface lesion begin, therefore only teeth with gum recession are examined.

- 4 surfaces of root are examined (mesial, distal, lingual and buccal or labial).
- A judgment of no gum recession is made if the CEJ(cement enamel junction) Cannot be visualized.

The root caries index is calculated for an individual using the formula

$$RCI = \frac{(R-D)+(R-F)X100}{(R-D)+(R-F)+(R-N)}$$

R-N= Recession present :surface normal or sound.

R-D= Recession present, with a decay root surface.

R-F= Recession present, with a filled root surface.