

*GOOD MORNING*



# D Y PATIL DENTAL SCHOOL

DEPARTMENT OF  
PUBLIC HEALTH  
DENTISTRY

# INDICES USED IN DENTISTRY

# INDICES TO ASSESS ORAL HYGIENE STATUS

**ORAL HYGIENE INDEX**

**ORAL HYGIENE INDEX – SIMPLIFIED**

**PLAQUE INDEX – SILNESS & LOE**

# ORAL HYGIENE INDEX

**John C Greene, Jack R Vermillion -1960**



# ORAL HYGIENE INDEX

DEBRIS  
INDEX

CALCULUS  
INDEX

# Method of examination



"Right Tarzan, say 'Aaaaiiaaaaahhhh!!...'"

**segment 2**

**CALCULUS**

**DEBRIS**

**segment 1**

**segment 3**

13  
14  
18

23  
24

28

48

38

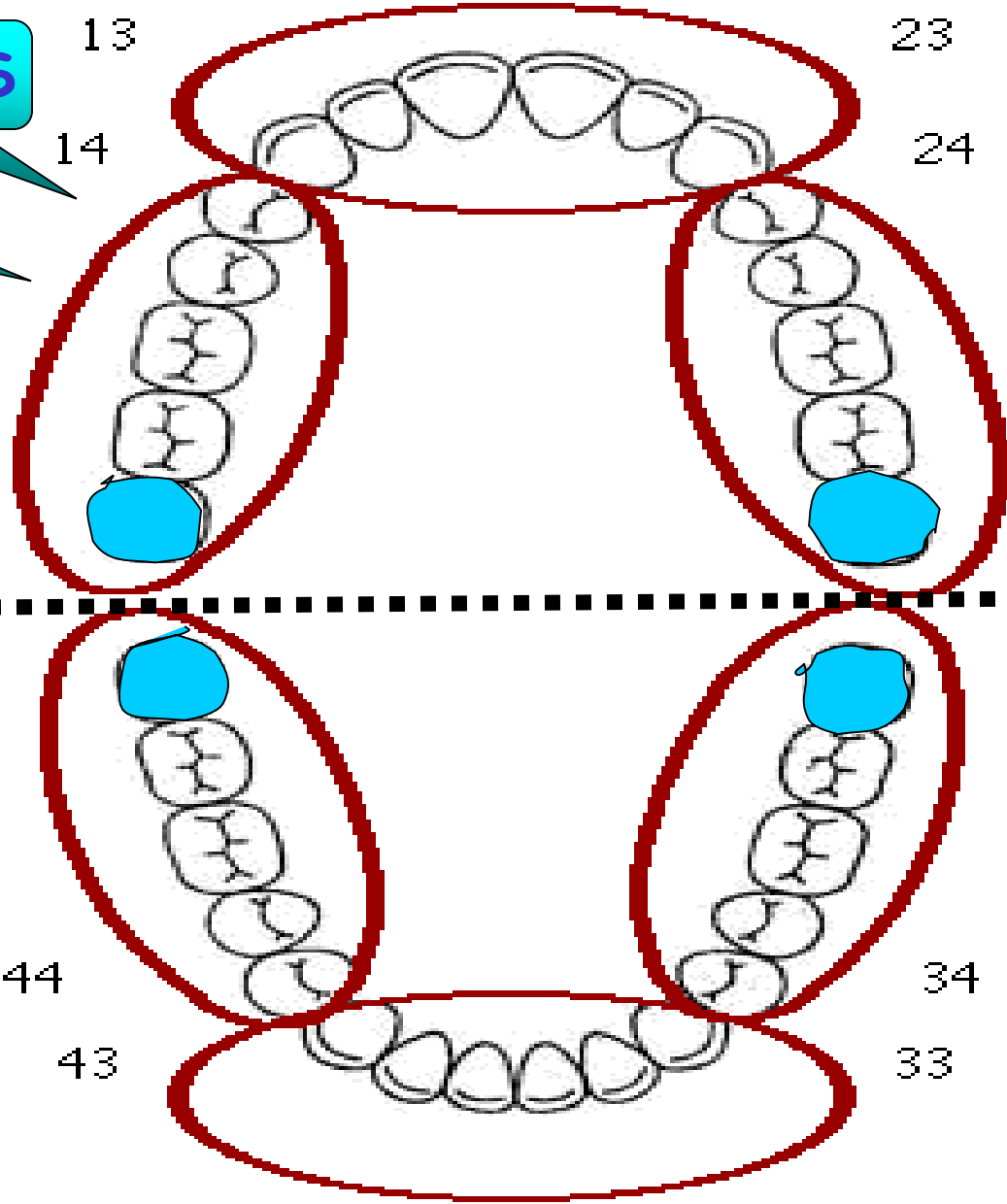
**segment 6**

**segment 4**

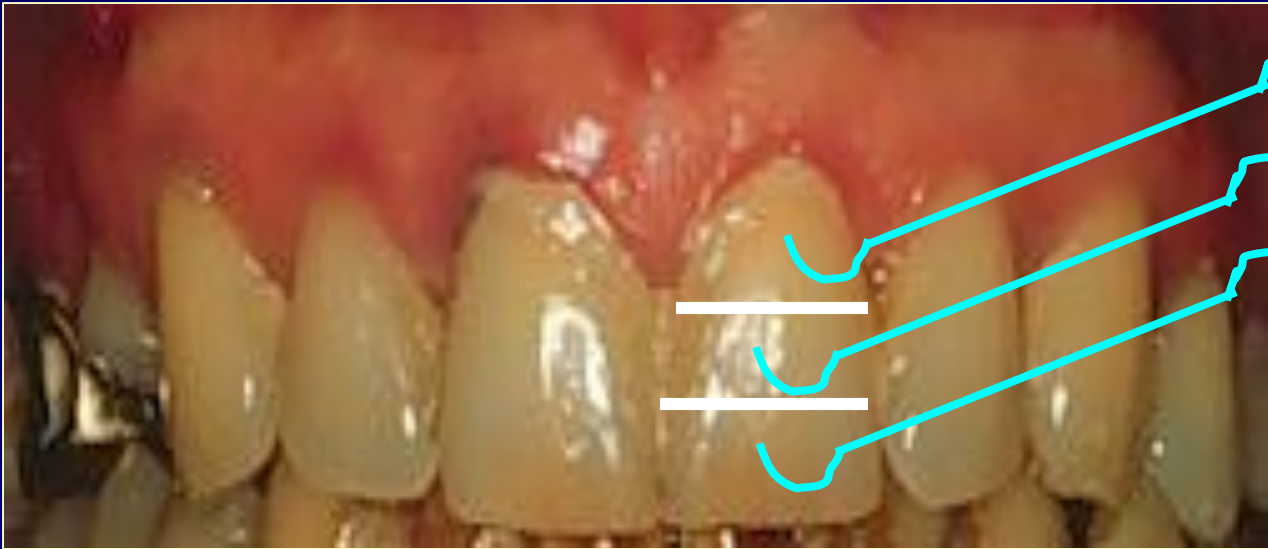
44  
43

34  
33

**segment 5**



- **Separate recording for both oral debris and calculus recorded in each segment.**
- **In each segment, two surfaces will be recorded namely, facial and lingual / palatal surfaces of each tooth.**
- **Debris and calculus score assigned to a segment are based on the buccal and lingual surfaces having the greatest scores.**



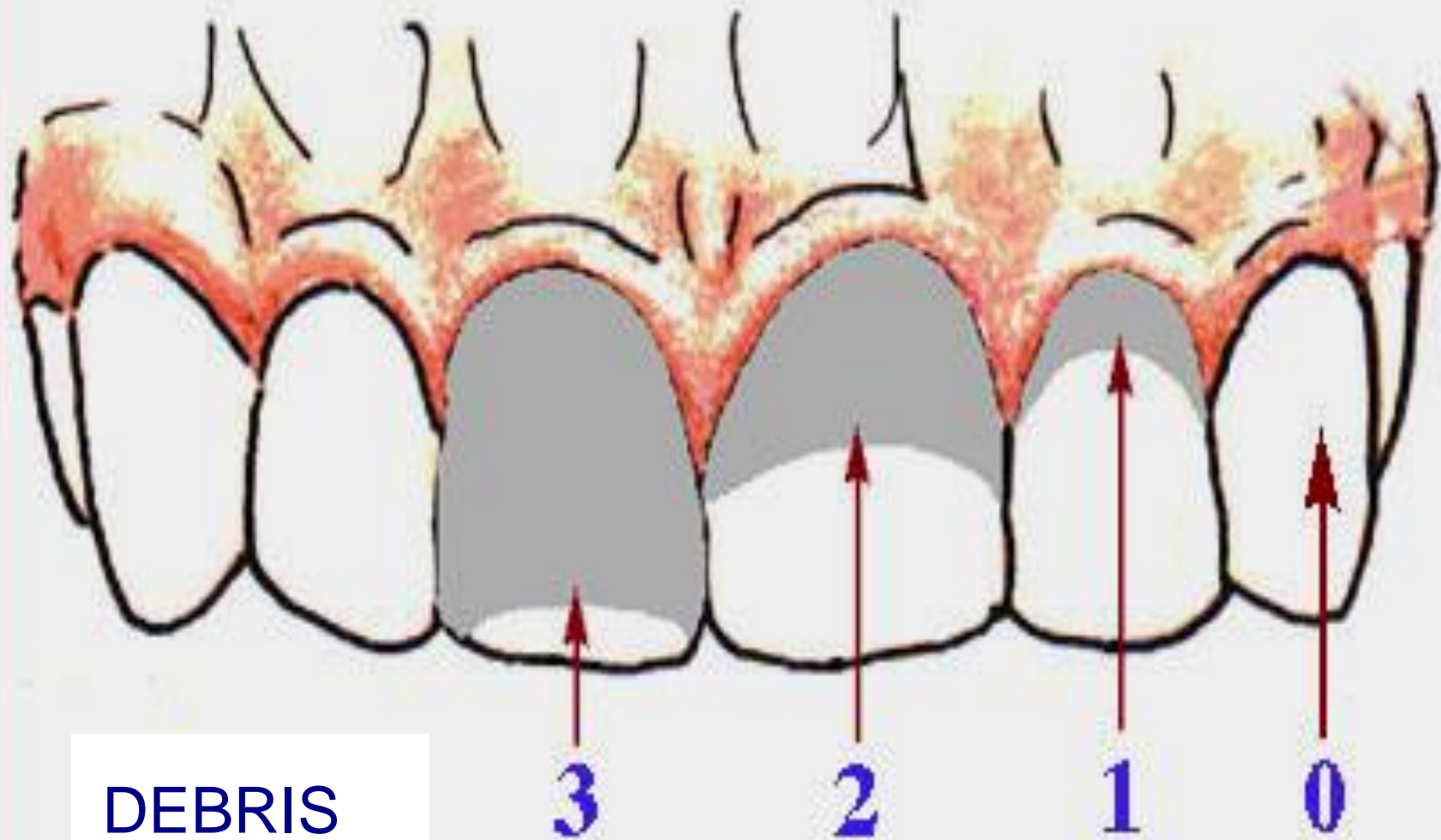
## Debris score :

**0 - No debris or stain present.**

**1 - Soft debris covering not more than one third of the tooth surface or the presence of extrinsic stains regardless of surface area covered or both.**

**2 - Soft debris covering more than 1/3rd but not more than 2/3rds of the exposed tooth surface.**

**3 - Soft debris covering more than 2/3rds of the exposed tooth surface.**



DEBRIS

# Calculus score:

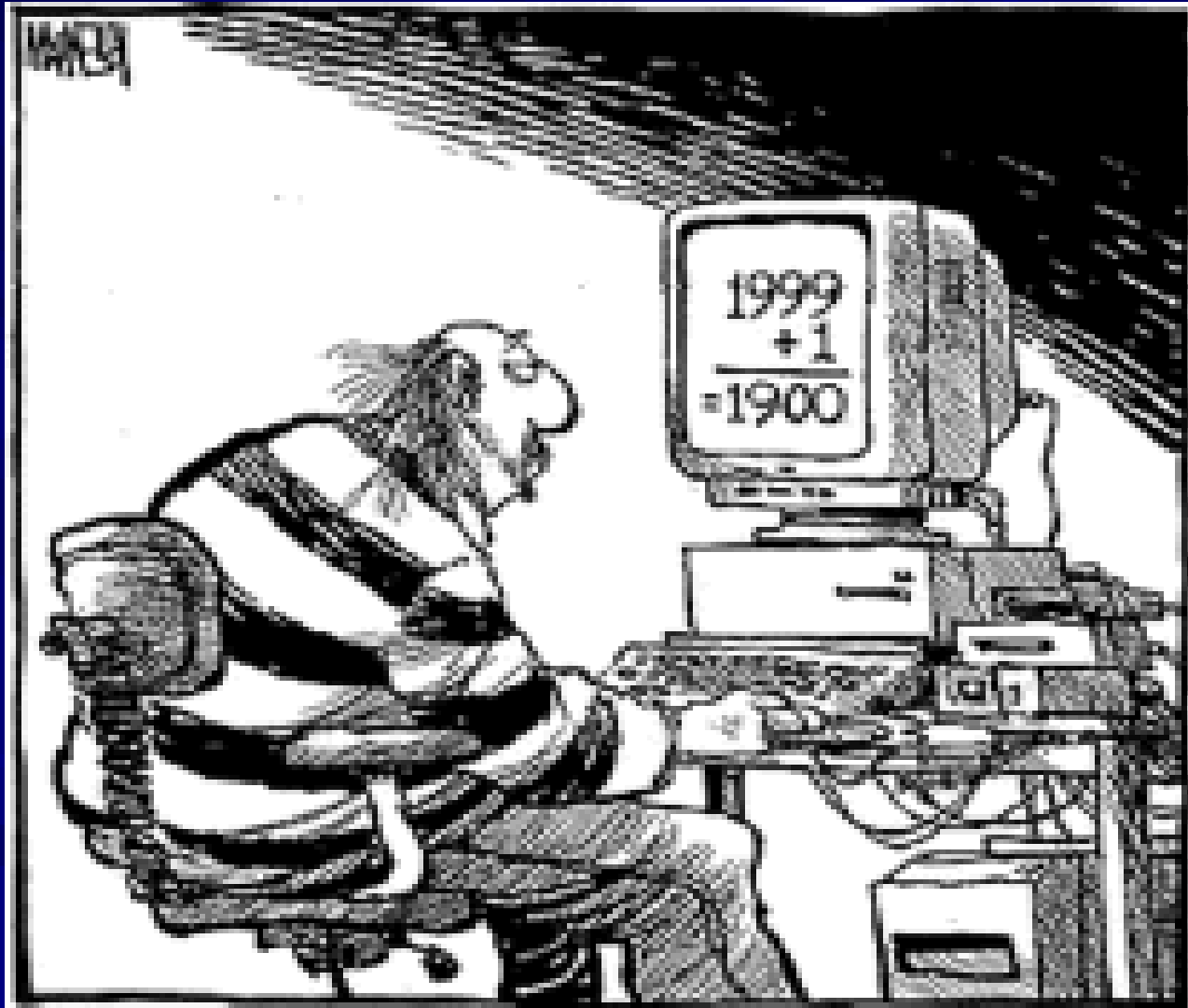
**0 - No calculus present.**

**1 - Supragingival calculus covering not more than 1/3rd of the exposed tooth surface.**

**2 - Supragingival covering more than 1/3rd, but not more than 2/3rds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth or both.**

**3 - Supragingival calculus covering more than 2/3rd of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth.**

# CALCULATION OF INDEX



The scores for debris and calculus should be tabulated separately and indices for each calculated independently but in the same manner.

$$\text{Debris index} = \frac{\text{Total debris score recorded}}{\text{No. of segments scored.}}$$

### **Range of debris index**

*Minimum – 0    Maximum - 6*

**Calculus index = Total calculus score recorded  
No. of segments scored.**

**Range of calculus index**

*Minimum – 0      Maximum - 6*

**ORAL HYGIENE INDEX = DEBRIS INDEX + CALCULUS INDEX**

*Range of Oral Hygiene Index is 0 - 12*

**ADVANTAGES:**

- 1. Sensitive enough to reflect the cleansing efficiency of the tooth brushing and the expected relationships between oral cleanliness and periodontal disease**
- 2. Simple, useful method for assessing a group of individual oral hygiene status quantitatively.**

**4. Useful tool in program evaluation in monitoring oral hygiene maintenance programs.**

**5. Can assess individual's attitude and effectiveness of tooth brushing in oral hygiene practices.**

## LIMITATIONS

- 1. Examination of all surfaces of all teeth present in the mouth (though only 12 surfaces are scored). Hence requires more time.**
- 2. Since it is time consuming, it cannot be used in epidemiological surveys.**
- 3. Intra and interexaminer errors are more.**

# ORAL HYGIENE INDEX - SIMPLIFIED

**John C Green, Jack R Vermillion -1964**

**Differs from oral hygiene index in:**

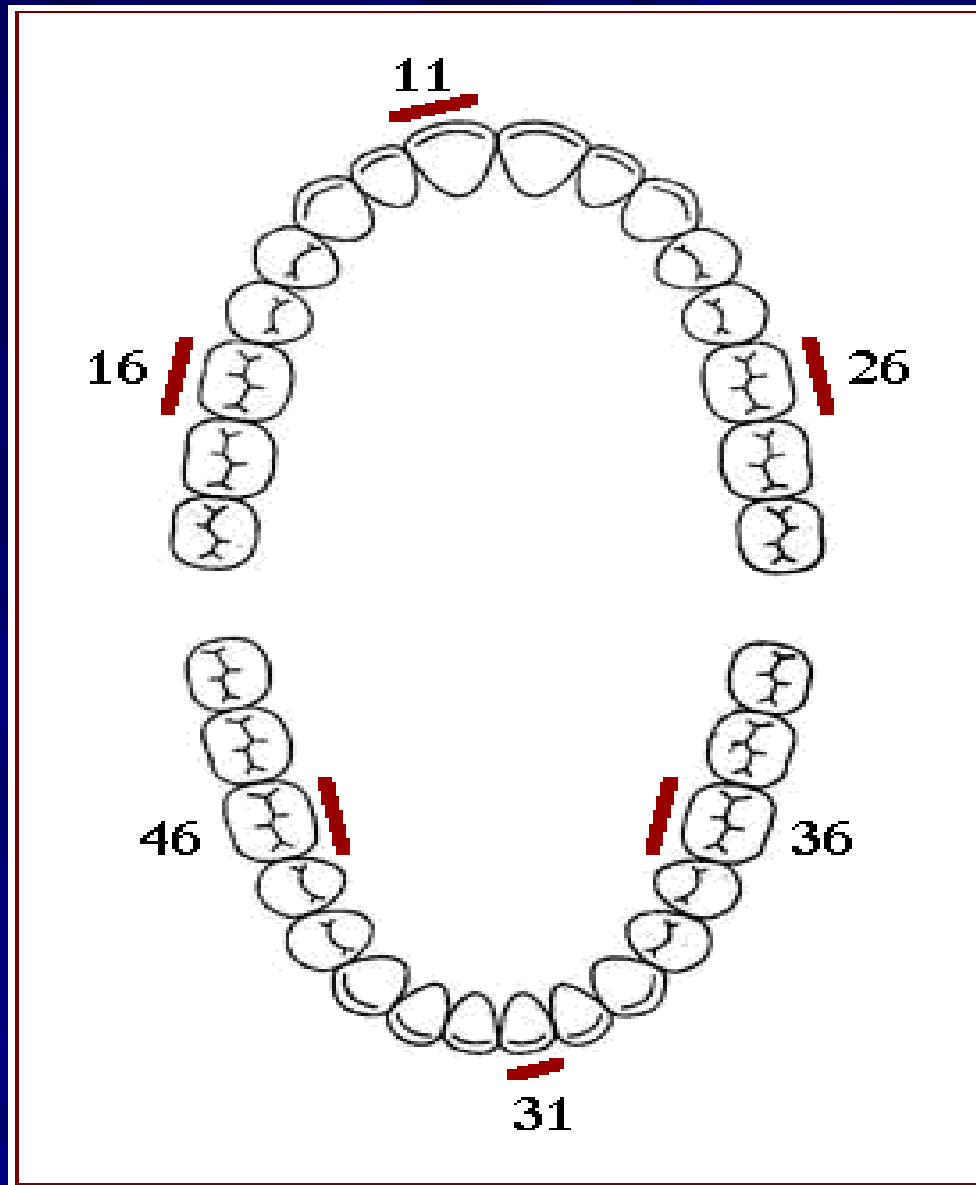
- the number of tooth surfaces scored**
- the method of selecting the surfaces to be scored**

**Greene and Vermillion selected 6 index teeth surfaces that were representative of all anterior and posterior teeth in each segment of the mouth.**

**ORAL HYGIENE INDEX – S = DEBRIS INDEX-S**

**+**

**CALCULUS INDEX-S**



**TOOTH SURFACES TO BE EXAMINED**

- **Only fully erupted permanent teeth are scored.**
- **Natural teeth with full crown restorations and surfaces reduced in height by caries or trauma are not scored.**

**THE DEBRIS INDEX-S AND CALCULUS INDEX-S VALUES  
RANGE FROM  
0 TO 3**

**THE ORAL HYGIENE INDEX-S VALUES  
RANGE FROM  
0 TO 6**

# ADVANTAGES

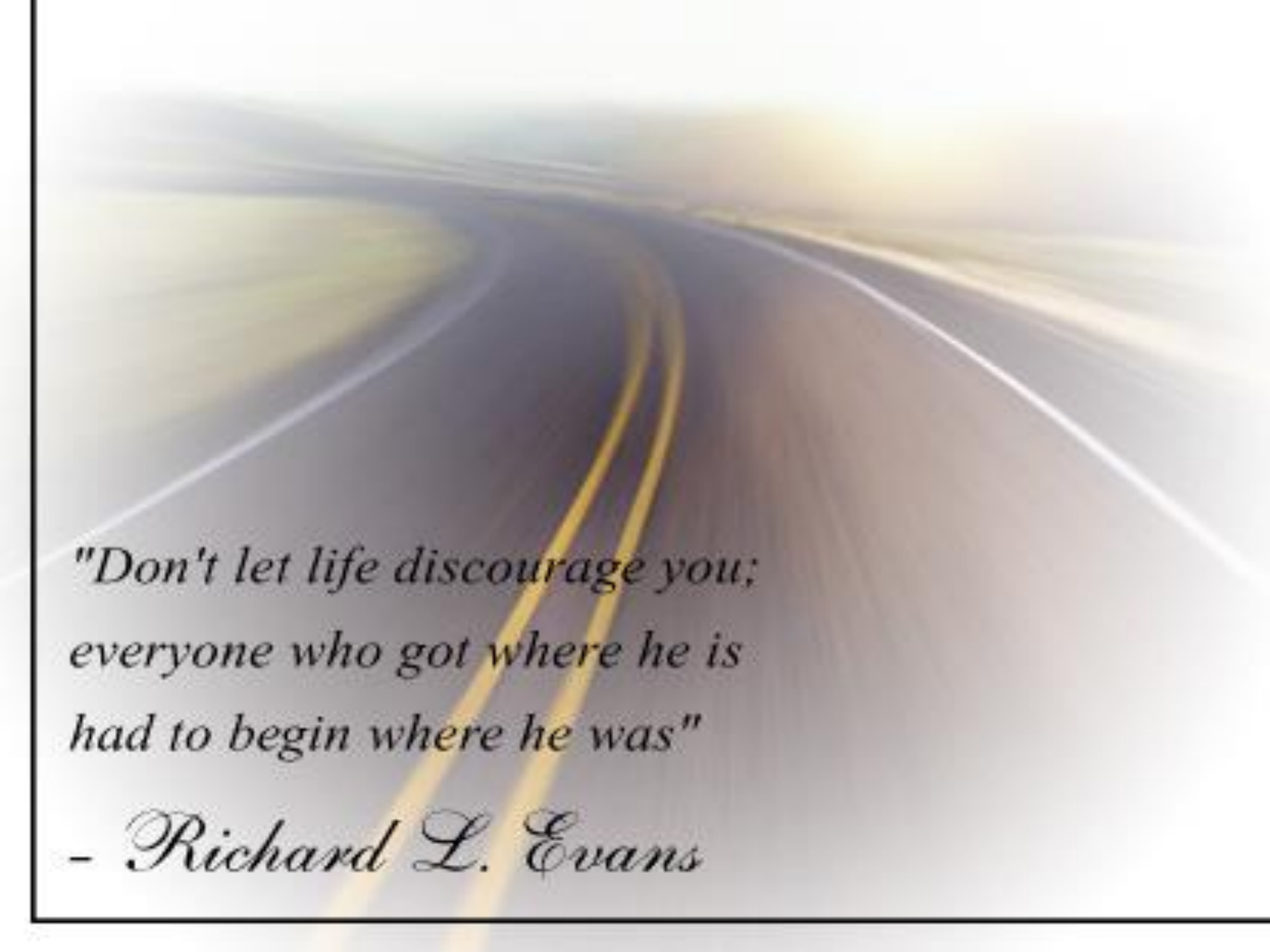
- 1. It is easy to use.**
- 2. Requires less time and hence can be used in field studies, sometimes in selected clinical trails and programme evaluation.**
- 3. It may be used as an adjunct in epidemiological studies of periodontal disease**
- 4. It determines the status of oral hygiene cleanliness in groups.**

**5. Useful in evaluation of dental health education procedures (immediate and long term effects).**

**6. Inter and intra examiner errors are less.**

# **LIMITATIONS**

- 1. Lacks the degree of sensitivity as much as the original version.**
- 2. Underestimation or overestimation of debris and calculus.**
- 3. Not appropriate for individual oral hygiene status evaluation.**
- 4. Not appropriate for certain types of clinical studies including detailed investigation of plaque, and calculus formation.**



*"Don't let life discourage you;  
everyone who got where he is  
had to begin where he was"*

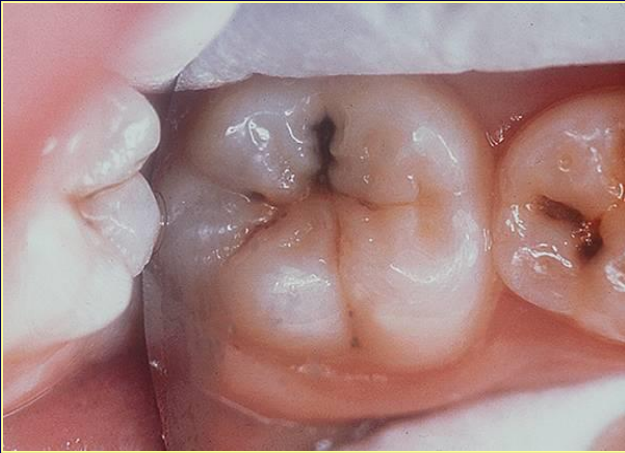
*- Richard L. Evans*

# CARIES INDICES

# DMF INDEX

**ADVOCATED BY HENRY KLEIN, CARROLE E. PALMER  
AND KNUTSON J.W. - 1938**

- Most universally accepted**
- Irreversible index**
- Gives total lifetime caries experience of an individual and group of individuals**



D - Refers to decayed tooth



## **CRITERIA FOR SCORING:**

**Decayed:** 1. Discoloration

2. Definite catch

3. Discontinuity of enamel surface

4. Definite cavitation

5. Softness of base



**M - Tooth missing due to caries**



**F - Tooth that has been permanently filled due to caries**

## METHOD OF EXAMINATION

- All 28 teeth are included
- Third molars are excluded - because of the difference in their status like congenitally missing, impacted or unerupted

**Instruments - Mouth mirror, Standard No. 23 explorer**

- **Examine visually**
- **Explore only when necessary**
- **Ask and determine the reason for absent teeth**
- **Teeth surface should be cleaned if obscured by debris and calculus**

# RULES FOR SCORING



- 1. A tooth is considered to be erupted when the occlusal surface or incisal edge is exposed.**
- 2. No tooth should be counted more than once.**
- 3. Decayed, missing and filled teeth should be recorded separately.**
- 4. Tooth lost or filled due to causes other than caries are not included.**

# ADVANTAGES

- 1. Caries experience (past and present) and prevalence of an individual and community can be found out.**
- 2. By using caries experience, oral health status can be estimated indirectly.**
- 3. It gives a broad overview of caries experience in a population over a period of time**

**5. D-component gives treatment needs in terms of teeth to be filled, extracted or endodontically treated**

**6. M component gives tooth mortality**

**7. F component gives the account of fillings done among the population**

# LIMITATIONS

- 1. DMF values are not related to the number of teeth at risk. So it does not directly give an indication of the intensity of attack of caries.**
- 2. DMF index is invalid in older adults as teeth can be lost for reasons other than caries.**
- 3. Reaches saturation level at particular point of time when all the teeth are involved and prevents further registration of caries attack even when caries activity is continuing.**

- 4. Cannot be used for root caries.**
- 5. Even under extreme conditions, the scores are same.**
- 6. Rate of caries progression cannot be assessed.**
- 7. Does not give the account for treatment needs.**

# DMF(S)

**Missing tooth** - M component - 4 surfaces.

**Root stumps** - D component - posteriors - 5  
- anteriors - 4

**Advantages**

- More sensitive
- More precise.
- Gives true status of the caries attack.

**Limitations**

- Takes a longer time.
- May require radiographs.

## W.H.O criteria for caries - 1986

1. Third molars are included.

2. In persons below 30 years, teeth lost only due to caries are considered as missing.

In persons above 30 years, teeth lost for any reason are considered as missing.

3. Initial caries are not considered as decayed.

## def INDEX

*Grubbel in 1944*

- **d** - decayed primary teeth.
- **e** - primary teeth indicated for extraction
- **f** - primary teeth with permanent restoration due to caries

### MODIFICATIONS:

1. dmf index - for children before the age of exfoliation
2. def index applied only to primary molars after 9 years.
3. df index after 9 years.



A journey of a thousand miles begins with a single step.  
Chinese Proverb

# **INDICES TO ASSESS PERIODONTAL HEALTH STATUS**

**GINGIVAL INDEX – LOE & SILNESS - 1963**

**PMA INDEX - SCHOUR AND MASSLER – 1948**

**PERIODONTAL DISEASE INDEX – SIGMOND P. RAMFJORD – 1959**

**PERIODONTAL INDEX – RUSSEL – 1956**

**COMMUNITY PERIODONTAL INDEX FOR TREATMENT NEEDS - 1982**

**COMMUNITY PERIODONTAL INDEX**

# RUSSEL'S PERIODONTAL INDEX

**RUSSEL - 1956**

**Measures both reversible and irreversible aspects of periodontal disease**

**It is an epidemiologic index with a true biological quotient**

- Mouth mirror and periodontal probe are used.**
- Every tooth present is scored.**
- Residual roots are not examined.**

Scoring Criteria: **Score 0 - NEGATIVE**



**Score 1 – MILD GINGIVITIS** - an overt inflammation of free gingiva that does not circumscribe the tooth.



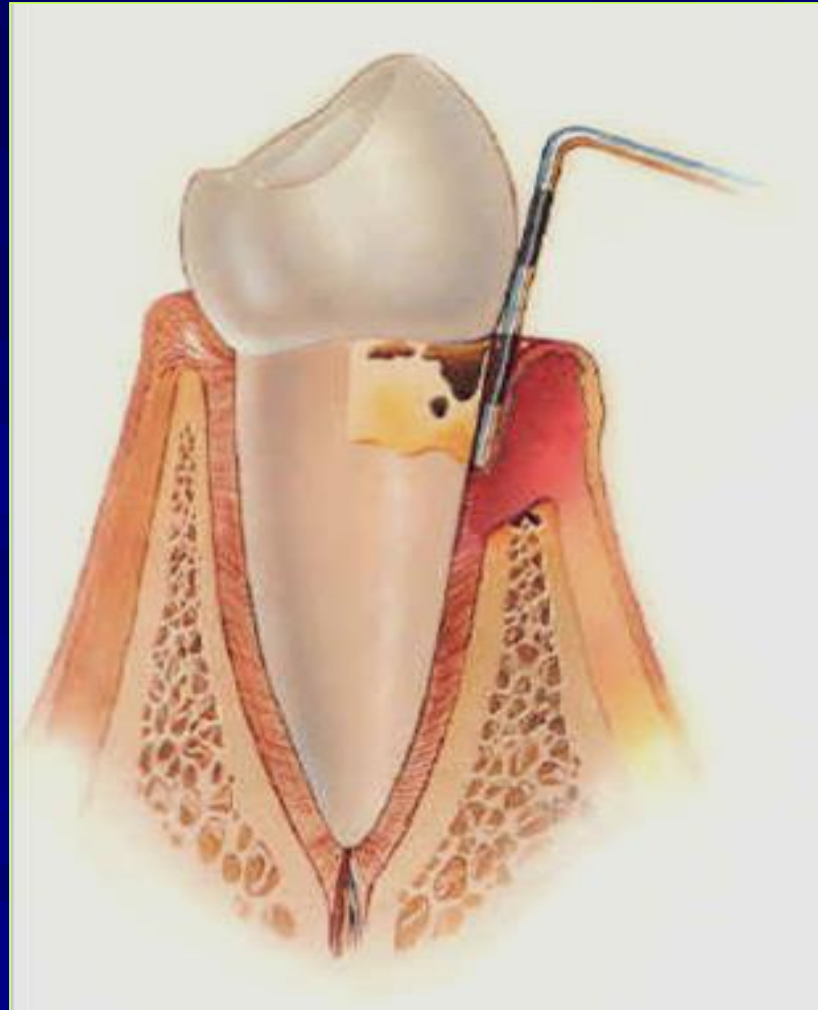
**Score 2 - GINGIVITIS - Inflammation completely  
circumscribing the tooth**



## **Score 4: Onset of periodontitis**

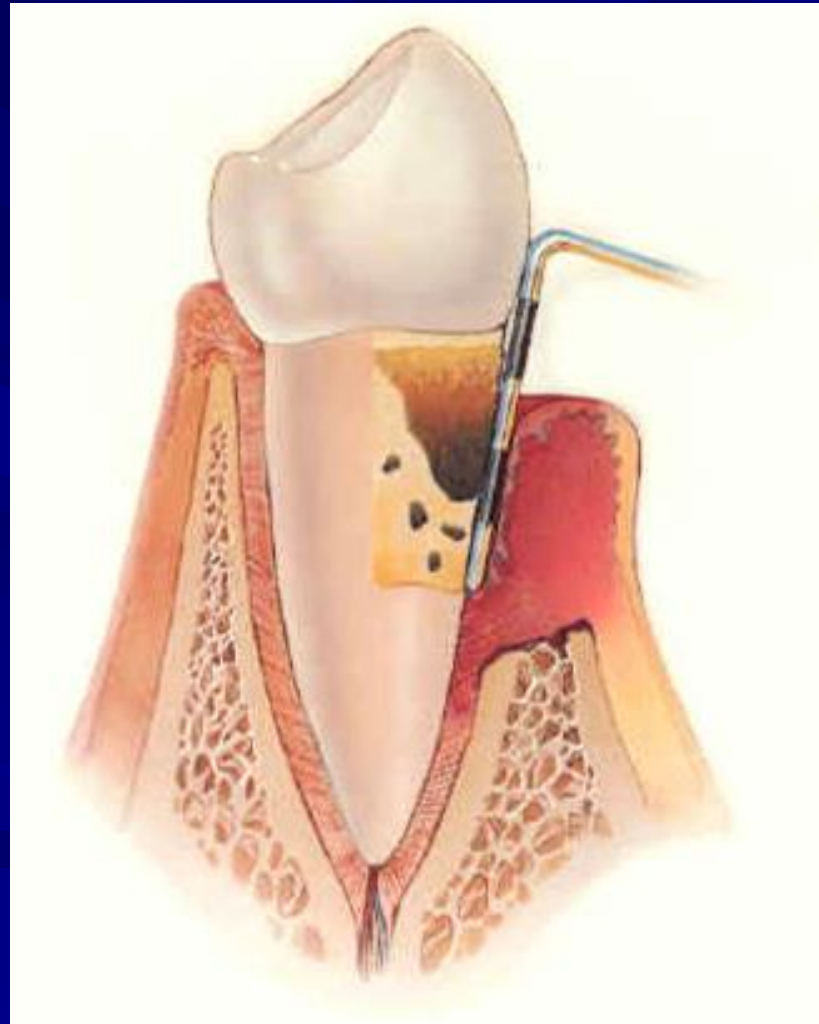
- Used when radiographs are available
- Shows notch like resorption of crestal bone

**Score 6: Gingivitis with pocket formation - no loss of masticatory function, no mobility and pathological migration**



## **Score 8: Advanced destruction with loss of masticatory function**

**Shows - mobility, pathological drifting, dull note on percussion, loss of function**



**Rule : When in doubt, assign lesser score.**

**Add together the score for each tooth and divide by the total teeth scored.**

**Round off to one place beyond the decimal point.**

## **USES:**

- 1. Epidemiological studies**
- 2. Most useful when it is necessary to distinguish between population with mild, moderate and advanced chronic destructive disease.**

## **ADVANTAGES:**

- 1. Easy and quickly learned, is reproducible.**
- 2. Index is simple enough to be practicable under a wide variety of field conditions.**
- 3. Measures both reversible and irreversible aspects of periodontal disease and hence it is known as an epidemiologic index with significance**

**4. Significance of periodontal index is that, more data has been assembled using this index than any other index of periodontal disease.**

**5. The application and uses of Russel's periodontal index in the past has led to the development of better understanding of periodontal health status including research in the present era.**

**6. Criteria are clear and most of the time in epidemiological studies, results obtained are comparable**

## **LIMITATIONS:**

- 1. In field surveys, carrying of radiographic facilities is impracticable and hence score 4 cannot be used.**
- 2. Index scores from 2 onwards, jump to 4, 6, and 8 only to signify the severity and nature of destruction of periodontium which are not recordable and most of them are irreversible.**
- 3. More time consuming.**

**4. This index is not sensitive to minor changes in periodontium**

**5. No standardized probes are used.**

**6. It does not give past periodontal disease experience.**

A photograph of a field of tall, golden-brown grasses in the foreground, with a bright green field in the background. The image has a soft, slightly blurred quality.

Learn to let go and be free.

-Buddha

# COMMUNITY PERIODONTAL INDEX OF TREATMENT NEEDS CPITN

By J. Ainamo, Cutress, Barmes, Sardo-Infirri - 1982

## **Development of CPITN methodology**

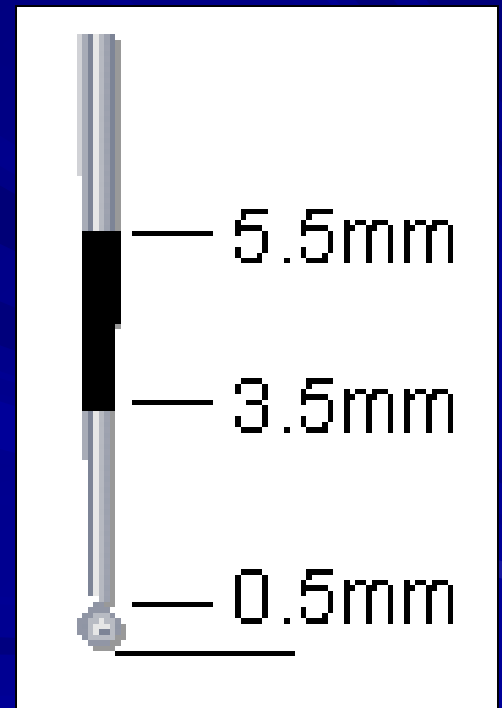
- 1. WHO organized workshop inviting experts from 14 countries at Moscow in 1977 - to examine and advice on the epidemiology, etiology and prevention of periodontal disease.**
- 2. To develop CPITN, the criteria was published in 1978 (the clinical examination proposed by Ainamo and Ainamo). Later minor modifications were made in 1982 and has been in use more than 20 years.**

**3. A. The original CPITN divided the mouth into 6 sextants  
(teeth numbers 17-14, 13-23, 24-27, 37- 34, 33-43, 44-47)**

**B. The clinical findings and observation into 5 codes (0-4).**

**C. The periodontal treatment need indicators into 4  
different treatment need categories ( 0 - III ).**

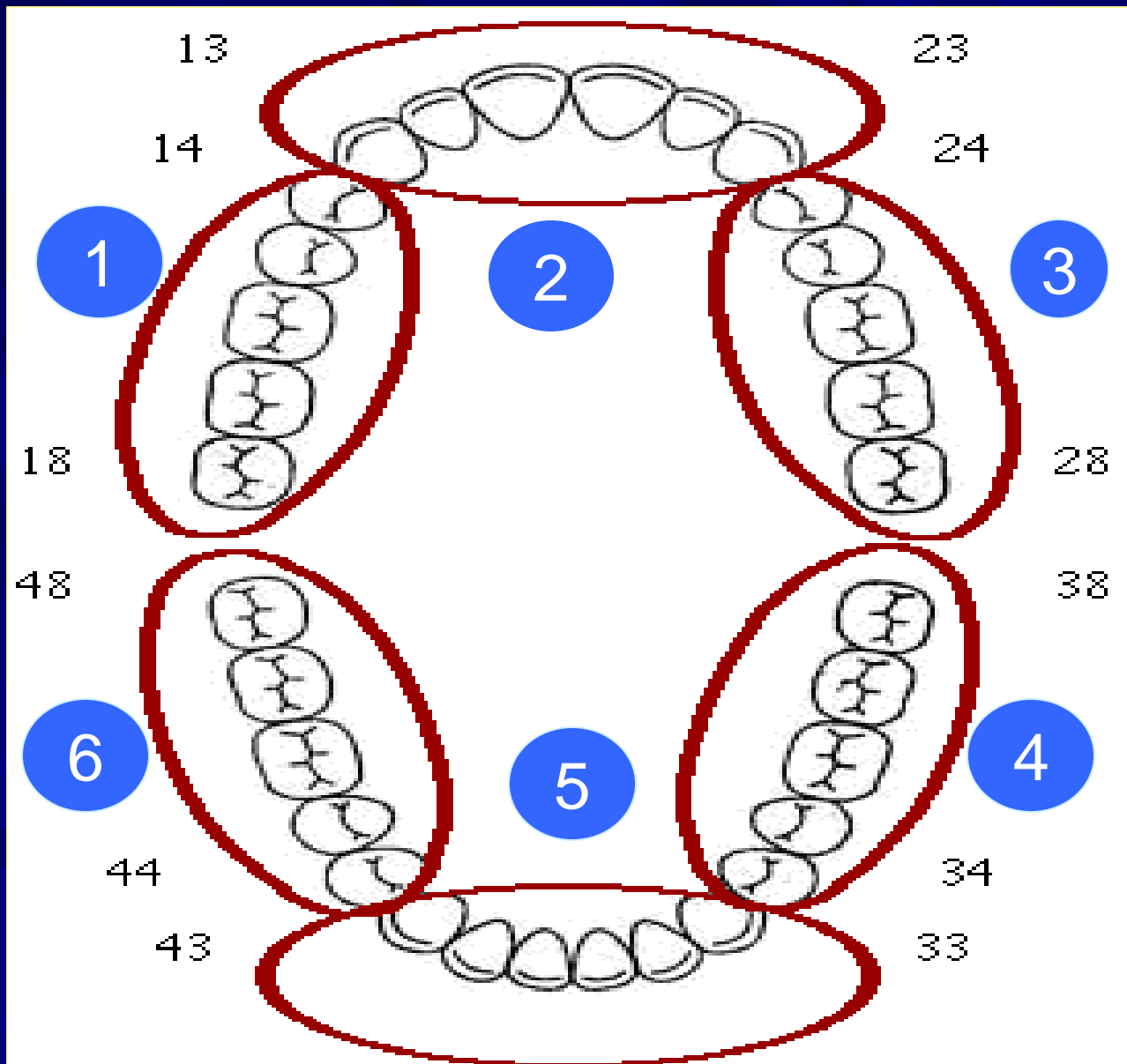
**D. Treatment need is assessed using specially designed W.H.O colour coded periodontal probe for assessment of probing pocket depths around either all teeth or all the W.H.O. designated index teeth.**



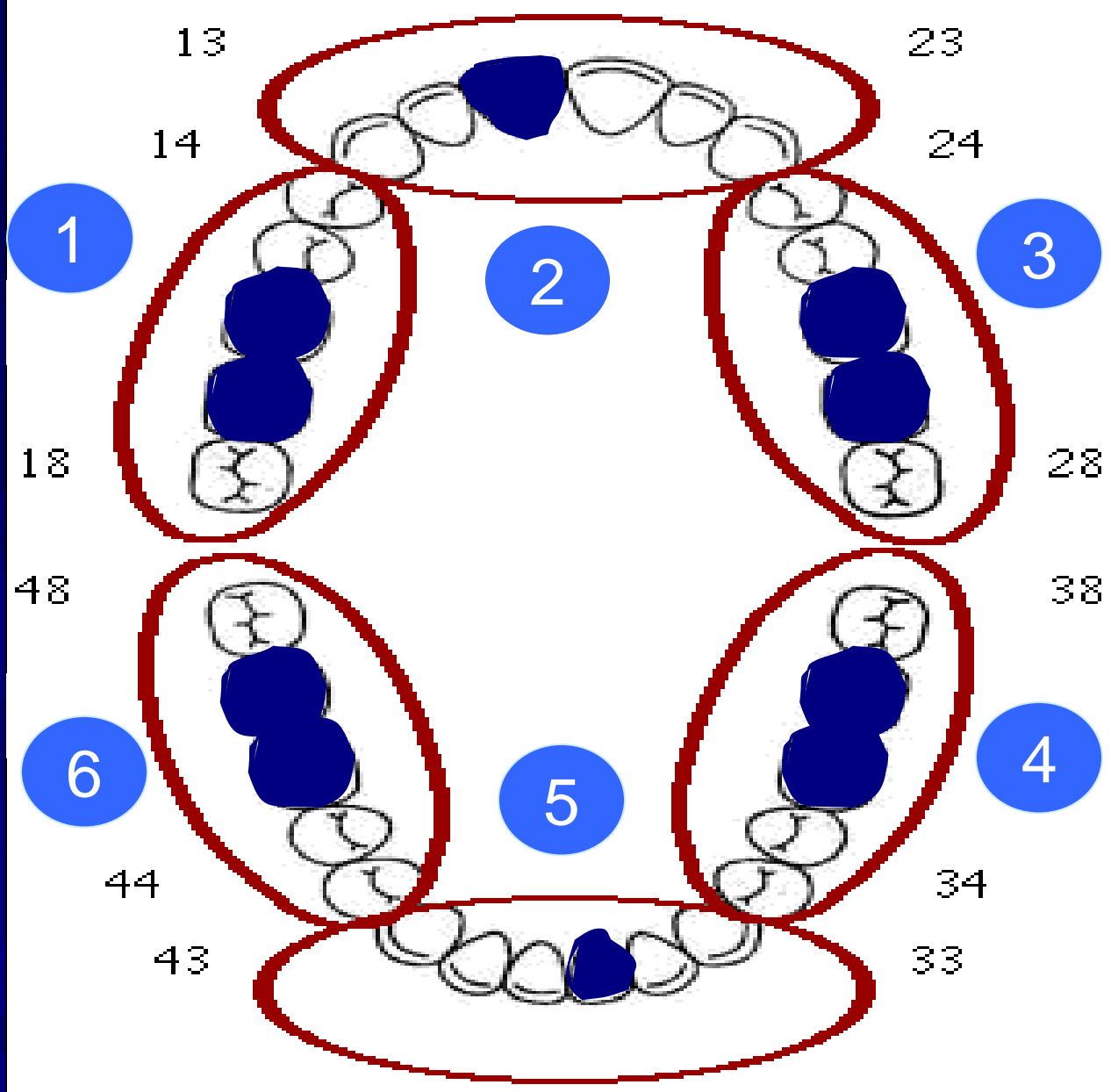
**E. For each sextant only the highest treatment need indicator is recorded.**

**F. In CPITN methodology, probing force is between 0 - 20 gms.**

# METHOD OF EXAMINATION



- **A sextant is examined only if there are two or more functional teeth present and not indicated for extraction.**
- **Highest score in each sextant is identified after examining all teeth**
- **When only one teeth remains in a sextant it is included in the adjacent sextant**



INDEX TEETH

## INDEX TEETH:

These teeth have been identified as the best estimators of the worst periodontal condition of the mouth

- For adults aged 20 years or more only ten index teeth are examined

<u>17</u>	<u>16</u>	<u>11</u>	<u>26</u>	<u>27</u>
47	46	31	36	47

- For young people up to 19 years only six index teeth are examined

$$\begin{array}{r} 16 \quad 11 \quad 26 \\ \hline 46 \quad 31 \quad 36 \end{array}$$

- When examining children less than 15 years pockets are not recorded

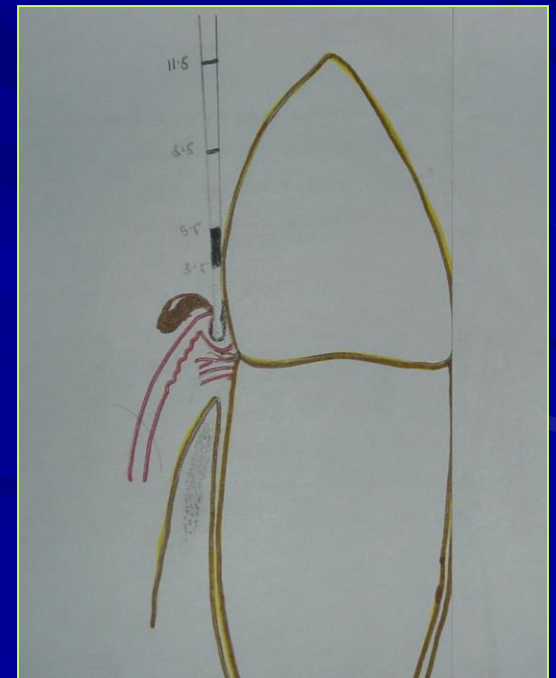
## SCORING CRITERIA:

**Code X:** When only one tooth or no functional teeth are present in a sextant

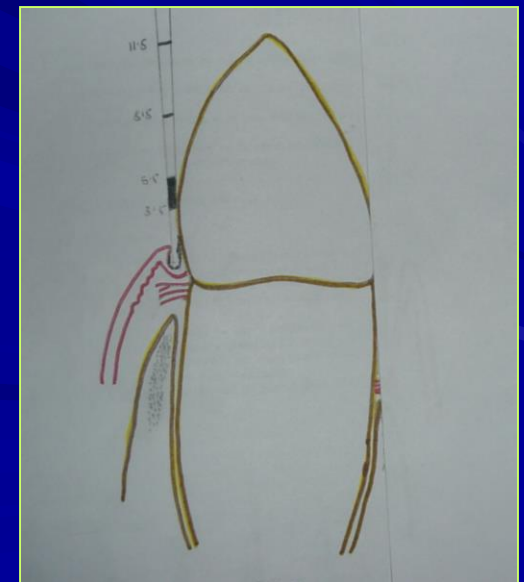
## Code 0: Healthy tissue



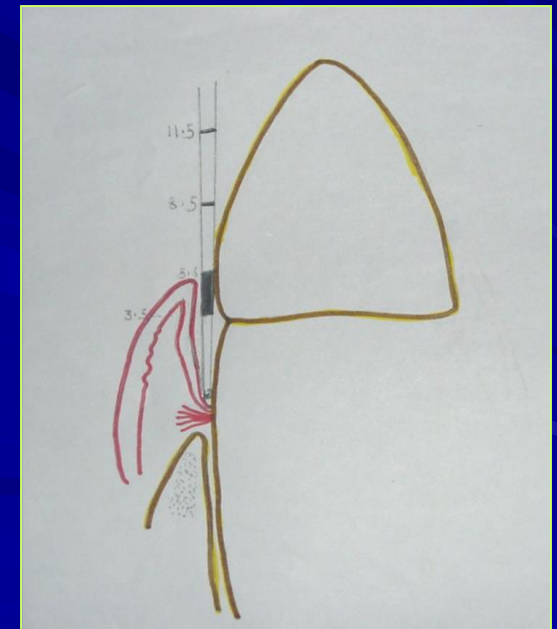
# Code 1: Bleeding observed during or after probing



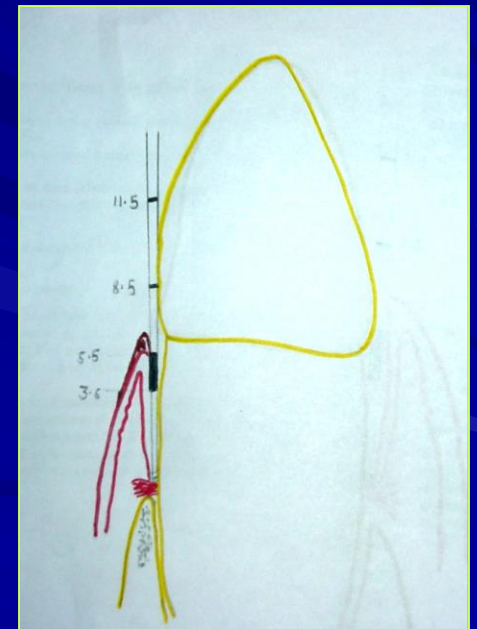
**Code 2: Supra or sub gingival calculus or plaque retentive areas seen or felt during probing**



**Code 3:** Pathological pocket of 4 or 5mm, that is the black area of the CPITN probe is at the gingival margin.



**Code 4: Pathological pocket of 6mm or more, that is the black area of the CPITN probe is not visible**



## TREATMENT NEEDS:

**TN 0:** Code 0 (healthy) or X - No treatment

**TN 1:** Code 1 - Improving the personal oral hygiene of that individual

**TN 2:** Code 2 or 3 - Need for professional cleaning, root planing and removal of plaque retentive factors in addition to oral hygiene instructions

**TN 3: Code 4 - complex treatment which involves deep scaling, root planing and more complex surgical procedures.**

# ADVANTAGES

1. When compared to other epidemiological indices for periodontal health, the CPITN is simple and more objective in its choice of clinical criteria and methodology.
2. The data offers rapid appreciation of periodontal condition of a population and their treatment needs and personnel required.

**3. International uniformity.**

**4. Treatment needs provide an indication of the level of complexity of care needed if the periodontal conditions are to improve.**

# LIMITATIONS

- 1. Does not provide assessment of past periodontal disease experience**
- 2. Does not record the position of gingival margin, that is the degree of recession, level of alveolar bone**
- 3. Exclusion of important signs of past periodontal breakdown, notably attachment loss, tooth mobility**
- 4. Absence of any marker of disease activity or susceptibility**

**5. No difference between supra and sub - gingival calculus**

**6. No distinction is made between the presence of calculus with or without bleeding**

**7. Validity of CPITN index as a measure of the amount of periodontal care needed has not been demonstrated**



Glory lies in  
the attempt  
to reach one's  
goal and not  
in reaching it.

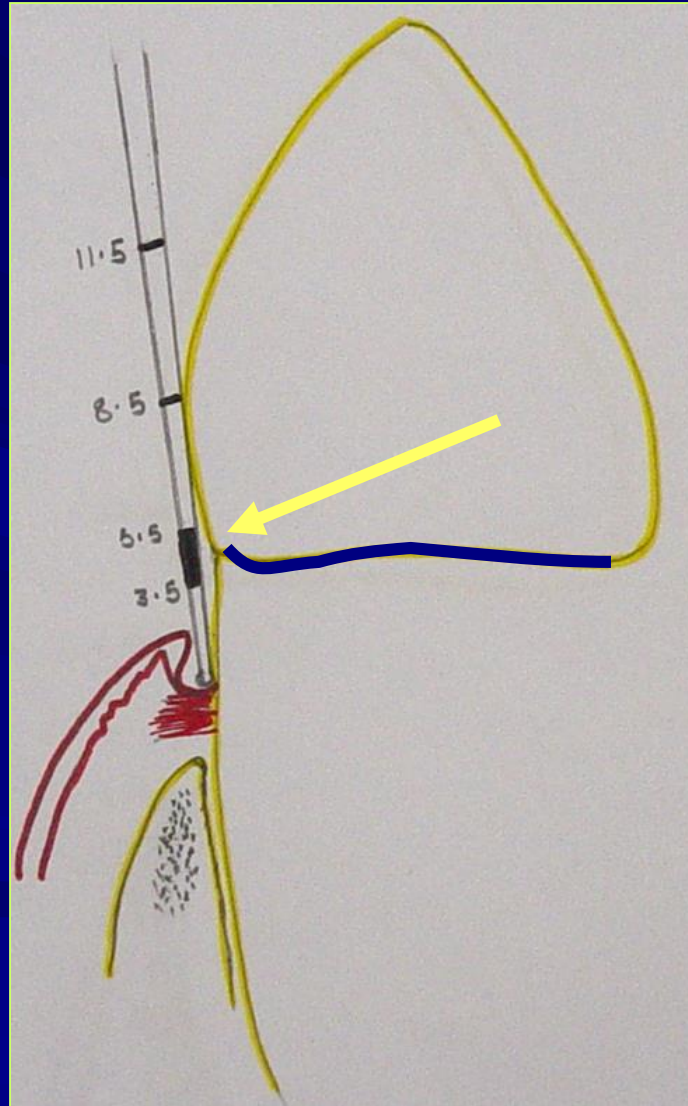
Mahatma Gandhi

# COMMUNITY PERIODONTAL INDEX CPI

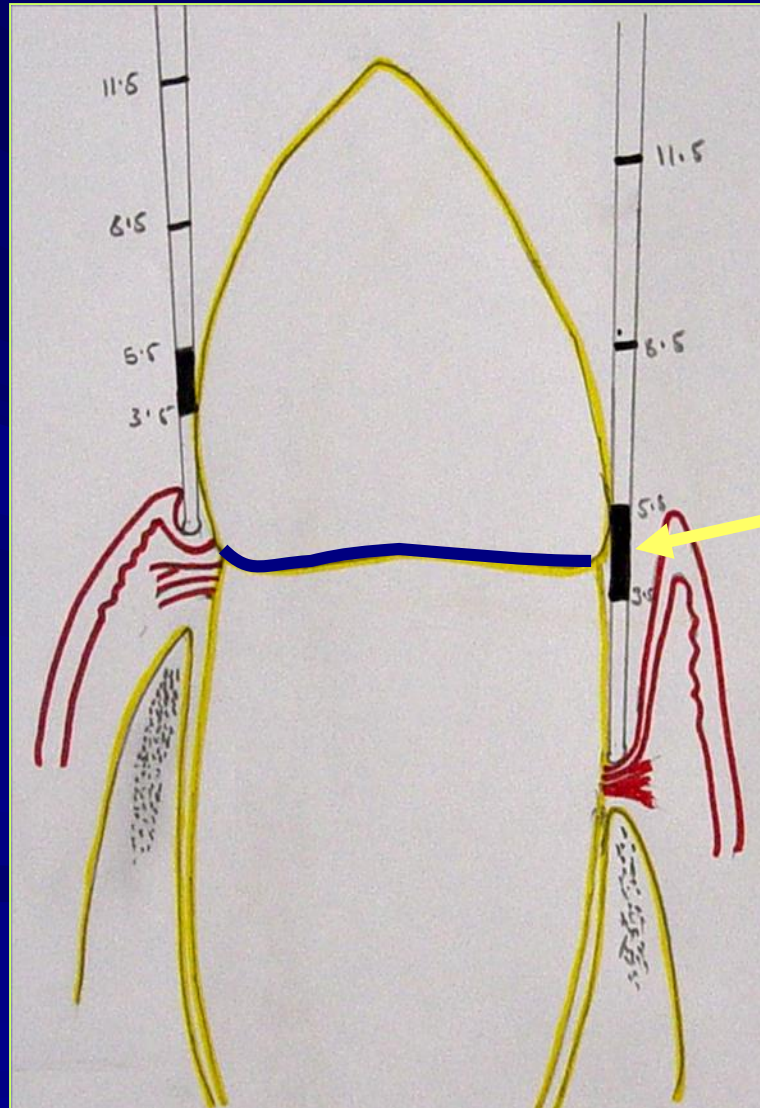
- Introduced in 1994 by WHO

**Score 0 - Loss of attachment: 0 – 3 mm**

**(CEJ not visible and CPI score is 0 – 3 mm)**



- **Score 1 - Loss of attachment 4 – 5 mm**  
**(CEJ within the black band)**

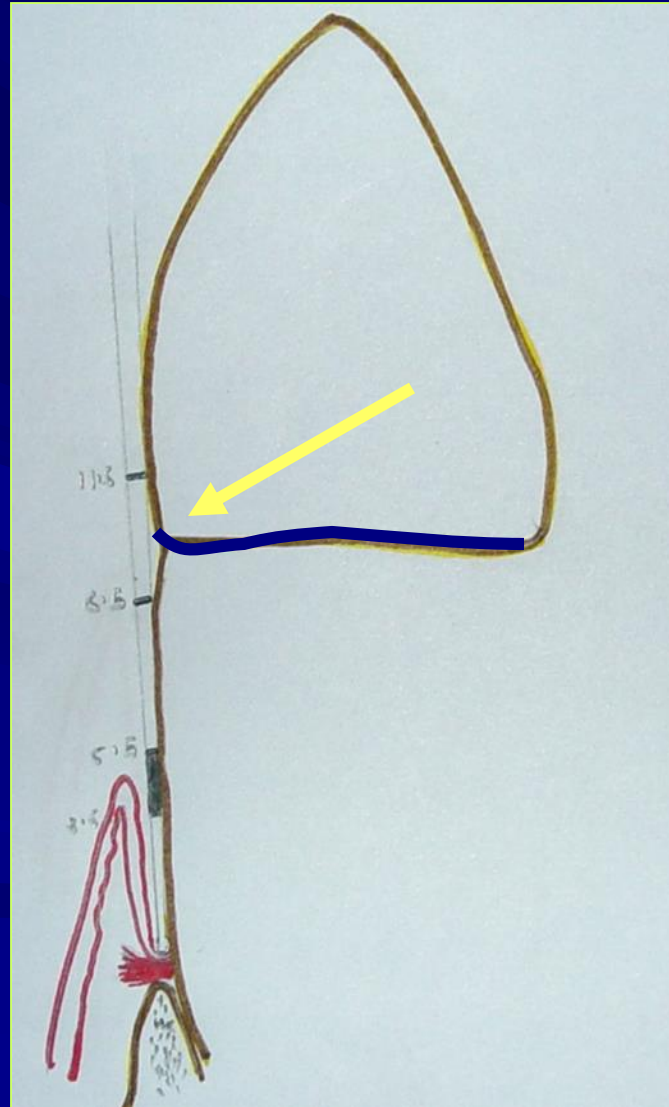


• **Score 2 - Loss of attachment 6 – 8 mm**

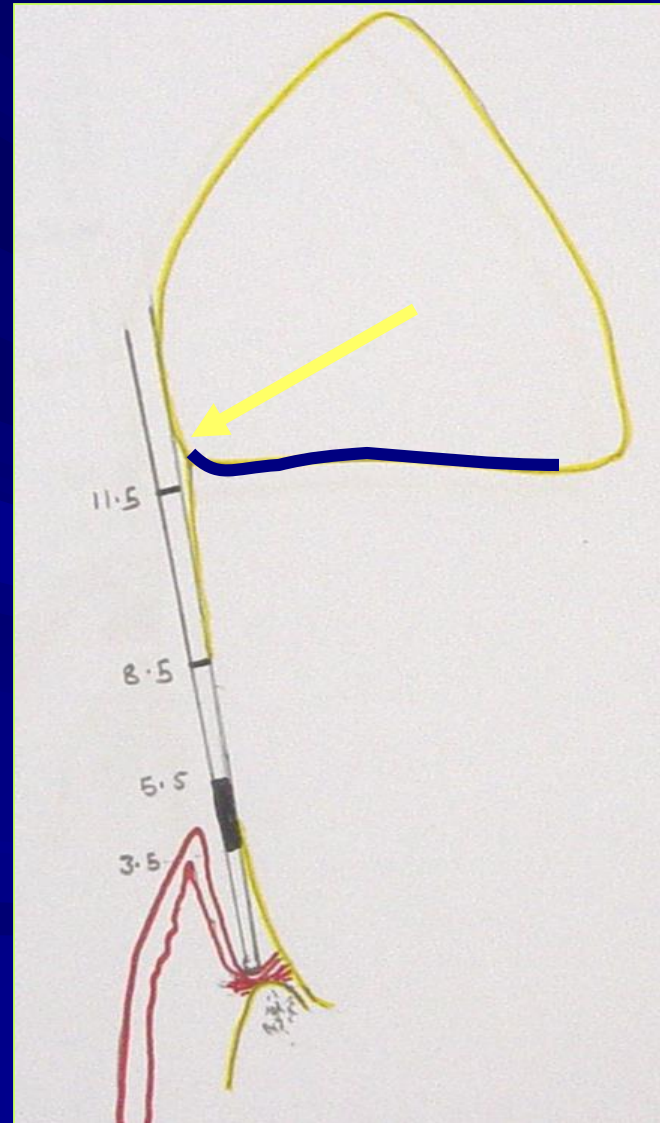
**(CEJ between the upper limit of the black band and  
and 8.5 mm)**



**Score 3 - Loss of attachment 9 – 11 mm  
(CEJ between the 8.5 mm and 11.5 mm)**



- **Score 4 - Loss of attachment 12 mm or more  
(CEJ beyond the 11.5 mm)**



- **X - Excluded sextant**
- **9 - Not recorded (CEJ neither visible nor detectable)**

## ***ADVANTAGES:***

- 1. Comprehensive measurement of periodontal diseases.**
- 2. Severity of the disease can be measured.**
- 3. Treatment need can be recorded.**

## ***DISADVANTAGES:***

- 1. Time consuming**
- 2. Calibration will be difficult**
- 3. Involves many criteria**

*In three words I can  
sum up everything  
I've learnt about life.  
It goes on.*

*-Robert Frost*



# INDICES USED TO MEASURE FLUOROSIS

- **Dean's Fluorosis Index – 1934**
- **Thylstrup-Fejerskov index of Fluorosis (1978)**
- **Tooth Surface Index of Fluorosis - National Institute of Dental Research in U.S (Horowitz et al 1986)**

# Dean's Fluorosis Index

Dean – 1934

**The following classification was used (7 categories)**

- Normal**
- Questionable fluorosis**
- Very mild fluorosis**
- Mild fluorosis**
- Moderate fluorosis**
- Moderately severe fluorosis**
- Severe fluorosis**

**-In 1942 Dean modified the index.**

**-The scoring system ranged from 0 (normal enamel) to 4 (severe fluorosis)**

**Normal (0)** - The enamel represents usual translucent semi-vitriform type of structure. The surface is smooth, glossy and usually of a pale creamy white colour.



**Questionable fluorosis (1)** - The enamel discloses a slight aberration from the translucency of normal enamel ranging from a few white flecks to occasional white spots. This classification is used in those instances where a definite diagnosis of the mildest form of fluorosis is not warranted and classification of 'normal' not justified.



**Very mild fluorosis (2)** - Opaque, paper-white areas scattered irregularly over the tooth but involving less than 25% of the labial tooth surface



**Mild Fluorosis (3)** - The white opacity of the enamel of the teeth is more extensive than for code 3, but covers less than 50% of the tooth surface



**Moderate fluorosis (4)** - The enamel surfaces of the teeth show marked wear and brown stain is frequently a disfiguring feature.



**Severe fluorosis (5)** - The enamel surfaces are badly affected and hypoplasia is so marked that the general form of the tooth may be affected. There are pitted or worn areas and brown stains are widespread; the teeth often have a corroded appearance.



**Excluded (8) - (Ex. A crowned tooth).**

**9 - Not recorded**

# COMMUNITY FLUOROSIS INDEX

The proportion in each category was multiplied by the weight given to derive a score for the community.

$$Fci = \frac{n \times w}{N}$$

n - No of persons in each category.  
W - Weight of the scale (average score)  
N - The total population.

Cfi

Public Health Significance

0.0-0.4

Negative

0.4-0.6

Borderline

0.6-1.0

Slight

1.0-2.0

Medium

2.0-3.0

Marked

3.0-4.0

Very Marked

## **ADVANTAGES:**

- 1. Widely used in epidemiological studies worldwide.**
- 2. It is of value while making comparisons between various studies.**
- 3. To assess the correlation between caries and fluorosis**
- 4. To assess the severity of fluorosis with level of fluoride in drinking water**

## **LIMITATIONS:**

- 1. Does not provide information on distribution of fluorosis within the dentition.**
- 2. Questionable score has created confusion and continues to do so.**
- 3. It is not sufficiently sensitive in its lower scores.**
- 4. Definition of a pitting necessary for the severe category is not clear in the 1942 diagnostic criteria.**



# C·H·A·N·G·E

A BEND IN THE ROAD IS NOT THE END OF THE ROAD...  
UNLESS YOU FAIL TO MAKE THE TURN.



*THANK YOU*