Community Dentistry

Dental Caries indices:

Dental Caries is the most prevalent chronic disease affecting the human race. Once it occurs, its manifestations persist throughout life even the lesion is treated. It is a post eruptive disease. It affects both genders, all races, all ages and all socio-economic groups.

Dental caries indices:

1- Indices used for coronal caries.

A- Permanent teeth.

B- Primary teeth.

2- Indices used for root caries.

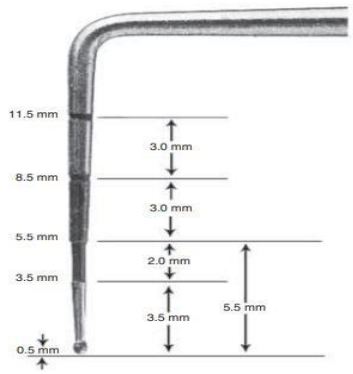
1-Indices used for coronal caries:

A-Permanent teeth index:

-Decayed-Missing-Filled Index (DMF): This index was developed by Henry Klein, Carrole E Palmer and Knutson JW in 1938 and modified by WHO, it is simple, rapid and universally accepted. The instruments used in the examination procedure are plane mouth mirror and CPI (community periodontal index) probe, this index is of two types:

1-DMF teeth index **(DMFT)** which describe the amount (the prevalence) of dental caries in an individual. DMFT numerically expresses the caries prevalence and is obtained by calculating the number of teeth

2- DMF surfaces index **(DMFS)** which measures the severity of dental caries and is obtained by calculating the number of surfaces.



CPI (community periodontal index) probe

Principles and rules in recording DMFT:

1- A tooth may have several restorations but it counted as one tooth, F.

2- A tooth may have restoration on one surface and caries on the other , it should be counted as decayed D.
3- No tooth must be counted more than once D, M, F or sound.

Principles and rules in recording DMFS:

1. Each tooth was recorded as 4 surfaces for anterior teeth and 5 surfaces for posterior teeth.
2. Retained root (the crown has been destroyed and only the roots are left) was recorded as 4 D for anterior teeth, 5 D for posterior teeth.
3. Missing tooth was recorded as 4 M for anterior teeth, 5 M for posterior teeth.
4. Tooth with crown due to caries was recorded as 4 F for anterior teeth, 5 F for posterior teeth.

Sound crown : A crown is coded as sound if it shows no evidence of treated or untreated clinical caries .Thus, a crown with the following defects should be coded as sound:

- ☒ White or chalky spots; discolored or rough spots that are not soft to touch with a metal CPI probe
- ☒ Stained enamel pits or fissures that do not have visible cavitation or softening of the floor or walls detectable with a CPI probe.

D component:

Used to describe (Decayed teeth) which include:

1. Carious tooth.
2. Filled tooth with recurrent decay.
3. Only the roots are left.
4. Defect filling.
5. Temporary filling.
6. Filled tooth surface with other surface decayed (DMFT).

The criteria for identification of dental caries: I. The lesion is clinically visible and obvious.

II. There is a discoloration or loss of translucency typical of undermined enamel

III. The explorer tip in a pit or fissure catches or resist removal after moderate to firm pressure on insertion in discolored pits and fissures and when there is softness at the base.

M component:

Used to describe (Missing teeth due to caries) other cases should be excluded these are:

1. Missing due orthodontic treatment.
2. Impaction.
3. Missing due periodontal disease.
4. Unerupted teeth.
5. Congenitally missing.
6. . Avulsion of teeth due to trauma or accident.

F component: All the following points should be present: **A.** Filled teeth due to caries.

B. Permanent restorations.

C. There was no secondary (recurrent) caries.

D. Undefected filling.

NOTE: A tooth with a crown placed because of previous decay was recorded in this category (F).

Teeth stored for reason other than dental caries should be excluded, which include:

1. Trauma (fracture).
2. Hypoplasia (cosmetic purposes).
3. Bridge abutment (retention).
4. Seal a root canal due to trauma.
5. Fissure sealant.
6. Preventive filling.

Notes:

1- A tooth is considered to be erupted when just the cusp tip of the occlusal surface or incisor edge is exposed .The excluded teeth in the DMF index are:

1- Supernumerary teeth.

2- The third molar according to **Klein, Palmer and Knutson** only. 2-The examination should proceed in an orderly manner from one tooth or tooth space to the adjacent tooth or tooth space starting from upper right second molar and ending with lower right second molar.

3-If a permanent and primary tooth occupy the same tooth space, the status of the permanent tooth only should be recorded.

4-Limitations - DMF index can be invalid in older adults or in children because index can overestimate caries record by cases other than dental caries.

Calculation of DMFT \ DMFS:

1- For individual

DMF = D + M + F

2- For population

$$\text{Mean DMF} = \frac{\text{Total DMF}}{\text{Total No. of the subjects examined}}$$

Maximum score: **Minimum score = Zero**

1- DMFT = 32 or 28

2- DMFS = 12 * 4 + 20 * 5

= 48 + 100 = 148 or 128

D1-4MFS index : It is used to record coronal caries lesion of permanent teeth by its depth (severity) according to the criteria by Manji et al. (1989):

Grade1: the lesion is restricted to enamel surface, only extrinsic discoloration which is hard upon probing

Grade 2: enamel lesion with catching on probing, but no sign for the involvement of dentin.

Grade 3: dental caries including enamel and dentin but with no pulpal involvement

Grade 4: Coronal caries with established pulpal involvement.

Notes about **D1-4MFS index:**

- ☒ Clinical examination is carried out using plane mouth dental mirrors and probe.
- ☒ When more than one grade is present in the same surface , so the most sever grade was recorded.
- ☒ Temporary filling is recorded as D3
- ☒ Fraction F is recorded according to DMF criteria
- ☒ Fraction M is recorded according to DMF criteria (teeth extracted just due to caries)

B- Primary teeth index:

1- dmft / dmfs Maximum scores: dmft = 20 , dmfs = 88

2- deft / defs , which was introduced by Gruebbel in 1944 d- decayed tooth . e- decayed tooth indicated for extraction .

f- filled tooth.

3- dft / dfs

In which the missing teeth are ignored, because in children it is difficult to make sure whether the missing tooth was exfoliated or extracted due to caries or due to serial extraction.

Mixed dentition:

Each child is given a separate index, one for permanent teeth and another for primary teeth.

Information from the dental caries indices can be derived to show the:

1. Number of persons affected by dental caries (%).
2. Number of surfaces and teeth with past and present dental caries (DMFT / dmft -- DMFS / dmfs).
3. Number of teeth that need treatment, missing due to caries, and have been treated (DT/dt , MT/mt , FT/f t).

Differentiation between tooth missing due to caries and due to exfoliation:

1- By age of the patient if it is near to exfoliation time or not.
2- The shape of ridge is concave in carious missing tooth and straight in exfoliated one and permanent successor may be seen.
3- DMF/dmf index is higher in association with carious missing tooth especially adjacent and the contra lateral teeth.
4- Bad oral hygiene mainly associated with carious teeth.

Differentiation between tooth missing due to caries and due to orthodontic treatment:

1- By type of teeth, in orthodontic treatment most teeth should be extracted are 4,5/c, d while in carious missing teeth any teeth may be involved.
2- Bilateral and /or opposing missing generally associated with orthodontic treatment, while in carious missing teeth it is not necessary.
3- DMF/dmf index is higher in association with carious missing tooth especially adjacent and the contra lateral teeth with bad oral hygiene mainly associated with carious teeth.
4- Crowding or appliance may be seen in orthodontic treatment.

***Root Caries Index (RCI), which was introduced by Katz in 1979:**

RCI is based on the requirement that gingival recession must occur before root surface lesions begin. Therefore, only teeth with gingival recession are examined.

1. All teeth are examined in both the lower and upper arch.
2. To obtain the RCI, each of the four surfaces the mesial, distal, buccal (labial), and lingual, of a root are examined for a single tooth.
3. When multiple types of root surfaces are exposed, the most severely affected root surface be recorded for that tooth.

The calculation of RCI:

$$RCI = \frac{(R\text{-}D) + (R\text{-}F)}{(R\text{-}D) + (R\text{-}F) + (R\text{-}N)} * 100$$

(R-D) is no. of root surfaces with decay.
(R-F) is no. of root surfaces which have permanent filling. (R-N) is the no. of sound root surfaces.