

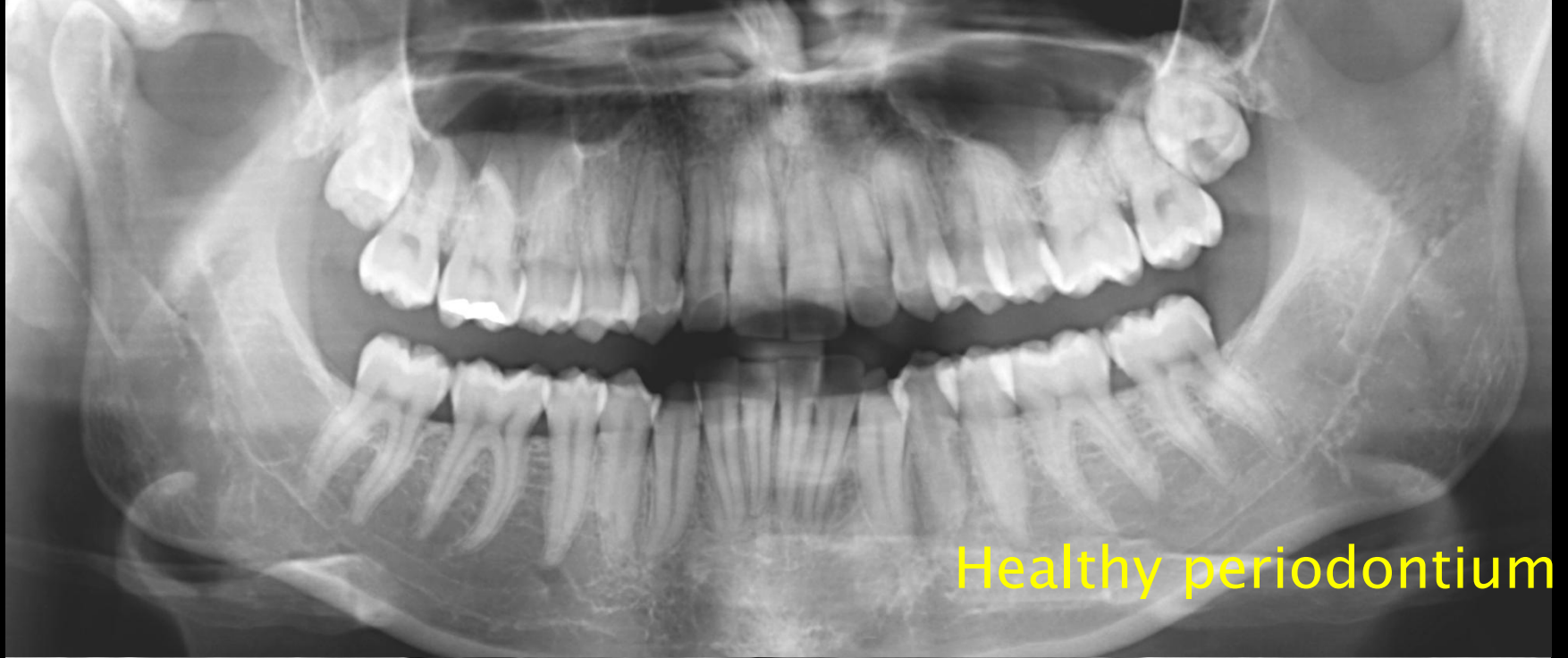
# ***Examination methods of periodontium and oral hygiene***

***Influence of the results on the treatment plan***

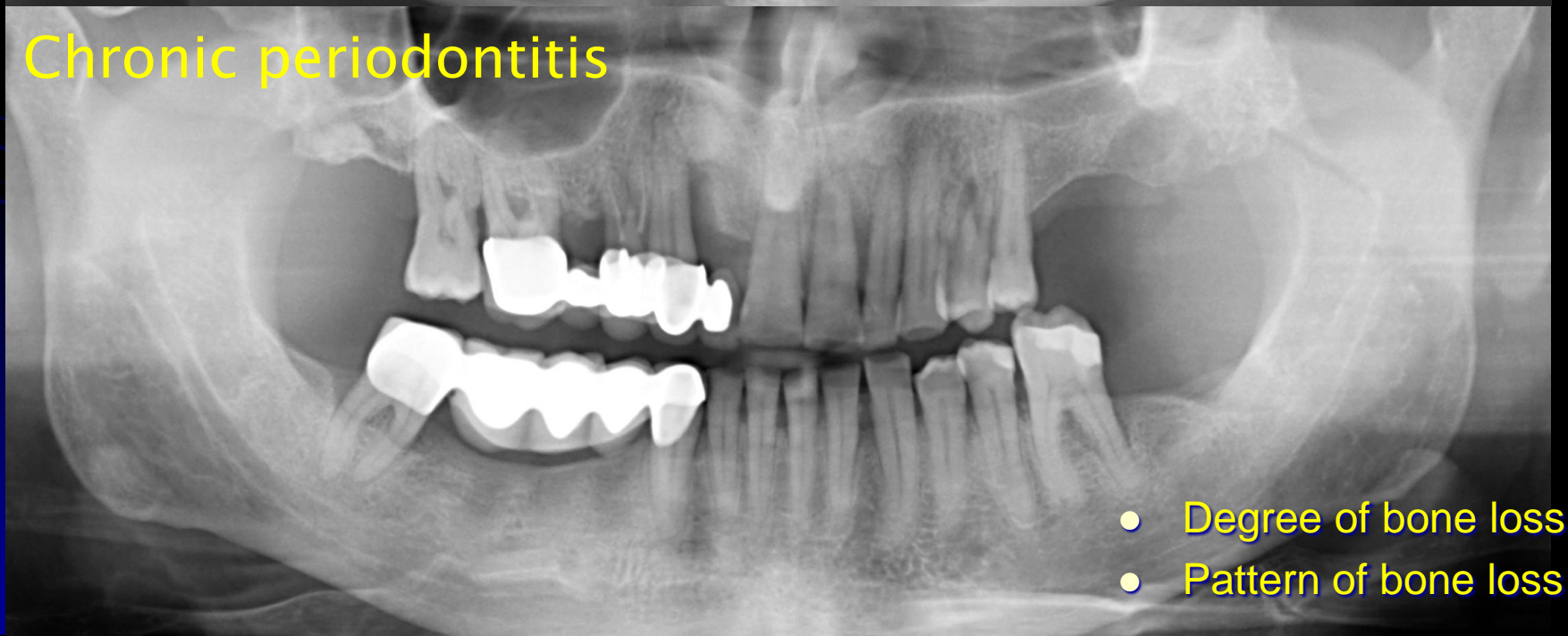
***Examinations of oral hygiene, dentition and periodontium within  
screenings.***

***Indices***

Dr. Kinga Kelemen  
Department of Oral Diagnostics



Healthy periodontium



Chronic periodontitis

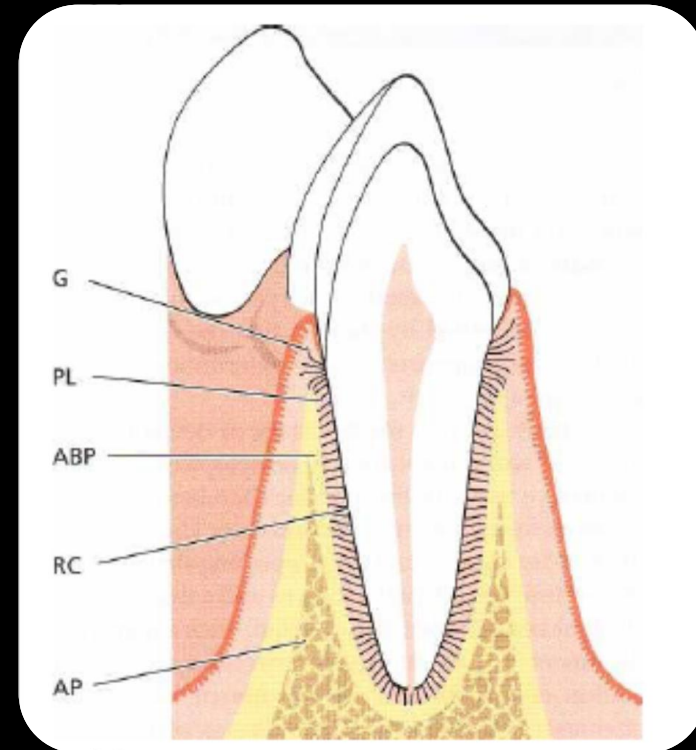
- Degree of bone loss
- Pattern of bone loss

# Periodontal Diseases



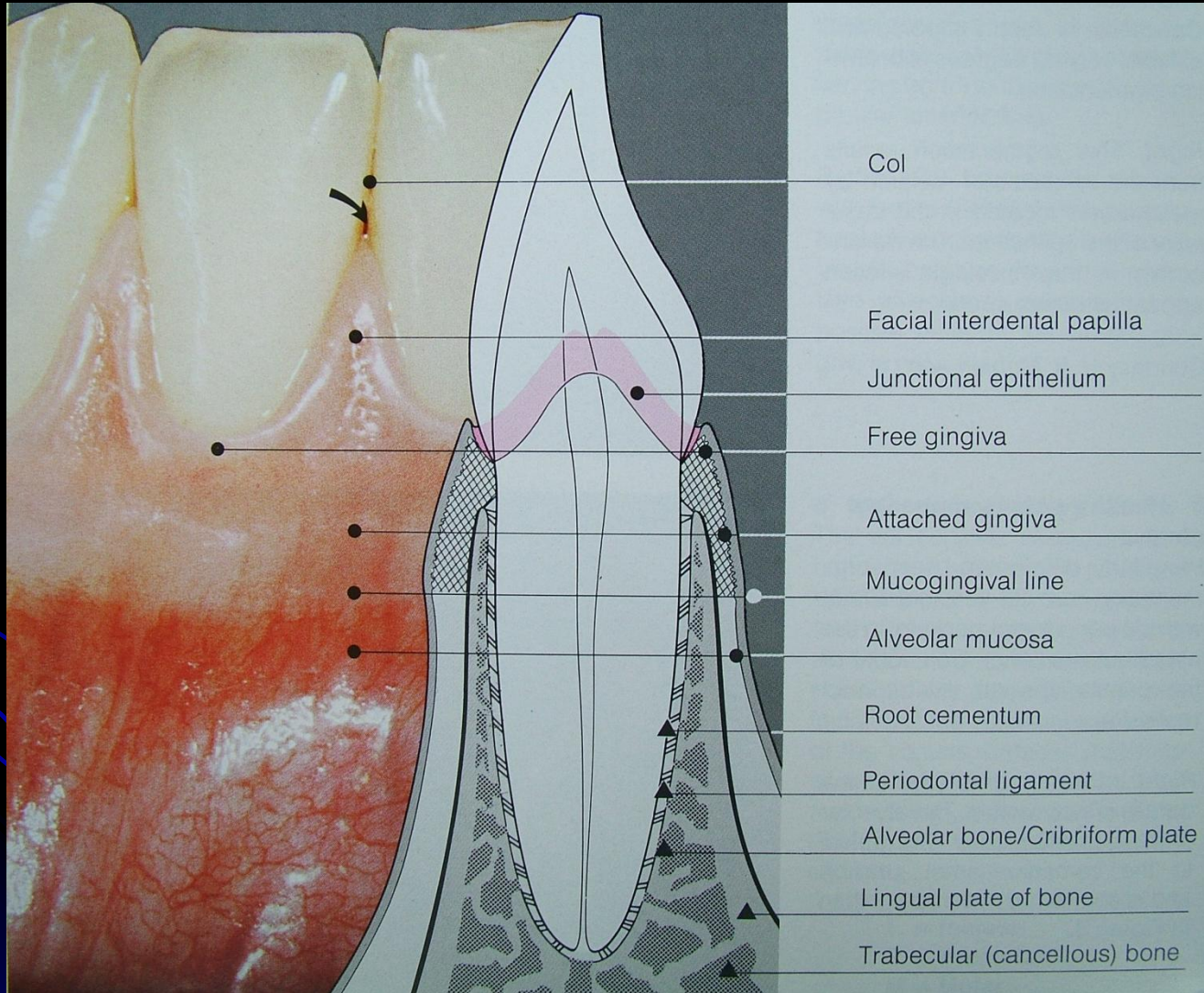
- Periodontal disease, which is an infection of the periodontium caused by bacteria, is an encompassing term that includes the subcategories: gingivitis and periodontitis.
- Infected periodontium is not always limited to just the gums, or gingiva.

- **Periodontium:** attach the tooth to the bone tissue of the jaws
- Periodontium comprises the following tissues:
  - 1) *the gingiva (G),*
  - 2) *the periodontal ligament (PL)*
  - 3) *the root cementum (RC)*
  - 4) *the alveolar bone*

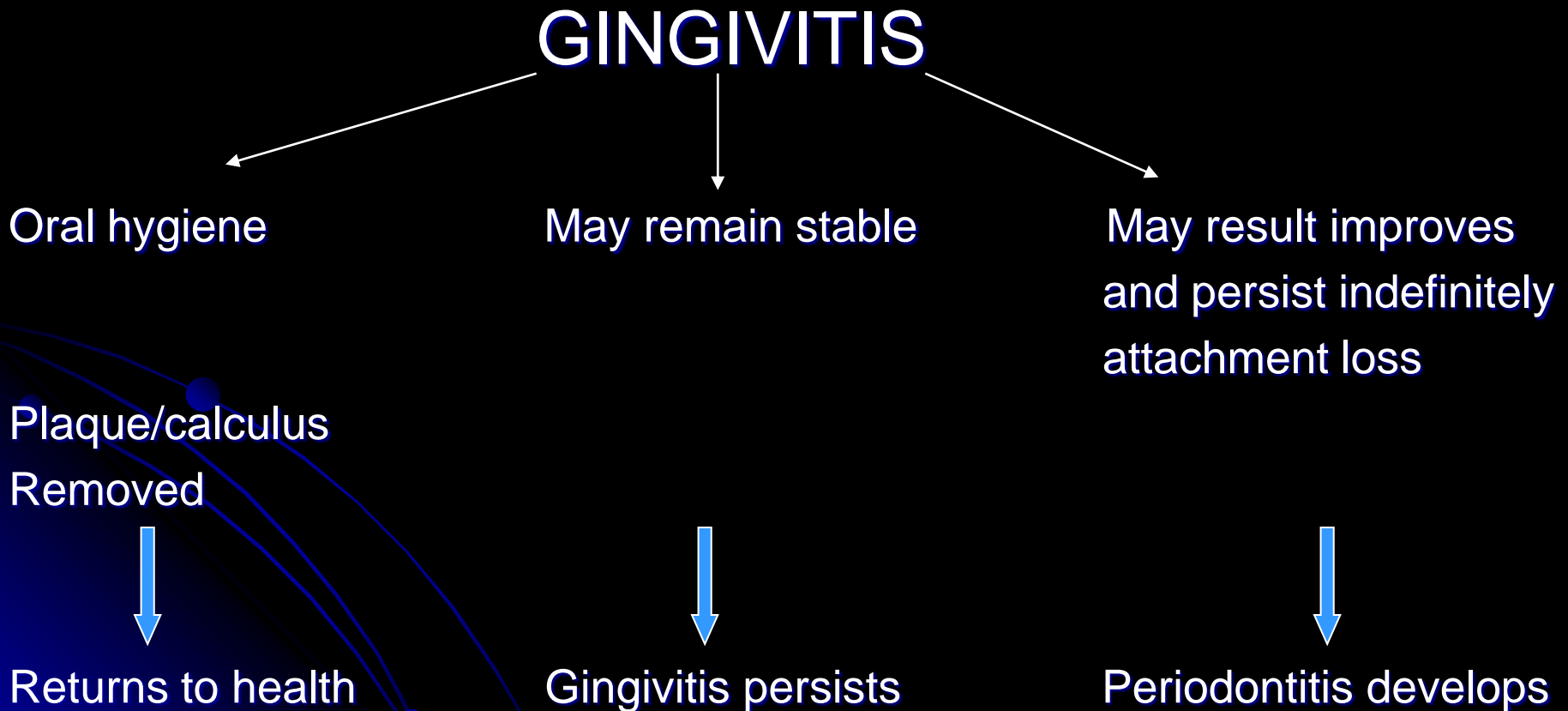




# Periodontium



# *The potential outcomes of gingivitis*



# Oral Diagnostics

## Essentials of periodontal diagnoses

- Listen : listen to the patient.
- Inspect, probe : Probing is essential for periodontal diagnosing and monitoring.
- Record
- Explain : Try to translate your dental knowledge into words that the patient can understand.
- Anamnesis
- Assessments
- X-ray

# Anamnesis Medical History

The medical history is used to evaluate the patient's potential to have systemic diseases that could contribute to the periodontal condition.

- Etiologic factors
  - Factors predisposing to periodontitis
  - Specific aspects of treatment
- } Periodontology

# Main complaint

## Previous and present dental complaint

- bleeding while brushing teeth
- Other complaints: **tooth migration, increased tooth mobility**
  
- Periodontitis- painless, few acute symptoms
- Symptoms - develops slowly
  - the patient does not notice the periodontal disease



# ***Features to be noted during a periodontal examination***

## ***Visual***

*Deposits – supragingival plaque, calculus*  
*Gingivae – erythema, hyperplasia, recession*  
*Occlusal abnormalities*

## ***Probing***

*Pocket depths*  
*Bleeding on probing*  
*Subgingival calculus*  
*Furcation defects*

## ***Palpation***

*Mobility*

# Visual - Gingiva

## Gingival colour and contour

### Clinically healthy periodontium

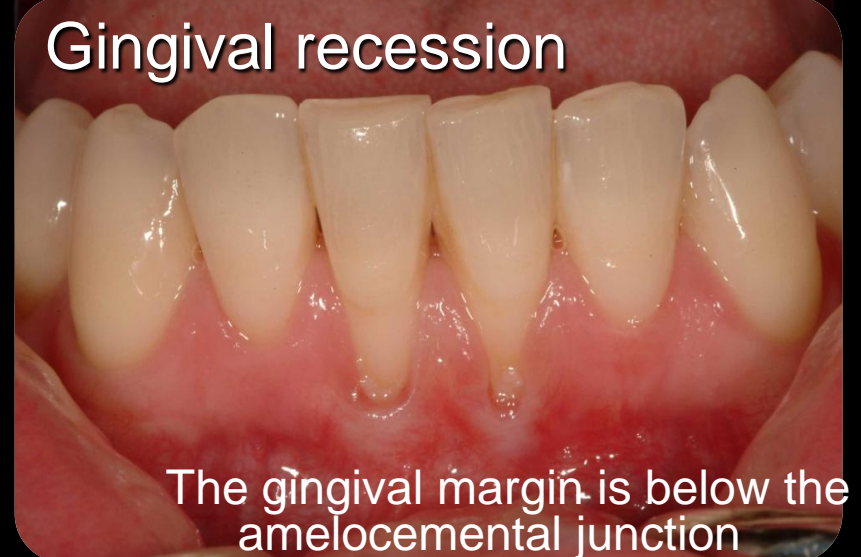
- Pink in colour
- Stippled
- Triangular interdental papilla
- Firm in consistency
- Knife-edged gingival margin
- Probing pocket depths <2 mm
- No bleeding to probe
- No recession
- No mobility



# Visual-Gingival health

## Gingival colour and contour

The condition of gingivae should be recorded.





# Gingival colour

- Physiological pigmentation (increased pigmentation - racial pigmentation)
- pigmentation of the buccal mucosa



# Visual-Oral hygiene Plaque



- Good
- Satisfactory
- Poor



# Visual Calculus



## Supragingival calculus

- accumulates most readily adjacent to the orifices of the major salivary glands
- light yellow in colour
- best visualized by drying the teeth

# Oral hygiene - good

## Subgingival calculus



- Dark brown or green in colour
- located beneath the gingival margin.
- It is detectable only by tactile means or by using an air syringe to deflect the gingivae.
- the ball end of the CPITN probe

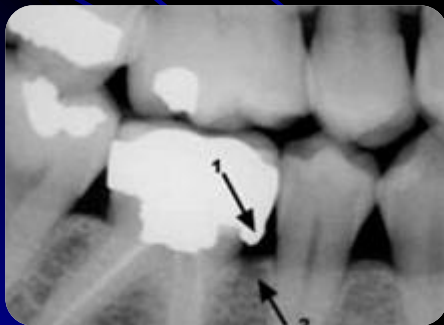
# Other symptoms

- Foetor ex ore
- Pus, exudatum/ suppuration: sulcular fluid with PMN leukocytes, active phase of destructive periodontitis it is a typical inflammatory exudate

# Dental examination

## Presence & location of plaque retention factors

- Overhangings
- Poorly contoured restorations
- caries
- Weak contact areas between the teeth resulting in chronic food packing
- Tooth anomalies: enamel pearls, root groves and concavities
- Orthodontic problems: crowding, ectopia





# Probing



assessment of  
pocket depth

*Pocket depths also need to be noted.*

- Bleeding on probing - the most reliable indicator of disease activity
- Bleeding from the depth of the pocket - This may represent inflammation at the depth of the pocket where it could be associated with disease progression

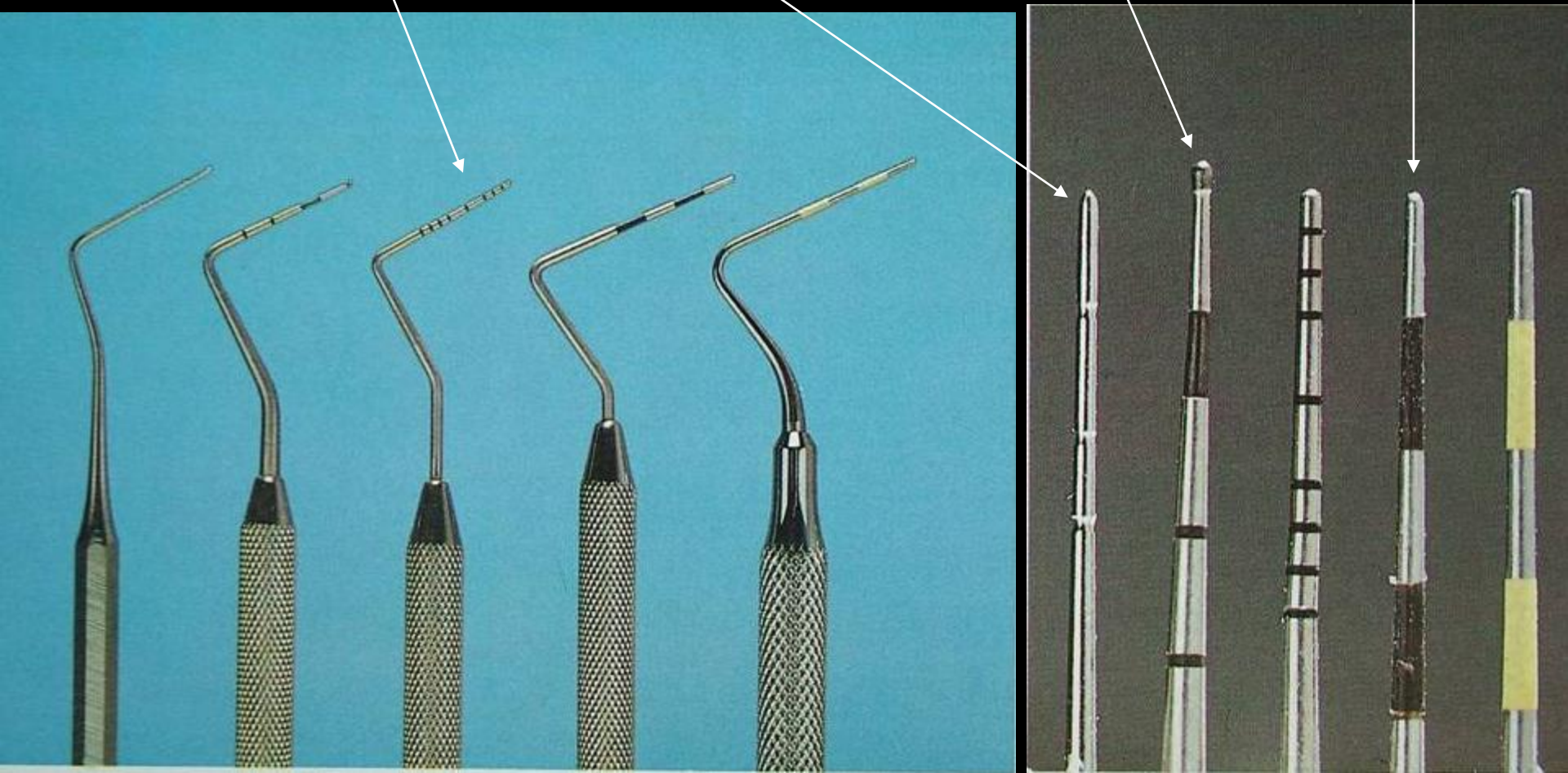


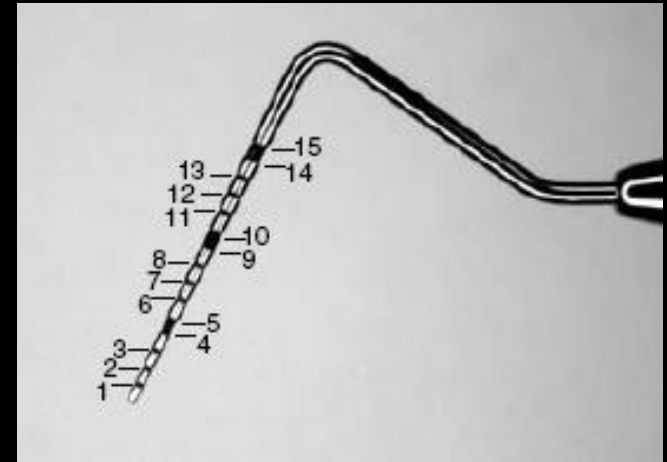
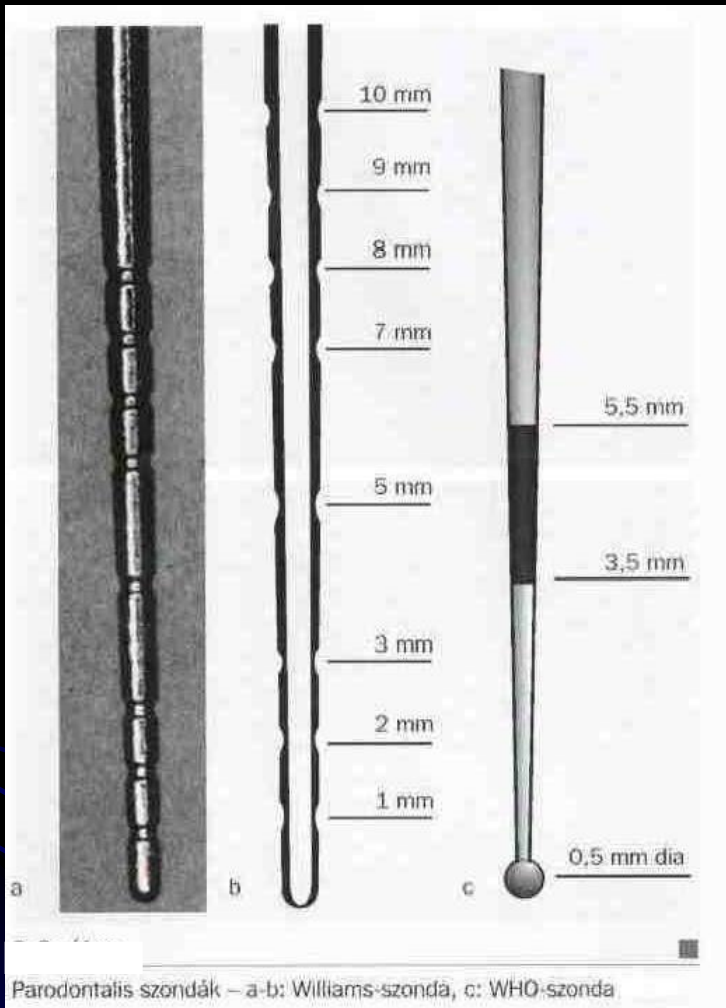


# Probing

**Periodontal probe** - a fine instrument calibrated in millimeters, which is used to measure pocket depth

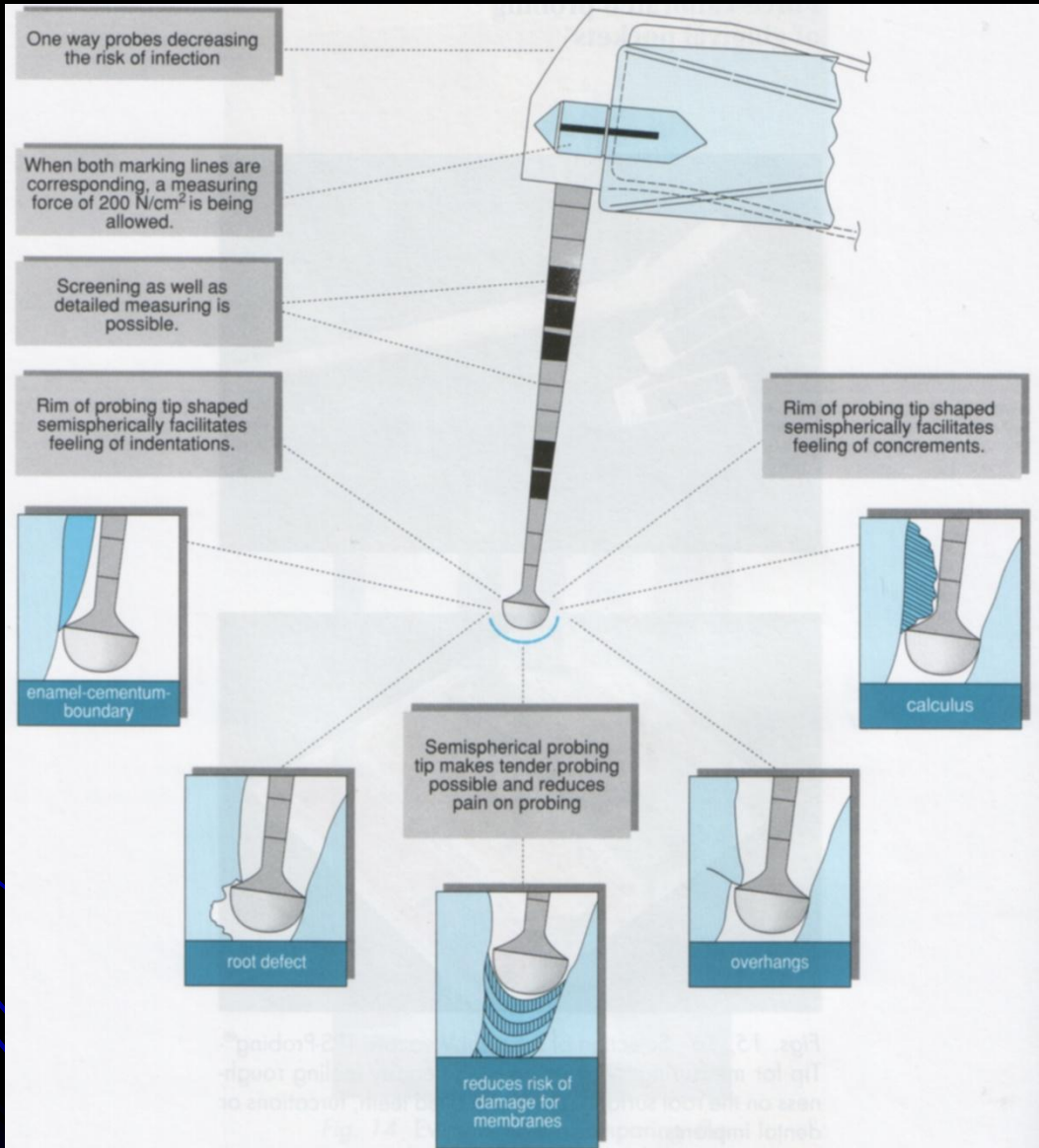
**Williams probe, Michigan probe, WHO probe, Marquis**



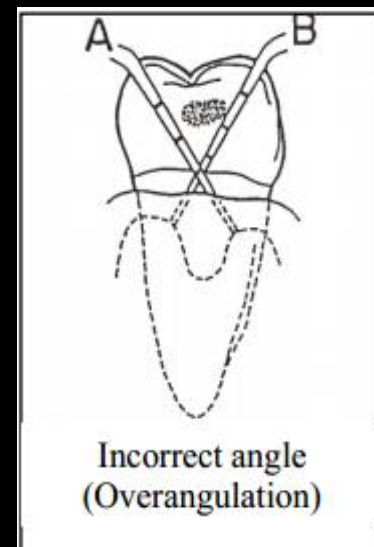
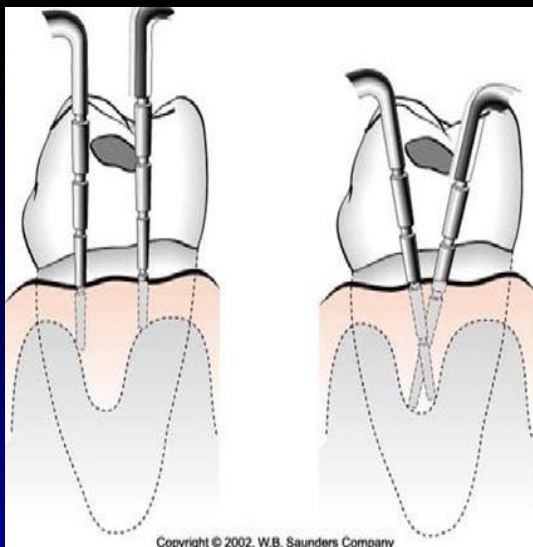
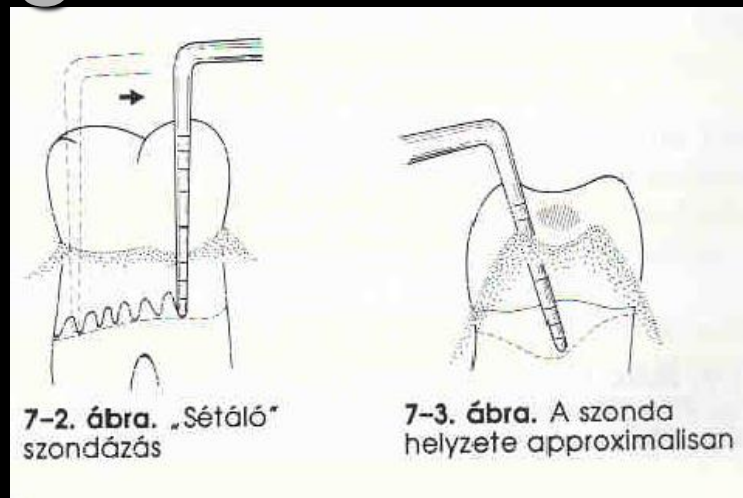
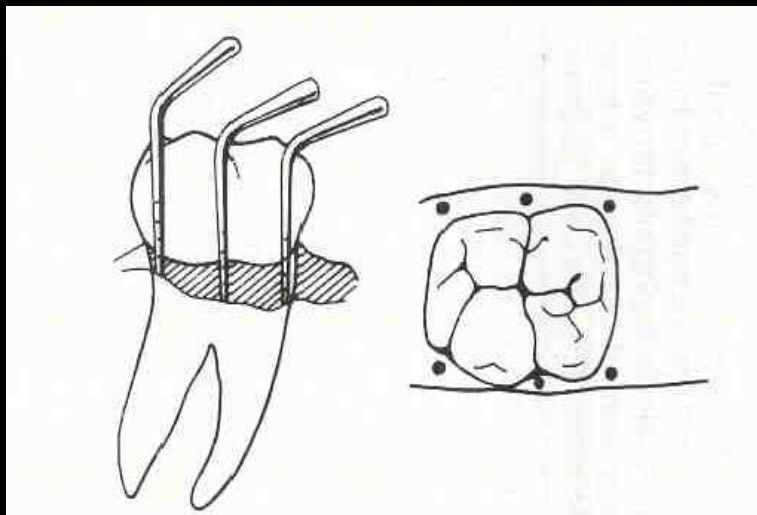


UNC 15 periodontal probe

## Williams and CPITN periodontal probes



# Probing



•The probe should be inserted parallel to the long axis of the tooth and walked around each surface of each tooth to detect the depth of pocket at each -surface.

•A probing force of 25 grams (0.75 Newtons) have been found to be well tolerated and accurate.

•In the interproximal areas probe should be inserted with angle of 10-15 degree to be able to detect interdental craters.

•Forcing the probe can penetrate the periodontal tissues, resulting in inaccurate pocket depths and discomfort for the patient

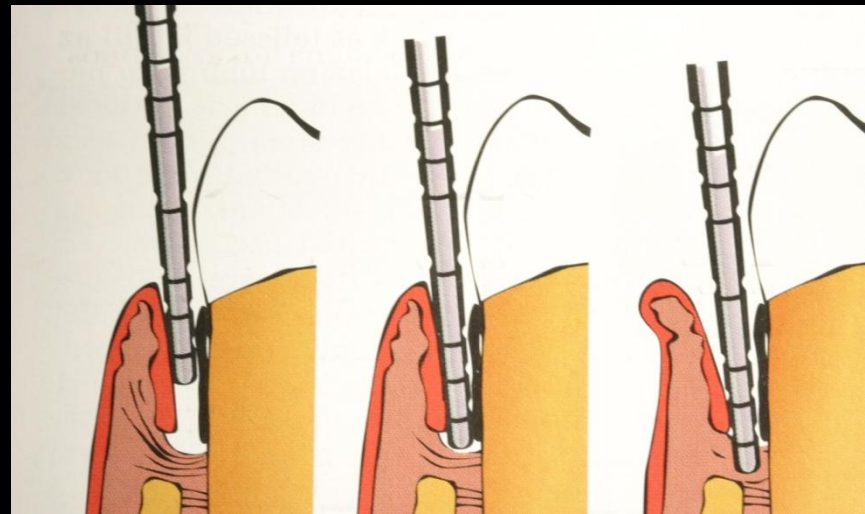


# Probing

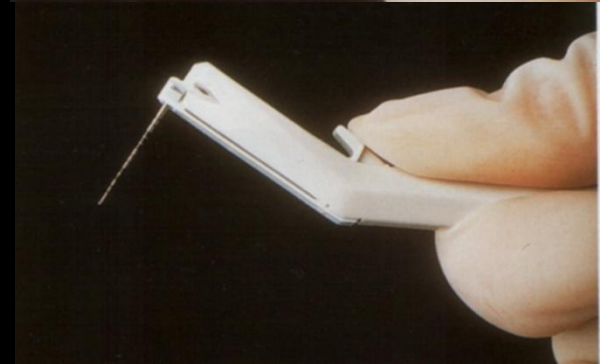
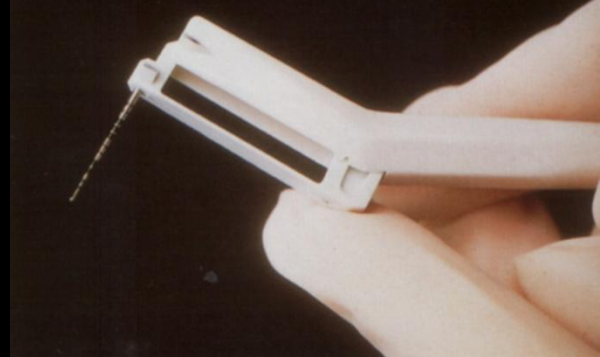
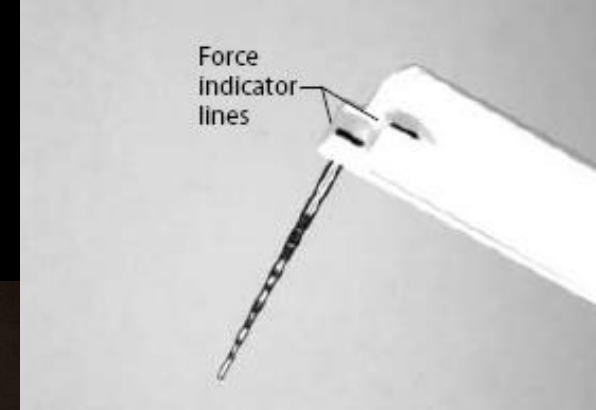
Modifying factors (under- overestimate)

Factors influencing the result of the measurement made with a periodontal probe:

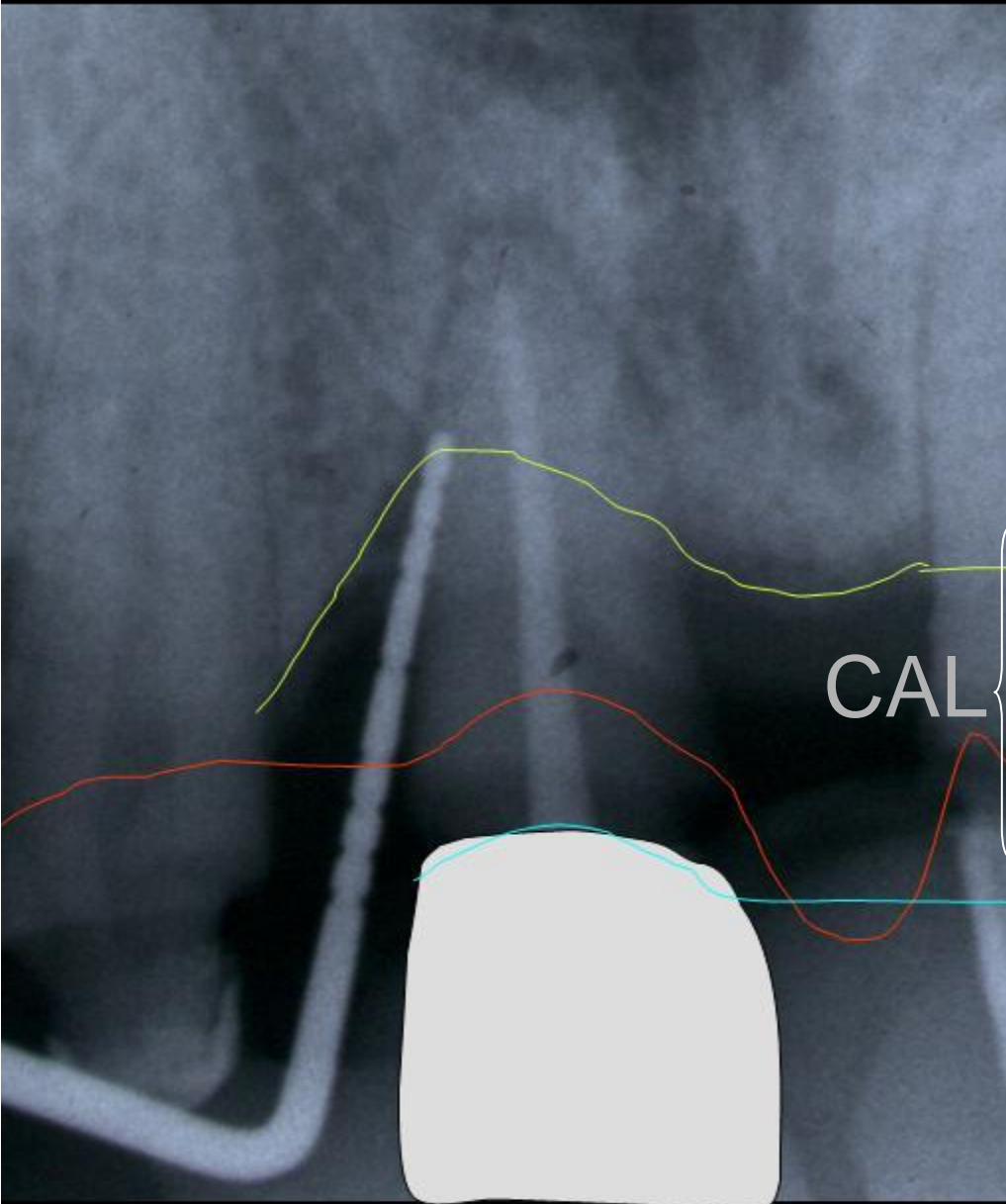
- Thickness of the probe
- Malposition of the probe due to anatomic features (contour)
- Pressure applied
- Degree of inflammatory cell infiltration in the soft tissue







- pressure-sensitive probes are developed which have standardized, controlled insertion pressure.



PROBING POCKET DEPTH – distance between gingival margin and pocket base

CLINICAL ATTACHMENT LEVEL - distance between CEJ and pocket base

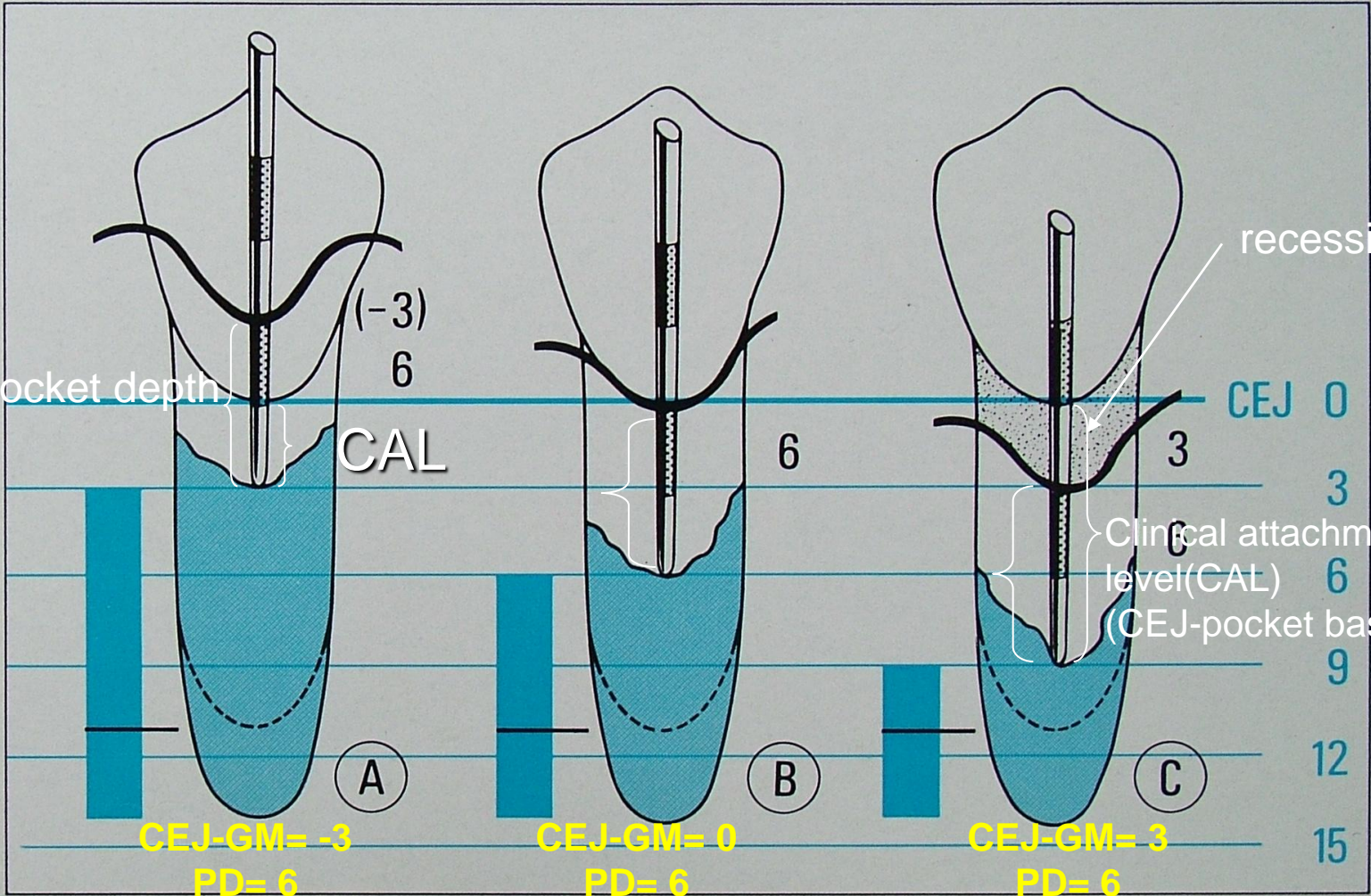
GINGIVAL RECESSION - distance between CEJ and gingival margin

CAL } PD } POCKET BASE  
GR } GINGIVAL MARGIN  
CEJ



# Pocket depth, clinical attachment level, gingival recession

Probing pocket depth



recessio

CAL

CEJ 0

Clinical attachment level (CAL) (CEJ-pocket base)

A

B

C

CEJ-GM = -3

CEJ-GM = 0

CEJ-GM = 3

PD = 6

PD = 6

PD = 6

CAL = 3

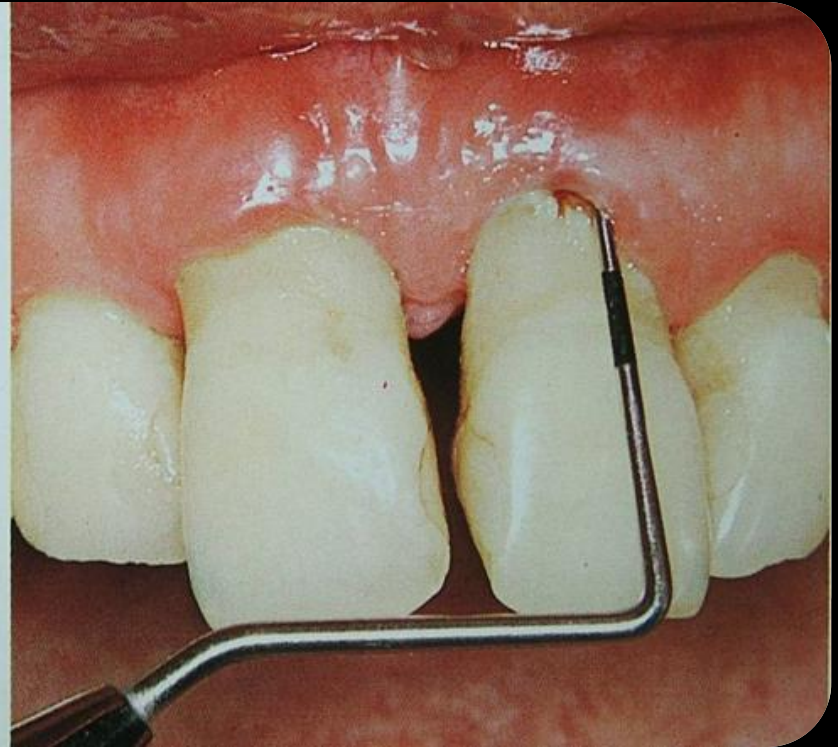
CAL = 6

CAL = 9

# Probing



- pseudopocket

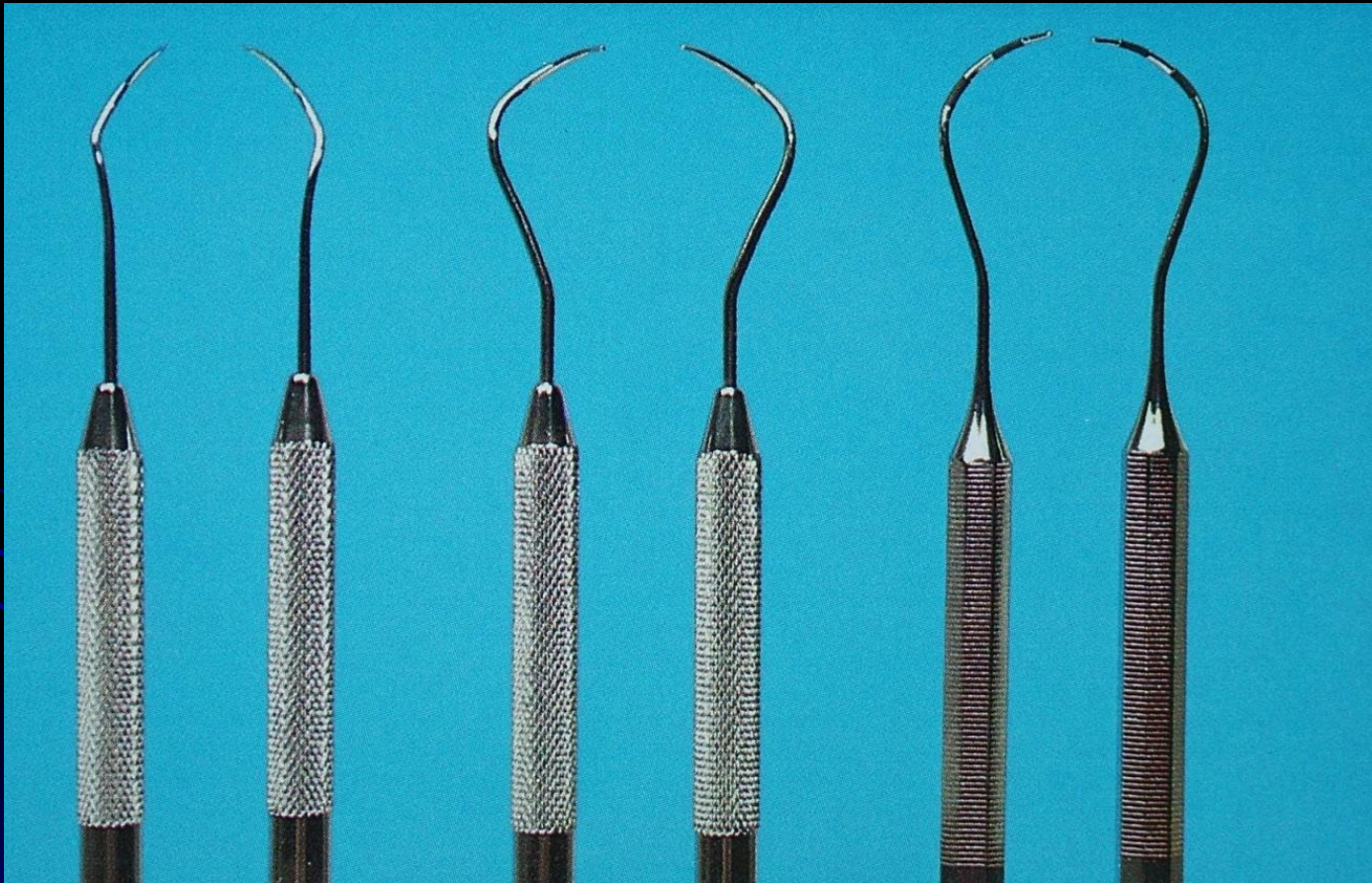


- recession

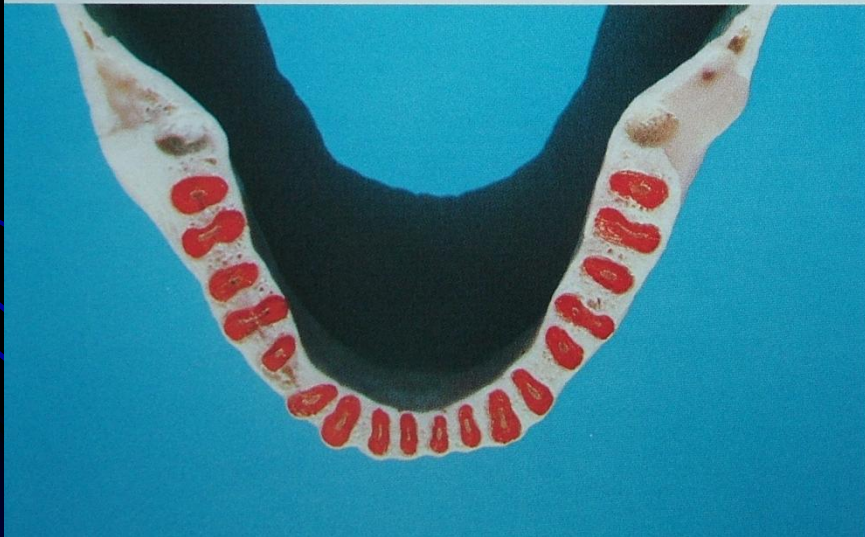


# Probing- Furcation defects

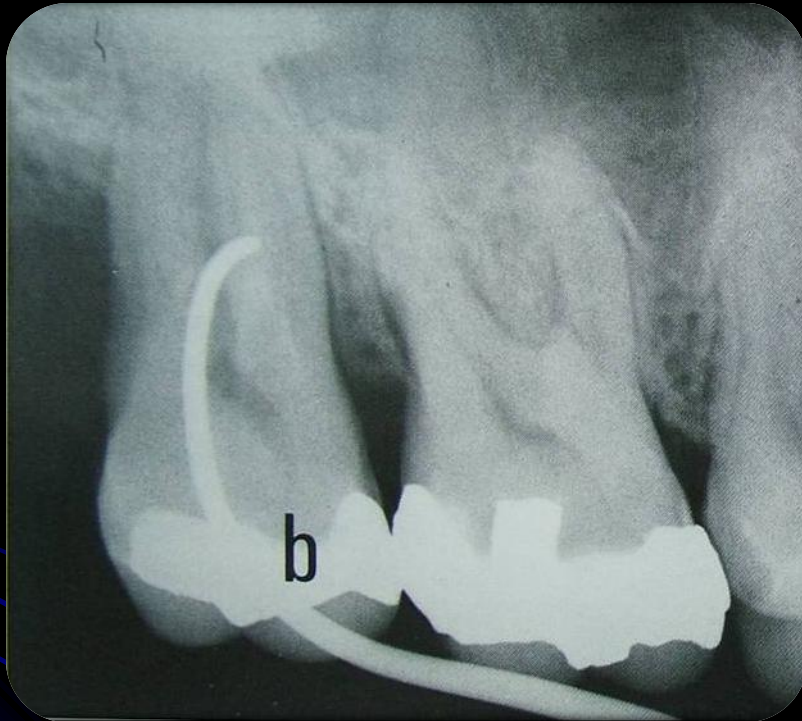
Probing also enables furcation lesions to be detected. A furcation lesion occurs in multirooted teeth when the loss of periodontal attachment has reached the area where the roots diverge. There are special curved periodontal probes to detect furcation lesion.







# Probing- Furcation defects



*Grade 1* Bone loss up to one-third of the tooth width, i.e. about 3 mm of horizontal attachment loss.

*Grade 2* Bone loss between one-third and two-thirds of the tooth width.

*Grade 3* A 'through and through' lesion.

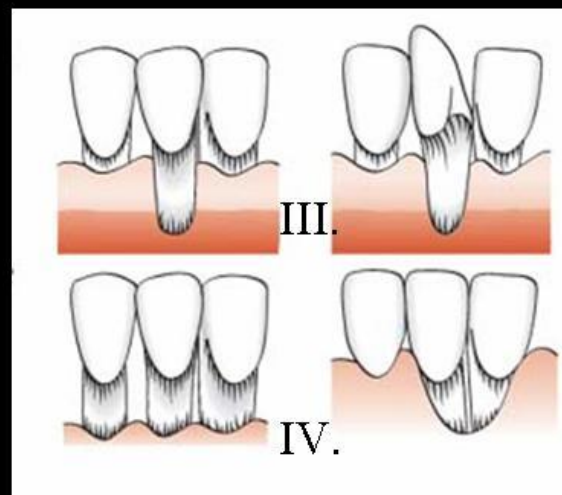
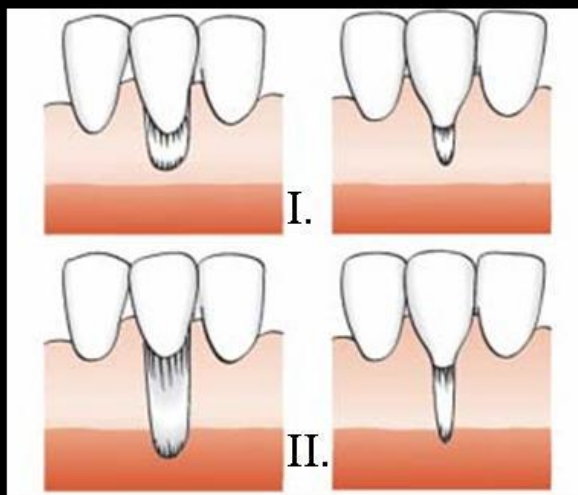


# Probing- Subgingival calculus





# Assesment of gingival recession

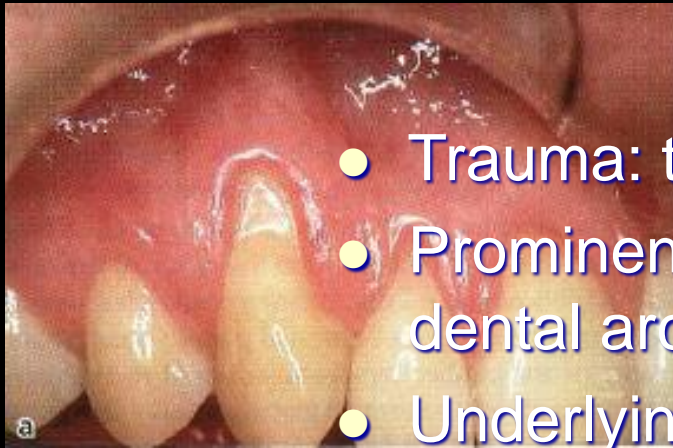


## MILLER CLASSIFICATIO

<b>I. osztály</b>	A recesszió nem érinti a papillát, és nem éri el a mucogingivalis junctiót.
<b>II. osztály</b>	A recesszió eléri a mucogingivalis junctiót, de nem érinti a papillát.
<b>III. osztály</b>	A recesszió a papillát is érinti.
<b>IV. Osztály</b>	A papilla jelentősen érintett

# Gingival recession

Causes of gingival recession :

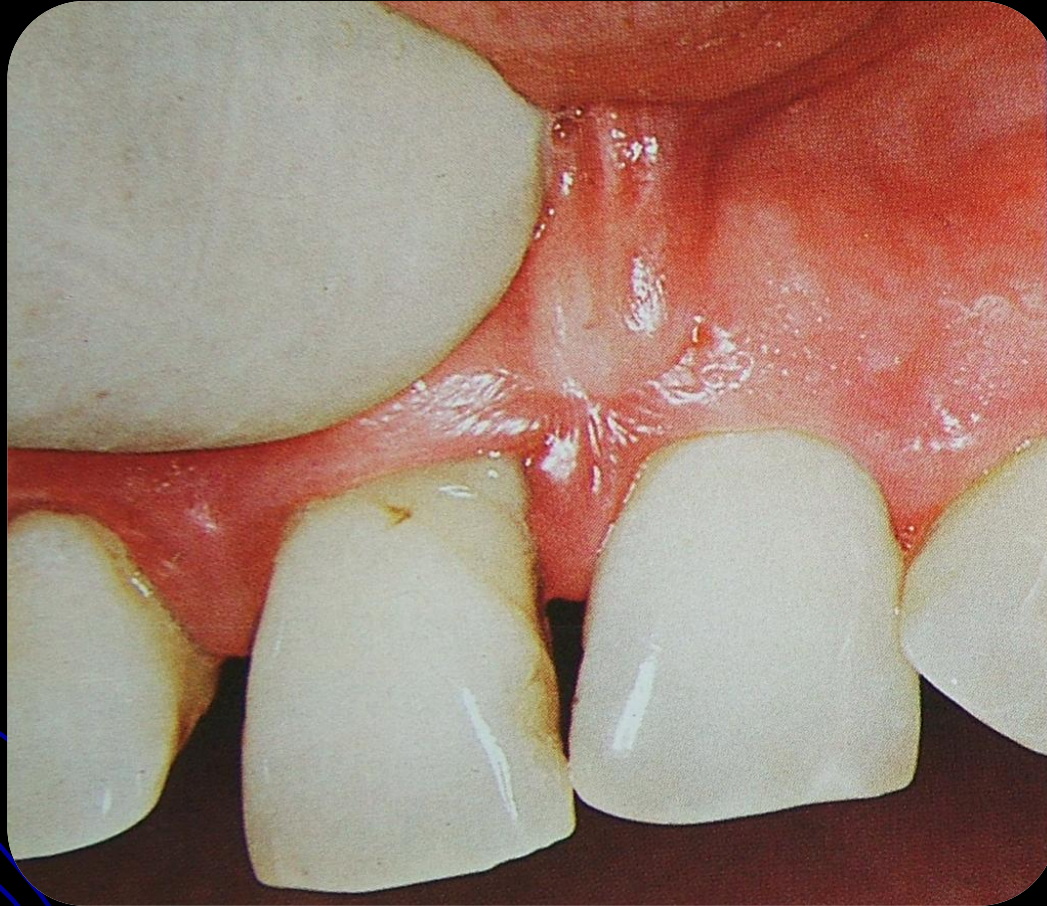


- Trauma: toothbrushing
- Prominent position of tooth in dental arch
- Underlying bony dehiscence
- plaque induced inflammation
- Orthodontic treatment
- Following periodontal treatment



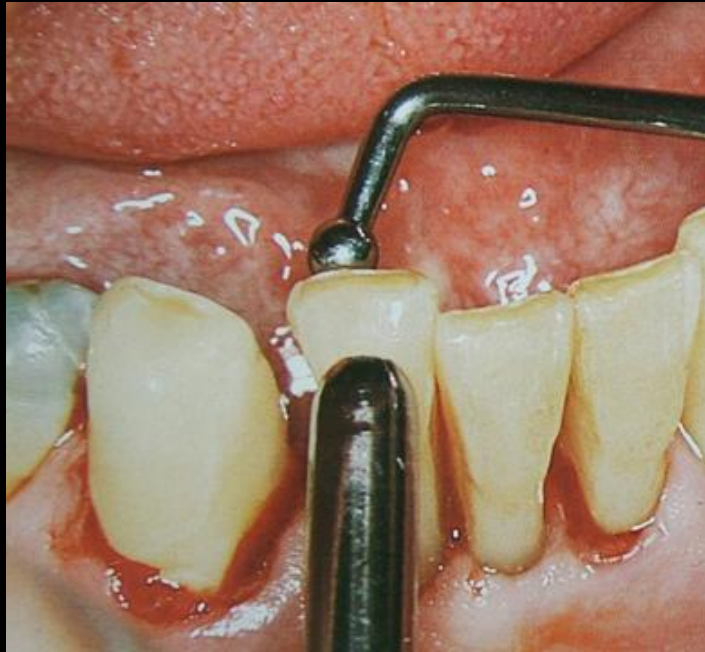


# Gingival recession



• High fraenal attachment

# Palpation-Tooth Mobility

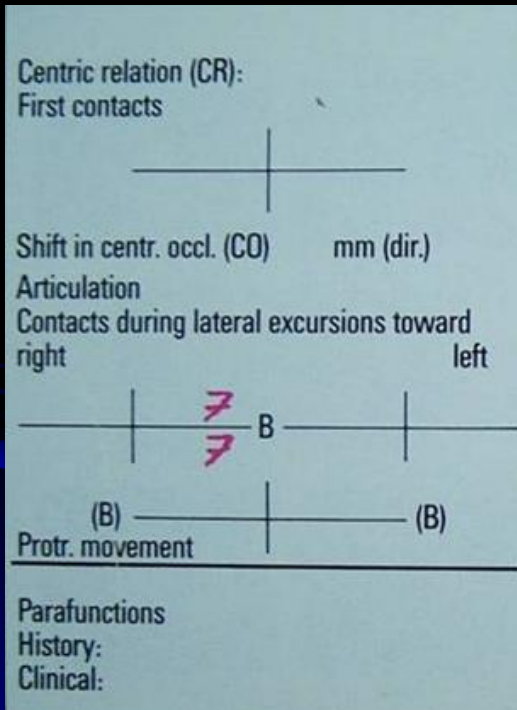


- Score 1 Mobility up to 1 mm
- Score 2 Mobility of 1-2 mm
- Score 3 Mobility over 2 mm and/or rotation or depression



# Occlusion:

- Premature contact
- Overerupted teeth
- Deep traumatic overbite



# Pocket Charts

The data resulting from a comprehensive periodontal examination can be recorded on a pocket chart. ( If BPE score 3- the sextant, score 4- full periodontal probing chart )

Parodontológiai Klinika  
**Parodontális státuszlap** dátum \_\_\_\_\_  
 páciens vezetékneve \_\_\_\_\_ keresztnéve \_\_\_\_\_ születési ideje \_\_\_\_\_  
 első vizsgálat  újraértékelés kezelőorvos Dr. Kelemen Kinga

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
mozgathatóság	0			0	0	0	0	0	0	0	0	0	0	0	0	0	
implantátum																	
furkáció-érintettség																	
Bleeding on Probing																	
Plaque																	
marginális gingivitis	0	0	0	1	3	0	0	0	0	0	0	0	0	0	1	0	0
szövetes mélység	2	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2

**buccális**

**palatinális**

	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
marginális gingivitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
szövetes mélység	3	2	2	1	2	3	2	1	2	3	1	2	2	1	2	2	2

Mean Probing Depth = 2.8 mm Mean Attachment Level = -2.9 mm 23% Plaque 30% Bleeding on Probing

**lingvális**

**buccális**

	1	0	0	1 <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th> <th>0</th>	0	0	0	0	0	0	0	0	0	0	0	0	0
marginális gingivitis	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
szövetes mélység	2	2	0	1	2	2	1	1	1	1	1	1	1	1	1	1	1

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- Missing teeth
- Position of the gingival margin
- Pocket depth
- Loss of attachment
- Bleeding on probing
- Furcation lesion
- Mobile teeth
- Presence of plaque/ calculus

# Radiographs in the diagnoses of periodontal disease

- **Full-mouth series**
- **Vertical Bite wings**
- **Panorex**
  - **developmental anomalies**
  - **pathology**
  - **fractures**
- **Previous radiographs**

Radiographs are essential in the diagnosis and management of periodontal disease, but, should be used only to supplement clinical examination

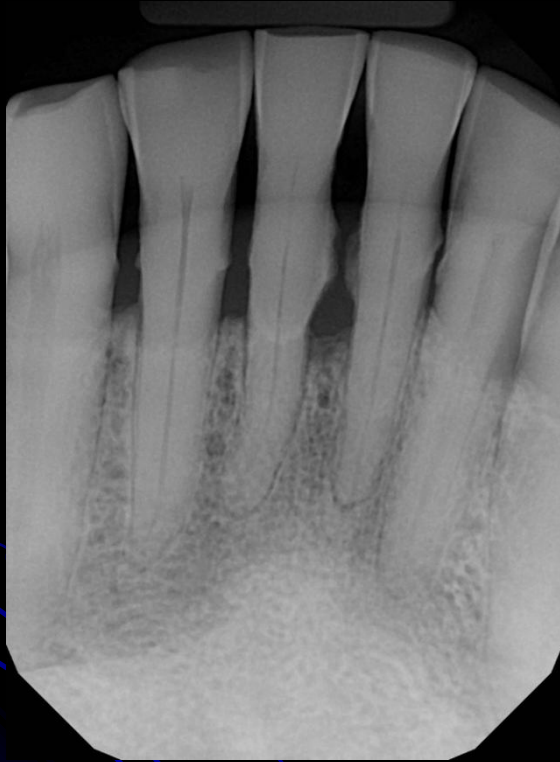
# The Role of Radiology in Assessment of Periodontal Disease

The following information should be noted:

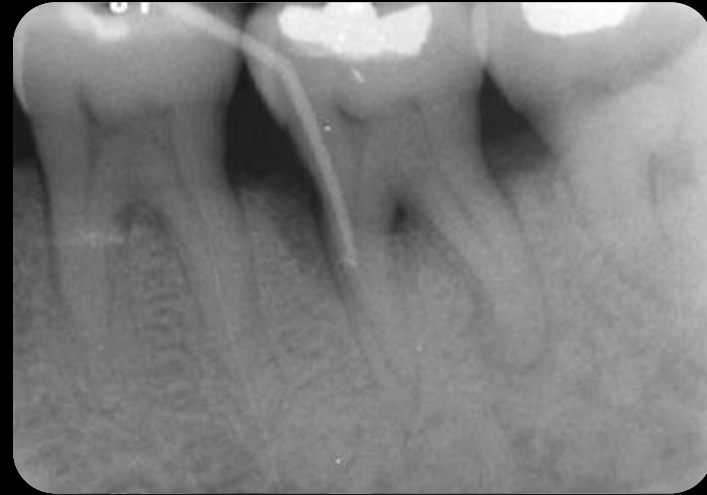
- **Bone levels** • degree of bone loss – mild, moderate or severe
  - distribution of bone loss – localized or generalized
  - pattern of bone loss – vertical, horizontal or both.
- **Furcation defects** • teeth affected.
- **Crown : root ratio** • relative length of the root to the crown – particularly relevant in incisors.
- **Root morphology**
- **Restorations** • overhanging margins
  - deficient margins
  - recurrent caries.
- **Periapical pathology** – perio-endo lesions.



# Radiographic Evaluation for Periodontal Disease



Subgingival calculus



Furcation lesion:

Evidence of furcal bone loss on (lower left permanent second molar), with a mesial vertical defect on the same tooth

J. Lindhe, T. Karring, N.P. Lang: Clinical Periodontology and Implant Dentistry (2003, 4th edition)



Furcation lesions



# Peridontal abscess vs. Combined perio-endo lesion



Predisposing factors: the presence of subgingival plaque ,frequently associated with a deep periodontal pocket.

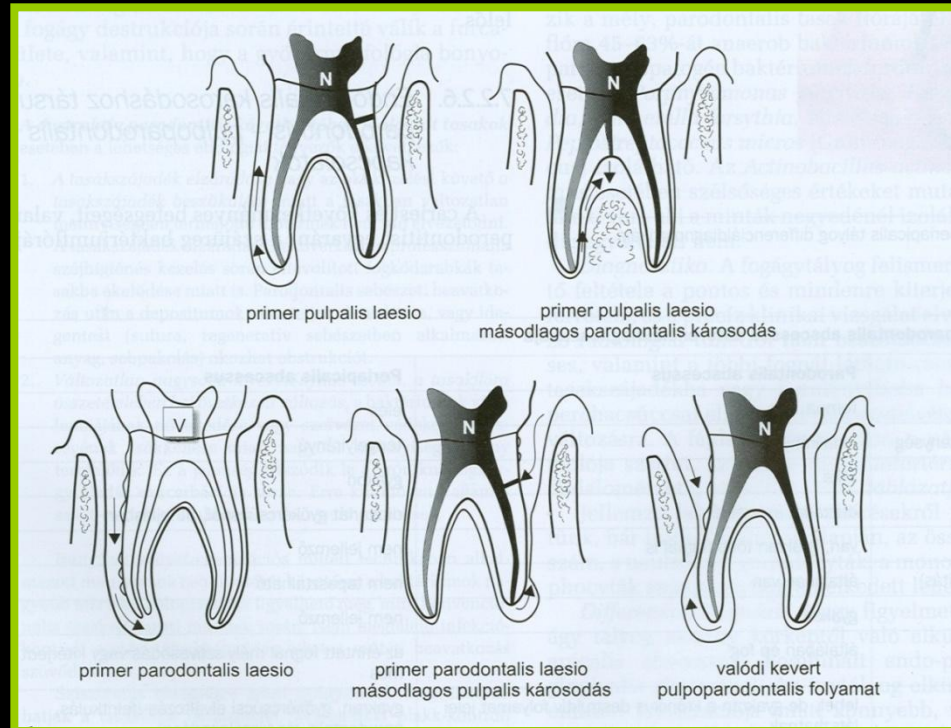


# The differentiation of abscesses that are periodontal and periapical in origin

	Periodontal abscess	Periapical (dental) abscess
Pain	Acute onset	History of toothache
Swelling	Usually localized, extraoral swelling unlikely	Over tooth apex, more likely to be extensive
Pocket	Always present; more likely in presence of periodontal disease	± pocket
Sinus	Frequently on attached gingivae	Tracks to apex
Percussion	TTP, worse laterally	TTP, especially in axial direction
Restoration	More likely if tooth status caries-free/unrestored	More likely in heavily restored tooth
Vitality	Tooth vital	Tooth non-vital
Radiographs	Little evidence in early stages; bone loss	Loss of lamina dura in periapical area (after 10 days or so)

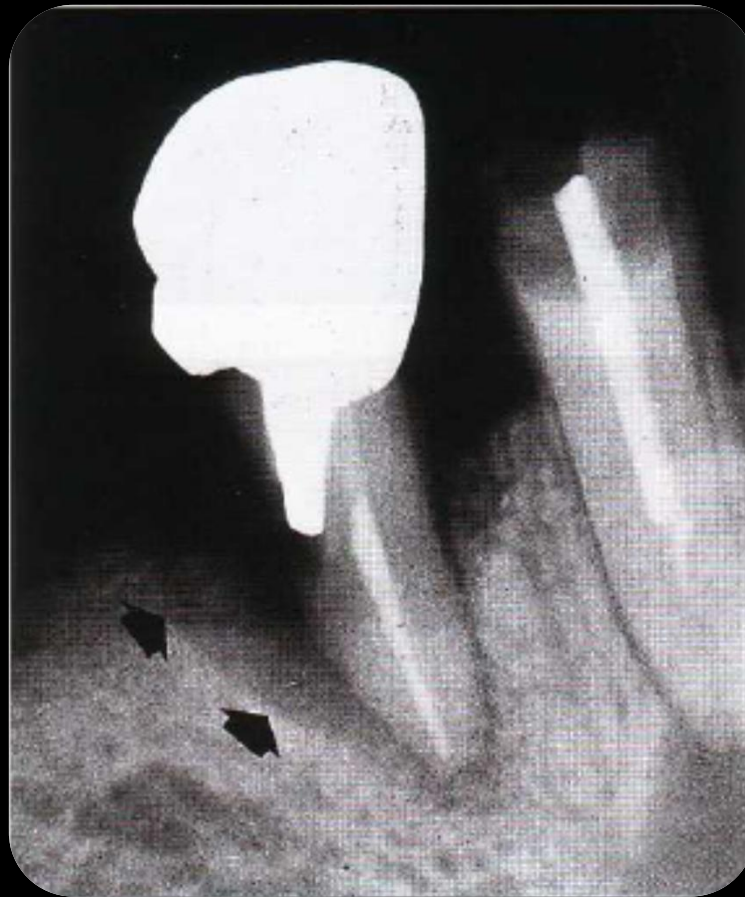
TTP= tender to percussion

# Perio-endo lesion



May arise as a result of:

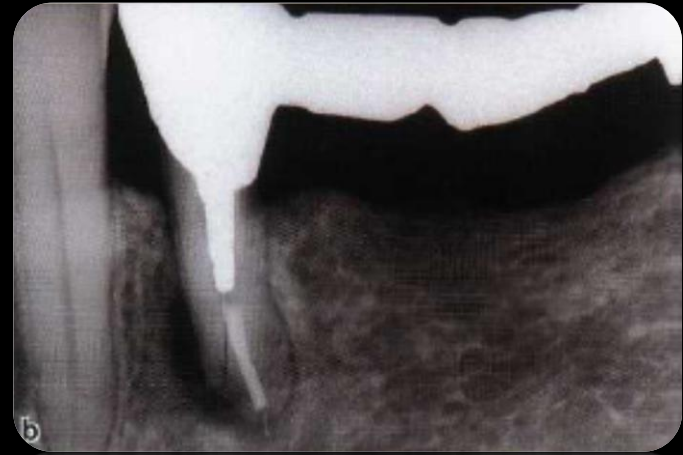
- infection in a necrotic pulp draining via the periodontal ligament (usually in the presence of existing periodontal disease)
- toxins from pulp reaching periodontal ligament via lateral or accessory canals, especially in the furcation region
- the root having been perforated by a pin or post



# Root perforation at the distal surface of the root

J. Lindhe, T. Karring, N.P. Lang: Clinical Periodontology and Implant Dentistry (2003, 4th edition)





# Root fracture

J. Lindhe, T. Karring, N.P. Lang: Clinical Periodontology and Implant Dentistry (2003, 4th edition)

# Diagnoses

- Recorded these factors
- Information on the patient's presenting complaints, age, medical and social history

➔ provisional diagnoses

- Additional information may be obtained from:
  - radiographic examination
  - pulp vitality tests
  - study models
  - biopsy
  - microbiological and haematological investigations.

# Periodontal Diagnoses

Current Classification System ( International Workshop for a Classification of Periodontal Diseases and Conditions 1999).

## I. Gingival diseases

Dental plaque-induced gingival diseases

Non-plaque-induced gingival lesions

## II. Chronic periodontitis

## III. Aggressive periodontitis

## IV. Periodontitis as a manifestation of systemic diseases

## V. Necrotizing periodontal diseases

## VI. Abscesses of the periodontium

## VII. Periodontitis associated with endodontic lesions

## VIII. Developmental or acquired deformities and conditions.



# Possible periodontal diagnoses

Healthy	Gingivitis	Periodontitis
Clinically no gingival inflammation	Clinically presence of gingival inflammation	Presence of gingival inflammation
No attachment loss	Without loss of connective tissue attachment	Attachment loss
	Gingival margin coronally to CEJ	Gingival margin coronally or apically to CEJ

# Dental plaque-induced gingivitis

- No pain
- redness
- Edema of the gingival tissue
- Bleeding upon provocation
- Changes in contour and consistency
- Presence of calculus and/or plaque
- No radiographic evidence of crestal bone loss



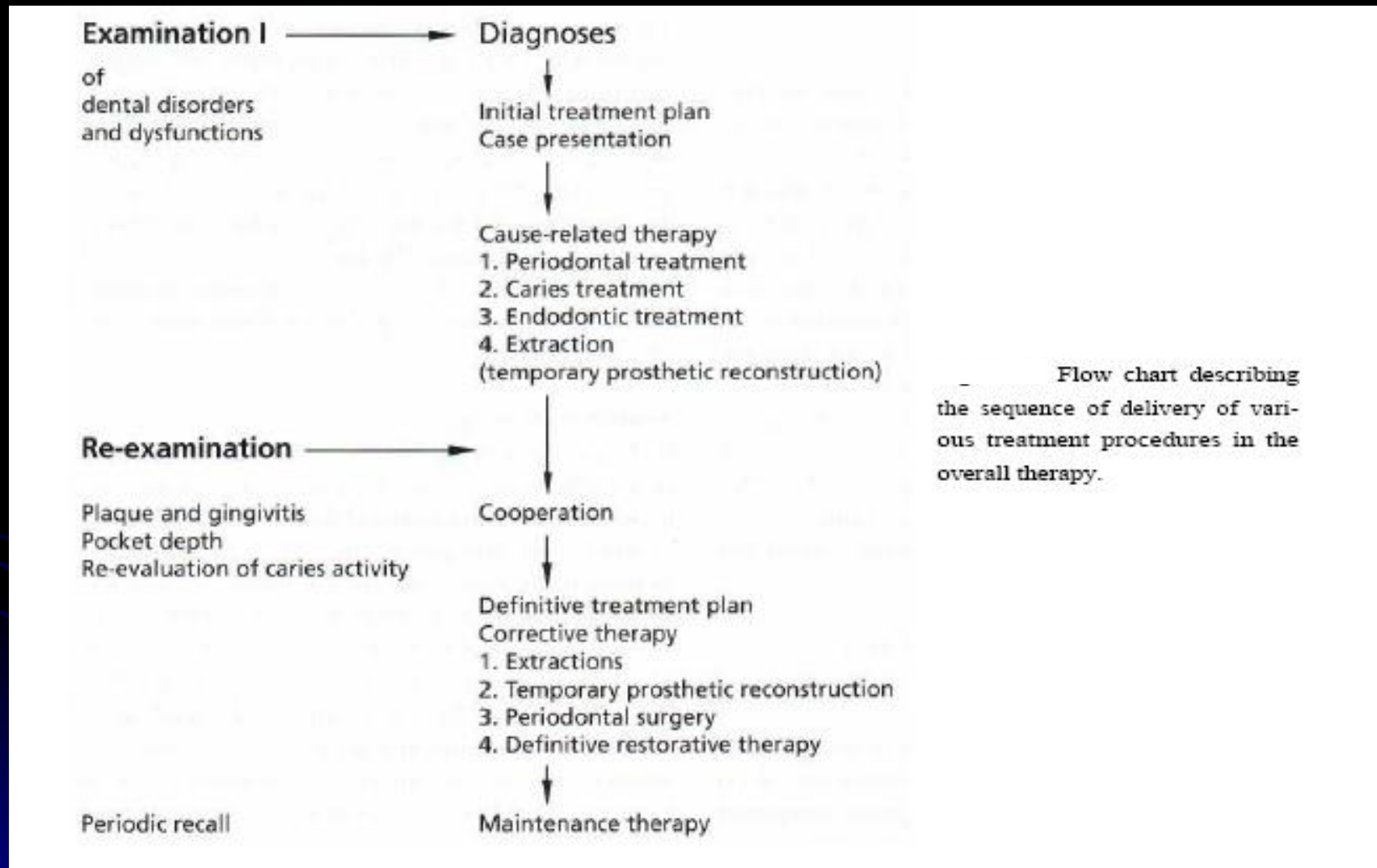
# Clinical signs of periodontitis

- Presence of gingival inflammation (red, swollen gingiva)
- BOP +
- Periodontal pocket
- Attachment loss
- Bone loss
- Loosening teeth
- Foetor ex ore





# Flow chart describing the sequence of delivery of various treatment procedures in the overall therapy.



Flow chart describing the sequence of delivery of various treatment procedures in the overall therapy.

# Indices

Objective: epidemiological examination,  
monitoring of a population

1. Caries-indices
2. Indices used for plaque and debris assessment
3. Indices used for gingival disease assessment
4. Indices used for periodontal disease assessment

# Indices

## 1. Caries-indices:

DMF-T

DMF-S

DMFT and DMFS describe the amount of dental caries in an individual. DMFT and DMFS are means to numerically express the caries prevalence and obtained by calculating the number of

- Decayed (D)
  - Missing (M)
  - Filled (F)
- teeth (T) or surfaces (S)



# Indices

## 2. Indices used for plaque and debris assessment:

- Oral Hygiene Index ( Greene and Vermilion, 1960)
- Simplified Oral Hygiene Index / OHI-S
- Plaque Index ( Silness and Løe, 1964)
- Quigely Hein Index ( modified)
- Plaque Control Record: The Plaque Control Record was developed to give the therapist, hygienist, or dental educator a simple method of recording the presence of the plaque on individual tooth surfaces.

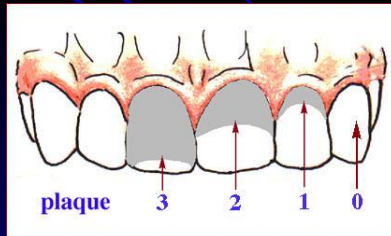
- **Simplified Oral Hygiene Index** (Green & Vermillion 1964<sup>2</sup>) has 2 components: **Debris Index** and **Calculus index**

0 = No plaque

1 = Plaque covering 1/3 tooth

2 = Plaque covering 2/3 tooth

3 = Plaque totally covering tooth



Scores	Criteria
0	No calculus present
1	Supragingival calculus covering not more than third of the exposed tooth surface.
2	Supragingival calculus covering more than one third but not more than two thirds 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 two third of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth or both.

# Indices

- **Plaque index** (Silness & Loe 1964<sup>3</sup>)

recording both soft debris and mineralized deposits on the following teeth.

12, 16, 24, 32, 36, 44

0 = No plaque detected

1 = Looks clean but material can be removed from gingival 1/3 with probe

2 = Visible plaque

3 = Tooth covered with abundant plaque

- **Quigely Hein Index ( modified)**

score of 0 to 5 is assigned to each facial and lingual nonrestored surface of all the teeth except third molars

0-No plaque

1-Separate flecks of plaque at the cervical margin of the tooth

2-A thin continuous band of plaque (up to one mm) at the cervical margin of the tooth

3-A band of plaque wider than one mm but covering less than one-third of the crown of the tooth

4-Plaque covering at least one-third but less than two-thirds of the crown of the tooth

5-Plaque covering two-thirds or more of the crown of the tooth

# Indices

## 3. Indices used for gingival disease assessment:

### Gingival Index (GI) (Löe-Silness, 1963)

### Papillary Bleeding Index (PBI)

### Gingival Bleeding Index

#### Gingival Index

0= Normal gingiva;

1= Mild inflammation – slight change in color and slight edema but no bleeding on probing;

2= Moderate inflammation – redness, edema and glazing, bleeding on probing;

3= Severe inflammation – marked redness and edema, ulceration with tendency to spontaneous bleeding

#### Modified gingival index (Loe 1967)

0 = Healthy gingivae

1 = Gingivae look inflamed, but don't bleed when probed

2 = Gingivae look inflamed and bleed when probed

3 = Ulceration and spontaneous bleeding



# Indices

## 4.Indices used for periodontal disease assessment:

- Periodontal Index ( Russell, )
- Periodontal Disease Index (Ramfjord, 1959)
- Periodontal treatment needs: CPITN

General practice – **PSR-Index/ BPE**, 1992.WHO

BPE is derived from the Community Periodontal Index of TN

# Indices - Clinical Practice

Clinical assessments of inflammation in the periodontal tissues:

## I.) FMBS

Dátum: \_\_\_\_\_ Felvevő neve \_\_\_\_\_

B P  
L B  
L P

1 8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8

FMPS:  $\frac{\text{Összfelszín} \times 100}{\text{Fogak száma} \times 6} = \text{---} = \text{---} \%$

FMBS:  $\frac{\text{Összfelszín} \times 100}{\text{Fogak száma} \times 6} = \text{---} = \text{---} \%$

6 measurement points

- = Absence of visual signs of inflammation, or slight change in color and texture, no bleeding
- + = Visual inflammation with bleeding tendency or spontaneous bleeding

FMBS:  $\frac{\text{involved surfaces}}{\text{total surfaces}} \times 100 = \text{.....}\%$

## II.) Plaque Index

# Indices - Clinical Practice

Clinical assessments of inflammation in the periodontal tissues:

## II.) FMPS

6 measurement points, +/-

Dátum: \_\_\_\_\_ Felvevő neve \_\_\_\_\_

B P

1

8 7 6 5 4 3 2 1 | 1 2 3 4 5 6 7 8

L B

FMPS:  $\frac{\text{Összfelszín} \times 100}{\text{Fogak száma} \times 6} = \text{---} = \text{---} \%$

FMBS:  $\frac{\text{Összfelszín} \times 100}{\text{Fogak száma} \times 6} = \text{---} = \text{---} \%$

FMPS :  $\frac{\text{involved surface}}{\text{total surface}} \times 100 = \text{.....}\%$

# Indices- General Practice

Assessment of periodontal treatment needs

WHO: CPITN – Community Periodontal Index for Treatment Needs (Ainamo - '82)

ADA+AAP: PSR – Periodontal Screening and Recording

CPITN + PSR:

- WHO probe
- measures the worst teeth per sextants
- coding between 0-4

BPE: Basic Periodontal Examination



# Screening for periodontal disease

## Basic periodontal examination (BPE)

*The goal of the BPE is to screen the periodontal condition of a new patient and to facilitate treatment planning.*

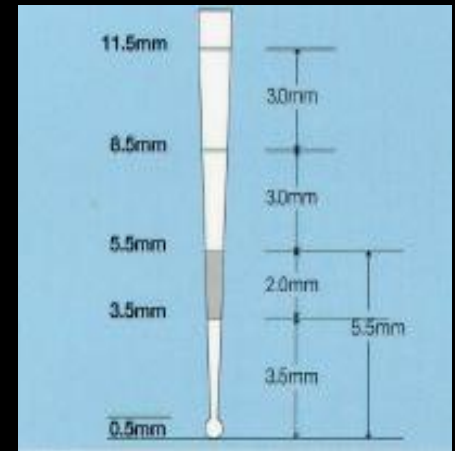
*BPE scoring will allow the therapist to identify:*

- 1. A patient with reasonably healthy periodontal conditions, but in need of long term preventive measures*
- 2. A patient with periodontitis and in need of periodontal therapy.*

# Screening for periodontal disease

## The BPE process

- In the BPE screening each tooth or implant is evaluated. Mouth divided into sextants (no 8's) represented by a single box chart for each sextant.
- A thin graduated periodontal probe is introduced into the gingival sulcus with a light probing pressure (25-30g) WHO probe is used, for a sextant to qualify for recording, it must contain at least 2 teeth
- The probe is "walked" around the tooth (or at least two sites MB and DB) starting buccally
- Each sextant within the dentition is given a BPE score, only the highest score for each sextant is recorded
- 0>1>2>3>4>\*



17-14	13-23	24-27
47-44	43-33	34-37

**Periodontal Screening & Recording**

SEXTANT SCORE	MONTH	DAY	YEAR		

# BPE codes, together with the description, a clinical example and appropriate management

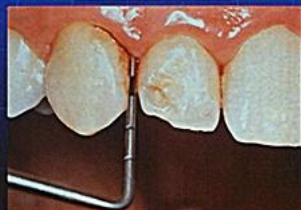
BPE code	PPD	Calculus, overhangs	BOP	MANAGEMENT
0	0-3,5	-	-	No treatment required
1	0-3,5	-	+	Oral hygiene instruction (OHI)
2	0-3,5	+	-/+	OHI, removal of plaque retentive factors, including all supra- and subgingival calculus
3	3,5-5,5	-/+	-/+	6point probing chart should be taken for sext OHI, root surface debridement
4 ★	PPD>5 furcation	-/+	-/+	Full mouth periodontal probing chart OHI, RSD. Assess the need for more complex treatment, referral to a specialist may be indicated

**CODE 0**



Colored band completely visible

**CODE 1**



Colored band completely visible

**CODE 2**



Colored band completely visible

**CODE 3**



Colored band only partly visible

**CODE 4**



Colored band not visible

# BPE

## Advantages and Limitations

- Early detection
- Speed
- Simplicity
- Cost-effectiveness
- Ease of recording
- Risk management

### Limitations:

- Not intended to replace a full-mouth periodontal examination
- Those patients who have received treatment for periodontal diseases and/or are in a maintenance phase of care should receive comprehensive periodontal examinations
- Limited use of the PSR system in children



If dentist do *not measure pocket depth* ...



