

DANYLO HALYTSKYLVIV NATIONAL MEDICAL UNIVERSITY

Pediatric Dentistry Department

Methodological Recommendations
Prevention of dental diseases

**for preparing of specialists of the second (master) level
of higher education**

3rd year, 5th semester

Lviv 2021

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THEMATIC PLAN OF THE PRACTICAL LESSONS

Prevention of dental diseases

3rd year, 5th term

№	Theme of the lesson	Hour
1	Introduction into prophylaxis course. General questions of the oral cavity diseases prevention, concept, purpose, task, methods. Instruction in prevention of accidents during work in the dental office.	2
2	Anatomical and physiological peculiarities of the oral cavity structure in age aspect. Stages of the jaw-facial region development, teeth formation and mucous membrane (oral cavity and parodontium).	2
3	Registration of the dental formula: clinical, anatomical. Methods of the dental clinical examination. Algorithm of the examination. Practical demonstration of the dental clinical examination on the student. Examining by students each others.	2
4	The main epidemiological indices of dental caries (frequency, intensity – DMF and dmf).	2
5	Hygienic indices (Green-Vermillion, Fedorova-Volodkinoyi, Sillness-Loe).	2
6	Indices estimation of periodontal tissues state (CPI, PMA, PI, Shillera-Pisarevaprobe).	2
7	Methods of clinical examination according to WHO. Study the WHO chart. Mastering the main dental indices in WHO chart.	2
8	Cariogenic situation in the oral cavity. The methods of its determination and removing.	2
9	Structure and biological qualities of enamel and dentin. Enamel maturation after tooth eruption. The resistance of enamel to caries formation. The influence on formation, mineralization, maturation of enamel with caries prevention purpose. Biological properties of the pulp. The modern idea about exchanging processes in the enamel and pulp of the tooth.	2
10	Composition and properties of oral liquid: its role in enamel maturation, demineralization, remineralization. Defense mechanism of the oral cavity.	2
11	Microorganisms of the oral cavity. Their role in the dental diseases development. Dental deposits. Debris classification.	2
12	Hygienic means of the oral cavity: composition, qualities. Indication for using depending on dental state.	2
13	Hygienic things of the oral cavity. Indication for using depending on dental state.	2
14	Methods of hygienic care for the oral cavity. Individual hygiene. Mastering of tooth brushing techniques. Control tooth brushing.	2
15	Professional hygiene of the oral cavity: methods and equipment	2
	Whole	30

THEMATIC PLAN OF THE SELF-WORK

Prevention of dental diseases

3rd year, 5th term

№	Theme of the lesson	Hour
1	Algorithm of the clinical examination. Peculiarities the clinical examination of children.	3
2	Determine the resistance of enamel.	2
3	Composition and properties of oral liquid.	3
4	Factors of local immunity of oral cavity	2
5	Pigmented plaque: types, etiology.	3
6	Write down the anticaries local mechanism of action of fluoride.	2
7	Classification of toothpaste. Requirements for children's toothpastes. Representatives.	3
8	Modern devices for professional hygiene	2
	Whole	20

THEMATIC PLAN OF THE LECTURES

Prevention of dental diseases

3rd year, 5th term

№	Theme of the lecture
1	The main organization principle of children dental help and prevention. Primary prevention. Definition, principle.
2	Period of children development and dentoalveolarsystem development. Structure and biological qualities of tooth hard tissues (chemical composition, structure, mineralization).
3	The main children dental disease. Epidemiology, children examination. The main epidemiological indices of dental caries and periodontal disease.
4	Metabolism in tooth hard tissues. Enamel penetration. Theoretical substantiation of dental caries prevention. Structure-functional enamel resistance. Factors, influencing on its formation and methods of determination.
5	Oral liquid, composition, properties, function. The role of oral liquid in dental caries prevention. Cariogenic factors, methods of determination and removing. The role of oral cavity microorganism.

Practical lesson № 1

Introduction into prophylaxis course. General questions of the oral cavity diseases prevention, concept, purpose, task, methods. Instruction in prevention of accidents during work in the dental office

Aim of the lesson. To study the students the main tasks of preventive dentistry, main dental diseases.

Actuality. Prevention is a system of state, social, hygienic and medical measures aimed at ensuring a high level of health of the population and prevention of diseases.

Control of the initial level of knowledge

1. What are the tasks of preventive dentistry on your opinion?
2. What means the term "prophylaxis"?
3. What main groups of dental instruments do you know?
4. What main oral cavity diseases do you know?

Content of the lesson

The primary goal of preventive dentistry is to maintain the oral structures in a state of optimal health for the longest period of time possible - using the simplest, most universally acceptable methods.

The major concern in preventive dentistry is to stop the plaque-caused destruction of teeth by dental caries and the loss of their support through inflammatory periodontal disease.

However, all forms of dental neglect are costly in terms of pain, ill health, financial burden, loss of man-hours, psychological damage, and waste of human resources. Preventive dentistry can help to reduce or eliminate these costs.

Preventive dentistry can:

Prevent aching and disease of the teeth, which affect health, nutrition, development, and learning.

Prevent unsightly teeth, which affect personality, adjustment, and job opportunities.

Prevent concern over bad breath, which affects interpersonal relations.

Prevent dental pain and disease, which keep people from enjoying life; this in turn affects the lives of others.

Prevent the speech impairments that derive from dental problems.

Prevent the waste of human resources due to dental neglect.

It is impossible to convince a patient of the value of preventive dentistry if the members of the office team obviously do not believe in and practice it. Therefore, it is essential that every member of the dental health team share a philosophy of preventive dentistry.

It is important for each person in the office to follow a good dental health program, which includes having all required dental work completed, a carefully followed program of personal oral hygiene, and the practice of good nutrition and recommended general health care procedures.

Although the control of plaque and its damage is the prime target of preventive dentistry, the concept is really much larger in scope and provides a wider range of services for the patient. It includes:

Public Health Dentistry. To reduce the incidence of tooth decay through programs such as fluoridation of the public water supply and dental health programs in the schools.

Pediatric Dentistry. To maintain the child's mouth in healthy condition and provide developmental guidance to prevent abnormalities. It also includes preventive measures such as pit and fissure sealants and starting the child on good dental health habits.

Prophylactic Dentistry. The professional removal of harmful plaque and calculus; also, to provide continued guidance in the development and maintenance of good nutrition and personal oral hygiene habits.

Dental caries and periodontal diseases have been considered to be among the most common bacterial diseases affecting humans. Millions of children and adults continue to experience caries, periodontal disease, tooth loss, and malocclusions - most of which could be prevented if only they engaged in daily oral hygiene practices, had optimal systemic and topical fluorides, and sought professional care on a scheduled basis.

Dental health education has been pursued within communities in various ways. The Health Education Authority (1996) has recommended that dental health message should be based on the following four statements;

1. Diet: reducing the consumption and especially the frequency of sugar-containing food and drink.
2. Toothbrushing: cleaning the teeth thoroughly twice every day with a fluoride toothpaste.
3. Fluoridation: requesting local water company to supply water with the optimal fluoride level.
4. Dental attendance: have an oral examination every year.

Assessing caries risk is important for all patients and the process has to be repeated at intervals. Caries-promoting factors may change between visits. It must be appreciated that primary prevention will be required in all children to maintain low caries risk status.

Primary prevention: Keeping children's teeth healthy before disease occurs. Individuals who do not clearly fit into high or low risk categories are not considered to be at moderate risk.

Primary prevention in children at high caries risk:

1. Behaviour modification

- **dental health education advice** should be provided to individual patients at the chairside as this intervention has been shown to be beneficial;

- children should **brush their teeth** twice a day using toothpaste containing fluoride;
- the need to **restrict sugary food and drink** consumption to meal times only should be emphasised;
- dietary advice to patients should encourage the use of **non-sugar sweeteners**, in particular xylitol, in food and drink;
- patients should be encouraged to use **sugar-free chewing gum**, particularly containing xylitol, when this is acceptable;
- clinicians should prescribe **sugar-free medicines** whenever possible and should recommend the use of sugar-free forms of non-prescription medicines.

2. Tooth protection:

- **sealants** should be applied and maintained in the tooth pits/fissures of high-risk children;
- the condition of sealants should be reviewed at each check-up;
- glass-ionomer sealants should only be used when resin sealants are unsuitable;
- **fluoride tablets** (1mg F daily) for daily sucking should be considered for children at high risk of decay;
- a **fluoride varnish** may be applied every four to six months to the teeth of high caries risk children;
- **chlorhexidine varnish** should be considered as an option for preventing caries.

Consistent preventive messages should be reinforced by the dental practice team and by other health care professionals.

Secondary prevention: Limiting the impact of caries at an early stage.

Tertiary prevention: Rehabilitation of the decayed teeth with further preventive care.

Knowledge level control

1. What is the main aim of preventive dentistry?
2. Account the possibilities of preventive dentistry.
3. What is primary prevention?
4. What risk factors of dental caries do you know?
5. What is secondary prevention?
6. What is tertiary prevention?
7. Name the dental public health method.

Practical lesson № 2

Anatomical and physiological peculiarities of the oral cavity structure in age aspect. Stages of the jaw-facial region development, teeth formation and mucous membrane (oral cavity and parodontium)

Aim of the lesson. To learn with students the peculiarities of the oral cavity structure in age aspect, anatomical structure of primary and permanent teeth in children, its formation.

Actuality. For each age period, only the age-specific features of the structure of the mucous membrane, which must be taken into account in the analysis of the pathological condition, are inherent in it.

Control of the initial level of knowledge

1. Periods of child development.
2. Anatomical and physiological peculiarities of oral cavity in children of different ages.
3. Peculiarities of maxillofacial anatomy in children of different age.
4. Terms of teeth eruption.

Content of the lesson

Types of the teeth in both arches of primary dentition, 20 teeth in all, include 8 incisors, 4 canines, and 8 molars. Types of the teeth in both arches of permanent dentition, 32 teeth in all, include 8 incisors, 4 canines, 8 premolars and 12 molars.

Each type of the tooth has a specific shape which is related to the masticatory function as well as to the part the tooth takes in speech and aesthetics.

Eruption of the primary teeth starts on the 6th -8th month of a child's life and ends at 2.5-3 years. Crown of the tooth is developed by the moment of eruption. Root of the tooth is developing and its formation is completed after the tooth eruption. It lasts 1.5-2 years in primary teeth and 3-4 years in permanent teeth.

The terms of eruption, root formation and resorption of primary teeth

Tooth	Beginning of the mineralization (in utero)	Terms of eruption (month)	Finishing of formation (years)	Beginning of root resorption (years)
I	4.5	6-8	1.5	from 5
II	4.5	8-12	2	from 6
III	7.5	16-20	4-5	from 8
IV	7.5	12-16	3-4	from 7
V	7.5	20-30	4	from 7

The terms of formation and eruption of the permanent teeth

Tooth	Terms of tooth eruption	Terms of root formation
1	6-8	10

2	8-9	10
3	10-11	13
4	9-10	12
5	11-12	12
6	6	10
7	12-13	15
8	Different	Different

Knowledge level control

1. Anatomical and physiological peculiarities of primary teeth structure.
2. Anatomical and physiological peculiarities of permanent teeth structure.
3. Anatomical and physiological peculiarities of immature permanent teeth.
4. Terms of primary and permanent teeth eruption.
5. Terms of mineralization of primary and permanent teeth.
6. Terms of root formation of primary and permanent teeth.

Practical lesson №3

Registration of the dental formula: clinical, anatomical. Methods of the dental clinical examination. Algorithm of the examination. Practical demonstration of the dental clinical examination on the student. Examining by students each others

Aim of the lesson. To study with students the methods of clinical examination of patients, registration of dental formula.

Actuality. Dental examination is an important stage of preventive work, provides an opportunity to create an information base for planning preventive care and evaluate its effectiveness.

Control of the initial level of knowledge

1. Name the steps of epidemiological examination.
2. What is palpation?
3. How many teeth are there in primary dentition?
4. How many teeth are there in permanent dentition?
5. Indicate differences between primary and permanent teeth.

Content of the lesson

Many different tooth charting systems are currently in use, including the universal system illustrated in the hard-tissue examination section. This system of marking permanent teeth uses the numbers 1 to 32, beginning with the upper right third molar (No 1) and progressing around the arch to the upper left third molar (No. 16), down to the lower left third molar (No. 17), and around the arch to the lower right third molar (No. 32). The primary teeth are identified in the universal system by the first 20 letters of the alphabet, A through T.

The Federation Dentaire International Special Committee on Uniform Dental Recording has specified the following basic requirements for a tooth charting system:

1. Simple to understand and teach
2. Easy to pronounce in conversation and dictation
3. Readily communicable in print and by wire
4. Easy to translate into computer input
5. Easily adaptable to standard charts used in general practice.

According to this system, the first digit indicates the quadrant and the second digit the type of tooth within quadrant. Quadrants are allotted the digits 1 to 4 for the permanent teeth and 5 to 8 for the primary teeth in a clockwise sequence, starting at the upper right side; teeth within the same quadrant are allotted the digits 1 to 8 (primary teeth 1 to 5) from the midline backward. The digits should be pronounced separately; thus the permanent canines are teeth one-three, two-three; three-three, and four-three.

Permanent teeth

<i>Upper right</i>	<i>Upper left</i>
18 ; 17 ; 16 ; 15 ; 14 ; 13 ; 12 ; 11	21 ; 22 ; 23 ; 24 ; 25 ; 26 ; 27 ; 28
48 ; 47 ; 46 ; 45 ; 44 ; 43 ; 42 ; 41	31 ; 32 ; 33 ; 34 ; 35 ; 36 ; 37 ; 38
<i>Lower right</i>	<i>Lower left</i>

Primary teeth

<i>Upper right</i>	<i>Upper left</i>
55 ; 54 ; 53 ; 52 ; 51	61 ; 62 ; 63 ; 64 ; 65
85 ; 84 ; 83 ; 82 ; 81	71 ; 72 ; 73 ; 74 ; 75
<i>Lower right</i>	<i>Lower left</i>

Knowledge level control

1. What methods of clinical examination do you know?
2. What types of recordings do you know?
3. Of what parts examination chart consist of?
4. What instruments are used for oral cavity examination?
5. What are the sequences of extraoral examination?
6. What are the sequences of intraoral examination?
7. What tooth charting system do you know?

Practical lesson № 4

The main epidemiological indices of dental caries (frequency, intensity – DMF and dmf)

Aim of the lesson. To teach the students the tasks of epidemiological examination, main epidemiological indices of dental caries, mastering them in practice.

Actuality. Knowledge about calculations is required to evaluate the condition of hard tissue teeth. Also, the evaluation of caries morbidity and the effectiveness of various preventive measures is also measured by caries indices.

Control of the initial level of knowledge

1. What means the term “epidemiology of dental diseases”?
2. What are the main steps of epidemiological examination?
3. Name the main instruments for dental examination?
4. What are the signs of healthy dental tissues?
5. What tooth charting systems do you know?

Content of the lesson

At the beginning of the lesson the teacher underlines the importance of carrying out the epidemiological examination. The main tasks of epidemiological examination are:

1. to evaluate the frequency and intensity of the main diseases of oral cavity;
2. to reveal the prevention and treatment need;
3. to determine the quality of dental aid (sanation quality and prevention effectiveness);
4. to compare the state of diseases occurrence in the different regions;
5. to establish the quantitative and qualitative tasks for industry connected with Dental Service.

Epidemiological examination (by WHO method) include three sequence stages:

- preliminary stage;
- examination (examination of oral cavity and recording in the combined WHO card for dental examination and determination of treatment need);
- results estimation.

Preliminary stage include formation of a group (the group consist of two dentists and a nurse) for examination. This group should master the methodic of examination and is acquainted with criteria of estimation of pathological changing in oral cavity.

Teacher underlines that the main caries indices are prevalence, intensity, increasing of caries intensity, caries activity.

At the clinical exam the number of cavities, fillings and missing teeth should be recorded. Such a recording is an estimation of the dental caries history from the time of the eruption of the first permanent molars up to the day of examination. Incipient caries lesions “white spot lesions” are usually not included. These readings provide an indices of caries prevalence and are calculated for 28 (permanent) teeth, excluding the 4 third molars. This index provides:

How many teeth have caries lesions (D).

How many teeth have been extracted (M).

How many teeth have fillings or crowns (F).

The sum of these three factors provide the DMF (T)-value.

DMF(T) and DMF(S) are used as dental caries indices to describe numerically the amount (the prevalence) of dental caries in an individual. This provides the total cumulative caries experience. They are obtained by totaling the number of Decayed (D), Missing (M) and Filled (F) teeth (T) or surfaces (S).

- Currently, we can only measure cavitated lesions.
- Using the tooth “(T)” designation, each tooth can have only one decayed or filled surface maximum. If a tooth has both a carious lesion and a filling, it is calculated as D only.
- The “M” indicator is for missing teeth. Teeth may be missing for reasons other than caries such as trauma or periodontal disease. This is especially true in older individuals where periodontal disease could be a factor.
- A DMF (T) of 28 is maximum, meaning that all teeth are affected. For example (resize new screen so that you will be able to observe both browser windows).
- D=4, M=3, F=9 means that 4 teeth are decayed, 3 teeth are missing and 9 teeth have fillings.

The DMF(T) is the total=16. It also means that 12 teeth are intact, since this index is based on a maximum of 28 teeth.

Index DMF is used for permanent dentition, index df – for primary dentition, index DMF+dmf – for mixed dentition.

Prevalence – an indicator of past history.

Prevalence illustrates the balance between resistance factors and caries inducing factors in the past and the present. For an adult patient, the caries prevalence usually is a result of caries activity from six years of age, when the first permanent molars appeared. If the caries prevalence is high, it means that the patient has been susceptible to the disease during a past period of time.

Prevalence is determined by one oral exam using a light, probe and mirror.

The examination is usually without x-rays. Without x-rays proximal caries are not easily found.

Prevalence is depicted in cross-sectional studies. It does not show current state of caries activity.

DMF may not portray changes in oral health. “F” can be high while “D” may be low. Increase in “F” usually means better oral health, while an increase in “D” may indicate poorer oral care.

Teacher explain students how use caries epidemiological indices in practice.

Knowledge level control

1. What means the term “epidemiology of dental diseases”?
2. What are the main steps of epidemiological examination?
3. Name the main instruments for dental examination?
4. What are the main caries indices?

Practical Lesson № 5

Hygienic indices (Green-Vermillion, Fedorova-Volodkinoyi, Silness-Loe)

Aim of the lesson. To teach students to define the hygiene indices.

Actuality. To learn the method of determining the hygienic indices.

Control of the initial level of knowledge

1. What are the kinds of the dental deposits?
2. Influence of the dental deposits in the dental diseases formation process.
3. What hygiene indexes do you know?

Content of the lesson

An index is an expression of clinical observations in numerical values. It is used to describe the status of the individual or group with respect to a condition being measured. By using a number scale and a standardized method for interpreting observations of a condition, an index score can be more consistent and less subjective than a word description of that condition.

Indices using various criteria have been developed to compare the extent and severity of disease. For example, dental caries is indexed by the number of teeth or surfaces with carious lesions and fillings. An index for dental fluorosis identifies very mild, mild, moderate, or severe involvement of the enamel, ranging respectively from white spots visible only when a tooth is dry to marked brown stains with pitting.

Various factors associated with gingivitis and periodontal diseases have been used in the development of indices. Measurement criteria include recession, bone loss, pocket formation, mobility of teeth, gingival inflammation, gingival bleeding, and the amount and distribution of plaque and calculus. These measurements aid in the overall assessment of the oral health status.

Mastering the indices of Fedorov-Volodkinoyin practice. We conduct painting of vestibular surfaces of 6 lower frontal teeth by solution of Shillera-Pisareva by a cotton rolls. Criteria of estimation in marks:

- 1 - absence of colouring
- 2 - colouring $\frac{1}{4}$ crowns of the tooth
- 3 - colouring $\frac{1}{2}$ crowns of the tooth
- 4 - colouring $\frac{3}{4}$ crown of the tooth
- 5 - colouring of all surface of crown of the tooth

Formula for the calculation: ***index of hygiene*** = $\sum/6$ (\sum is the sum of values of marks of all teeth)

- 1.1-1.5 marks is a good hygiene
- 1.6-2.0 marks is a satisfactory hygiene
- 2.1-2.5 marks is an unsatisfactory hygiene
- 2.6-3.4 marks is a bad hygiene
- 3.5-5.0 marks is a very bad hygiene

Mastering the indices of Green-Vermillion in practice. Conduct painting of vestibular surfaces 16, 11, 26 and lingual surfaces 46, 31, 36 teeth by solution of Shillera-Pisareva. On the explored surfaces at first determine the dental plaque of Debris-index, and then - dental calculus of Calculus-index. Criteria of estimation:

Dental plaque (DI)

- 0- no debris;
- 1- debris within gingival $\frac{1}{3}$ only
- 2- debris beyond gingival $\frac{1}{3}$ but within gingival $\frac{2}{3}$
- 3- debris covering most of tooth surfaces.

Dental calculus (CI)

- 0- no debris;
- 1- debris within gingival $\frac{1}{3}$ only
- 2- supragingival calculus covers $\frac{2}{3}$ surfaces of crown of the tooth, and subgingival calculus as separate conglomerates;
- 3 - supragingival calculus covers $\frac{2}{3}$ surfaces crowns of the tooth and (or) subgingival calculus surrounds collum part of crown of the tooth.

Formula for the calculation:

$$OHI = \frac{\sum DI}{n} + \frac{\sum CI}{n}$$

where \sum is sum of values; DI is the dental plaque; CI is the dental calculus; n - is the amount of the inspected teeth (6).

Estimation of values:

	OHI-S	Hygiene of oral cavity
0-0.6	low	good
0.7 – 1.6	middle	satisfactory
1.7 – 2.5	high	unsatisfactory
more than 2.5	very high	bad

Plaque Index (Silness and Loe). There is no universally accepted index for the assessment of plaque. A specific index for scoring plaque has been adapted by Loe and Silness and Loe from the PMA index of Schour and Massler. It is based on an assessment of the severity and location of soft debris aggregates in terms of scores of 0, 1, 2 and 3.

In this system the most stress is placed on the thickness of the plaque at the gingival margin area on all four surfaces of each tooth. The plaque index is computed for all surfaces—mesial, distal, oral, and vestibular—on all or selected teeth or on specific areas of all or selected teeth. This index may be employed for large-scale epidemiologic studies as well as for clinical studies of smaller groups. The assessment of the index requires a light source, gentle drying of the teeth and gingiva, a mirror, and a probe. If optimal conditions and chairside assistance are provided, approximately 5 minutes should be sufficient time to score all the teeth. The scores of all four areas of all the teeth can then be added and divided by the number of teeth.

The Plaque Index (PI) scores only differences in thickness of the soft deposits in the gingival area of the tooth surfaces. The index can be scored for all surfaces or selected teeth or for selected surfaces of all or selected teeth. By adding the indexes for the individual teeth and dividing by the number of teeth examined, the PI for the individual is obtained.

0- Gingival area of tooth free of plaque; the surface is tested by running a probe across the tooth surface; if no soft material adheres, then the area is considered plaque free

1 - No plaque observed in situ by the unaided eye, but plaque is made visible on the point of a probe after the probe has been moved over the tooth surface at the entrance of the gingival crevice

2- Gingival area covered by a thin to moderately thick layer of plaque visible to the naked eye

3- Heavy accumulation of soft matter, the thickness of which fills the crevice produced by the gingival margin and the tooth surface

A disclosing agent is a preparation in liquid, tablet, or lozenge form which contains a dye or other coloring agent. In dentistry a disclosing agent is used for the identification of soft deposits for instruction, evaluation, and research.

When applied to the teeth, the agent imparts its color to soft deposits but can be rinsed readily from clean tooth surfaces. After staining, the deposits that can be distinctly seen provide a valuable visual aid in patient instruction. Such a procedure can demonstrate dramatically to the patient the presence of deposits and the areas that need special attention during personal oral care.

Knowledge level control

1. How to define the hygienic index of Fedorov-Volodkinoy?
2. How to define the hygienic index of Green-Vermillion?
3. What dyes for the detecting of the dental calculus do you know?

Practical Lesson № 6

Indices estimation of periodontal tissues state (CPI, PMA, PI, Shillera-Pisareva probe)

Aim of the lesson. To teach students defining of the basic periodontal indices, to select groups of children based on the investigation results for the prevention and treatment of periodontal diseases.

Actuality. To master the periodontal indices.

Control of the initial level of knowledge.

1. What is periodontal and its structure at different children ages?
2. Name the periodontal functions.
3. What are the risk factors of general importance which cause the periodontal diseases progress?
4. What are the risk factors of local importance which cause the periodontal diseases progress?

Content of the lesson

There are a number of methods for the measurement and assessment of periodontal disease.

Index of *PMA* is used for estimation of inflammatory process of gums. It is conducted by sight. Inflammations of gingival papilla (P) near one tooth estimate in a 1 mark, inflammation of marginal edge (M) - in 2 marks, inflammation of alveolar gums (A) - in 3 marks.

Calculate Index of PMA in per cents on a formula:

$$\text{PMA} = \frac{\text{sum of marks}}{3 \times \text{number of teeth}} \times 100$$

The sum of marks concerns by addition of all greatest indexes of periodontal tissues state near every tooth.

Account of teeth in age 6-11 years – 24, 12-14 years-28, 15 years and more-30

In a period of temporal bite to 6 years - 20 teeth

Criteria of estimation:

to 25% is an easy degree of gingivitis

25-50% is a middle degree of gingivitis

higher 51% it is a heavy degree of gingivitis.

In *Russell's Periodontal Index (PI)* the condition of both the gingiva and the bone is estimated individually for each tooth in the mouth. A progressive scale that gives relatively little weight to gingival inflammation and relatively much weight to alveolar bone resorption is used for scoring. The scores from

each tooth are added together, and the total is divided by the number of teeth present in the mouth. The result gives the periodontal disease index of the patient, which reflects the average status of periodontal disease in a given mouth without reference to the type or causes of the disease. The community's score is the arithmetic average of individual scores of persons examined. Such scoring tends to blur individual distinction.

Criteria

0 *Negative*—there is neither overt inflammation in the investing tissues nor loss of function because of destruction of supporting tissue

1 *Mild gingivitis*—there is an overt area of inflammation in the free gingiva circumscribing the tooth

2 *Gingivitis*—inflammation completely circumscribes the tooth but probing depth is within normal limits

6 *Gingivitis with pocket formation*—there is a pocket (not merely a deepened gingival sulcus because of swelling of the free gingivae), there is no interference with normal masticatory function; the tooth is firm in its socket and has not drifted

8 *Advanced destruction with loss of masticatory function*—the tooth may be loose, may have drifted; may sound dull on percussion with a metallic instrument and may be depressible in its socket

Method of implementation the index of CPITN. Inspect surrounding tissues in the area of ten teeth (17, 16, 11, 26, 27, 37, 36, 31, 46, 47). Register the state only six teeth, where the pathological changes are more expressed for every pair of teeth. Register such clinical signs of periodontal diseases, as bleeding, presence above' and undergingival dental calculus and periodontal pockets. Periodontal tissues inspect by a probing method for the exposure of bleeding, presence above' and undergingival dental calculus and pathological pocket by the graduated probe.

Estimation of index is conducted in marks:

1—bleeding

2- presence of dental calculus

3- pathological pocket by a depth 4-5 mm

4- pathological pocket by a depth more than 5 mm

Sum of marks of all sextants divides on 6.

At the value of CPITN: 0 marks treatment it is not needed

1 mark - it follows to improve the individual hygiene of oral cavity

2 marks - are the necessity of professional hygiene of oral cavity

3 marks - antiinflammation therapy

4 marks – complex of treatment measures

Knowledge level control

1. Evaluation of the periodontal tissues state according to the index PMA.
2. Russell's Periodontal Index defining technique.
3. Defining technique and evaluation of the CPITN index.

Practical Lesson № 7

Methods of clinical examination according to WHO. Study the WHO chart. Mastering the main dental indices in WHO chart

Aim of the lesson. To study the students the methods of clinical examination on the patient, sequence, dental recording in charts.

Actuality. To teach the students the methods of epidemiological examination of patients and registration of dental indexes in the WHO chart.

Control of the initial level of knowledge.

1. Name the steps of epidemiological examination.
2. What is palpation?
3. How many teeth are there in primary dentition?
4. How many teeth are there in permanent dentition?
5. Indicate differences between primary and permanent teeth.

Content of the lesson

	<p>Each pediatric patient should be given an opportunity to receive complete dental care. Before making a diagnosis and developing a treatment plan, the dentist must collect all information about the patient and evaluate general oral health.</p> <p style="text-align: center;">Form used in completing the preliminary medical and dental history.</p> <p>DATE _____</p> <p>Child's name _____ Sex _____ Birth date _____ Place of birth _____</p> <p>Date of last medical examination _____ Child's physician/pediatrician _____</p> <p>Physician's address _____</p> <p>Telephone _____</p> <p>Medical history</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 45%; text-align: center;">Growth</td> <td style="width: 10%; text-align: center;">and</td> <td style="width: 30%; text-align: center;">development</td> </tr> <tr> <td></td> <td style="text-align: center;">No</td> <td></td> <td style="text-align: center;">Yes</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 5%; text-align: center;">1.</td> <td style="width: 70%;">Any learning, behavioral, excessive nervousness, or communication problems?</td> <td style="width: 5%;"></td> <td style="width: 15%;"></td> </tr> <tr> <td style="text-align: center;">2.</td> <td>Has child had psychological counseling or is counseling being considered for the future?</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">3.</td> <td>Were there any complications during pregnancy or was child premature at birth?</td> <td></td> <td></td> </tr> </table>		Growth	and	development		No		Yes	1.	Any learning, behavioral, excessive nervousness, or communication problems?			2.	Has child had psychological counseling or is counseling being considered for the future?			3.	Were there any complications during pregnancy or was child premature at birth?			
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4.	Any problems with physical growth?		
Notes:			
Central nervous system			
1.	Any history of cerebral palsy, seizures, convulsions, fainting, or loss of consciousness?		
2.	Any history of injury to the head?		
3.	Any sensory disorders? (Seeing, Hearing)		
Notes:			
Cardiovascular system			
1.	Any history of congenital heart disease, heart murmur, or heart damage from rheumatic fever?		
2.	Has any heart surgery been done or recommended?		
3.	Any history of chest pains or blood pressure?		
Hematopoietic and lymphatic systems			
1.	Has Your child ever had a blood transfusion or blood products transfusion?		
2.	Any history of anemia or sickle cell disease?		
3.	Does Your child bruise easily, have frequent nosebleeds, or bleed excessively from small cuts?		
4.	Is Your child more susceptible to infections than other children are?		
5.	Is there any history of tender or swollen lymph nodes or glands?		
Notes:			
Respiratory system			
1.	Any history of pneumonia, cystic fibrosis, asthma, shortness of breath, or difficulty in breathing?		
Notes:			
Gastrointestinal system			
1.	Any history of stomach, intestinal or liver problems?		
2.	Any history of hepatitis?		
3.	Any history of eating disorders, such as anorexia nervosa or bulimia?		
4.	Any history of unintentional weight?		
Notes:			
Genitourinary system			
1.	Any history of urinary tract infections, bladder or kidney problems?		
2.	Is the patient pregnant or possibly pregnant?		

Notes:			
Endocrine system			
1.	Any history of diabetes?		
2.	Any history of thyroid disorders or other gland disorders?		
Notes:			
Skin			
1.	Any history of skin problems?		
2.	Any history of cold sores (herpes) or canker sores (aphthae)?		
Notes:			
Extremities			
1.	Any limitations of use of arms or legs? placements or other joint problems?		
3.	Any problems with muscle weakness or muscular dystrophy?		
Notes:			

Allergies			
1.	Is Your child allergic to any medications?		
2.	Any hay fever, hives, or skin rashes caused by allergies?		
3.	Any other allergies?		
Notes:			

Medications or treatment			
1.	Is Your child currently taking any medication (prescription or nonprescription medicine)? If yes, Medication(s) _____ Dosage _____ Time _____ Per Day _____ _____ _____		
2.	Has Your child ever received radiation therapy (x-ray treatment) or is it planned?		
3.	Has Your child ever received chemotherapy or is it planned?		
Notes:			

Hospitalizations

Has Your child been hospitalized?

Hospital(1) _____ (2) _____ (3) _____

Date _____

Reason _____

	Reason_____		
5.	Has Your child any ever had unfavorable dental experience?		
6.	Is (was) your child nourished by nursing beyond one year of age? If yes, check: Breast__ Nursing bottle__ Both__, and to what age?__		
7.	Does Your child fail to eat a well-balanced diet? If yes, what foods or food groups are not adequate?_____		
8.	Does (or has) Your child have (or had) sucking habit beyond one year of age? If yes, check: Thumb(s)_____ Finger(s)_____ Pacifier_____ Other_____		
9.	Does (or has) Your child have (or had) any other oral habits beyond one year of age? If yes, check: Lip biting_____ Mouth breathing_____ Nail biting_____ Teeth grinding_____ Other_____		
10.	Does (or has) Your child have (or had) difficulty opening his or her mouth, or does the child's jaw sometimes lock or stick in a certain position?		
11.	Does (or has) Your child have (or had) popping or clicking noises or pain during chewing or yawning?		
12.	Does (or has) Your child have (or had) frequent headaches or pain in or about ears, eyes, or cheeks?		

Dental diseases prevention

1.	How often does Your child brush?_____ time per_____		
2.	Does Your child use dental floss?		
3.	Does someone assist Your child with brushing and cleaning the teeth?		
4.	Does someone inspect for thoroughness after the procedure?		
5.	Does Your child use a fluoride toothpaste?		
6.	Has Your child ever taken a fluoride supplement or vitamins with fluorides?		
Drinking water source: City water supply_____ Name of city_____			
Has a fluoride analysis been done_____			
Date of analysis_____ Fluoride content_____			

SIGNATURE _____ **(parent** **or**
guardian) _____

Dentist's comments

MEDICAL COSULTATION RECOMMENDED? No _____ Yes _____ Date requested _____

Purpose for consultation:

Semi-annual review of medical-dental history

If history remains essentially unchanged, sign below:

Date _____ Parent _____ Date _____ Parent _____

Date _____ Parent _____ Date _____ Parent _____

Date _____ Parent _____ Date _____ Parent _____

Oral examination record

Patient _____ Birth date _____ Chart _____

Date _____

LAST FIRST

Medical history Summary	Last history completed _____ Current medical status and medication:	
Dental History summary	Date of last exam _____ Last radiographs _____ Appliances: _____ Describe any present problem: Past treatment summarized:	
Extra-oral findings	Head Neck Face Lips Hands	
Intra-oral findings	Palate and oropharynx Airway Tongue and floor of mouth Buccal mucosa Frena Gingivae and periodontium	
Plaque score	Today's score _____ Last score _____	
Occlusion review	<i>Facial profile:</i> _____ <i>Molar relationship:</i> Permanent: R L; Primary : R L Unerupted - (Terminal plane) End-to-end - Straight Class - Mes.step Dist.step Primate space	<i>TMJ and function:</i> <u>Opening path:</u> Normal __ Deviating _____ <u>Closing path:</u> Normal __ Deviating _____ <u>Opening:</u>

<p><i>Canine relationship:</i> R L Class _____</p> <p><i>Incisor relationship:</i> Overjet _____ mm Overbite _____ % Openbite _____ mm</p> <p><i>Midline:</i> Normal _____ Deviates _____ Maxilla R__ L__ mm. _____ Mandible R__ L__ mm. _____ Mandibular shift No__ Yes __ R_____ L_____ Ant. _____ mm. _____</p> <p><i>Arch length:</i> (general impression) Maxilla _____ Mandible _____ Adequate _____ Adequate _____ Inadequate _____ Inadequate _____</p> <p><i>Eruption sequence and timing:</i> Normal _____ or Describe: _____</p>	<p>Normal__ Limited_____</p> <p><u>Joint sounds:</u> None Left Right Opening _____ Closing _____ Crepitus _____</p> <p><u>Muscle Tenderness:</u> None _____</p> <p>Tongue Function: Normal _____</p> <p><i>Crossbites:</i></p> <p><i>Oral habits:</i></p> <p><i>Supernumerary teeth/ Congenitally missing teeth:</i></p> <p><i>Ectopic eruption:</i></p> <p><i>Other anomalies:</i></p> <p>Analysis recommended: No _____ Yes _____</p>
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Hard tissue examination

CLINICAL RADIOGRAPHIC	CLINICAL	RADIOGRAPHIC
11 / A	+	21 / F
12 / B		22 / G
13 / C		23 / H
14 / D		24 / I
15 / E		25 / J
16		26
17		27
18		28
41 / P		31 / K
42 / Q		32 / L
43 / R		33 / M
44 / S		34 / N
45 / T		35 / O
46		36
47		37
48		38

DMF= , df= , DMF+df=

Diagnostic summary
Treatment proposed

Knowledge level control

1. What methods of clinical examination do you know?
2. What types of recordings do you know?
3. Of what parts examination chart consist of?
4. What instruments are used for oral cavity examination?
5. What are the sequences of extraoral examination?
6. What are the sequences of intraoral examination?
7. What tooth charting system do you know?

Practical Lesson № 8

Cariogenic situation in the oral cavity. The methods of its determination and removing.

Aim of the lesson. To study cariogenic factors of general and local action. To find out a cariogenic situation of the oral cavity.

Actuality. To teach the students to differentiate the concept of carious factors of general and local character, the notion of cellular and humoral factors of both specific and nonspecific resistance.

Control of the initial level of knowledge

1. What are the cariogenic factors of general action?
2. What are the cariogenic factors of local action?
3. The role of saliva in the processes of mineralization and demineralization of enamel. Composition of saliva and its main features.
4. Name factors which influence on composition and features of oral liquid.
5. The role of microorganisms of oral cavity at the beginning of caries.

Content of the lesson

At the beginning of the lesson a teacher tests student's knowledge on that topic. A teacher points out that a high level of caries makes about 100% of prevalence at some regions of Ukraine and at the same time makes its different prevalence and intensity at different countries of the world and create necessary study and exposure of cariogenic factors.

Early checking of cariogenic situation promotes effective testing of prophylactic measures and promotes a high-quality treatment of caries on the initial stages of its development.

Caries is a dystrophic process of tooth hard tissues that appears under the influence of general and local factors. The combination of two factors (general and local) makes the beginning of caries process.

Basic cariogenic factors of the oral cavity are microflora of the oral cavity (especially when the hygienical state of the oral cavity is unsatisfactory), uncontrolled use of carbohydrates, change of composition of saliva, insufficient functional loading of the tooth system. To the general cariogenic factors belong: low maintenance of fluor in a drinking-water, somatic state of a child's health, unfavorable ecological ways of residence. Cariogenic factors can have different degrees of intensity, so however much terms of the oral cavity are permanent and they depend on composition of a drinking-water, meal, functional state of the tooth-jaw system, state of organs and systems of all organism.

A cariogenic situation of the oral cavity always appears at high concentration of free hydrons (H^+), the source of which are organic acids (mainly milk) that is appeared during fermentation of carbohydrates by the microorganisms of dental plaque. The accumulation of microorganisms on the tooth surface to contribute: diminishing of self-cleaning of teeth, crowding of teeth, bad filling, prosthetic and orthodontic apparatuses, violations of physical and chemical properties of saliva.

Cariogenic action of microorganisms explains the beginning of dental plaque. A dental plaque adjoins closely to the tooth surface and disposes above pellicle. A dental plaque contains the same basic types of microorganisms in different correlation in most of people. Thus, streptococci (mutans, salivarius, mitis, sangvis) makes about 40% from the common amount of microorganisms of the plaque.

A number of microorganisms can produce enough acid to decalcify tooth structure, particularly aciduric streptococci, lactobacilli, diphtheroids, yeasts, staphylococci, and certain strains of sarcinae. Streptococcus mutans has been implicated as one of the major and most virulent of the caries-producing organisms.

It is generally accepted that the dental caries process is controlled to a large extent by a natural protective mechanism inherent within the **saliva**. Many features of saliva have been investigated in during caries process. Considerable importance has been placed on the salivary pH, the acid-neutralizing power, and the calcium, fluoride, and phosphorus content. It has been long suggested that in addition to these features the rate of flow and the viscosity of saliva may influence on the development of caries. The normal salivary flows aids to the solution of food debris on which microorganisms thrive. In addition, the saliva manifests a variety of antibacterial and other antiinfectious features. All well-known characteristics of saliva seem somehow are relevant to the process of dental caries.

The mucous membrane of the oral cavity, saliva, include the multicomponent system of defense from the pathogenic factors of environment. The epithelium of mucous membrane shows itself a functional barrier to the microorganisms, and from its state, above all things, defense of oral cavity depends from infections. But,

most value in the defense mechanism of the oral cavity is acquired by the specific and heterospecific factors of resistance. Mechanic cleaning of oral cavity takes place due to saliva flow, the use of hard meal. Saliva hinders to adhesion of microorganisms to the surface of mucous membrane of oral cavity, to hard tissues of teeth. The IgA of saliva can change metabolism of microorganisms, limit formation of colonies, reduce virulence of contagiums.

Methods of determination of cariogenic situation in the oral cavity:

1. Methods, which are based on the study of tooth environment (lactobacilli test, determination of pathogenic microflora of dental plaque, determination of pH, viscosity, buffer capacity, mineral components of saliva

2. Methods that study solubility of enamel TER-test. Teaching methodology: put the drop of a 1N solution of HCl on cleaned from the plaque, dried up, isolated from saliva vestibular surface of upper central incisor in the distance 2mm from a cutting edge. In 5 seconds wash off the acid, dry out an enamel. Put 1 drop 1% methylene dark blue on a bitten-into enamel, take off by a cotton tampon. Estimate a test on a 10-point scale. Fluoride varnish inflicted on the area of demineralization.

3. The individual risk of the development of caries is determined on the basis of estimation: rapid formation of dental plaque, level of the use of cariogenic products, the amount of initial caries.

During practical work students examine children and find out a soft dental plaque and the main features of saliva. Students solve situational tasks with the teacher.

Teacher makes conclusion at the end of the lesson. Teacher points out on student's drawbacks and their mistakes. Teacher announces the results.

Knowledge level control

1. The role of feed at the beginning of tooth decay.
2. Influence of somatopathy on the defeat of hard tissues of teeth by caries.
3. What dental deposits do you know? What is their role in the development of caries?
4. What purpose is a TER-test determined for? Methods of its leading.
5. Defensive mechanism of oral cavity. Their characteristics.

Practical Lesson № 9

Structure and biological qualities of enamel and dentin. Enamel maturation after tooth eruption. The resistance of enamel to caries formation. The influence on formation, mineralization, maturation of enamel with caries prevention purpose. Biological properties of the pulp. The modern idea about exchanging processes in the enamel and pulp of the tooth

Aim of the lesson. To acquaint students with the structure and biological properties of enamel and dentin, maturation of enamel after tooth eruption.

Actuality. Students master the structure and biological properties of enamel and dentin, the process of maturation of the enamel after tooth eruption.

Control of the initial level of knowledge:

1. From what tissues does tooth consist of?
2. Indicate the terms of primary teeth eruption?
3. Indicate the terms of permanent teeth eruption?

Content of the lesson

The teeth are composed of enamel, pulp-dentin complex and cementum.

Enamel is usually the only portion of a tooth that is seen clinically in a healthy mouth because it covers the anatomical crown. Enamel provides a hard surface for mastication and speech. Enamel alone is various shades of bluish white, which is seen on the incisal tips of newly erupted incisors but turns various shades of yellow-white elsewhere due to the underlying dentin. Preservation of the enamel of every tooth during a patient's lifetime is one of the goals of every dental professional. Dental professionals must take into consideration the properties of enamel when deciding the caries risk for the patients, counseling patients and communities on fluoride use, applying enamel sealants, and using and recommending polishing agents.

Chemically, enamel is a highly mineralized crystalline structure containing from **96%** inorganic matter by weight. It is the hardest substance of the human body. Hydroxyapatite, in the form of a crystalline lattice, is the largest mineral constituent and is present 90% to 92% by volume. The remaining constituents of tooth enamel are on organic content of about **1%** and water content of about **3%** by weight. Other minerals such as carbonate, magnesium, potassium, sodium, and fluoride are also present in smaller amounts.

Enamel is formed by cells called ameloblasts, which originate from ectoderm. Enamel covers the anatomical crown of the tooth and varies in thickness in different areas of a tooth. Unlike enamel, dentin and pulp are not able to be viewed clinically if the teeth and associated periodontium are healthy. Dentin and pulp make up the inner portions of the tooth and are not exposed except when certain dental pathology exists. Today all dental professionals must have an increased understanding of the histology of these two tissues.

Mature dentin is a crystalline material that is less hard than enamel. Mature dentin is by weight 70% mineralized inorganic material, 20% organic material, and 10% water. This crystalline formation of mature dentin consists of mainly calcium hydroxyapatite with the chemical formula of $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$. This calcium hydroxyapatite is similar to that found in higher percentages in enamel and in lower percentages in bone and cementum. Small amounts of other minerals are also present, such as carbonate and fluoride.

Dentin is softer than enamel when instrumented, allowing removal with hand instruments even in a healthy state, unlike enamel. Dentin also appears less dense than enamel on radiographs. Due to the translucency of overlying enamel, dentin of the tooth gives the white enamel crown its underlying yellow hue.

Types of dentin

Type	Location/chronology	Description
Peritubular dentin	Wall of tubules	Highly calcified
Intertubular dentin	Between the tubules	Highly calcified
Mantle dentin	Outermost layer	First dentin formed
Circumpulpal dentin	Layer around outer pulpal wall	Dentin formed after mantle dentin
Primary dentin	Formed before completion of apical foramen	Formed faster and is more mineralized than secondary
Secondary dentin	Formed after completion of apical foramen	Formed slower and is less mineralized than primary
Tertiary dentin	Formed as a result of injury	Irregular pattern of tubules

Age changes in dentin.

With increased age, the diameter of the dentinal tubule becomes more narrowed because of deposition of peritubular dentin. This may be related to the decreased reactions of pulp to various stimuli with age. With age, the passageways of the tubules to the pulp are not as wide open as in youth; the stimuli have trouble being transmitted as rapidly and in large amounts. Some studies show complete obliteration of older tubules with mineralization of the associated odontoblastic processes.

The **pulp** is the most innermost tissue of the tooth. Pulp appears as a less dense area on radiographs. The main functions of the pulp are:

1) Importantly, the pulp is involved in the support, maintenance, and continued formation of dentin because of the inner layer of the cell bodies of odontoblasts remaining along the outer pulpal wall.

2) Another function of the pulp is sensory, because the cell bodies associated with the afferent axons in the dentinal tubules are located among this layer of odontoblasts. The only sensation perceived by the brain when the dentin or pulp is injured is pain. Changes in temperature, vibrations, and chemical changes that affect the dentin or pulp are thus perceived only as painful stimuli.

3) Pulp also has a nutritional function for dentin, because the dentin contains no blood supply of its own. Dentin depends on the pulp's vascular supply and associated tissue fluids for its nutrition. This is accomplished by way of the

tubules and their connection to the odontoblasts' cell bodies that line the outer pulpal wall.

4) Pulp has a protective function because it is involved in the formation of secondary or tertiary dentin, which increases the coverage of the pulp.

5) Pulp also has white blood cells within its vascular system and tissues; these allow triggering of inflammatory and immune responses.

Since pulp is a connective tissue, it has all the components of such a tissue: intercellular substance, tissue fluid, cells, lymphatics, vascular system, nerves, and fibers. Cells of the pulp: fibroblasts, odontoblasts, undifferentiated mesenchymal cells, white blood cells. The fibers present in the pulp are collagen fibers and some reticular fibers.

Age changes in pulp.

With an increase in age, pulp undergoes a decrease in intercellular substance, water, and cells as it fills with an increased amount of collagen fibers. The pulp becomes more fibrotic with increased age. Also, the overall pulp cavity can be smaller by the addition of secondary or tertiary dentin.

Today all dental professionals must have a perfect understanding of the histology of these two tissues. With the advent of expanded responsibilities and increased preventive concerns for patient, all members of dental team must be able to "see" into these interesting and important areas.

Primary tooth eruption

Eruptions of the primary dentition take place in chronological order. This process involves active eruption, which is the actual vertical movement of the tooth. Active eruption of a primary tooth has many stages in the movement of the tooth. After enamel apposition ceases in the crown area of each primary or permanent tooth, the ameloblasts place an acellular dental cuticle on the new enamel surface. In addition, the layers of the enamel organ are compressed, forming the **reduced enamel epithelium (REE)**. As this formation of the REE occurs for a primary tooth, it can begin erupt into the oral cavity. To allow for the eruption process, the REE first fuses with the oral epithelium lining the oral cavity. Second, enzymes from the REE disintegrate the central portion of the fused tissues, leaving an epithelial tunnel for the tooth to erupt through into the surrounding oral epithelium of the oral cavity. This tissue disintegration causes an inflammatory response known as "teething". As a primary tooth actively erupts, the coronal portion of the fused epithelial tissues peels back off the crown, leaving the cervical portion still attached to the neck of the tooth. This fused tissue that remains near the CEJ after the tooth erupts then serves as the initial junctional epithelium of the tooth.

The primary tooth is then lost as the succedaneous permanent tooth develops lingual to it. The process involving loss of the primary tooth consists of differentiation of osteoclasts, which absorb the alveolar bone between the two teeth, and odontoclasts, which cause resorption or removal of portions of the primary's root of dentin and cementum as well as small portions of the enamel crown.

Permanent tooth eruption. The succedaneous permanent tooth erupts into the oral cavity in a position lingual to the roots of the shed primary tooth. The only exception to this is the permanent maxillary incisors, which move to a more facial position as they erupt into oral cavity.

The process of eruption for a succedaneous tooth is the same as for the primary

tooth. The process of the nonsuccedaneous permanent tooth eruption is also similar, but no primary tooth is shed. Both succedaneous and nonsuccedaneous permanent teeth erupt in chronological order. A permanent tooth often starts to erupt before the primary tooth is fully shed, and problems in spacing can arise. Preventive orthodontic therapy can avoid some of these situations.

Root Development. The process of root development takes place after the crown is completely shaped and the tooth is starting to erupt into the oral cavity. The structure responsible for root development is the **cervical loop**. The cervical loop is the most cervical portion of the enamel organ, a bilayer rim that consists of only IEE and OEE.

The cervical loop begins to grow deeper into the surrounding mesenchyme of the dental sac, elongating and moving away from the newly completed crown area to enclose more of the dental papilla tissue and form **Hertwig's root sheath**. The function of this sheath is to shape the root(s) and induce dentin formation in the root area.

Root dentin forms when **outer cells of the dental papilla** in the root area are induced to undergo differentiation and become odontoblasts. After the differentiation of odontoblasts in the root area, these cells undergo **dentinogenesis** and begin to secrete **predentin**. As in the crown, a basement membrane is located between the inner enamel epithelium of the sheath and the odontoblasts in the root area. When root dentin formation is completed, this portion of the basement membrane also disintegrates, as does the entire Hertwig's root sheath. Cells of the root sheath may become the **epithelial rests of Malassez**. These groups of epithelial cells become located in the mature periodontal ligament and can become cystic, presenting future problems.

Cementogenesis in the root area also occurs when Hertwig's root sheath disintegrates. As a result the undifferentiated cells of the dental sac come into contact with the newly formed surface of root dentin. This contact of the **dental sac** cells with the dentin surface induces these cells to become immature **cementoblasts**. The cementoblasts move to cover the root dentin area. As a result of the apposition of cementum over the dentin, the **dentinocemental junction (DCJ)** is formed. Also at that time, the **central cells of the dental papilla** are forming into the **pulp**.

Knowledge level control

1. What is the composition of enamel?
2. What is the composition of dentin?
3. What types of dentin do you know?

4. What are the peculiarities of primary teeth eruption?
5. What are the peculiarities of permanent teeth eruption?

Practical Lesson № 10

Composition and properties of oral liquid: its role in enamel maturation, demineralization, remineralization. Defense mechanism of the oral cavity

Aim of the lesson. To study with students the composition and properties of oral liquid, specific and non-specific factors of resistance.

Actuality: students' mastering of the composition and properties of the oral liquid, their influence on the processes of maturation of the enamel after eruption.

Control of the initial level of knowledge

1. What major salivary glands do you know?
2. What minor salivary glands do you know ?
3. What means the term “pure saliva”?
4. What means the term “pooled saliva”?
5. What is the composition of enamel?
6. Explain the antibacterial properties of saliva.
7. What is dental plaque?

Content of the lesson

The fluid found in the mouth is derived mainly from the *major* and *minor* salivary glands. The major glands are the *parotid*, *submandibular*, and *sublingual*. Of these, the parotid elaborates a serous secretion containing electrolytes but is relatively low in mucoid organic substances. The submaxillary has both a serous and a mucus secretion; the sublingual has a greater proportion of mucus output than the other major glands. The minor *palatal*, *lingual*, *buccal*, and *labial* salivary glands empty onto the lining mucous membrane of the mouth in many places - on the palate, under the tongue, and on the inner sides of the cheeks and lips. These minor glands are mainly mucus-secreting glands.

The *pure* saliva secreted by the oral glands is sterile until it is discharged into the mouth. When it mixes with saliva from other glands, it becomes -known, as *pooled* or *whole* saliva. Whole saliva is further altered by additions from the periodic ingestion of food, oxygen from the air, carbon dioxide from the lungs, tissue fluids entering via the gingival crevice, and release of a great variety of intracellular organics from lysed bacteria, sloughed oral epithelial cells, and

dissolved food fragments. It becomes even more complex by the inclusion of living cells - bacteria from the mouth that produce enzymes and other chemicals, epithelial cells sloughing from the mucous membrane, and leukocytes derived from the gingival crevice and tonsils. Both of the latter also release proteins, ions, and even radicals into the pooled saliva.

The composition of saliva varies, depending on whether it is *stimulated* or *unstimulated (resting)*, (Antisialagogue: an agent, that diminishes or arrests the flow of saliva). During the day the submandibular gland secretes the greatest proportion of the unstimulated saliva, although the flow rate of resting saliva is very slow for *all* of the three major glands, being as low as 0.26 mL per minute for the submandibular, 0.12 mL per minute for the sublingual, and 0.11 mL per minute for the parotid gland. Approximately 69% of unstimulated saliva is from the submandibular gland, 26% from the parotid, and 5% from the sublingual gland. The minor glands secrete about 8% of the total amount of saliva. This unstimulated flow rate is subject to a circadian rhythm, with the highest flow in mid-afternoon and the lowest around 4 AM. There is a considerable variation of flow between individuals under resting conditions. The flow is exceedingly low, or nonexistent, during sleep.

The protective functions of saliva are due to its *physical, chemical, and antibacterial* properties.

1. Physical property of saliva.

The physical effect is mainly dependent upon the water content and the flow rate of saliva. Saliva, if in a sufficient quantity, serves a cleansing function. The fluid dilutes and removes acid concentrations in the dental plaque. A viscous saliva is not as effective as a more fluid saliva in clearing carbohydrates. If saliva does not have access to all tooth surfaces, the cleansing and dilution potential is diminished. Bacterial acidogenesis in the dental plaque causes the pH to fall farther and to remain low longer.

2. Chemical Protection.

Tooth damage results from a drop of pH in the plaque compartment. The chemical protection afforded by the saliva minimizes the pH drop, increases the resistance of the tooth surface to acid attack, accelerates the return of the pH to normal, and provides the ionic environment that facilitates repair of the enamel following acidogenesis.

Sodium bicarbonate is the buffering and neutralizing constituent of the saliva. Other components serving a similar function are the phosphates, amphoteric proteins, and urea. The latter compound is broken down by the bacteria to form ammonia. Its neutralizing effectiveness probably accounts for the fact that patients with renal transplants or on hemodialysis have both an increased salivary urea level and a reduced caries prevalence.

Another mechanism for pH control is achieved by the secretion of a protein known as *sialin*, or *pH rise factor*. This protein tends to minimize the extent of drop of the Stephan curve as well as to reduce the time necessary for the pH to return to more neutral levels.

The cations and anions of saliva most associated with increasing the resistance of enamel to acid attack are calcium, phosphate, and fluoride. At the time of secretion, saliva is supersaturated (with calcium and phosphate) in relation to hydroxyapatite. With supersaturated solutions, there is a potential for precipitation of calcium salts. In the case of saliva, however, the calcium and phosphate do not precipitate because of the presence of a proline-rich phosphoprotein in the saliva called statherin. Statherin acts to stabilize the calcium and phosphates in the supersaturated saliva and plaque fluid. In turn, the supersaturated fluids aid in preventing demineralization as well as promoting remineralization. Furthermore, as the fluid phase calcium and phosphate ions fall, statherin may release its bound calcium. As the secretion of calcium increases on stimulation, so does the flow of statherin. Other *proline-rich proteins* also aid in maintaining supersaturation.

3. Antibacterial properties of saliva.

The antibacterial properties of whole saliva are due either to substances secreted by the glands or to humoral components of the body defense system that enter the saliva via the gingival crevice.

The most easily understood antibacterial function is performed by the secreted sulfated glycoproteins - the mucins - that serve as a trap to aggregate bacteria, which are eventually swallowed. The same mucins provide a thin lubricating film over the mucous membrane and teeth to serve as lubricants.

Four important proteins found in saliva are bacteriostatic or bacteriocidal. They are lysozyme, lactoferrin, salivary peroxidase, and secretory immunoglobulin A (sIgA). Lysozyme activity is depressed by the presence of iron and copper. On the other hand, lactoferrin combines with iron and copper to protect the lysozyme action, while at the same time depriving bacteria of some of their essential needs for those two metals. Salivary peroxidase reacts with salivary thiocyanate in the presence of hydrogen peroxide to form the antimicrobial compound hypothiocyanite, which, in turn, inhibits the capability of the bacteria to use glucose fully. Interestingly, the hydrogen peroxide is mainly a product of the plaque bacterial metabolism.

Lactoperoxidase strongly adsorbs to hydroxyapatite. As a component of the acquired pellicle, it can influence the qualitative and quantitative characteristics of the microbial population of plaque. The secretory immunoglobulin A (sIgA) is derived mainly from the minor salivary glands located strategically near and on all sides of the teeth.

The role of the body cellular and immunologic defense systems in moderating the course of the plaque diseases needs clarification. The main access that phagocytic cells and their antibacterial products have to the oral cavity is through the gingival crevice. This route may prove to have important implications on the onset and progress of periodontal disease. Conceivably, once the cellular and immunologic components are in the gingival crevice, they could influence the subgingival plaque organisms responsible for root caries and periodontal disease. It is more difficult to conceive of the humoral defense system operating in

supragingival plaque. Yet there is a continual low-level flow of leukocytes into the saliva.

The immunologic defenses, despite theoretic limitations, may have an influence on dental caries. Individuals with major immunologic deficiencies have more caries than normal persons. In the vaccination of monkeys against *S mutans*, there is an increase in serum IgA, serum IgG, and serum IgM as the caries incidence decreases. Perhaps these three serum immunoglobulins may prove important in the control of caries. Thus on a research basis there is reason to believe that there is a linkage between humoral defenses and the plaque diseases. How the cells and immunoglobulins exercise this potential is unclear. The development of a successful caries and possibly a periodontal disease vaccine will ultimately depend on such clarification.

The concentration of calcium and phosphate ions in the fluid bathing the tooth at the plaque-tooth interface is extremely important, since these elements are the same as those composing hydroxyapatite crystal. If the fluid adjacent to the tooth is supersaturated with calcium and phosphorus ions at a given pH, the enamel certainly cannot undergo demineralization at its surface.

The saliva bathing the teeth is normally supersaturated with respect to the calcium and phosphate of enamel. The continued supersaturation of the tooth environs is possible because the plaque can concentrate both calcium and phosphate to a higher level than in saliva. The phosphate in the plaque is three times greater than the level occurring in the saliva. This is of practical importance, since the calcium and phosphate in plaque tend to be inverse to the caries score.

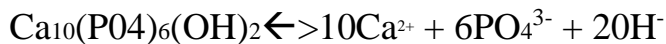
Enamel is the protective coat found on the visible portions of teeth above the gum line. It is the hardest substance in human body and is over 95% mineral in composition. The main structural component of the enamel is a mineral called hydroxyapatite which is chemically $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ and has frequent presence of carbonates and fluorides as impurities. Acid is produced when bacteria grow in the absence of oxygen. Such environments are formed in the pockets of teeth under bacterial films. Energy in this case is derived solely from the glycolytic process and the final product which is mostly lactic acid is secreted out of the cell. This acid reduces pH of the medium affecting the oral health of the host. The pH of dental plaque is a key factor in the balance between acid demineralisation of the teeth and the remineralisation of the initial caries lesion. Plaque pH falls each time acids accumulate in the plaque due to bacterial acid production following the consumption of fermentable carbohydrates - mainly sugars - in foods and drinks.

On the other hand, the plaque pH rises when the acids are washed out and neutralised by saliva, which contains the important buffer, bicarbonate. The pH also rises when the plaque bacteria either metabolise the acids, or produce alkali such as ammonia from nitrogenous compounds found in foods and saliva.

Besides its role in the control of plaque pH, saliva has another function of major importance in caries-remineralsing effects. Saliva is 'supersaturated' with the ions which make up the mineral content of the teeth (calcium, phosphate and hydroxyl ions) when the pH is above a 'critical' value, about 5.5. Below this value (e.g. after an intake of sugar) the saliva and plaque is unsaturated, and the tooth

dissolves. Above this value, the calcium and phosphate ions in saliva start to repair the damaged mineral crystals in the enamel - the process of remineralisation.

Dental caries is the result of an imbalance between demineralisation and remineralization. In health, loss of mineral is balanced by the reparative mechanisms of saliva. *Remineralization* is a natural process in which inorganic minerals in saliva are deposited on carious dental surfaces under appropriate conditions, restoring the mineral content of teeth. The effect of this process varies greatly among individuals depending upon enamel composition, oral health and salivary constituents. An equilibrium always exists between the solvated and solid mineral as



The solid crystals of the tooth mineral, called hydroxyapatite, dissolve to release calcium, phosphate and hydroxyl ions only if the latter are below saturation concentrations. If above saturation, the reaction will tend to move to the left, and any damaged crystals will be repaired by the acquisition of ions from solution.

Stimulation of saliva flow results in an increase in the washing out of acids (and sugars), and also an increase in the amount and concentration of bicarbonate buffers and of remineralising ions. The solubility of hydroxyapatite in water is extremely low. Thus it is not the dissolution of enamel that weakens the teeth surface. At lower pH, higher amounts of calcium are released from the mineral structure as both hydroxide and phosphate concentrations are low. This explains the higher rates of enamel demineralization at lower pH. Remineralization is essentially a reversal of the conditions that cause demineralization. Minerals from food or saliva get dissolved in carbonic acid formed momentarily from the CO_2 in breath and are deposited at the damage site of the enamel structure as the acid dissociates. However this process is naturally inefficient in recalcifying acid eroded enamel surfaces as they are always covered by a pellicle of salivary and bacterial proteins. Thus remineralization helps only if the enamel layer is intact as in a healthy individual or in the white caries lesions. These lesions are formed due to decalcification of inner tooth material and can be treated by enhancing salivary flow (to increase remineralization) and maintaining good hygiene.

Knowledge level control:

1. Account the properties of saliva.
2. Explain the physical property of saliva.
3. Explain the antibacterial properties of saliva.
4. What are the immunologic defenses of saliva?
5. How can you determine flow rate of saliva?
6. Explain the term "demineralization".
7. Explain the term "remineralization".

Practical Lesson № 11

Microorganisms of the oral cavity. Their role in the dental diseases development. Dental deposits. Debris classification

Aim of the lesson. To study the content of microflora of oral cavity, classification of deposits.

Actuality. To teach students to differentiate different types of dental deposits, to learn the method of determining the surface formations on the teeth, to learn the composition of the microflora of the oral cavity.

Control of the initial level of knowledge:

1. What is the composition of enamel?
2. Explain the antibacterial properties of saliva.
3. What is dental plaque?

Content of the lesson

Enamel is the protective coat found on the visible portions of teeth above the gum line. The function of the enamel is to protect teeth from wear and tear. The enamel coating is constantly damaged due to normal exposure to food and liquids and also as a result of the action of microbes that live on teeth. However it normally does not get depleted owing to regular remineralization processes operating in the oral cavity. There is always a balance between degradation and reformation which maintains the enamel in a healthy individual. Excessive colonization of dental surface due to lack of regular oral hygienic practices can however lead to a condition known as dental caries. In such a situation, the bacterial acid production and thus the rate of destruction of enamel coat is much faster than the natural rate of remineralization.

A large number of bacteria live in the oral cavities of organisms. Most of them colonize teeth surfaces and are facultative anaerobes. They ferment sugars taken by the host and produce acids which dissolve the protective surface of the teeth. Such teeth wear out faster and start decaying as newer species of bacteria prosper. The extent of damage caused by the acid is however dependent on numerous factors like oral hygiene, eating habits, time of contact, teeth and salivary composition etc. Anaerobic growth of microorganisms results in a lowered pH but salivary flow acts as a buffering solution maintaining the oral pH and providing materials for teeth reformation. This report describes the use of the Ludeking- Piret model for acid production and variation of acid concentration contacting teeth enamel and its dissolution with time. It was found that the rate of dissolution slows down initially and then increases exponentially with time. Further the solubility of enamel increases very rapidly when pH drops below 5.

Oral cavity being both a good shelter and a source of nutrition is home to a large variety of microorganisms. The human oral microflora is diverse and is

usually predominately composed of Gram-positive bacteria. Oral bacteria include streptococci, lactobacilli, staphylococci and corynebacteria, with a great number of anaerobes, especially bacteroides. *Streptococcal species* — *S. milleri*, *S. mutans*, *S. salivarins*, *S. mitior* and *S. sanguis* are almost always present in plaques and caries, the dominant species being *S. sanguis* and *S. mutans*. *Streptococcus mutans* appears to be important in the initiation of dental caries because its activities lead to colonization of the tooth surfaces, plaque formation, and localized demineralization of tooth enamel. Once enamel is weakened, other bacteria also colonize the damaged region. These include Lactobacilli, *Actinomyces*, and various proteolytic bacteria which eventually enter the interior of teeth.

Knowledge level control:

1. What is the content of oral cavity microflora?
2. What microorganisms living in oral cavity do you know?
3. What superficial deposits do you know?
4. What is the classification of deposits?

Practical Lesson № 12

Hygienic means of the oral cavity: composition, qualities. Indication for using depending on dental state

Aim of the lesson. To study with the students the means of hygiene of the oral cavity and how to choose them depending on the dental status.

Actuality. To teach students how to choose the hygiene products depending on age and dental status.

Control of the initial level of knowledge:

1. Toothbrush standard for the children and adults.
2. Toothpastes and its characteristics.
3. Mouthrinses as hygienic means of the oral cavity.

Content of the lesson

According to *Wehster's*, the term *dentifrice* is derived from *dens* (tooth) and *fricere* (to rub). A simple, contemporary definition of a dentifrice is a mixture used on the tooth in conjunction with a toothbrush. The historic aspects of dentifrice use was reviewed by Fischman.

Dentifrices are marketed as toothpowders, toothpastes, and gels. All are sold as either *cosmetic* or *therapeutic products*. If the purpose of a dentifrice is

therapeutic, it must reduce some disease process in the mouth. Usually the actual or alleged therapeutic effect is to reduce caries incidence, gingivitis, calculus formation, or tooth sensitivity. The sales appeal of a product, however, is strongly linked to its flavor and foaming action.

A dentifrice is a substance used with a toothbrush for the purposes of removing dental plaque, materiaalba, and debris, and for applying specific agents to the tooth surfaces for preventive or therapeutic purposes. As a result of research, the dentist and dental hygienist can apply current knowledge to aid the patient in the selection of an appropriate dentifrice which will benefit or prevent harm to the teeth and gingiva.

For a few patients, dentifrice selection can be based on individual preference for flavor and cleaning ability, provided the dentifrice is not excessively abrasive. For most patients, dental caries control is an important factor, and a dentifrice containing fluoride is essential.

Powder dentifrices contain abrasives, detergents, flavoring, and sweetener. Paste dentifrices contain the same plus binders, humec-tants, preservative, and water. Either may have a coloring agent. A therapeutic dentifrice has a drug or chemical agent added for a specific preventive or treatment action. In manufacturing products, a major problem is to combine agents that are compatible with each other.

The American Dental Association, Council on Dental Therapeutics evaluates only those dentifrices that claim therapeutic value.

Over the years research on chlorophyll dentifrices, ammoniated dentifrices, dentifrices containing enzyme inhibitors such as sodium-n-lauryl sarcosinate and sodium dehydroacetate, and antibiotics, penicillin and tyrothricin, contributed to the search for a major break into dental caries prevention. The fluoride dentifrice research has been shown to contribute the greatest benefits at the present time.

Problems with the fluoride dentifrices primarily have been related to finding compatible constituents to be combined with the fluoride in the dentifrice formula. The lack of caries prevention by early sodium fluoride dentifrices has been attributed to the use of abrasives containing calcium which combined with the fluoride and rendered it inactive. This problem has been overcome and compatible fluoride and abrasive systems have been developed.

Mouthrinses may be classified as cosmetic or therapeutic. When claims for therapeutic value have not been scientifically substantiated, there may be harm in repeated use of a product.

Mouthrinses that claim no therapeutic or disease preventive value are not included in the acceptance program of the American Dental Association, Council on Dental Therapeutics. At present, the unsupervised use of medicated mouthrinses by the public cannot be considered to contribute to oral health. Medicated mouthrinses that claim pain relief or elimination of halitosis should be considered with reservation. Several fluoride solutions have been accepted as effective agents for use as mouthrinses for reducing the incidence of dental caries.

When recording information about the oral health practices of a patient as part of the medical and dental history, it is advisable to determine whether a particular mouthrinse is used, how frequently, and what the patient believes to be the benefit from its use. If any detrimental effects are suspected after the oral examination, or if adverse effects are known to be possible, the patient can be informed and alternate procedures for rinsing can be recommended.

The *toothbrush* is the principal instrument in general use for accomplishing plaque removal as a necessary part of disease control. Many different designs of toothbrushes and supplementary devices have been manufactured and promoted.

Patients who have not previously received professional advice concerning the best brush for their particular oral characteristics very likely have used brushes selected on the basis of cost, availability, advertising claims, family tradition, or habit. Because of the variety in shapes, sizes, textures, and other characteristics, the dental hygienist must become familiar with the many available products in order that patients be advised appropriately.

Although the American Dental Association does not evaluate and classify manual toothbrushes, certain recommendations have been made. Desirable characteristics of a brush designed primarily to promote oral cleanliness are that it

1. Conform to individual patient requirements in size, shape, and texture.
2. Be easily and efficiently manipulated.
3. Be readily cleaned and aerated; impervious to moisture.
4. Be durable and inexpensive.
5. Have prime functional properties of flexibility, softness and diameter of the bristles or filaments; and strength, rigidity, and lightness in the handle.
6. Be designed for utility, efficiency, and cleanliness.

A manual toothbrush consists of a *head* with bristles and a *handle*. When the bristles are bunched together, they are known as *tufts*. The head is arbitrarily divided into the *toe*, which is at the extreme end of the head, and the *heel*, which is closest to the handle. A constriction, termed the *shank*, usually occurs between the handle and the head. Many toothbrushes are manufactured in different sizes—*large*, *medium*, and *small* (or *compact*)—to adapt better to the oral anatomy of different individuals. Toothbrushes also differ in their defined hardness or stiffness, usually being classified as *hard*, *medium*, or *soft*.

Knowledge level control:

1. What hygienic means do you know?
2. Toothbrushes classification?
3. To select the toothbrush for the child?
4. How are toothpastes divided by purpose, characteristics and structure?
5. Choice criteria of the oral cavity hygienic means?

Practical Lesson № 13

Hygienic things of the oral cavity. Indication for using depending on dental state

Aim of the lesson. To study with the students the oral hygiene items and their choice depending on dental status.

Actuality. Students under the control of a teacher conduct a conversation with children about the need to clean teeth and the importance of its proper technique. Teach children the right manual skills on phantom, and then in the oral cavity.

Control of the initial level of knowledge.

1. What are the risk factors of general importance which cause the periodontal diseases progress?
2. What are the risk factors of local importance which cause the periodontal diseases progress?
3. What are the dental plaque and its structure?
4. What are the dental calculus and its species?

Content of the lesson

There are many aspects of plaque control and many means and methods of plaque removal. Since all of the activities that are part of plaque removal can be controlled by the individual, and must be his responsibility, they are grouped together under the title personal oral hygiene. There is no right method of plaque removal, and personal oral hygiene must remain personal. Of the many techniques available, the ones selected must be those that are right for the individual patient.

Auxiliary measures are selected to complement toothbrushing. Since plaque on proximal tooth surfaces is not totally accessible to usual brushing, a means for proximal plaque removal is necessary in complete preventive care. The interdental area is generally inaccessible for toothbrushing. It is a protected area when the teeth are in normal position. Because of its shape, it tends to harbor microorganisms. Most gingival disease starts in the interdental areas and the incidence of gingivitis is highest in the interdental gingiva.

For complete plaque and debris removal from proximal tooth surfaces, more than the toothbrush is generally needed. Various materials and devices are described in the sections following.

Removal of all calculus and smoothing of the tooth surface increases the effectiveness of devices. Rough tooth surfaces retain plaque which initiates inflammation. Large deposits of calculus and overhanging restorations interfere with the use of devices; for example, dental floss

catches and shreds when applied to overhanging margins of restorations or calculus deposits.

It is not generally recommended that instruments that are used to apply pressure for massage or stimulation be used without first removing subgingival calculus. Rubbing the inflamed gingival wall of the pocket over calculus may aggravate the inflammatory reaction.

When *dental floss* is applied with firm pressure to a flat or convex proximal tooth surface, plaque can be removed. A concave tooth surface would escape contact with the floss.

Interproximal brushes are available in a variety of shapes. For best cleaning efficiency, the diameter of the brush should be slightly larger than the gingival embrasure so that the bristles exert pressure on the tooth surfaces.

These small brushes are inserted interproximally and activated with short back-and-forth strokes in a linguofacial direction.

The *Perio-Aid* consists of a *toothpick* with a round, tapered end that is inserted in a handle for convenient application. This device is particularly efficient for cleaning along the gingival margin and within gingival sulci or periodontal pockets. Deposits are removed by using either the side or the end of the tip.

Knowledge level control

1. What hygienic means do you know?
2. What interdental hygienic means do you know?
3. Coice criteria of the oral cavity hygienic means.
4. Dental flosses and its characteristics.

Practical Lesson № 14

Methods of hygienic care for the oral cavity. Individual hygiene. Mastering of tooth brushing techniques. Control tooth brushing

Aim of the lesson To study with the students the methods of teaching children tooth brushing and techniques of control of brushing of teeth.

Actuality: To learn with the students the technique of tooth brushing.

Control of the initial level of knowledge

1. At what age should the child start to clean teeth?
2. What hygienic means are recommended for the children?
3. What is laid in controlled teeth cleaning?

4. Oral cavity hygiene value in the dental diseases prevention.

Content of the lesson

Complete toothbrushing instruction for a patient involves teaching many details related to why, what, when, where, and how. In addition to descriptions of specific toothbrushing methods, the succeeding sections will consider the grasp of the brush, the sequence and amount of brushing, the areas of limited access, supplementary brushing for the occlusal surfaces and the tongue, the possible detrimental effects from improper toothbrushing as well as contraindications, and the care of toothbrushes.

Most toothbrushing methods can be classified into one of seven groups based on the motion applied by the brush. Noted below beside certain categories are names of methods that utilize the designated motion as part or all of their particular procedure. Some of these methods are recorded for descriptive, comparative, or historic purposes only, and are not currently recommended. A few have even been proved detrimental.

A. Roll: Rolling stroke, modified Stillman.

B. Vibratory: Stillman, Charters, Bass.

C. Circular: Fones .

D. Vertical: Leonard's.

E. Horizontal.

F. Physiological: Smith's.

G. Scrub-brush.

The most natural brushing methods used by patients uneducated in toothbrushing are a reciprocating *horizontal scrub technique*, (Hones' technique), or a simple *up-and-down* motion over the maxillary and mandibular teeth (Leonard's technique). Patients managing effective toothbrushing with these methods without causing traumatic problems or disease should not alter their brushing methods just for the sake of change.

HORIZONTAL. The horizontal scrub technique is probably the most used method. The toothbrush bristles are positioned perpendicular to the tooth crown. The brush is moved back and forth in short horizontal strokes. The bell-shaped anatomy of children's primary teeth is most effectively cleansed by the scrub technique. Over prolonged periods excessive pressure and abrasive dentifrices, however, can result in gingival recession and tooth damage at the cemento-enamel junction.

FONES. The Fones technique is similar to the horizontal scrub method except that rotary strokes are used. Fones cautioned about possible gingival damage but encouraged stimulating the gingiva with rotary strokes. In addition, Fones advocated mouth brushing, which included teeth, gingivae, and tongue.

LEONARD. In Leonard's method, an up-and-down brushing motion is used over the facial surfaces of the clenched posterior teeth to provide both tooth cleaning and gingival stimulation.

Often all three natural motions are used by the same individual during brushing, and it is impossible to determine a dominant motion in removing debris and stains from the smooth tooth surfaces; all stimulate and sometimes harm the gingiva.

STILLMAN. Stillman's method was originally developed to provide gingival stimulation. The toothbrush is positioned with the bristles inclined at a 45-degree angle to the apex of the tooth, with part of the brush resting on the gingiva and the other part on the tooth. A vibratory motion is used with a slight pressure to stimulate the gingiva. In this technique, the bristles are mainly pulsed.

CHARTERS. Charters advocated a pressure-vibratory technique to clean interproximal areas. Charters' original intent was to reduce the incidence of interproximal caries. The toothbrush should be placed at a 90-degree angle to the long axis of the teeth so that the bristles are gently forced between the teeth but do not rest on the gums. The brush is moved in several small rotary motions so that the sides of the bristles are in contact with the gum margin. After two or three such motions the brush is removed and replaced in the same area and the motions repeated. According to Charters these movements crowd the sides of the bristles into the V-shaped spaces between the teeth so that the gingivae are massaged. This method is useful in cleaning the abutting surfaces or fixed bridges, around fixed orthodontic appliances, and when interproximal tissues are missing. When normal papillae are present, other methods are easier to use and are equally effective in cleaning interproximal areas.

BASS. It is important to note that the Bass technique was the first to focus on the removal of plaque and debris from the gingival sulcus by the combined use of a soft toothbrush and unwaxed dental floss. The method is effective for removing plaque adjacent to and directly beneath the gingival margins as part of the self-care regimen for controlling periodontal disease and caries. In the Bass technique the toothbrush is positioned in the gingival sulcus at a 45-degree angle to the tooth apex. The bristles are then gently pressed to enter the sulcus. A vibratory action, described as a back-and-forth horizontal jiggle, causes a pulsing of the bristles to clean the sulci. **Modified Brushing Methods.** In attempts to enhance brushing of the entire facial and lingual tooth surfaces, the original techniques of Stillman, Charters, and Bass have been modified to include the rolling stroke method.

In the modified Stillman and Charters methods, the toothbrush bristles are placed in approximately the same position as advocated in the original method, and a pulsing action is started. Then the toothbrush is slowly press-rolled coronally. A continued vibratory motion is used during this rolling stroke.

In the modified Bass technique, sulcular brushing is done either before or after the use of the rolling method. The Bass sulcular brushing and the rolling stroke should not be combined into one continuous movement, because this may result in an inadequate amount of pulsing or the brush not being positioned correctly in the sulci and lead to injuries. Lingual surfaces are cleaned in the same manner by using small, circular, vibratory motions.

Knowledge level control

1. Teeth cleaning sequence, cleaning duration, direction of motions.
2. Sequence of operations during the study of children to clean teeth.
3. Hygienic care for the toothbrush and its keeping.
4. Usage of toothpicks and dental flosses.

Practical Lesson № 15

Professional hygiene of the oral cavity: methods and equipment

Aim of the lesson. To familiarize students with the means and methods of conducting of professional oral hygiene.

Actuality. To consider with the students the technique of professional oral hygiene in dental office.

Control of the initial level of knowledge

1. Give classification of the dental deposits.
2. Hygienic indexes (Fedorova-Volodrinoi, Green-Vermillon).

Content of the lesson

At the beginning of the lesson the teacher points out on important element prevention of periodontal diseases and caries that is professional hygiene of the oral cavity. The objective of the procedure is to identify and eliminate undesirable substances from the teeth's surface. These substances include plaque, stain, calculus, and food debris. Patients refer to this process as "teeth cleaning". It goes without saying that teeth cleaning has primary purpose of prevention of periodontal disease and dental caries.

This problem demands good medical care among individuals. To a great extent the number of prophylactic needs is determined by the effectiveness of a patient's own individual oral hygiene efforts. In general a majority of patients need this medical care twice a year. On the other hand, some patients require it regularly, and others should have it every 2 or 4 months.

The following groups of instruments should be used for effective removing of deposits and smoothing of root surface:

1. Ultrasonic and voice instruments
2. Hand instruments
3. Circulating instruments

Knowledge level control

1. What includes the professional hygiene of oral cavity?
2. Instruments for removing dental deposits.

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