



Epidemiology and Indexes in Periodontology Perio instruments Examination of oral membrane mucous

MUDr. Hana Poskerová Ph.D.
Dental Clinic St. Anne's Hospital and
Faculty of Medicine, Masaryk University Brno

FAKULTNÍ
NEMOCNICE
U SV. ANNY
V BRNĚ

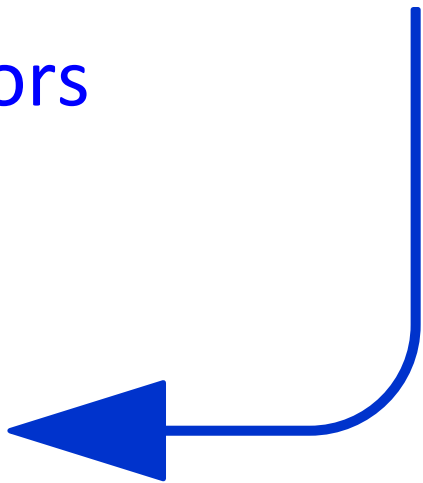


M U N I

Epidemiology - study of the health status of the population

- WHO will become ill ? WHEN? WHERE? WHY ?
Etiological factors
- What will we observe? How will we evaluate?
- ***Descriptive epidemiology***: description of the condition, formulation of hypotheses
- ***Analytical epidemiology***: hypothesis testing, conclusions

Epidemiological studies

- Description of the natural course of the disease
 - Occurrence and frequency of diseases in the population
 - Determined risk / protective factors
 - Identification of risk groups
 - Prevention- Therapy- Prognosis
- 

Epidemiology of periodontal diseases

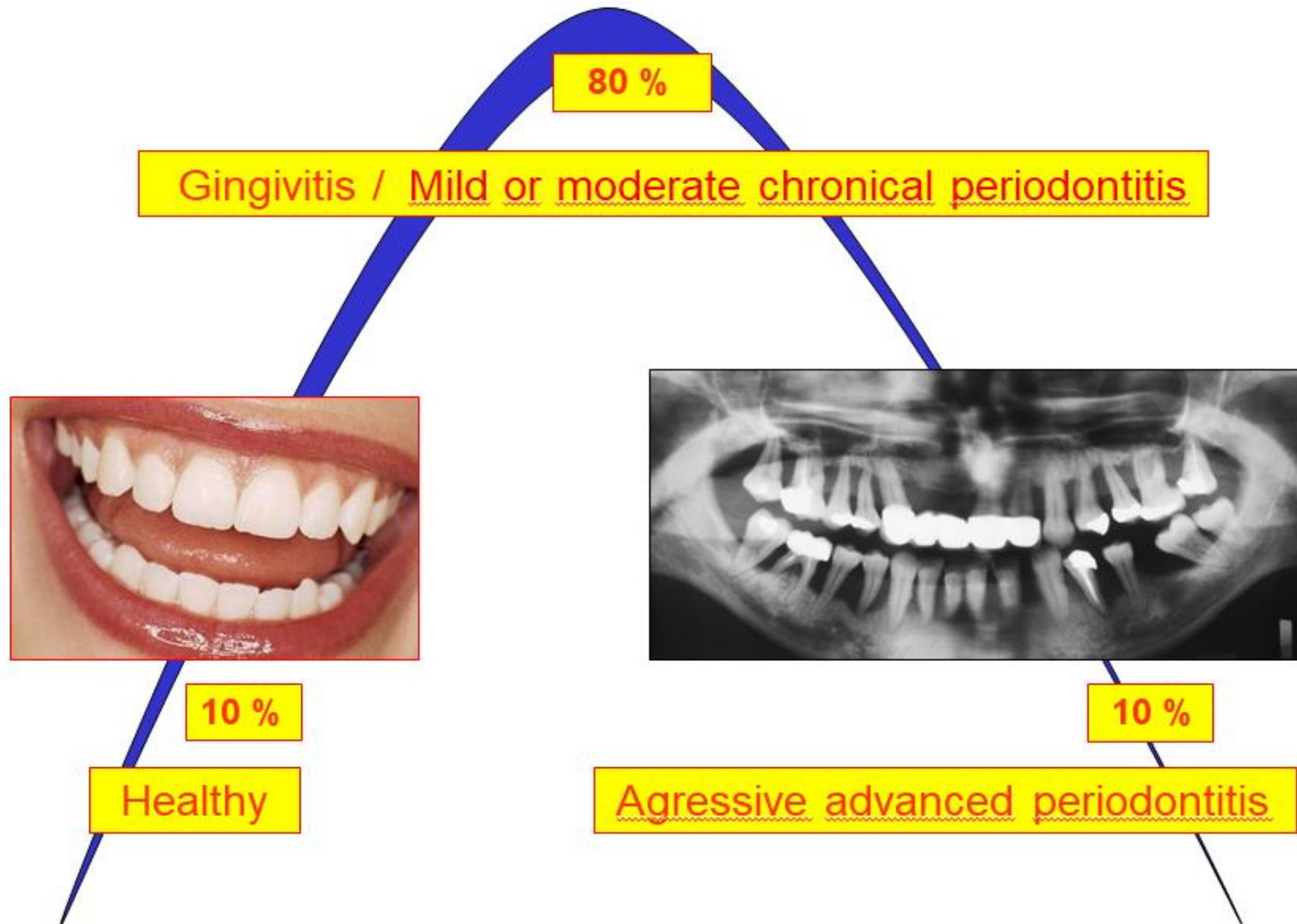
- **Prevalence** – total number of cases of the disease in the population at a given time
- **Incidence** – number of new cases within a specified time period
- **Gingivitis and periodontitis** occur almost in 100 % in adults
 - almost every adult over the age of 40 is affected by periodontitis

Epidemiology of periodontal diseases

- The **need to determine the degree** of disease (person, tooth, dental area)
- **Indicators** (indices) - evaluating gingival inflammation, loss of the periodontal tissue
- Slow development - **long-term observations necessary**

- Longitudinal study of periodontitis (15 years)

11 % without periodontitis 81 % mild course 8 % destructive course



Epidemiology of periodontal diseases

- Natural course of the disease
- Prevalence of periodontal disease and its degree
- Risk factors
- Effectiveness of preventive measures
- Effectiveness of therapeutic measures
- The need for treatment of the population
- **Multifactorial character** of periodontal diseases
- **Prevalence is increasing**
improved dental care, longer life expectancy →
the number of preserved teeth increases

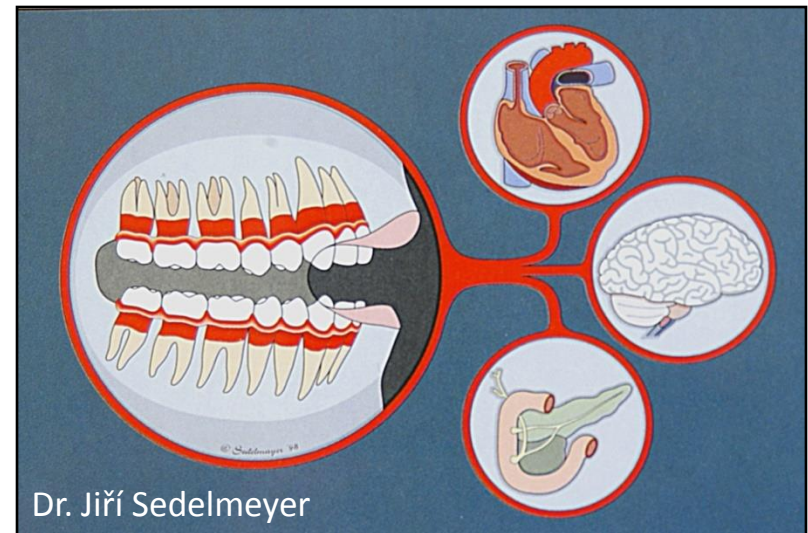
Risk factors

- **Periodontitis** - reaction of the organism to dental microbial plaque + host response + individual factors (total/local)
- **Dental microbial plaque - Oral hygiene**
- Age, gender, race, socioeconomic factors, education, income, geographical differences, diet
- Local factors
- **Smoking**
- Systemic diseases (**DM**, HIV, genetic syndromes, immune deficiency)

Periodontal disease as a risk factor for other diseases

- inflammation is not only a local problem of the periodontium, but bacteria and inflammatory mediators enter the systemic circulation
- Bacteriemia
- Inflammatory mediators

95% of atheromas had bacterial D.N.A from periodontal pathogens



<https://www.efp.org/news-events/news/oral-health-and-general-health-29938/>

Complex examination in periodontology

- Oral hygiene
- Dentition
- Periodontal tissue
- Soft tissues of oral cavity



Complex examination in periodontology

- **Medical history**

family history – systemic and oral health of parents
personal history – diseases and current medications,
allergies, tobacco use

- **Clinical examination**

- detailed overview of **periodontal status**
- detailed examination around each **tooth**
OH, calculus,
gingiva, gingival recession,
perio pockets, tooth movement, furcation, occlusion

Complex examination in periodontology

- Radiography
- Laboratory diagnosis - with a pathogen analysis, gen test
- Diagnosis
- Prognosis
- Method of therapy

Indices in periodontology

- Detect pathological changes
promptly without detailed evaluation
- Not able to produce the diagnosis !!!
- Simple, objective, reproducible, cheap,
quick and practical, easy interpretable

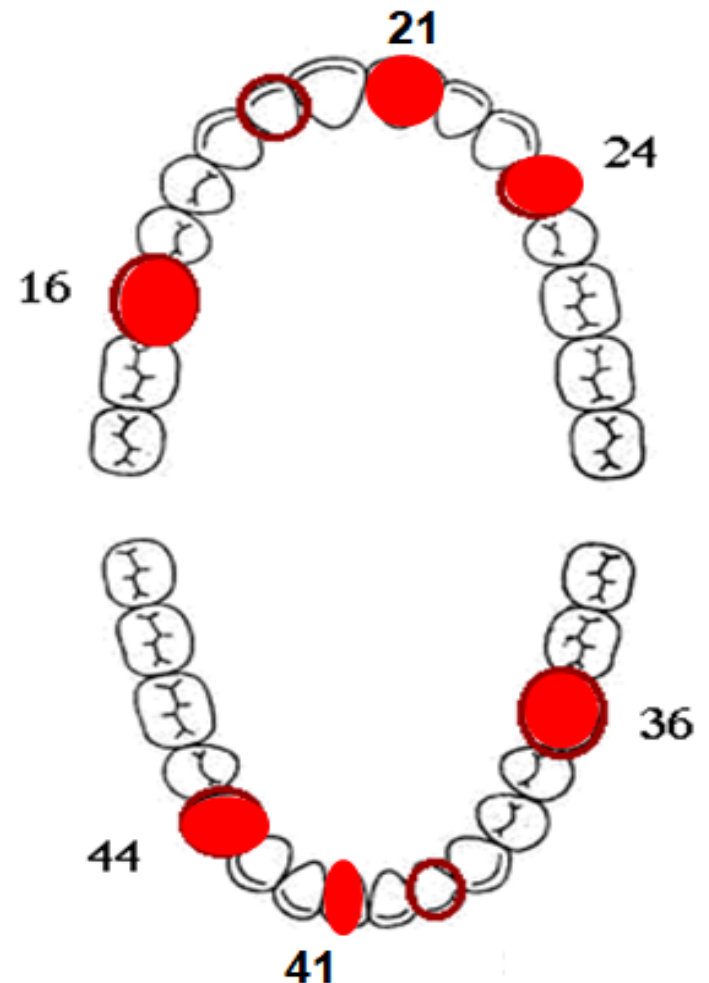
Indices in periodontology

- Primarily developed for **epidemiologic studies** - screening tests
- Clinical findings with **individual patients** - help for diagnosis, for patient motivation and education, determination of treatment need, control of therapy results

Indices in periodontology

- in **epidemiologic studies**
 - representative teeth
 - Ramfjord teeth

16 21 24 / 36 41 44
- with **individual patients**
 - the entire dentition



Indices in periodontology

- Indices provides **quantitative** and **qualitative** expression
- **quantitative** expression
presence – absence of a symptom (yes – no) API
- **qualitative** expression
presence and severity of pathology are expressed by a numerical value (0,1,2,3,4) PBI

Indices in periodontology

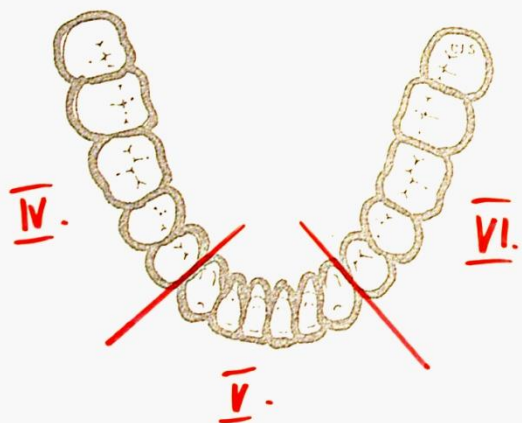
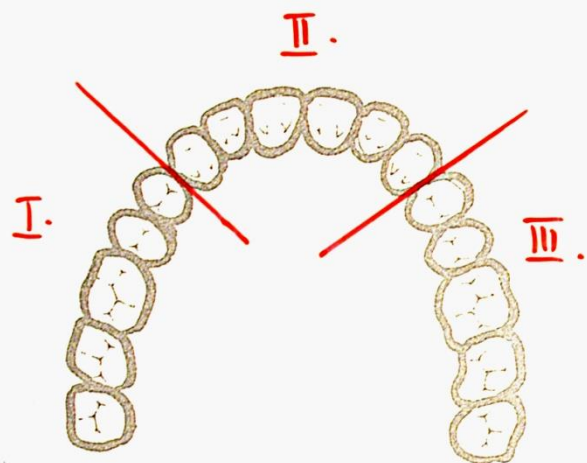
- We examine the indices with periodontological probes
- Features - blunt tip (or ball), calibration (various)



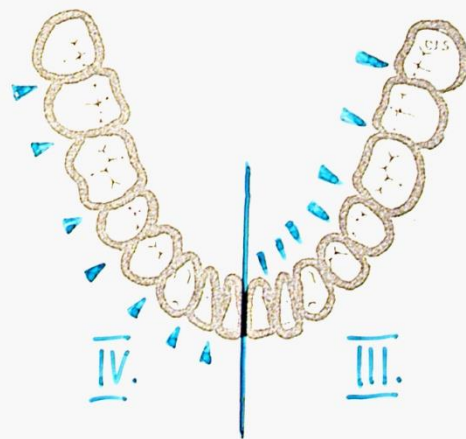
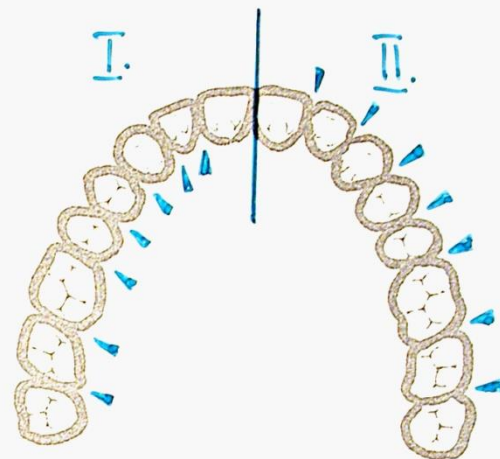
Indices in periodontology

- Plaque Indices PI / API, HYG
 - Gingival Indices GI / PBI
 - Periodontal Indices CPITN
-
- Dentition is divided to quadrants / sextants
 - Ramfjörd teeth / every teeth

CPITN - sextanty



PBI - kvadranty



313/423

3	1	3
4	2	4

index PBI = $\frac{\text{suma}(0-112)}{28} = 0 \text{ až } 4$

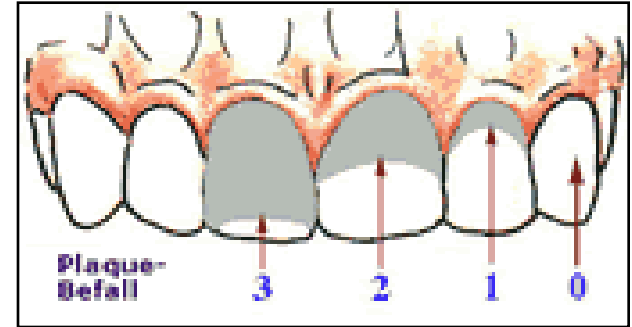
Hygienic Indices

- Records **plaque accumulation** (volume) and distribution of plaque in oral cavity or amount of **dental calculus**
- Evaluate oral hygiene quality and its improvement during the therapy
- Examined by **probe** or **staining**



Plaque index of Silness and Lööe

- in epidemiologic studies



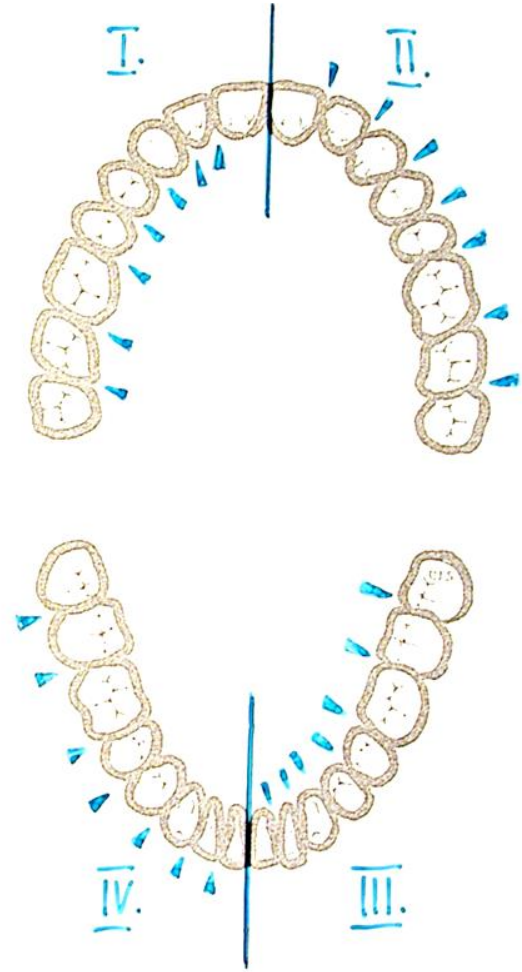
- 0 **no** plaque
- 1 **thin film** of plaque at the gingival margin, visible only when using an explorer
- 2 **moderate amount** of plaque visible with your own eyes
- 3 **heavy plaque accumulation**

Aproximal Plaque Index API

- Used with individual patients
- Records presence (+) or absence (-) of plaque in interdental spaces as a percentage
- 7 interdental spaces in each quadrant
- 28 measurement sites in complete dentition
- I. and III. quadrant from oral aspect
- II. and IV. quadrant from facial aspect

API

- 4 quadrants
- I. and III. quadrant from oral aspect
- II. and IV. quadrant from facial aspect
- 28 measurement sites in complete dentition



Aproximal Plaque Index API

- number of locations **with plaque** / number of evaluated areas $\times 100$ (%)
- $28/28 \times 100 \cong 100\%$ Bad OH
- $0/28 \times 100 \cong 0\%$ Very good OH
- Good motivation ability

17	16	15	14	13	12	11	21	22	23	24	25	26	27
----	----	----	----	----	----	----	----	----	----	----	----	----	----

+	+	+	+	-	-	-	-	-	-	+	+	+	+
+	+	+	+	-	-	-	-	-	-	+	+	+	+

47	46	45	44	43	42	41	31	32	33	34	35	36	37
----	----	----	----	----	----	----	----	----	----	----	----	----	----

Index API

number of locations **with plaque** / number of
evaluated areas $\times 100$ (%)

$$\text{API} \cong 16 / 28 \times 100 \cong 56 \%$$

Interdental Hygiene Index HYG

- reverse
- number of locations **without plaque** / number of evaluated areas $\times 100$ (%)
- $28/28 \times 100 \cong 100\%$ Very good OH
- $0/28 \times 100 \cong 0\%$ Bad OH

17	16	15	14	13	12	11	21	22	23	24	25	26	27
----	----	----	----	----	----	----	----	----	----	----	----	----	----

-	-	-	-	+	+	+	+	+	+	-	-	-	-
-	-	-	-	+	+	+	+	+	+	-	-	-	-

47	46	45	44	43	42	41	31	32	33	34	35	36	37
----	----	----	----	----	----	----	----	----	----	----	----	----	----

Index HYG

number of locations **without plaque** / number
of evaluated areas $\times 100$ (%)

$$\text{API} \cong 12 / 28 \times 100 \cong 44 \%$$

Gingival index of Löe and Silness

in epidemiologic studies

- 0 **No** inflammation, no discoloration, no bleeding
- 1 **Mild inflammation**, slight colour change, no bleeding
- 2 **Moderate inflammation**, erythema, swelling, bleeding on probing
- 3 **Severe inflammation**, severe erythema and swelling, spontaneous bleeding

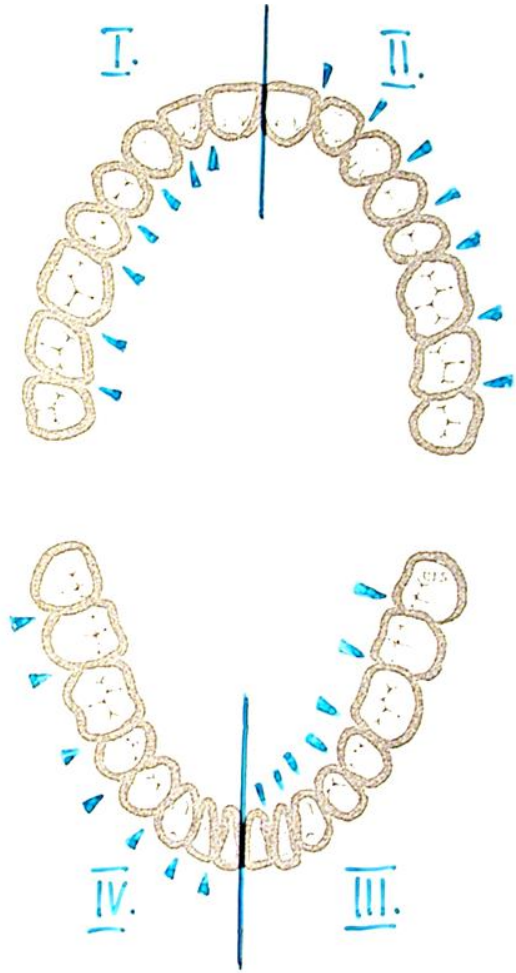
Papilla Bleeding Index

- Used with individual patients
- **Intensity of bleeding** from marginal gingiva upon its soft irritation
- Bleeding on probing of the gingival sulcus **in the papillary region**
- Sensitive indicator of the severity of gingival inflammation
- Serves for **motivating** the patients to maintain good OH

PBI

- 4 quadrants
- I. and III. quadrant from oral aspect
- II. and IV. quadrant from facial aspect
- 28 measurement sites in complete dentition

PBI - kvadranty



$$\text{index PBI} = \frac{\text{suma (0-112)}}{28} = 0 \text{ až } 4$$

Papilla Bleeding Index

- 7 distal papillas/half-papillas are evaluated
- for seven teeth in each quadrant
- drying
- stimulation of papillas
- after 20 sec from stimulation we can record the degree of bleeding



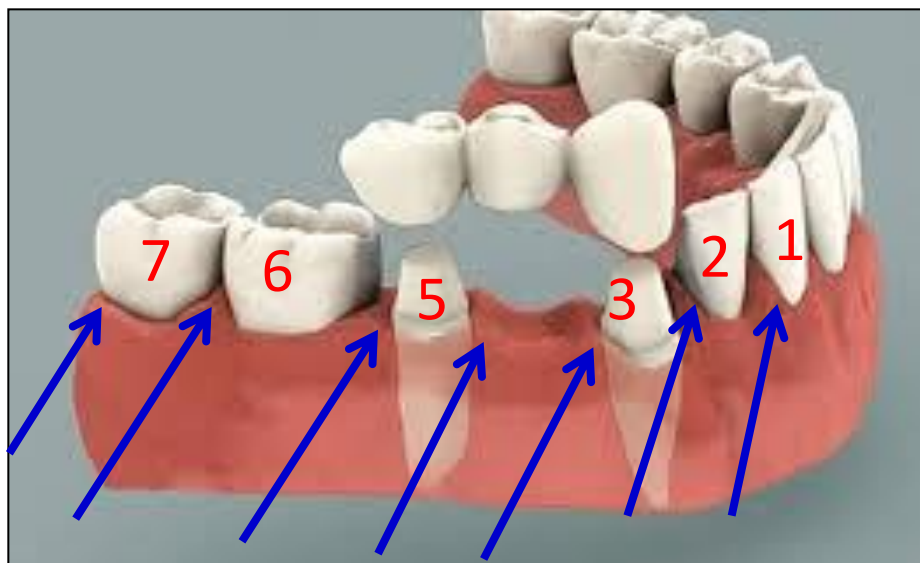
Papilla Bleeding Index

- Bleeding is provoked by using a periodontal probe under **light pressure** from the base of papilla to its tip along the tooth's distal and mesial aspects
- **Intense of bleeding** is scored in four grades



Papilla Bleeding Index

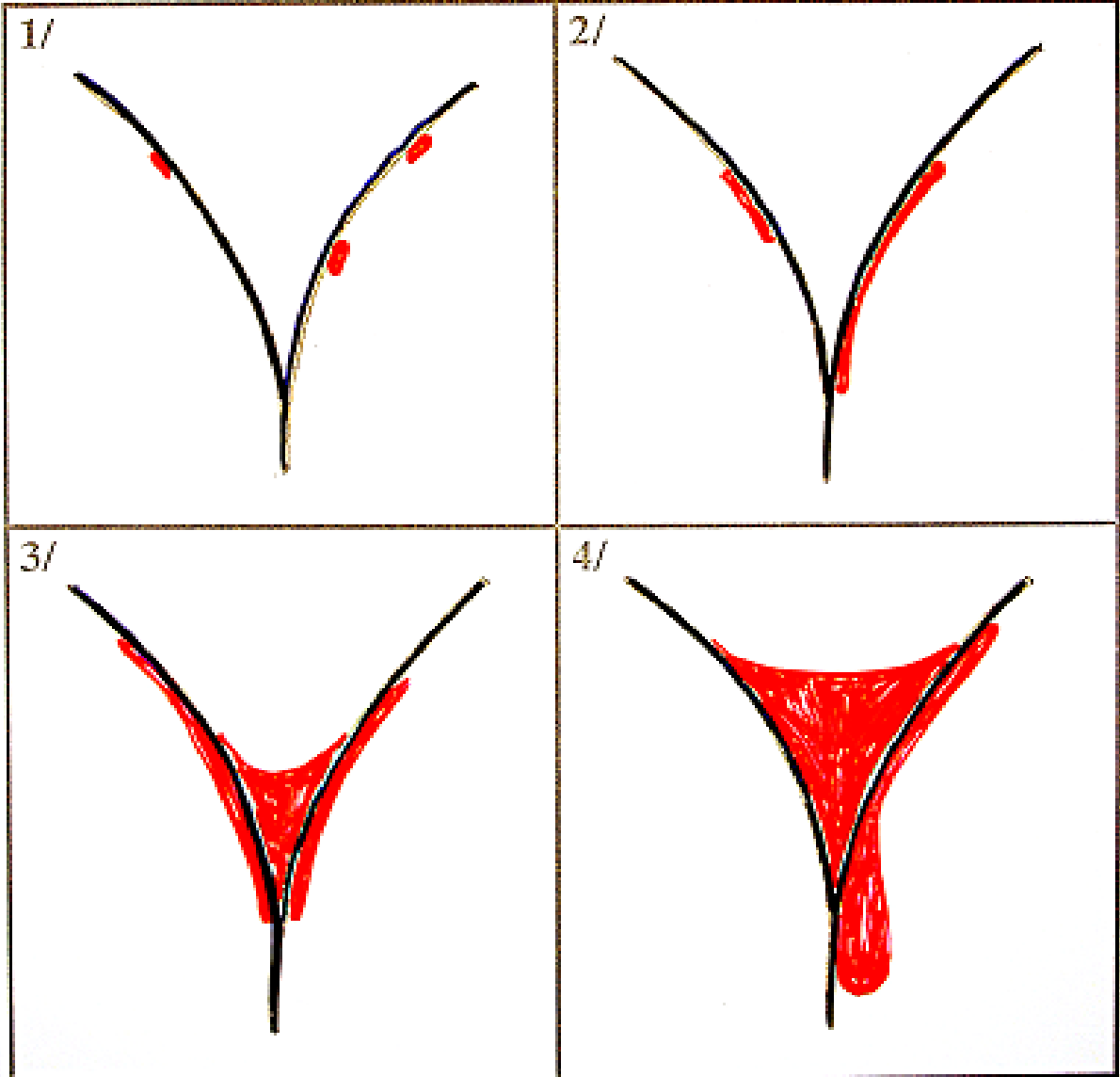
- distal papillas/halfpapilllas are evaluated in seven teeth in each quadrant
- if the 3rd molar is missing, we evaluate the halfpapilla of distal aspect behind the second molar, similarly at the bridge



In this case, therefore, no value is missing (it will be missing only if at least 2 adjacent teeth are missing)

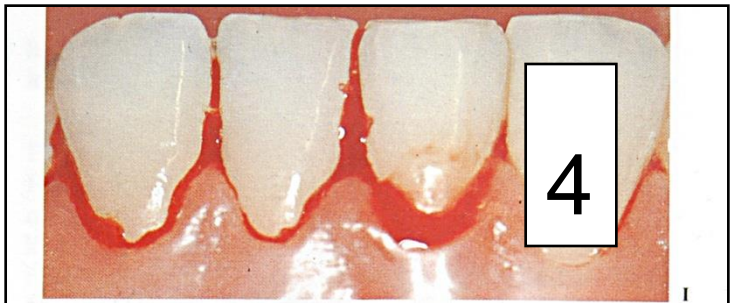
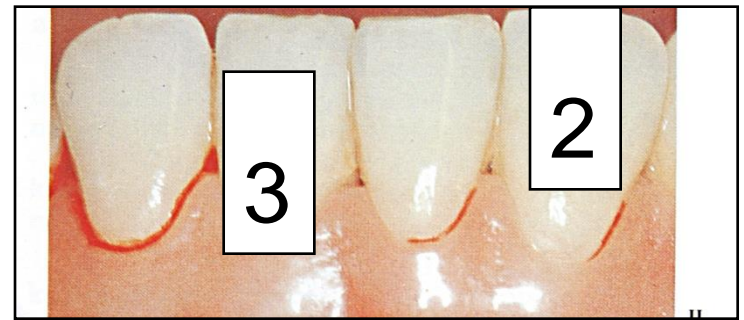
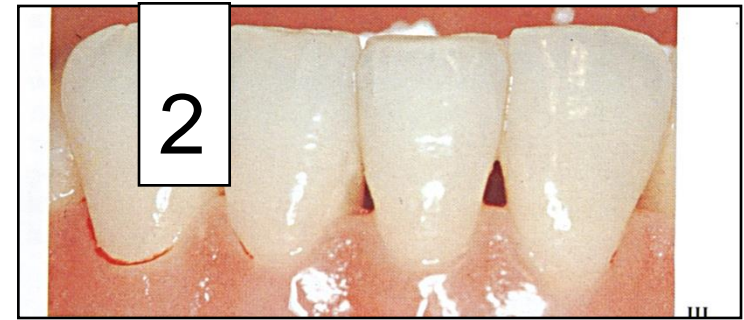
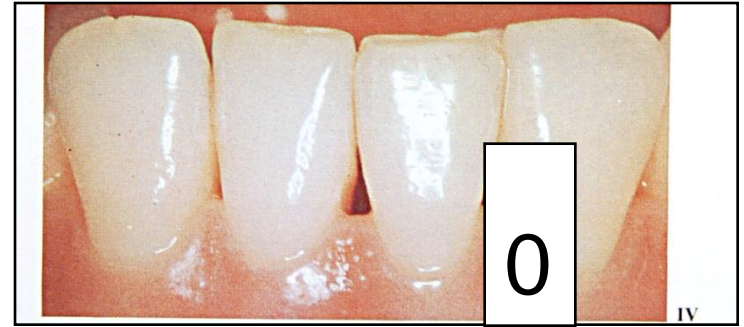
PBI

- 0
- 1 point
- 2 line
- 3 triangle
- 4 drop

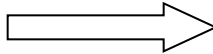


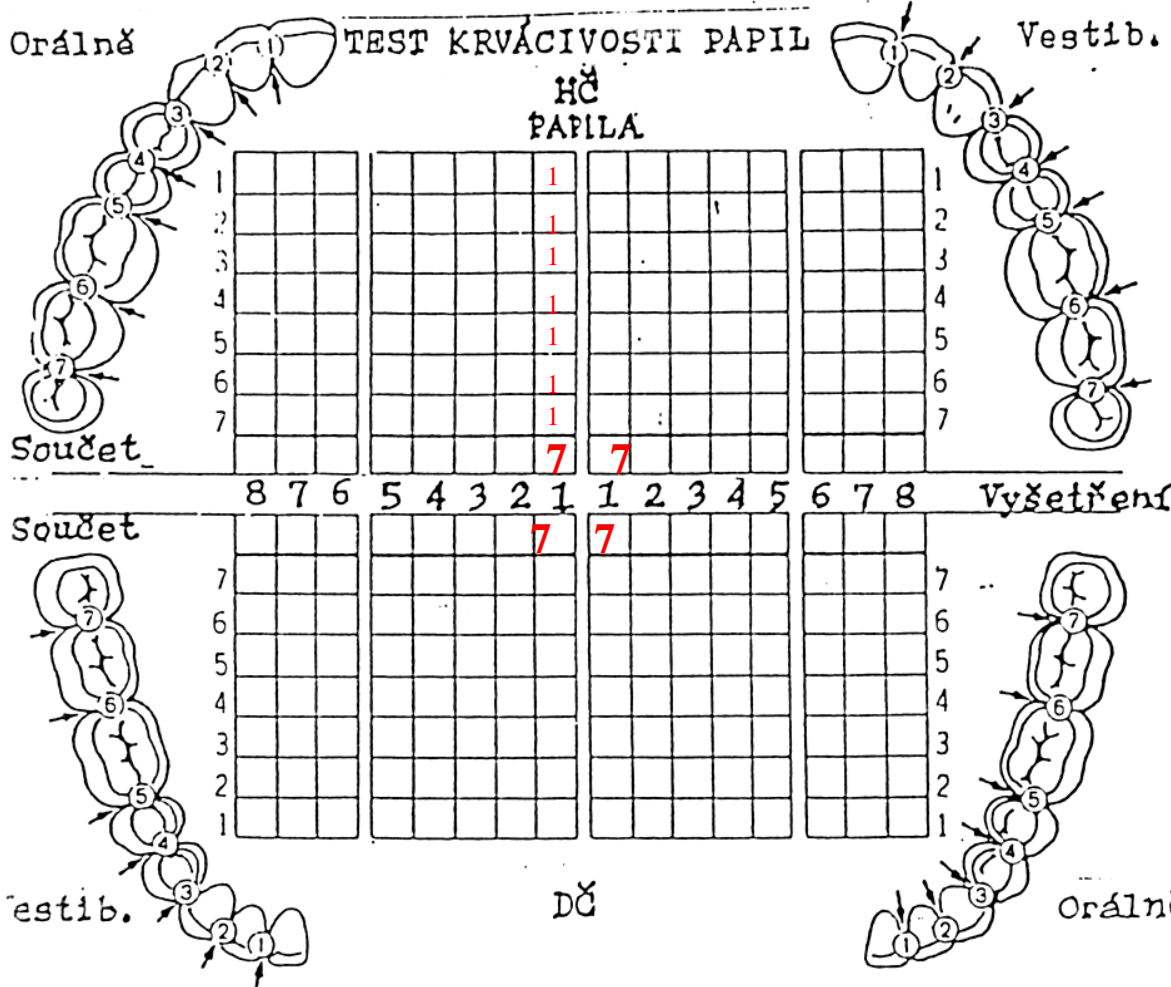
PBI

- 0 gingiva without bleeding
- 1 **point** bleeding (spot)
- 2 stripe bleeding (**line**)
multipoint bleeding
- 3 blood fills interdental space (**triangle**)
- 4 spontaneous bleeding, blood flows to adjacent areas (**drop**)



Papilla Bleeding Index

- **Total value** $4 \times 7 \times (0 - 4)$ **0 - 112**
 - $4 \times 7 \times 0 \cong 0$
 - $4 \times 7 \times 4 \cong 112$
- 
- Very good OH
 - Bad OH
- **Index** - total value of bleeding papillae / number of examined papilla
 - Index 0 – 4



Jméno	Datum	Součet	Index
	23.2.2010	28	1

Stupeň	Definice
0	Papila nekrvácí
1	KREV - bod
2	- linka
3	- trojúhelník
4	- kapka

PBI

- With the same quality of oral hygiene, it can **increase in pregnancy** when **smoking decreases**



BOP (Bleeding On Probing) + —

- bleeding after probing of the periodontal pocket
- is a manifestation of inflammation in the depth of the periodontal pocket, a sign of the activity of the disease



Community Periodontal Index of Treatment Needs

- was developed by WHO in 1978
- **universal screening test** for general evaluation of periodontal tissue status
- information about pathological changes and about the treatment need
- not correct diagnosis

CPITN

- Gingival **bleeding**

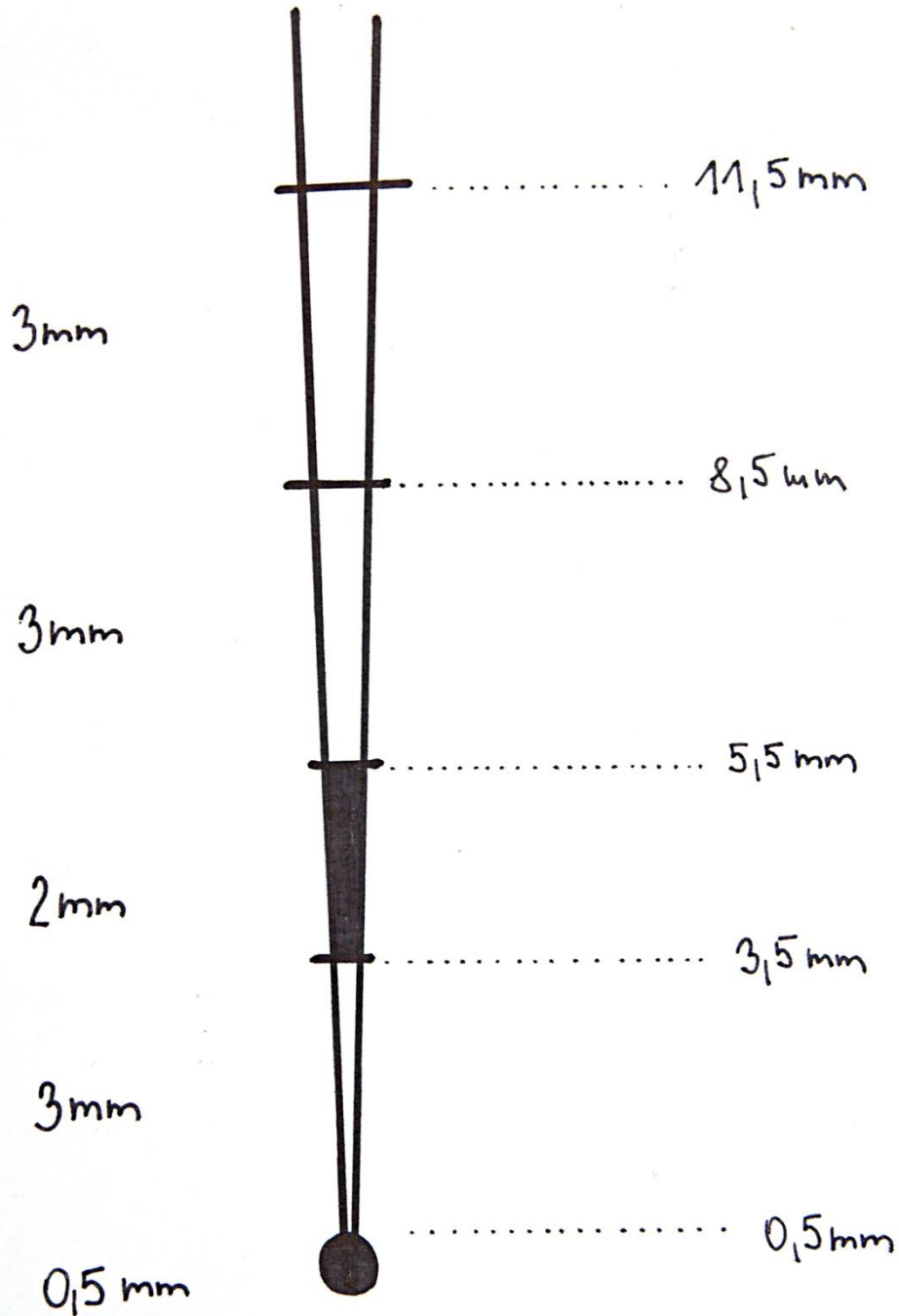


- Presence of dental **calculus** (iatrogenic irritating factors)



- Presence of **periodontal pockets**





Special WHO probe

Ball - shaped tip of 0.5 mm

Black - coloured zone

3.5 – 5.5 mm



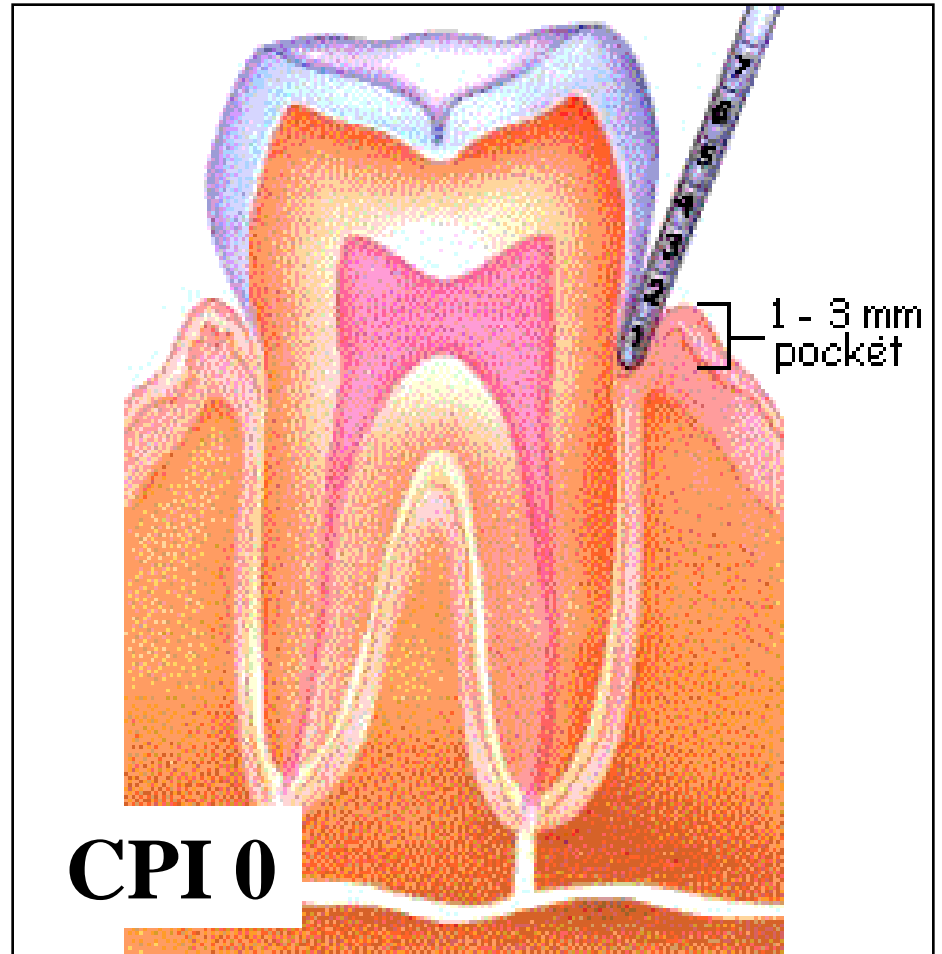
CPITN

- 0 healthy (?)
- 1 bleeding on probing
- 2 supra/subgingival **calculus**, iatrogenic marginal irritation
- 3 **shallow pockets** up to 5.5 mm (3.5 – 5.5)
- 4 **deeper pockets** up to 5.5 mm



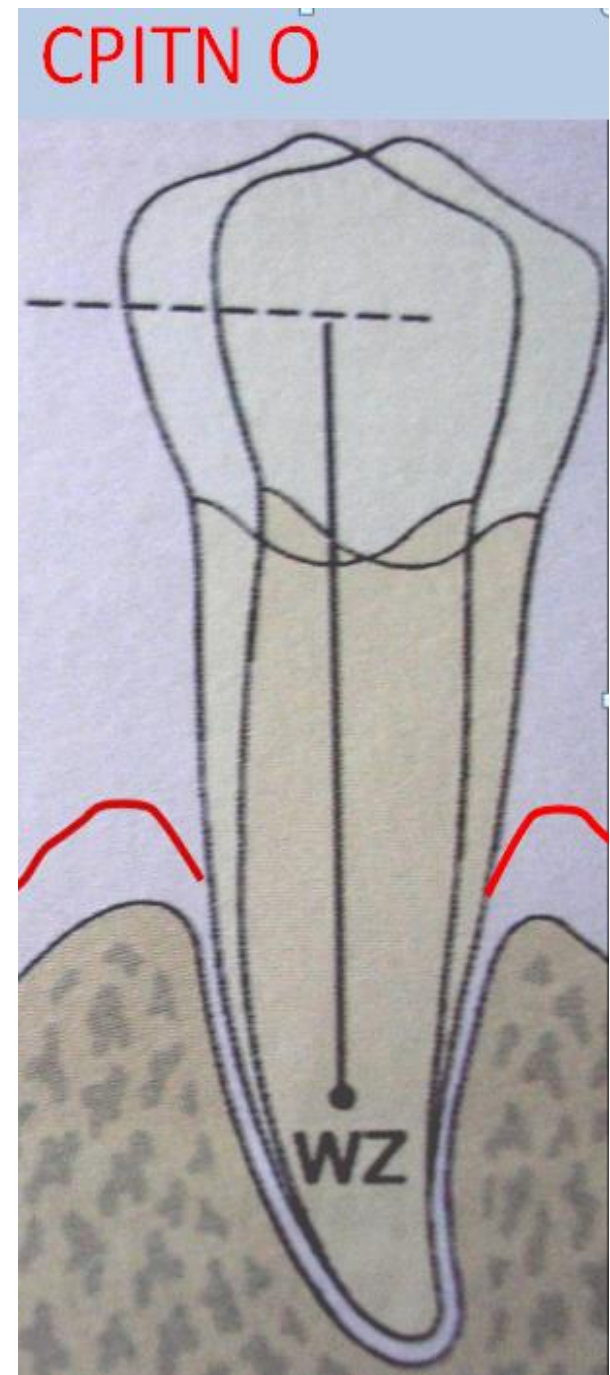
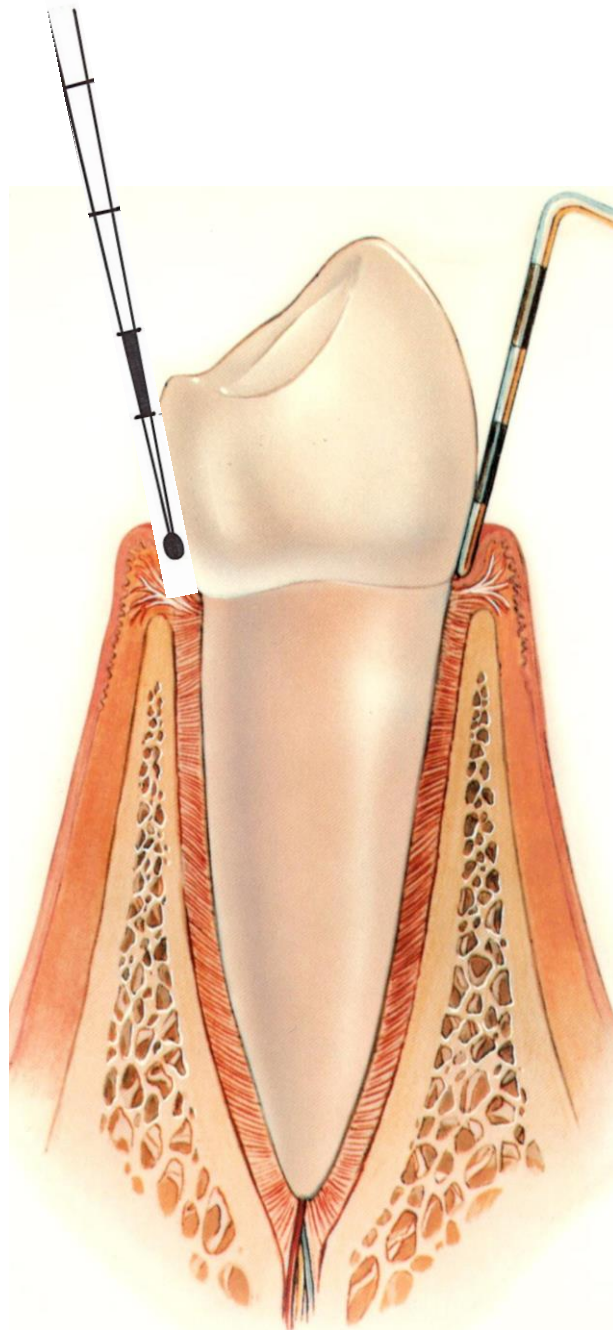
- **CPI 0**

- **without** bleeding
- without calculus
- without pocket (max. 3.0 mm)

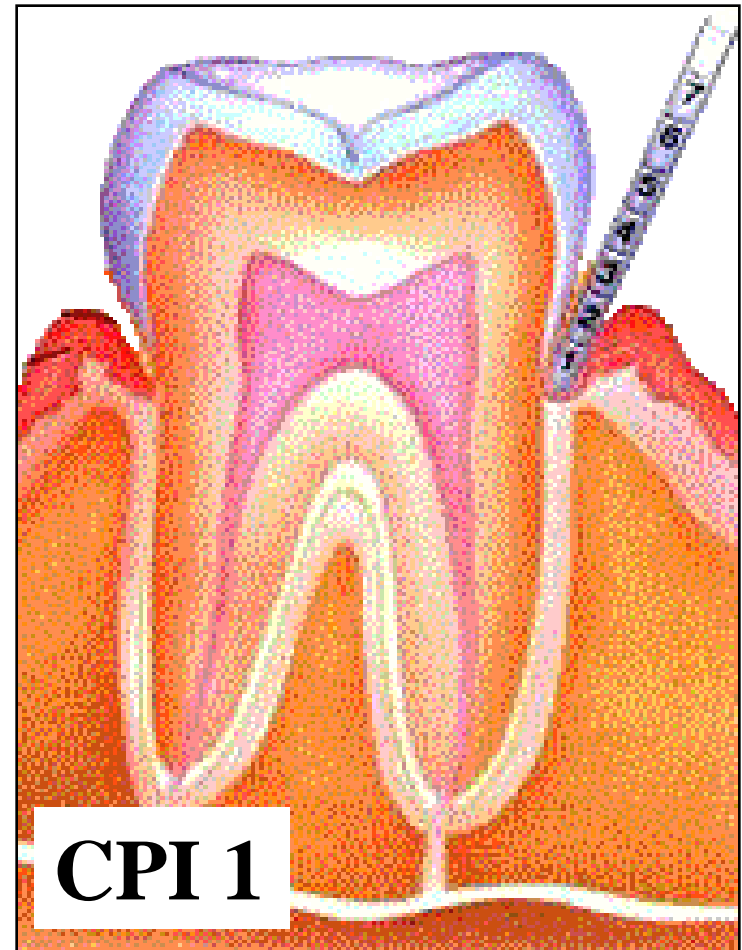


CPITN 0

- no **bleeding**
- no **calculus**
- **probing** up to 3,5 mm
(without)
so probing can be
0.5 mm / 1 mm
2 mm / 3 mm



- **CPI 1**
 - **bleeding** of gingiva
 - without calculus
 - without pocket (max. 3.0 mm)



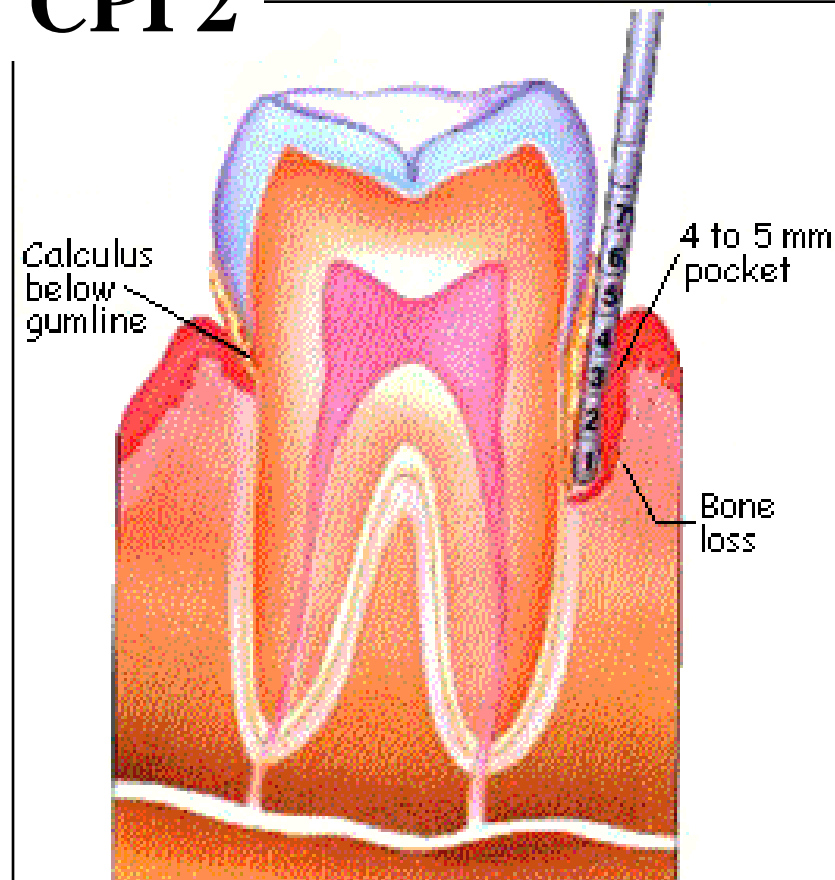
- **CPI 2**

- deposits of dental **calculus**

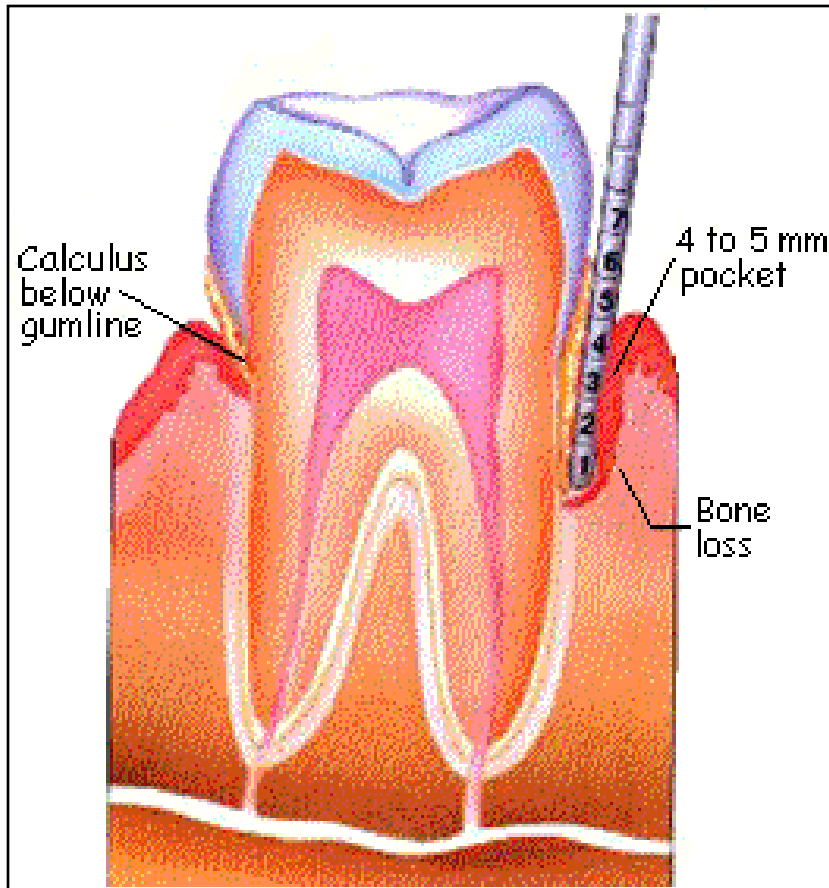
- without pocket (max. 3.0 mm)



CPI 2

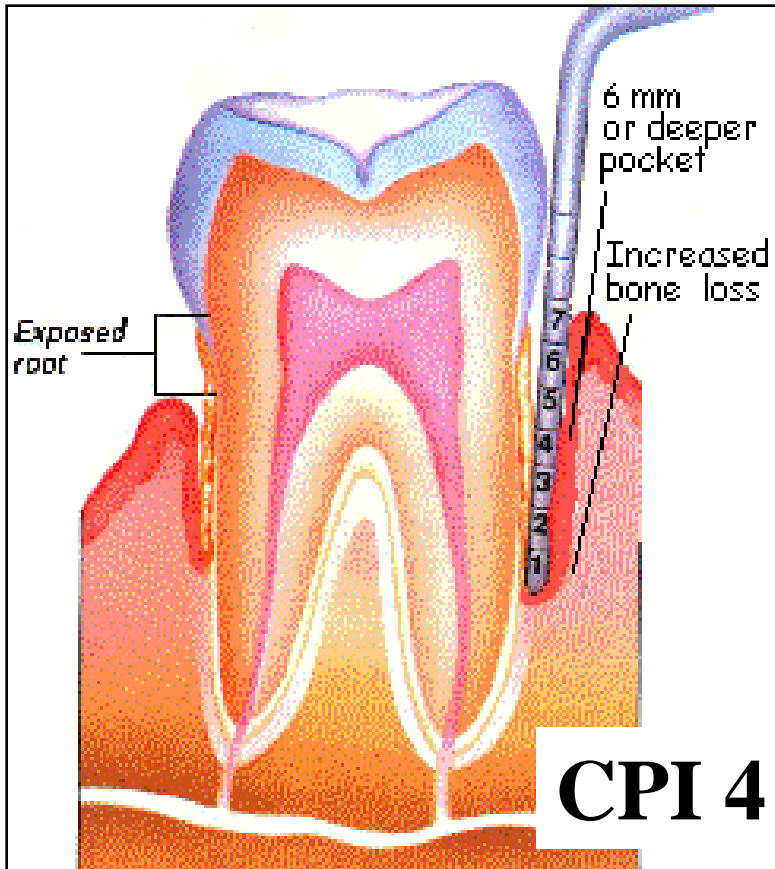


- **CPI 3** **perio pockets 3.5 – 5.5 mm**



CPI 3

- **CPI 4** **perio pockets** of 5.5 mm and more



CPITN

CPITN 0,1,2

- probing depth can be 0.5/1/2/3 mm

- no pocket

CPITN 3

- probing depth can be 4/5 mm

- shallow pocket

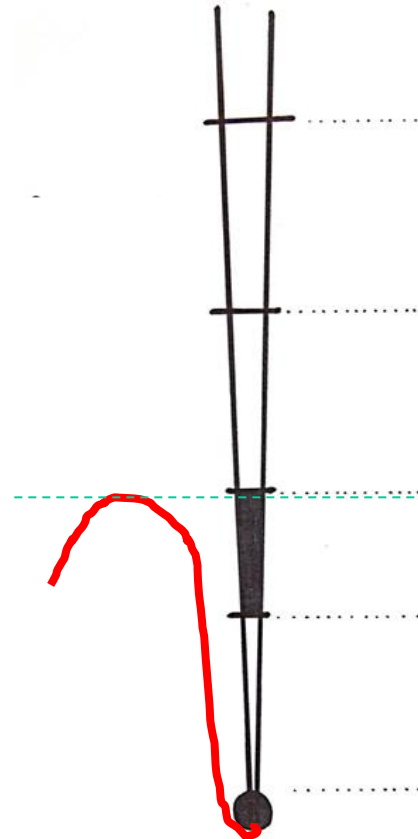
CPITN 4

- probing depth can be 6/7/8.....mm

- deep pocket

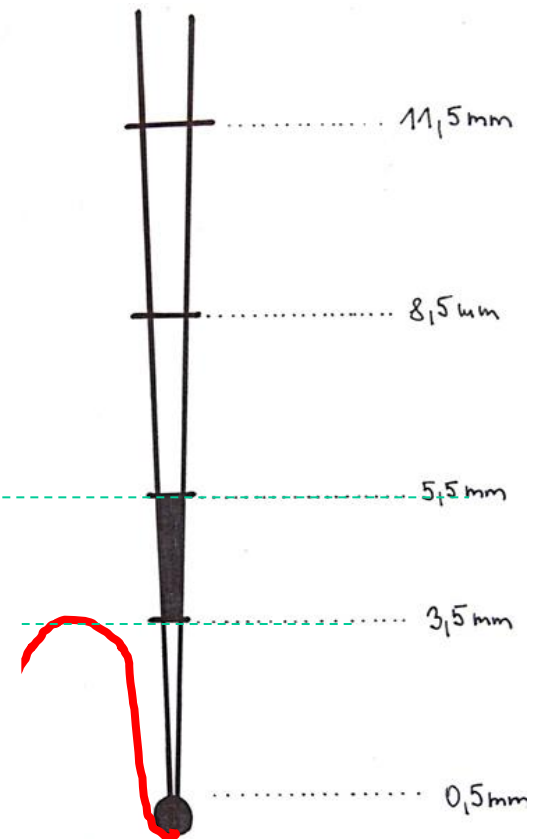
Probing depth 5,5 mm

CPITN 4



Probing depth 3,5 mm

CPITN 3



CPI 4



	Bleeding	Calculus	Pocket probing depth (in mm)	CPITN
1	-	-	3	0
2	-	-	3,5	3
3	-	+	3	2
4	-	+	3,5	3
5	+	+	3	2
6	+	+	3,5	3
7	-	-	4	3
8	+	+	4	3
9	+	-	5,5	4
10	-	+	5,5	4
11	-	-	8	4
12	+	+	8	4





Treatment need

- **TN I** (CPI 0,1)
 - improvement of OH
- **TN II** (CPI 2, CPI 3)
 - improvement of OH
 - removing of dental calculus and iatrogenic irritations
- **TN III** (CPI 4)
 - complete therapy



CPI

TN

- 0 healthy
 - 1 bleeding 
 - 2 calculus 
 - 3 pockets up to 5.5 mm 
 - 4 pockets up to 6 mm 
- I. OH
- II. OH + CR
- III. OH + CR +
complex perio
treatment

- **For epidemiological studies**

$$\frac{17\ 16}{47\ 46} / \frac{11}{31} / \frac{26\ 27}{36\ 37}$$

- **For individual use**

Children and adolescents below 19 years

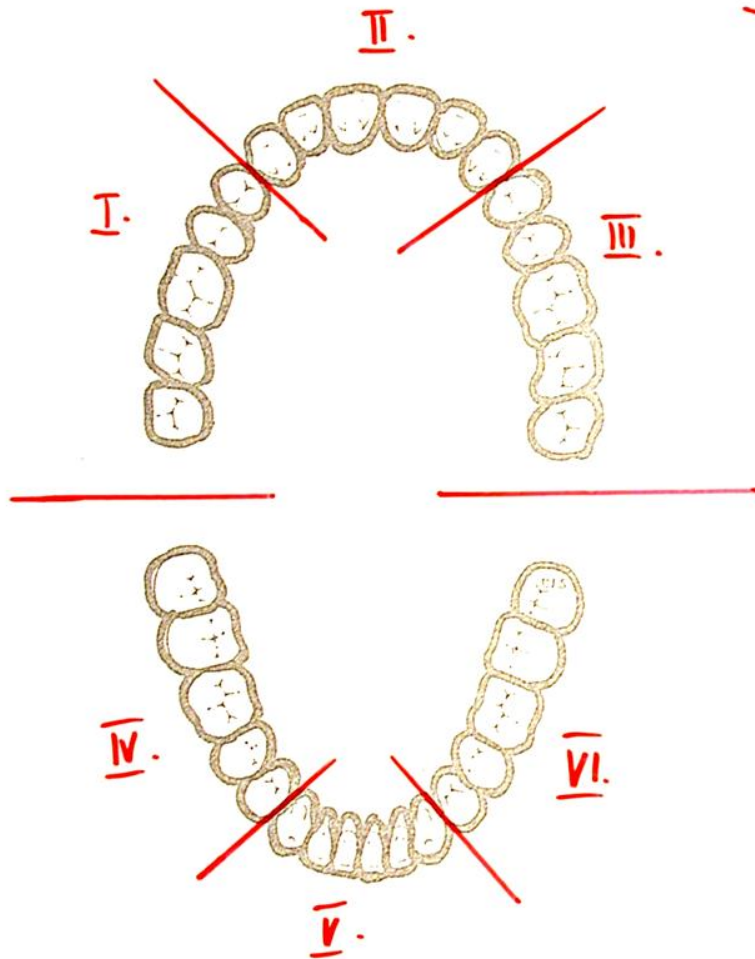
$$\frac{16}{46} / \frac{11}{31} / \frac{26}{36}$$

Adults - all functional teeth

(if only one tooth is in sextant – measured data are evaluated together with the adjacent sextant)

$$\frac{17 - 14}{47 - 44} / \frac{13 - 23}{43 - 33} / \frac{24 - 27}{34 - 37}$$

CPITN - sextant

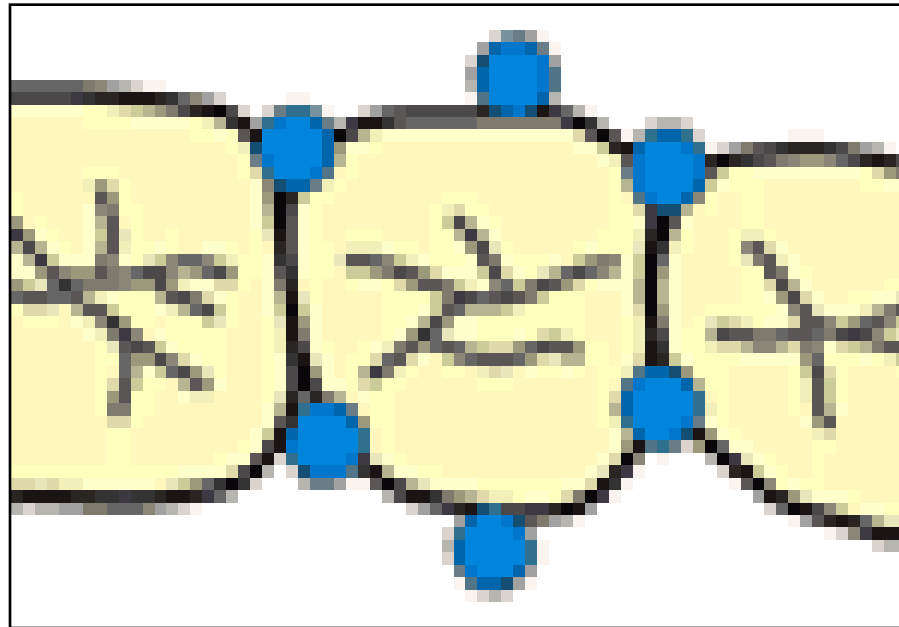


3 1 3 / 4 2 3

3	1	3
4	2	4

- Measurements are made **around each tooth**
- CPITN is taken by sextants (frontal, lateral)
- The **highest score** is recorded for **each sextant**

- Measurements are made **around each tooth**



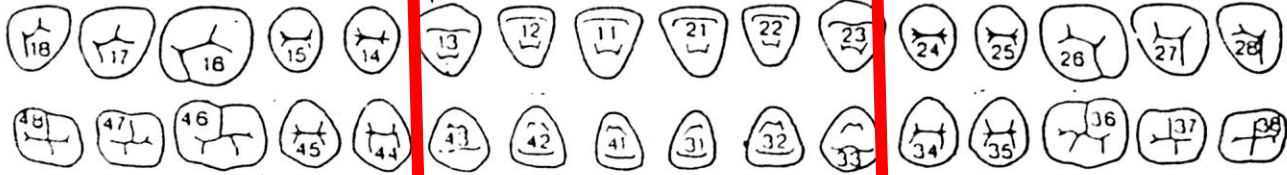
DV V MV

MO O DO

INDEX CPITN

DATA																		MAX. HOD
3																		
2																		
1	23.2.2010	3	4	3	3	3	1	0	1	1	1	0	2	2	3	3	3	
0																		

DATA																		MAX. HOD
3																		
2																		
1	23.2.2010	3	4	4	1	1	0	0	4	0	0	0	-	-	3	-	-	
0																		



STUPEŇ	DEFINICE	THERAPIE
0		INSTRUKTAŽ HYGIENY
1	KRYČENÍ GINGIVY	INSTRUKTAŽ HYGIENY, KONSERVATIVNÍ TH.
2	ZK SUPRAGINGIVÁLNÍ, SUBGINGIVÁLNÍ	OZK, INSTRUKT. HYGIENY, KONSERVATIVNÍ TH.
3	PARODONTÁLNÍ CHOBOTY 3,5 - 5,5 mm	KOMPLEXNÍ PARODONTOLOGICKÁ THERAPIE
4	PARODONTÁLNÍ CHOBOTY NAD 5,5 mm	KOMPLEXNÍ PARODONTOLOGICKÁ THERAPIE

PODPIS OŠETŘOVATELE

PACIENT ODEŠLÁN DNE

CPITN 4 1 3 / 4 4 3

JAN NOVÁK 1953



Pekařská 53, 656 91 Brno
IČ: 00159816
Tel.: 543 181 111

JMÉNO, ROK NAROZENÍ:

INDEX CPITN

DATUM																MAX. HODN.		
5																		
4	recessio																	
3	furca				5mm							4mm			F2			
2	mobilit						I											
1	2.3.2020	4M	40	3	3	0	1	1	1	1	3	40	4IV	40				
		18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
	DR																	
		48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
1	2.3.2020	4V	4V	40	4V	0	2	2	2	2	1	IMP	4V	4V	4			
2	mobilit																	
3	furca	F2	F2												F1	F2		
4	recessio					4mm						4mm						
5																		

STUPEŇ	DEFINICE	THERAPIE
0		INSTRUKTÁŽ HYGIENY
1	KRVÁCENÍ GINGIVY	INSTRUKTÁŽ HYGIENY, KONSERVATIVNÍ TH.
2	ZK SUPRAGINGIVÁLNÍ, SUBGINGIVÁLNÍ	OZK, INSTRUKTÁŽ HYGIENY, KONSERVATIVNÍ TH.
3	PARODONTÁLNÍ CHOBOTY 3,5-5,5 mm	KOMPLEXNÍ PARODONTOLOGICKÁ THERAPIE
4	PARODONTÁLNÍ CHOBOTY NAD 5,5 mm	KOMPLEXNÍ PARODONTOLOGICKÁ THERAPIE

PODPIS DŠETÁJÍCÍHO: MUDr. H. Poskerová 42813

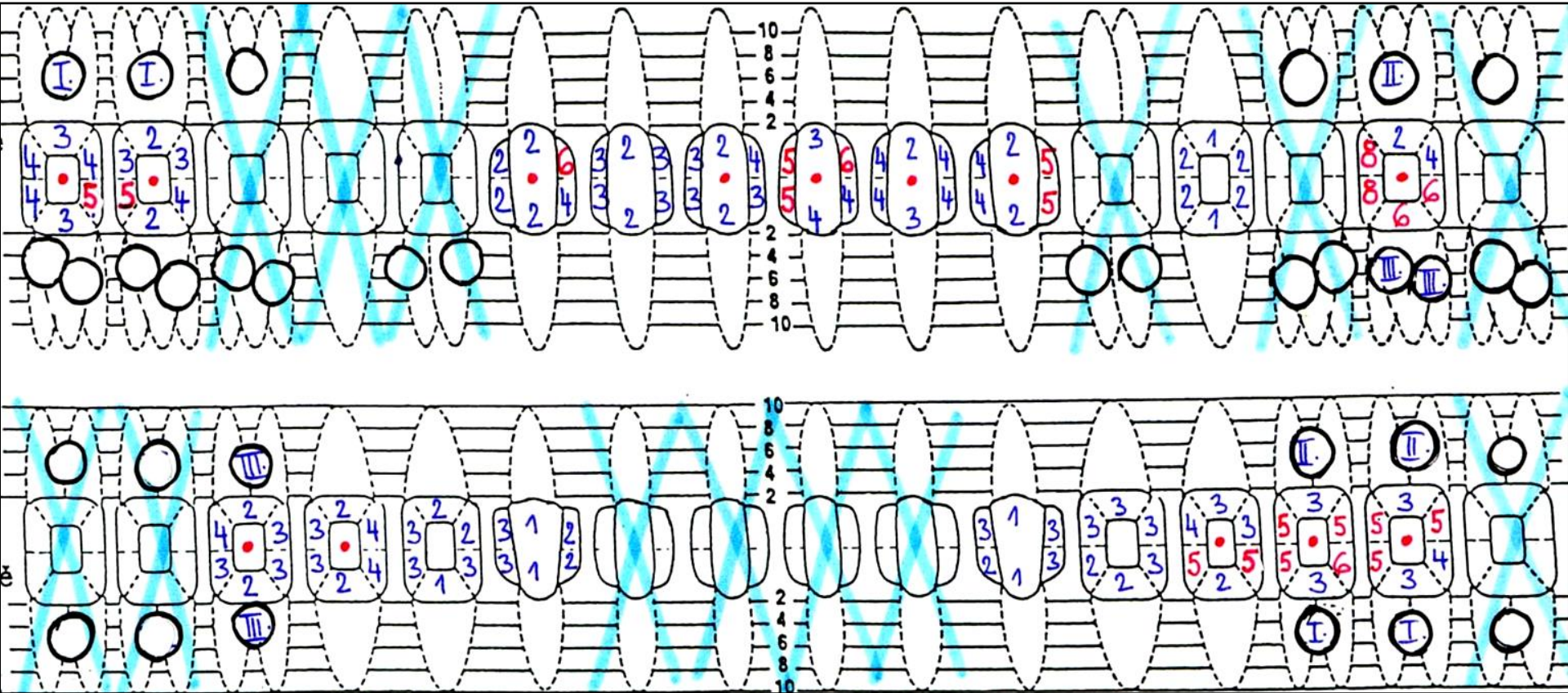
CPITN 434/424

Perio pockets

- deepnes in mm
- BOP (+/-)
- pus in pocket



Detailed perio examination

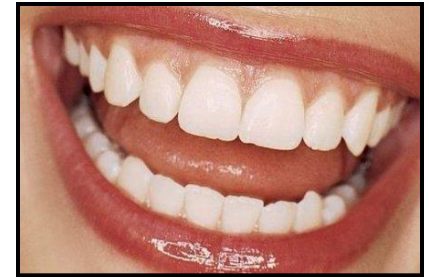


Intraoral examination in dentistry

- Oral hygiene



- Dentition



- Periodontal tissue



- Soft tissues of oral cavity



Intraoral examination of oral membrane mucous

- Good lightening
- Inspection, palpation
- Gloves
- **SYSTEMATICALLY**
- Comparison of left and right side
- Anatomical variations

Systematical examination of oral membrane mucous

- Lip vermilion
- Labial, buccal, alveolar mucosa
- Gingiva
- Tongue - dorsal surface, lateral borders, undersurface
- Floor of the mouth
- Palatal mucosa, hard and soft palate, oropharynx

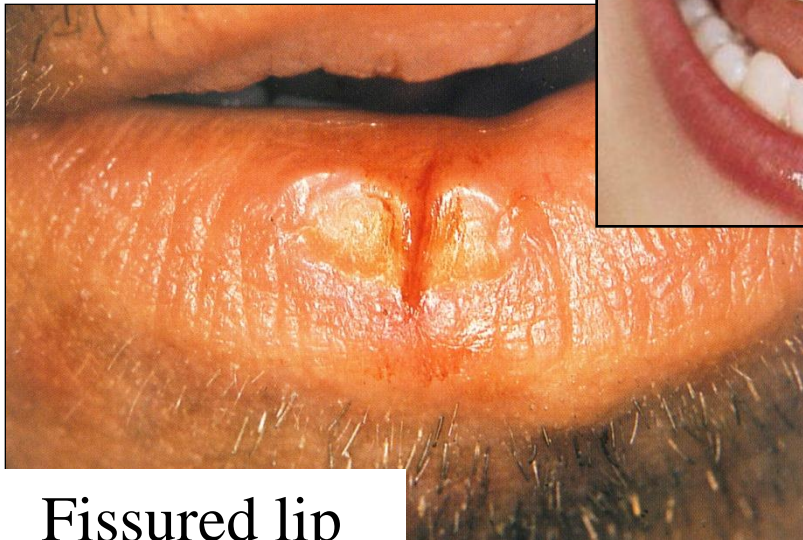
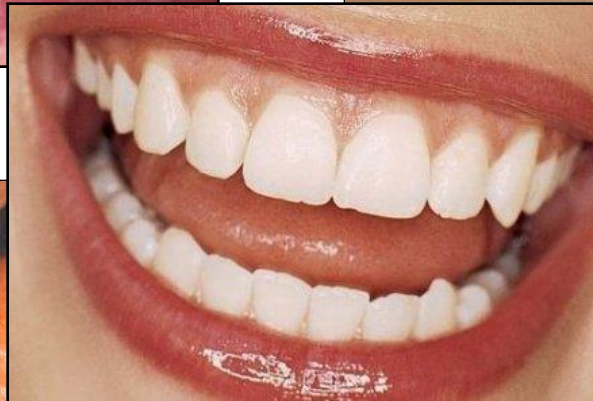
- **Lip** - skin, lip vermilion, angle of the mouth



Fordyce's granules



Cheilitis simplex

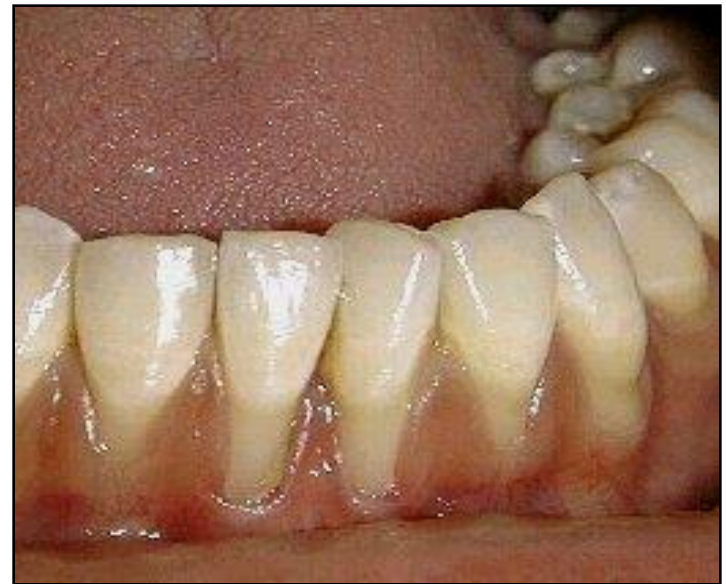


Fissured lip



Herpes labialis

- Gingiva



- Buccal mucosa



Linea alba



Morsicatio bucarum

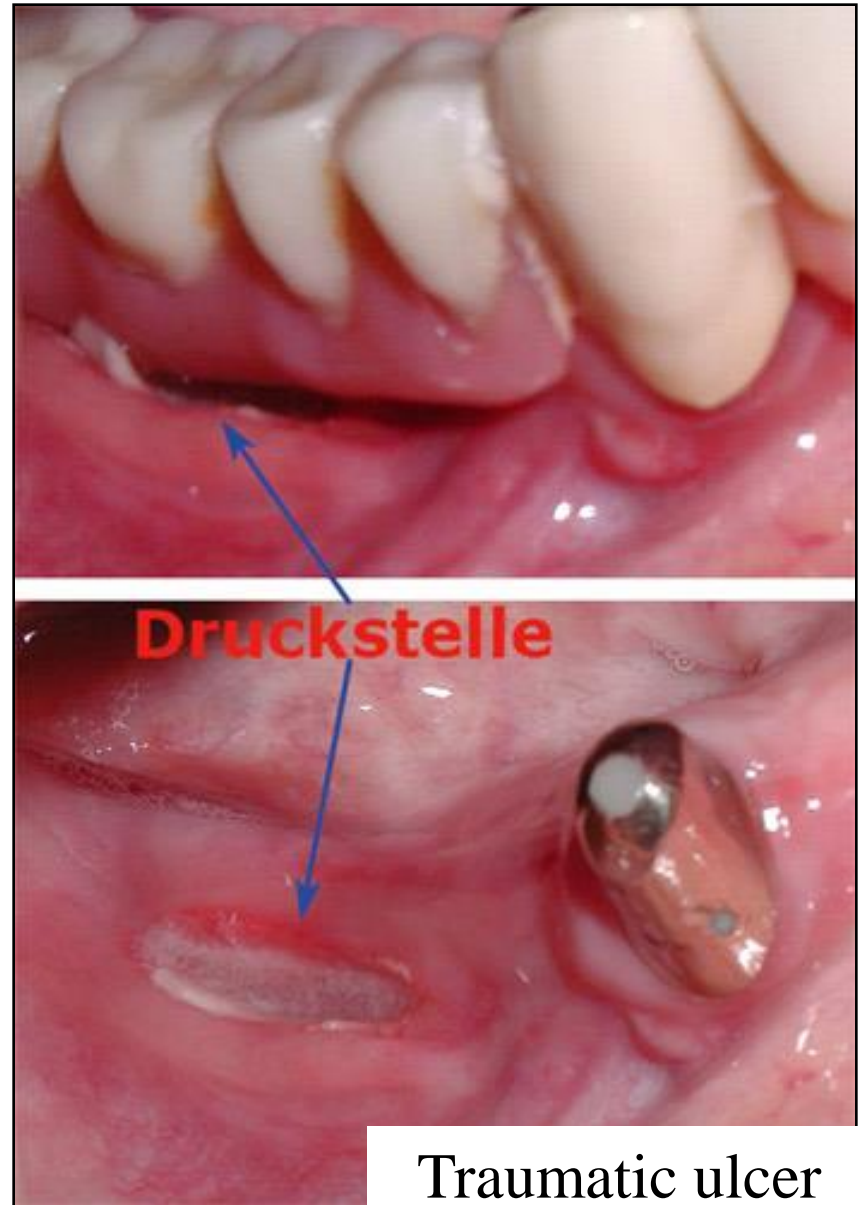


Fordyce's granules

- Alveolar
- Vestibular mucosa



Aphthous ulcers

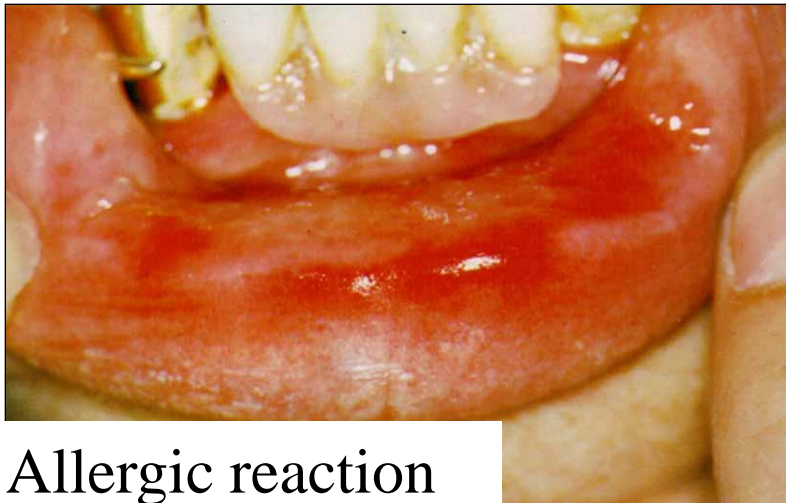


Traumatic ulcer

- Labial mucosa



Traumatic lesions



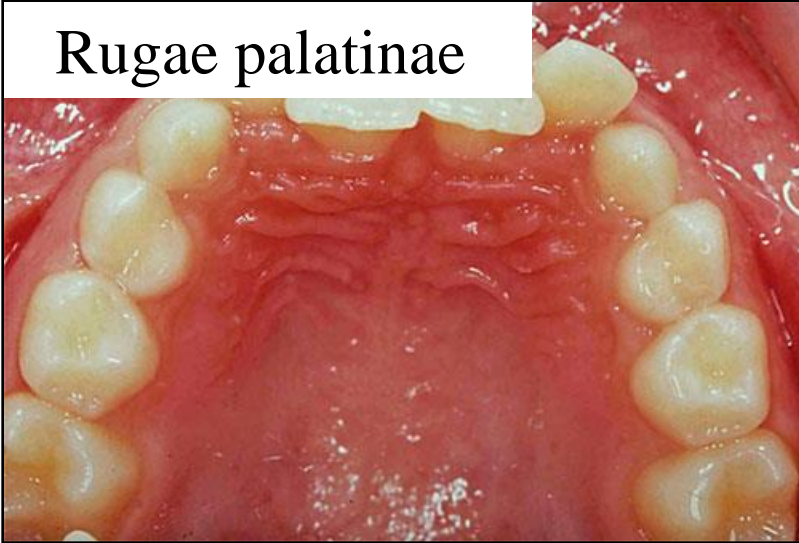
Allergic reaction



Aphthous ulcers

- Palatal mucosa, hard and soft palate, oropharynx

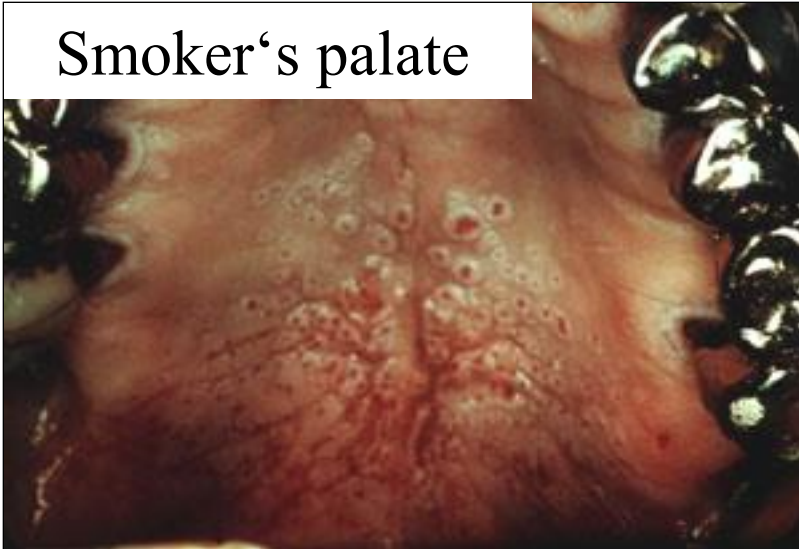
Rugae palatinae



Allergic reaction



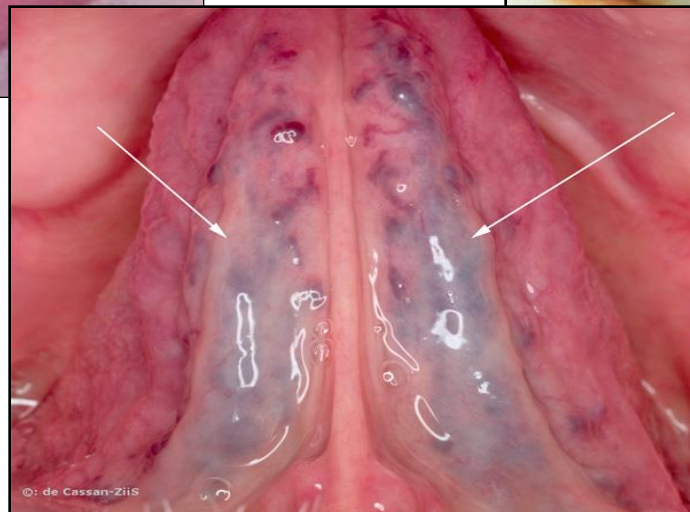
Smoker's palate



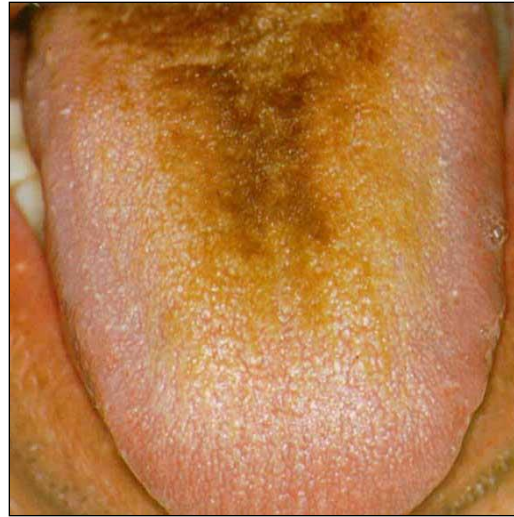
Materia alba



- **Tongue** – dorsal surface, lateral borders, undersurface

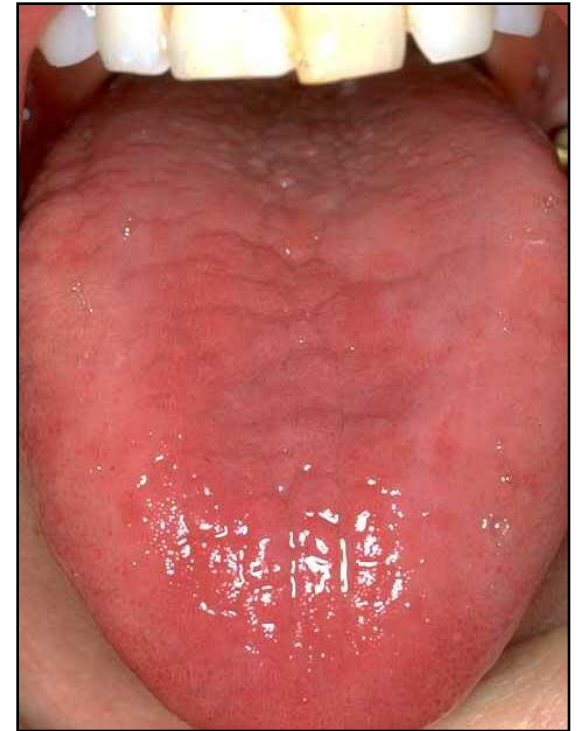


Coating tongue



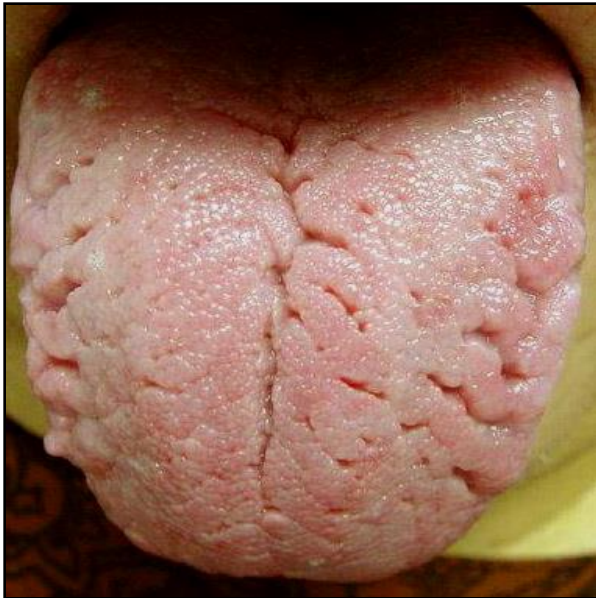
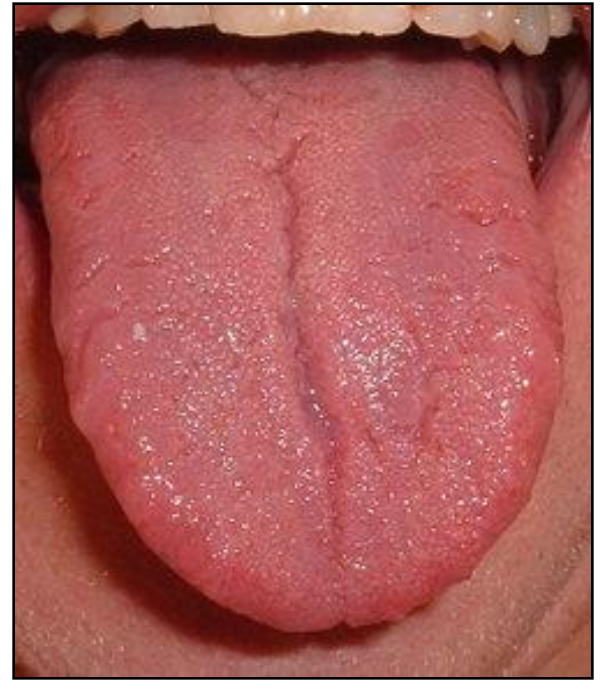


Atrophy
of the
Tonque





Fissured
(plicated)
Tonque

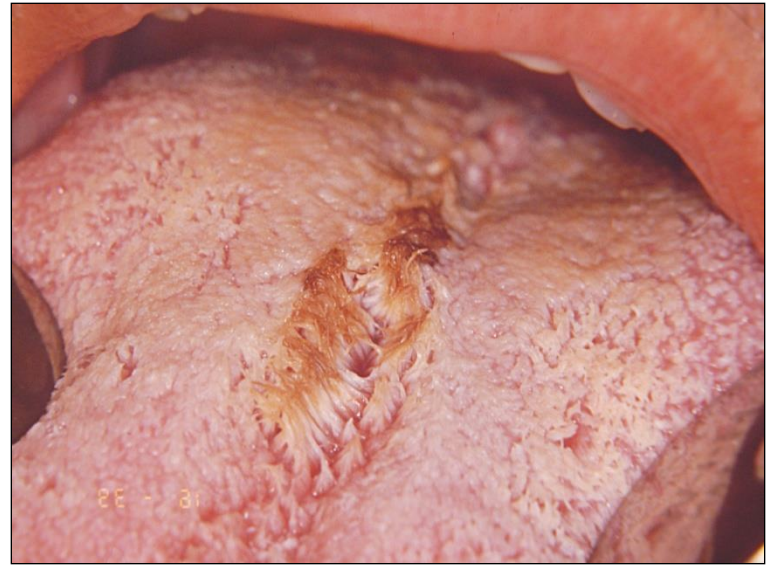


Geographic Tonque





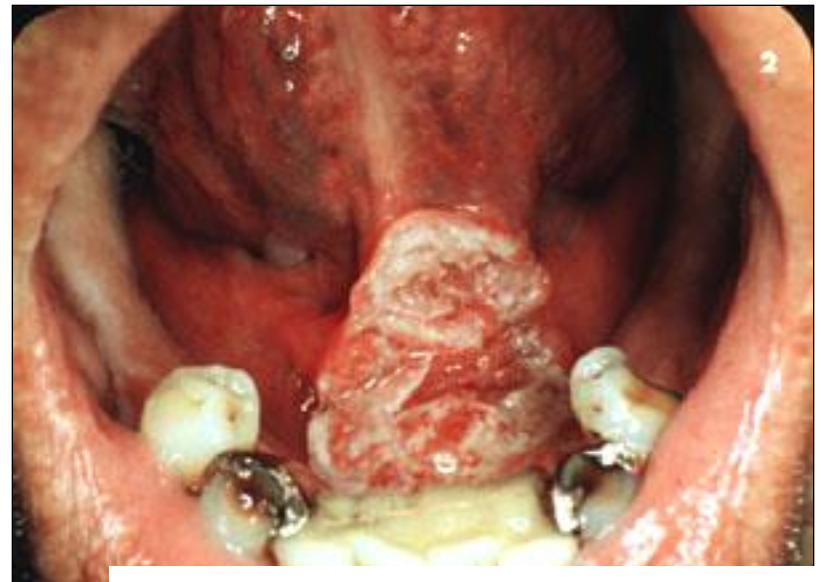
Black
hairy
Tonque



- Undersurface of the tongue
- Floor of the mouth



Retention cyst



Squamous cell carcinoma

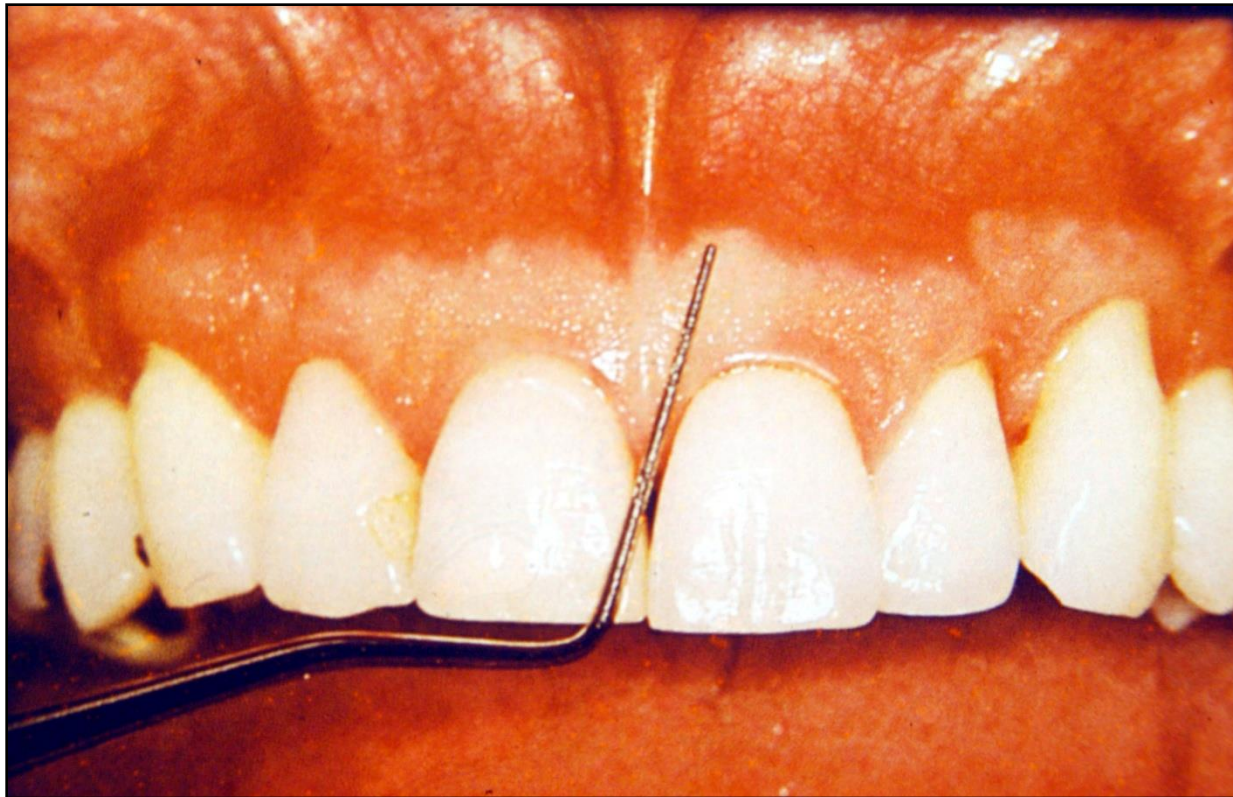
Examination of oral membrane mucous

- Colour
- Surface moisture
- Thickness, consistency
- Appearance
 - type, size and configuration of lesions
 - solitary or multiple lesions
- Location, presence of symmetry
- Relationship to the other parts of oral cavity

Colour of membrane mucous

Keratinized

Nonkeratinized



Colour of membrane mucous



- **Racial mucosal pigmentation** caused by melanin



- **Smoker's melanosis** caused by melanin



- Amalgam tattoo
corrosing process



Colour of membrane mucous - **White lesions**



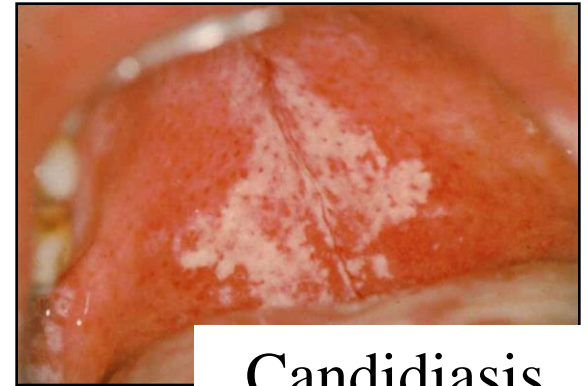
Materia alba



Leukoplakia



Oral lichen planus



Candidiasis

Colour of membrane mucous - Red lesions

- Inflammation
- Atrophy



Colour of membrane mucous - **Yellow lesions**

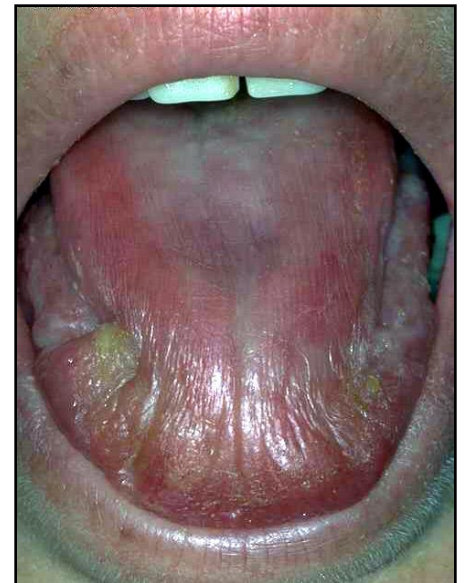
Fordyce's granules – sebaceous glands



Surface moisture of membrane mucous

- Healthy membrane mucous are always wet

- Hyposalivation



- Hypersalivation

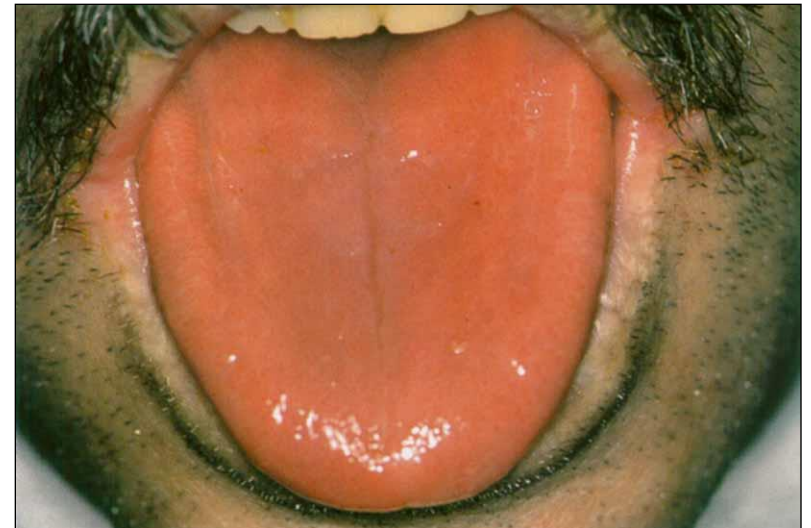
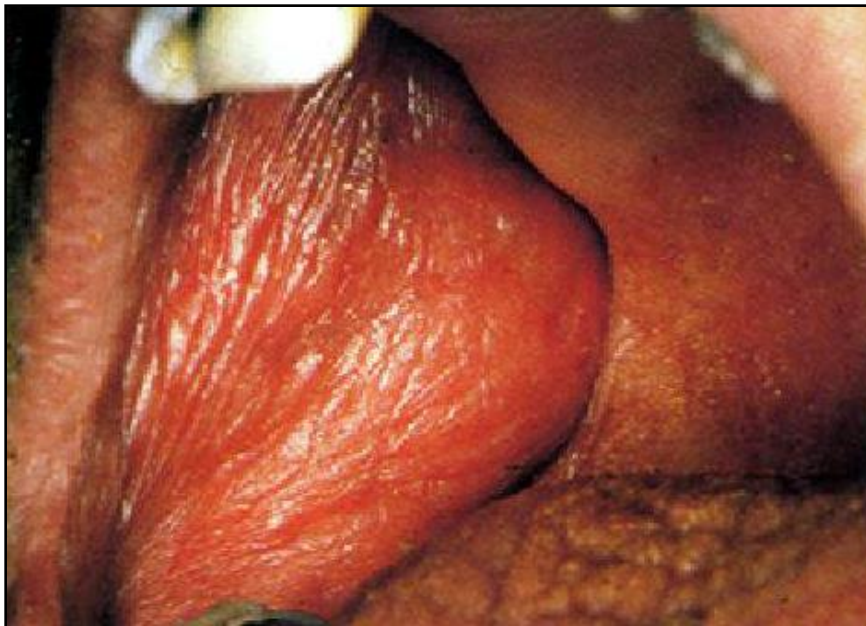
Thickness of membrane mucous

- thickening – **hyperplasia**
mechanical irritation,
drug or hormonal factors,
tumors



Thickness of membrane mucous

- thinnig - **atrophy**

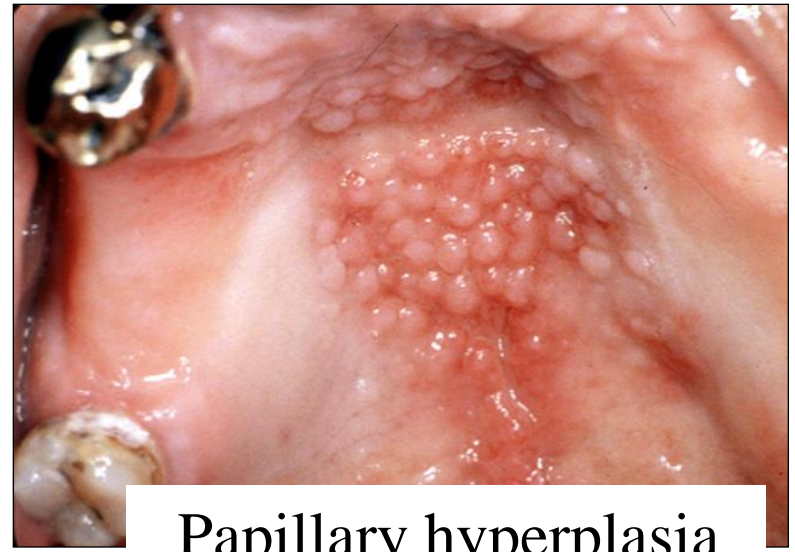


Surface of membrane mucous

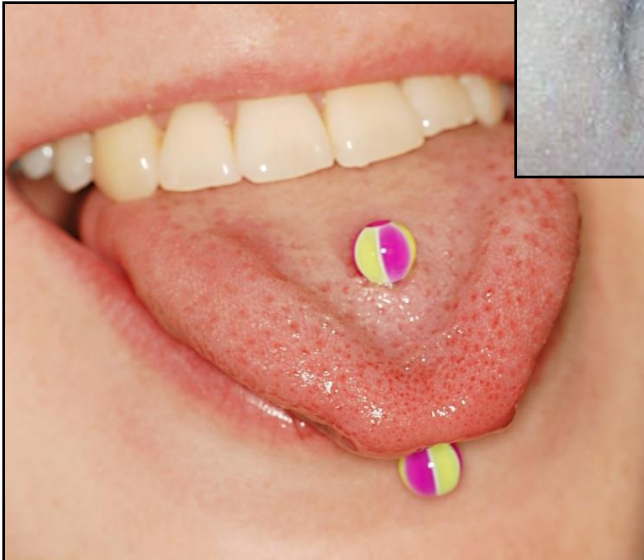
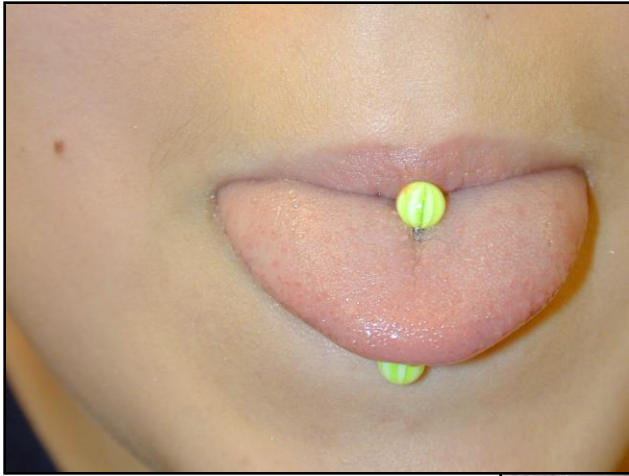
- Smooth (covered with intact mucosa)
- Rough
- Ulcerated



Smoker's palate



Papillary hyperplasia



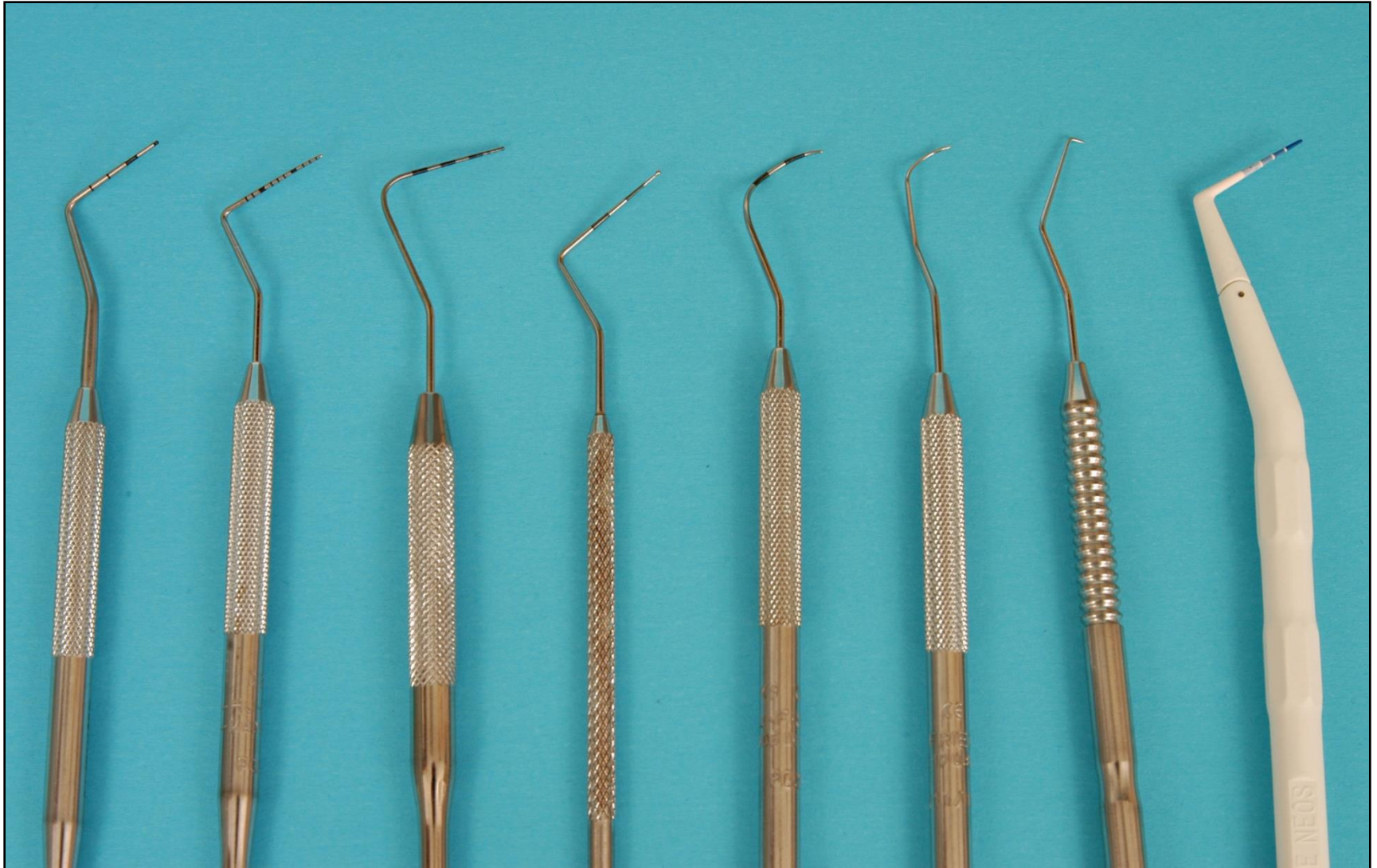
Periodontal instrumentarium

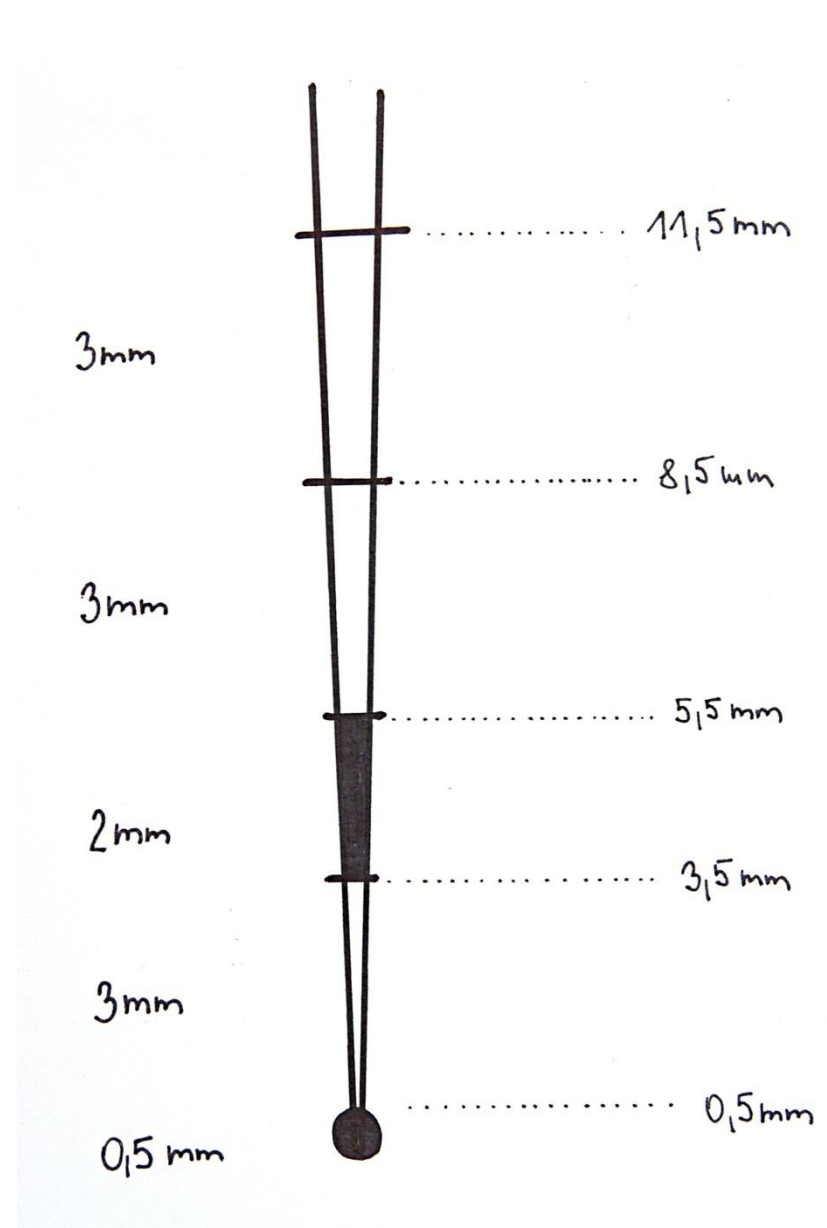
Instruments for scaling and root planing

Periodontal instrumentarium

- **Periodontal probes** – to locate, measure and mark pockets
- **Explorers** – to locate calculus deposits and caries
- **Instruments for scaling and root planing** (closely curettage)

Periodontal probes and explorers





Instruments for scaling and root planing

- **Supragingival** scaling instruments
- **Subgingival** scaling and root planing instruments
- Ultrasonic and sonic instruments
- Cleansing and polishing instruments

Instruments for scaling and root planing

- Hand instruments
 - **Scalers** – sickle s, (chisel s, hoes)
 - **Curettes** – universal, Gracey

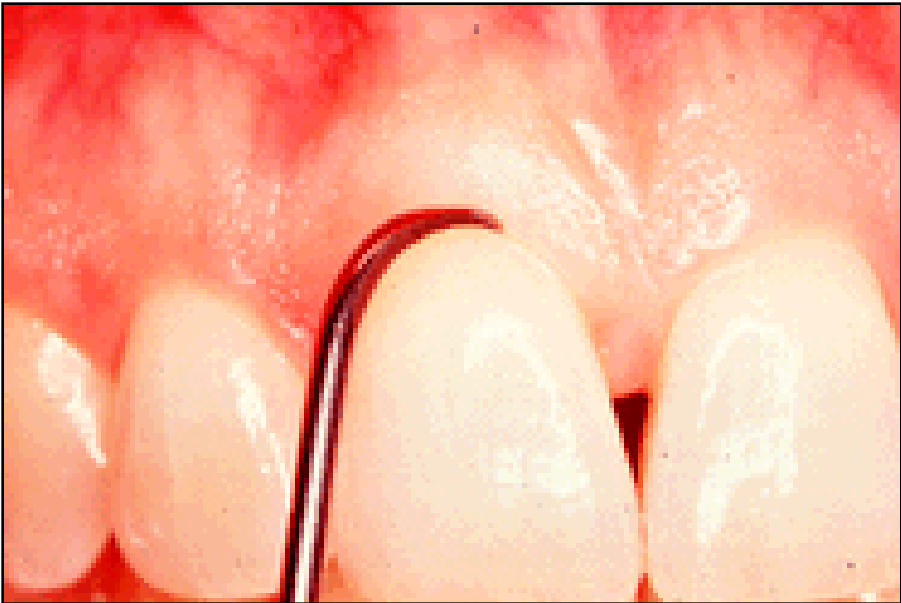
Handle (heavy and thin / light - weighted)

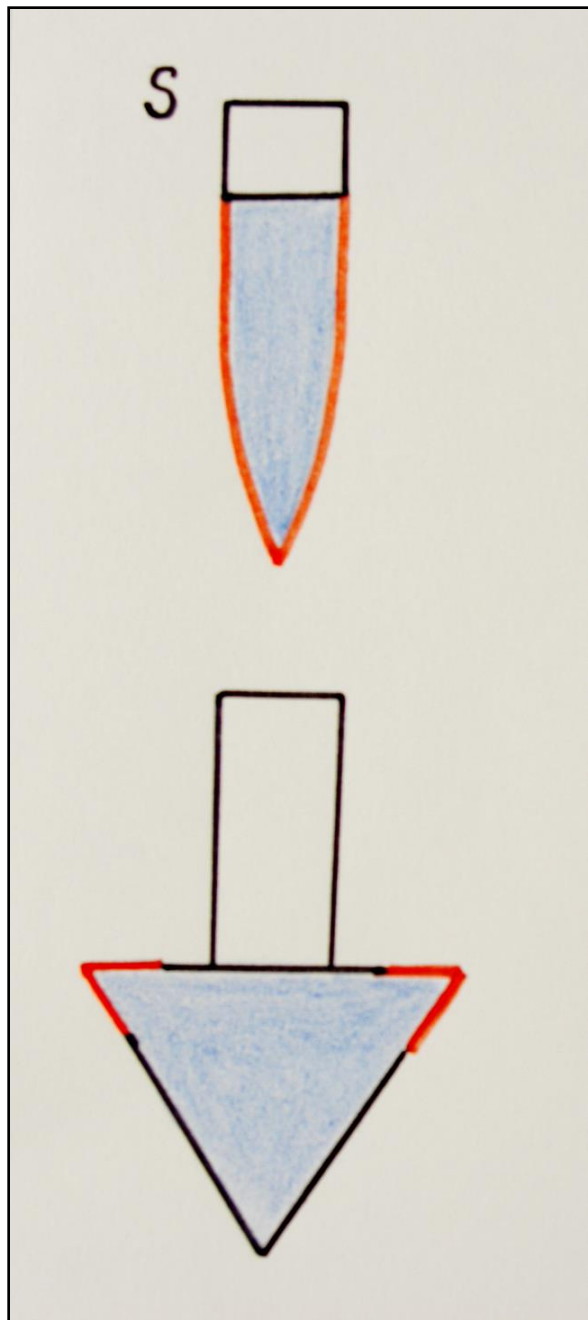
Shank (straight - frontal / complex - distal,
position of working end in pocket)

Working end, cutting edge

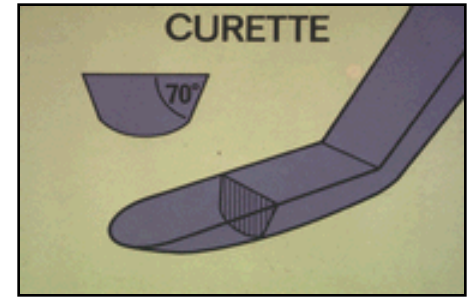
Supragingival scalers (sickle scalers)



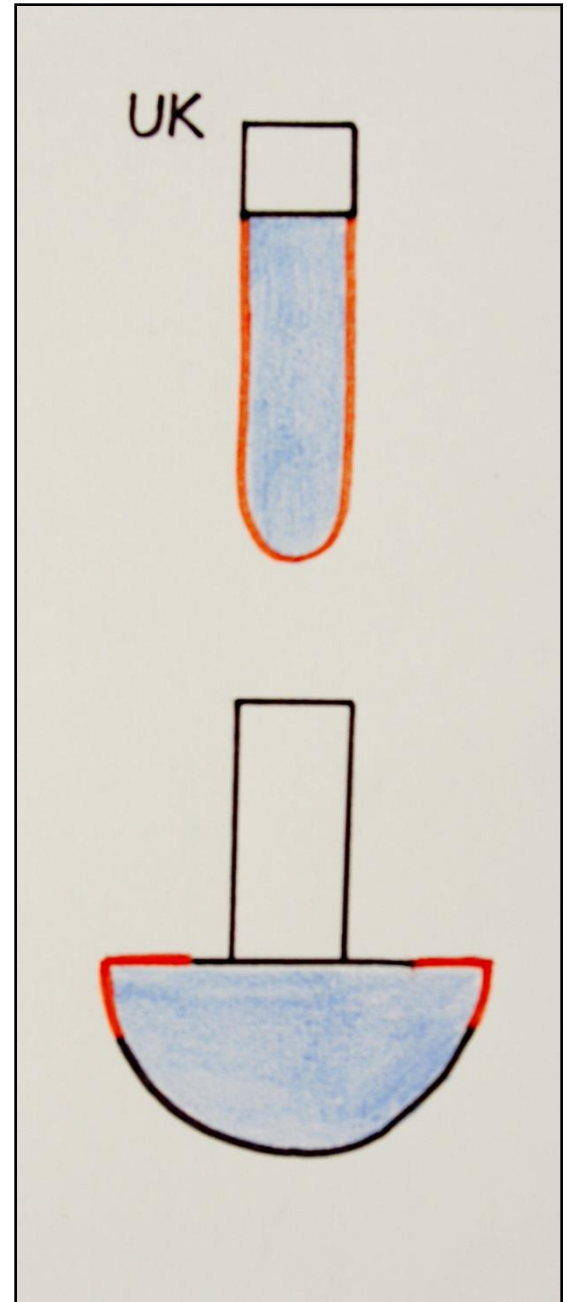
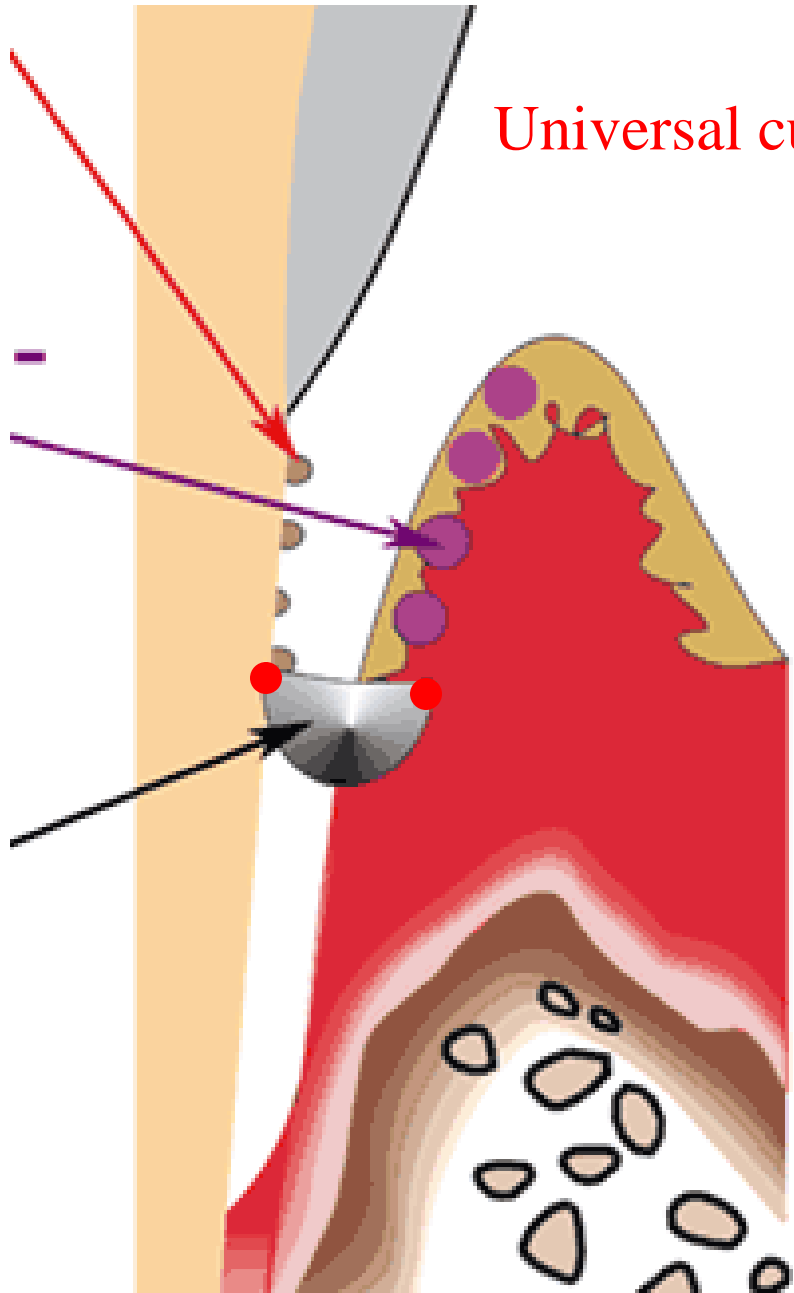




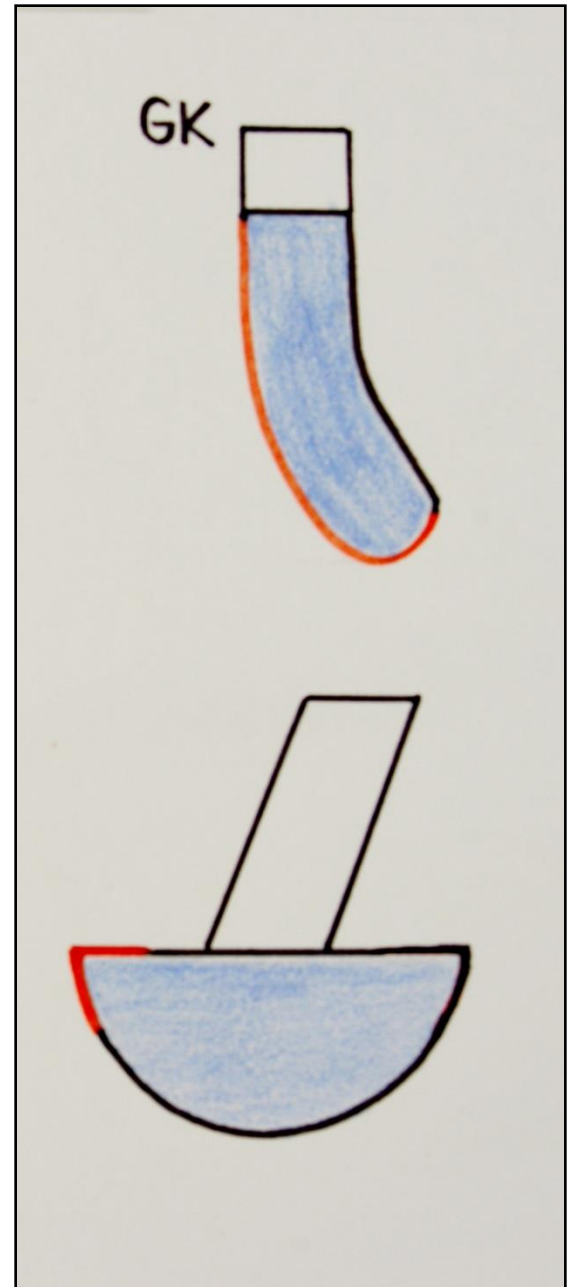
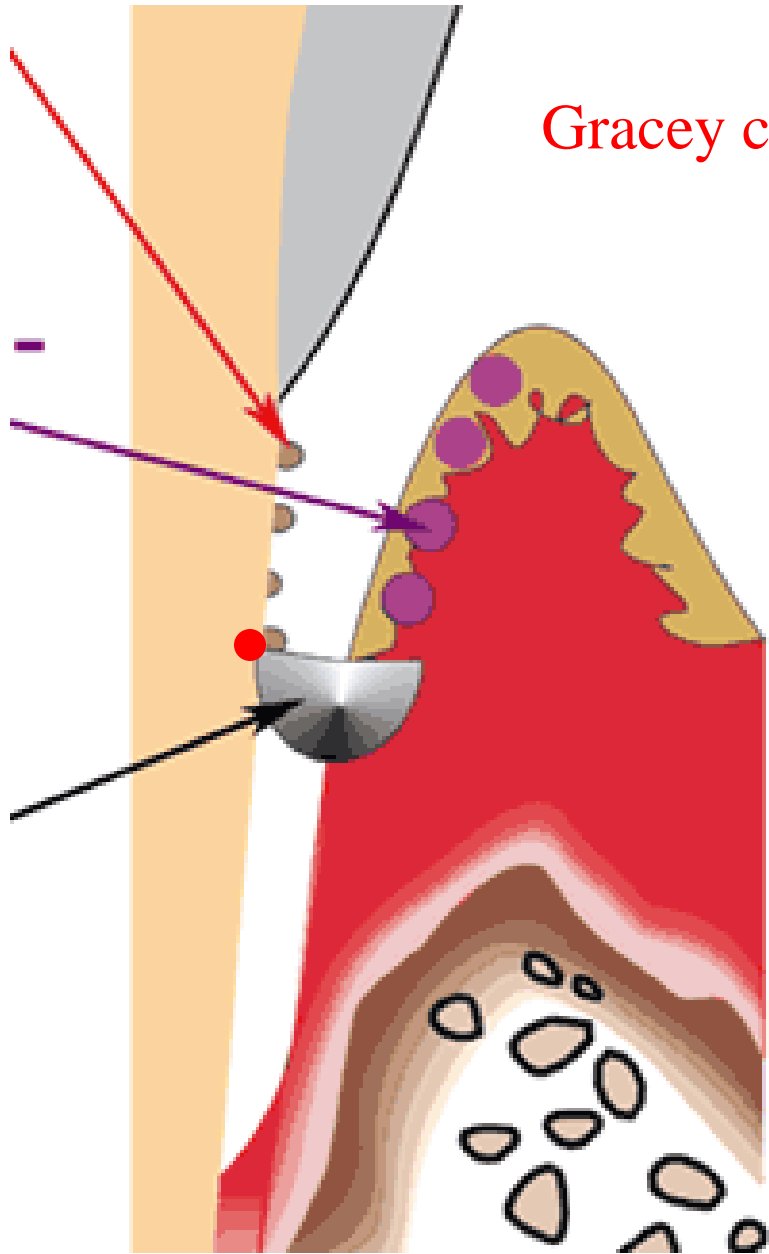
Universal cures



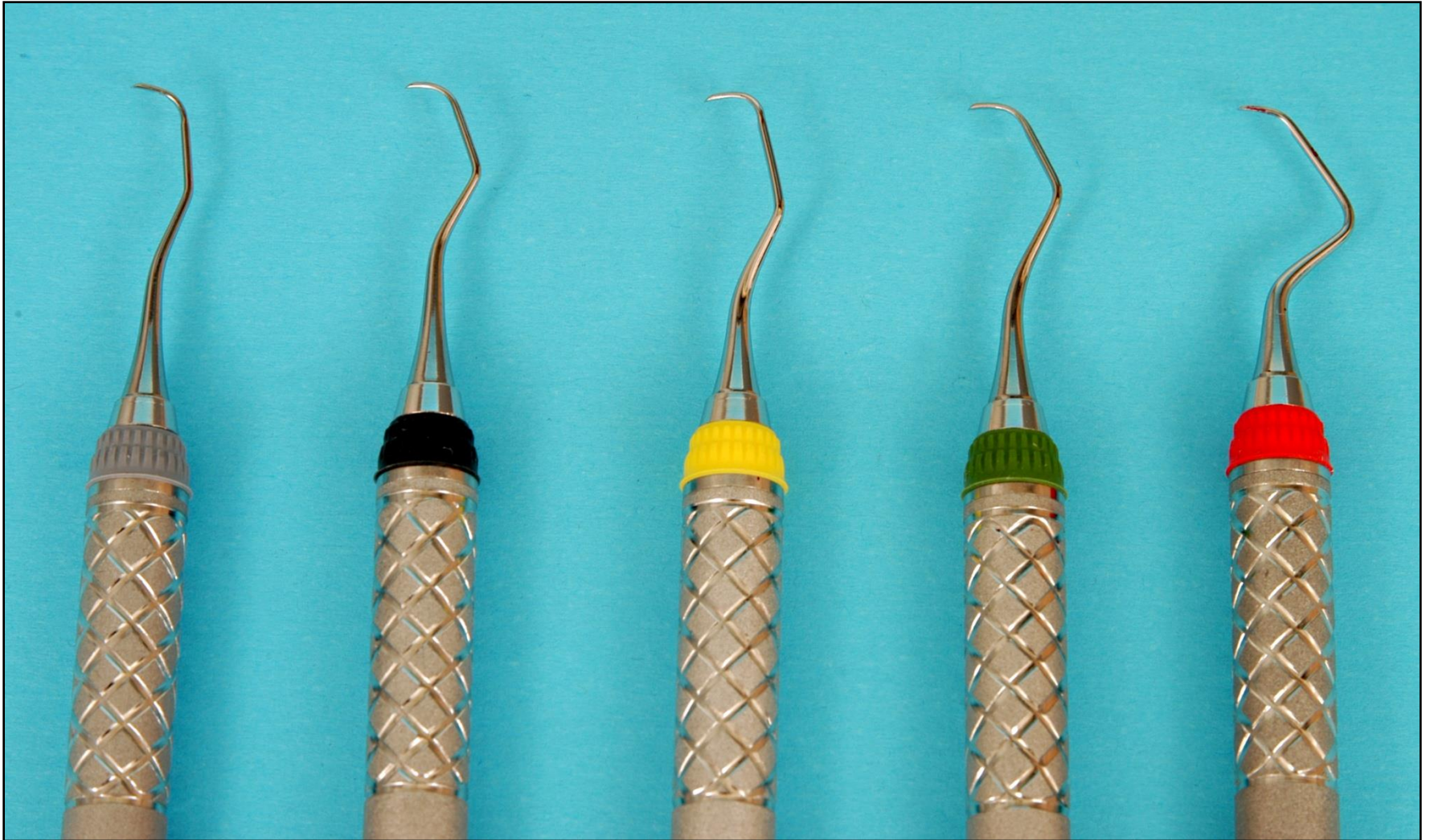
Universal currettes



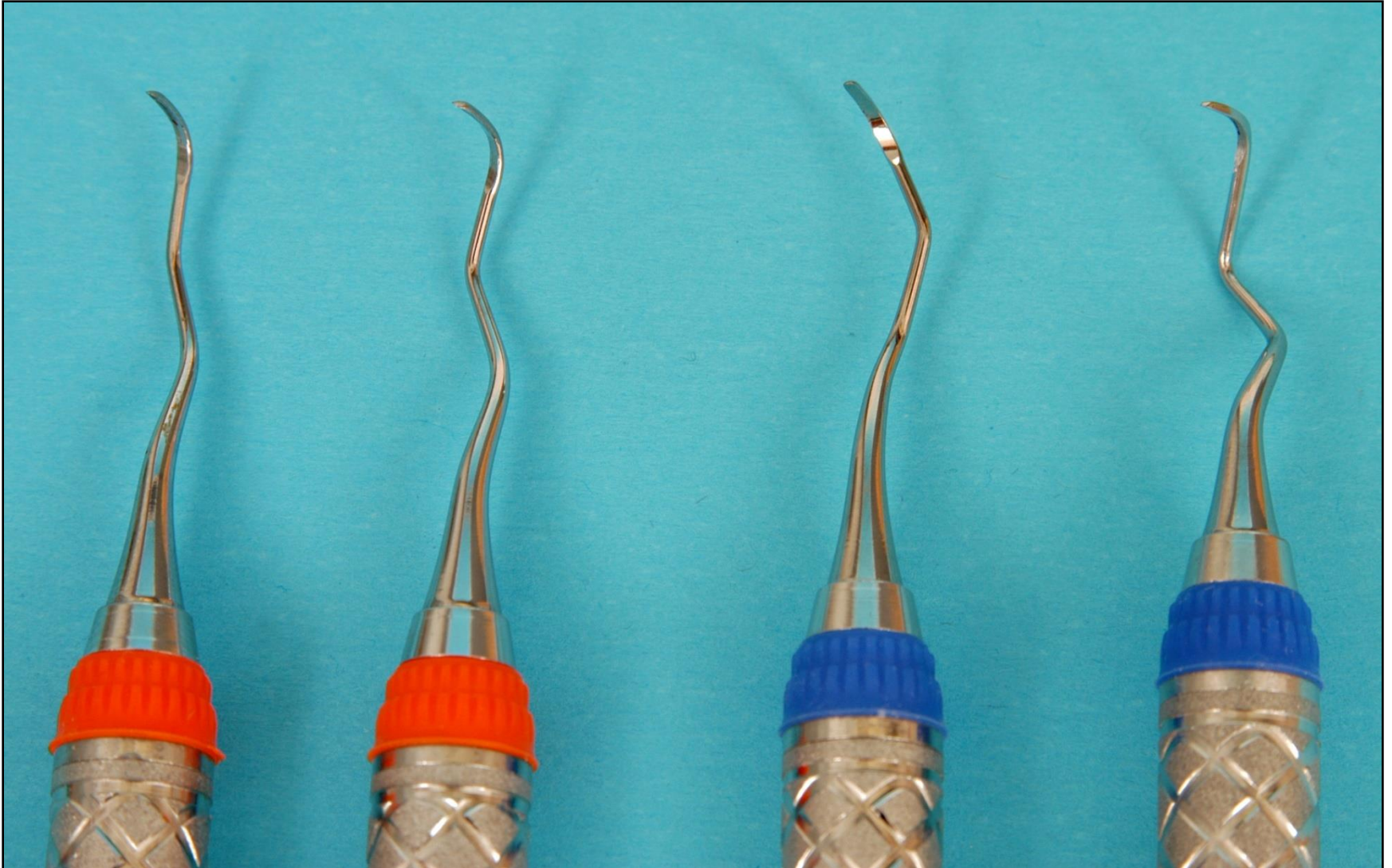
Gracey curettes



Area specific cures - Gracey cures



Area specific cures - Gracey cures





Standard Gracey
curettes

Rigid curettes

Mini curettes

Micro curettes

After five curettes

Mini five curettes

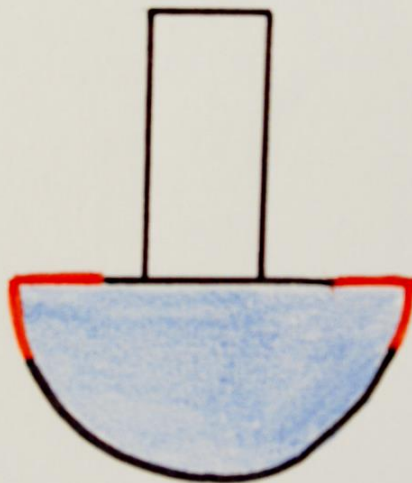
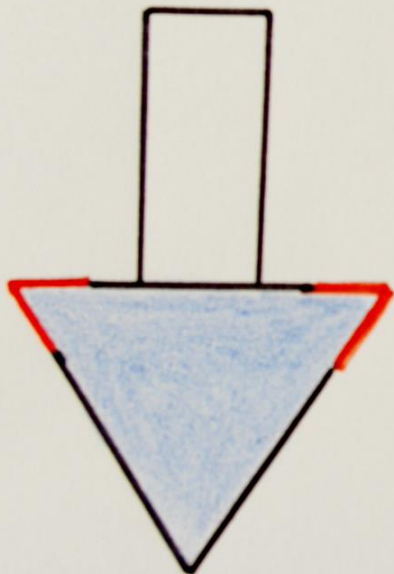
S

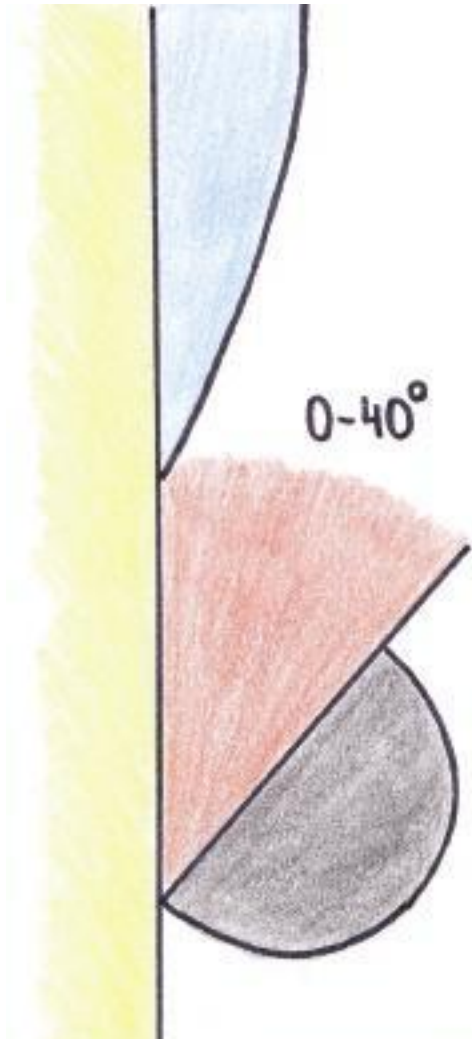


UK



GK

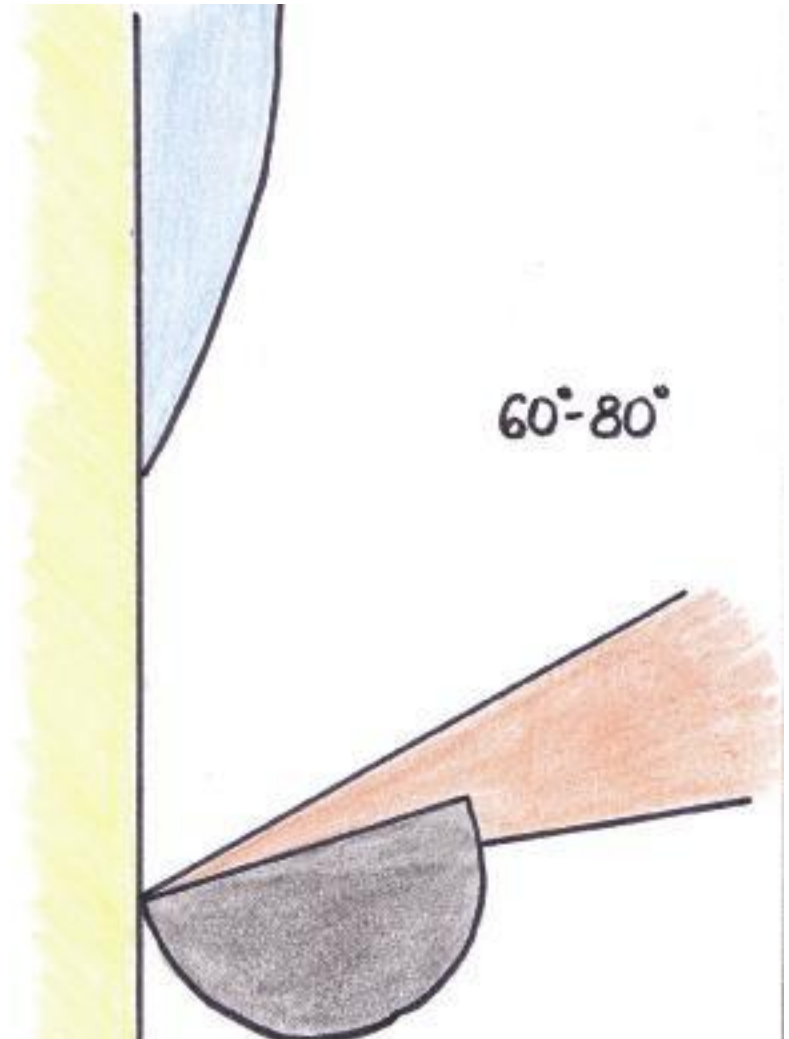




0-40°

Adaptation

angulation



60°-80°

activation

Electronically powered devices

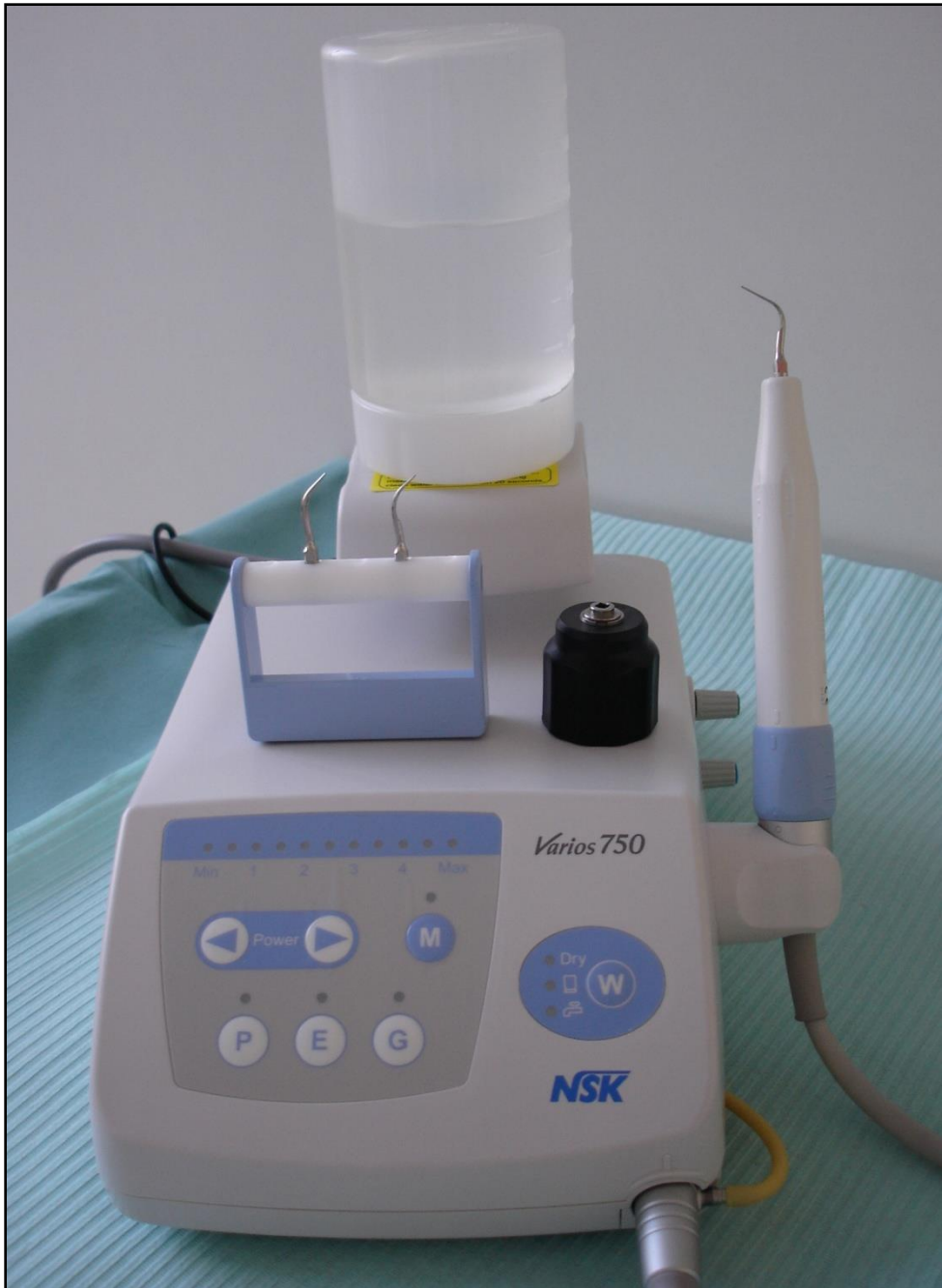
- Ultrasonic and sonic instruments

developed with the goal

making calculus removal **easier** and **faster**
with **less patient discomfort**

Ultrasonic and sonic instruments





Parallel position

No pressure

With permanent movement

Active part only 2 – 4 mm

Requires permanent water cooling

Infectious spray



Comparison of S+U devices and hand instruments

- Several mechanisms of action
- One mechanism (can remove only what it touches)
- The pocket is washing out
- Some debris remains in pocket
- Less time – more time
- Light lateral pressure, relaxed grasp
- More pressure, hold fast
- No sharpening required
- Infectious spray
- No at patients with cardiostimulator