

DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY

Department of Pediatric Dentistry

Methodological Recommendations

Pediatric Therapeutic Dentistry

**for preparing of specialists of the second (master) level
of higher education
*4th year, 8th semester***

(for students)

Lviv 2021

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Methodical recommendations were discussed, re-approved and confirmed at the meeting of the Department of Pediatric Dentistry of Lviv National Medical University named after Danylo Halytsky

Protocol № from « » _____ 202

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Protocol № from « » _____ 202

Protocol № from « » _____ 202

**Responsible for the issue
Vice-Rector for Academic Affairs, Professor M.R. Grzegotskyy**

THEMATIC PLAN OF THE LECTURES

Pediatric Therapeutic Dentistry		
№	Theme	Hours
1.	Anatomical and physiological features of the structure and functions of the periodontium at different age of children. Etiology and pathogenesis of periapical inflammation. Classification. Diagnosis and differential diagnosis of the periapical inflammation.	2
2.	Treatment of periapical inflammation of primary and permanent teeth in children.	2
Total		4

THEMATIC PLAN OF THE PRACTICAL LESSONS

Pediatric Therapeutic Dentistry		
№	Theme	Hours
1	Periapical inflammation of the primary teeth in children. Peculiarities of clinical course. Diagnostics, roentgenological diagnosis, differential diagnostics. Influence of the periapical inflammation of primary tooth on the permanent tooth follicle.	3
2	Roentgenological diagnosis of dental caries and its complication in children. The limits of conservative treatment of primary teeth with periapical inflammation.	3
3	Choice of methods of treatment of the periapical inflammation of primary teeth. Peculiarities of the endodontic treatment of the periapical inflammation in primary teeth. Prognosis.	3
4	Periapical inflammation of permanent teeth in children. Peculiarities of the clinical course. Diagnostics, roentgenological diagnosis, differential diagnostics.	3
5	Peculiarities of the endodontic treatment in permanent teeth with unformed root. Prognosis.	3
6	Peculiarities of the endodontic treatment in permanent teeth with formed root. Prognosis.	3
7	Mistakes and complication of the endodontic treatment of primary teeth in children. Their prevention and elimination.	3
8	Trauma of primary teeth in children. Causes. Clinics. Diagnosis. Treatment tactic.	3
9	Trauma of permanent teeth in children. Treatment tactic.	3
10	Medical history. Control of mastering practical skills.	3
	Whole	30

THEMATIC PLAN OF THE SELF-WORK

Pediatric Therapeutic Dentistry

№	Theme	
1	Preparing for the practical classes and seminars (theoretical, elaboration of practical skills).	18
2	Sealing of root canals of permanent teeth in children with using heated and thermoplastic gutta-percha.	2
3	Medical history.	6
	Whole	26

Methods of control

Control of knowledge of discipline is in the form of: current control, which is carried out at each practical lesson and allows to identify the level of mastering of individual elements of the training material. During assessment of mastering of each topic for the current educational activity of the student grades on a 4-point (traditional) scale are given taking into account the approved evaluation criteria for the respective discipline. This takes into account all types of work provided by the curriculum. The student must receive a grade on each topic. Forms of assessment of current educational activities are standardized and include control of theoretical and practical training.

Methods of evaluation of current educational activity:

Theoretical knowledge:

1. Individual oral questioning of theoretical material or theoretical interview.
2. Written theoretical control.

Practical skills:

1. Individual control of practical skills and their results.

Methods of controlling the assimilation of topics.

Theoretical knowledge:

1. Individual oral questioning.
2. Written test solution or computer-based test control.
3. Written theoretical control.

Practical skills:

1. Individual control of practical skills and their results.

Theoretical knowledge:

1. Written assignments of tests of the 2nd level or computer-based test controls.
2. Individual oral survey.

Practical skills:

1. Individual control of practical skills and their results.

Distribution of points that students receive

Conversion of a traditional 4-point scale into a multi-score (maximum 120 points) - the conversion of the total grade of the current performance - is made only after the current lesson that precedes the exam. Conversion is performed by the following algorithm:

- calculates the average mark of the student on the traditional 4-point scale, obtained during the current classes (up to a hundredth grade);

- to obtain a convertible multivariate total assessment of current performance, the average score obtained on the traditional 4-point scale must be multiplied by a factor of 24. The exception is the case when the average on the traditional 4-point scale is 2 points. In this case, the student receives 0 points on a multi-scale;

- the average grade of current achievement is calculated on the total number of lessons, and not on actually attended by the student.

The minimum converted amount of points of current achievement for the discipline "Pediatric Therapeutic Dentistry" is **72 points**.

Exam score is scored in points (traditional 4-point score is not given). The maximum score for an exam is 80 points. The minimum number of points for the exam under which control is considered to be passed is 50 points.

The maximum number of points per course is 200 points.

Marks:

- "**excellent**" - gets a student who fully possesses theoretical educational material on a subject, can use the acquired knowledge to answer a question, substantiate his / her answer; mastered the practical skills provided by the topic of the lesson; solves test tasks from the topic and explains the progress of their solving;

- "**good**" - a student who has full theoretical knowledge of the topic can use the knowledge gained to answer the question, but with some difficulty substantiates his answer; acquired the practical skills foreseen by the relevant occupation; can unlink test tasks from a topic and explain how they are solved;

- "**satisfactory**" - is obtained by a student who does not have sufficient theoretical teaching material on the topic, with difficulty uses the obtained knowledge, cannot substantiate his / her answer; has not sufficiently mastered the practical skills provided by the relevant occupation; Difficult to solve test tasks on a topic;

- "**unsatisfactory**" - is obtained by a student who does not possess theoretical teaching material on the topic, cannot use the acquired knowledge to answer the question and substantiate his / her answer; has not mastered all the practical skills foreseen by the relevant occupation; cannot and does not resolve test tasks from a topic.

PRACTICAL LESSON № 1

Theme: Periapical inflammation of primary teeth in children. Peculiarities of clinical course. Diagnostics, roentgenological diagnosis, differentialdiagnostics. Influence of the periapical inflammation of the primary tooth on the permanent tooth follicle.

Aim of the lesson: To teach the students to diagnose the different forms of the periapical inflammation of the primary teeth in children. To learn with students the peculiarities of structure of the periodontium in children, its change in the process of root formation and resorption of the primary teeth; classification of the periapical inflammation, diagnosis, differential diagnostics of an acute and chronic periapical inflammation of the primary teeth.

Actuality: Periodontitis of primary teeth is a very common pathology of the dental-jaw system in children, which is caused by the rapid development of complications of caries in temporary teeth.

Control of the initial level of knowledge

1. Peculiarities of the structure of the periodontium in children.
2. Function of the periodontium.

3. Anatomical and physiological changes in the periodontium during the root formation and resorption of the primary teeth in children.
4. Types of physiologic root resorption in primary teeth.
5. Types of pathologic root resorption in primary teeth.

Content of the lesson

Definition: **periapical inflammation (apical periodontitis)** is usually due to spread of infection following death of the pulp.

Etiology. The nature and behavior of lesions that form at the apex of the tooth are a reflection of the conditions that lead to the destruction of the pulp of the associated tooth.

Causes of apical periodontitis:

- infection
- trauma
- chemical irritation
- immune factor/ immunification.

I. Infection

1. Dental caries: Dental plaque → Dental caries → Pulpitis → Apical periodontitis
2. Periodontal pocket: the necrotic pulp probably becomes infected by bacteria from the gingival margins, leading to apical periodontitis.
3. Systemic infection (rare).

II. Trauma

1. The pulp sometimes dies from a blow which damage the apical vessels.
2. During endodontic treatment, instruments may be pushed through the apex or side of the root, damaging the periodontal membrane and carrying infected debris from the pulp chamber into the wound.
3. A high filling or biting suddenly on a hard object, sometimes caused an acute but usually transient periodontitis.
4. Occlusal trauma and orthodontic lead to trauma.

III. Chemical irritation:

1. irritant antiseptics used to sterilize a root canal can escape through the apex and damage the surrounding tissue.
2. A root-canal filling may also extend beyond the apex with similar effect.
3. Devital materials.

Clinic of the periapical inflammation of the primary teeth. The most often the chronic granulating periapical inflammation and the exacerbation of the chronic periapical inflammation are observed in the primary teeth in children.

Clinics. In most cases the pathological process is characterized by the absence of pain symptoms. The child primarily complains for the presence of a fistula (possibly with pus allocation), a carious cavity and the tooth's color change. In case of chronic granulating periapical inflammation the carious cavity is located within the parapulpal dentine. Though, it can also be located in the mantle dentine. These clinical features are caused by an acute course of caries in deciduous teeth and imperfect protective function of pulp (during the root growth and resorption periods in particular). That leads to rapid infection spread in periodontium.

Probing of the carious cavity bottom is painless in case of chronic granulating periapical inflammation. Reaction to thermal irritation is absent; tooth percussion is painless or slightly painful. Absence of pain during preparation of the enamel-dentine junction indicates on pulp

destruction and development of the inflammation process in periodontium. Probing of the carious cavity bottom, its connection with the pulp chamber and orifices of root canals is painless in case of periapical inflammation in deciduous teeth. Sometimes, probing may be accompanied by insignificant pain and bleeding as a result of granulating tissue ingrowth into root canals and pulp chamber, especially during the root growth and resorption periods.

In most cases a fistula with growing granulations and purulent excretion is defined on the gingival mucosa in the projection of root apexes or bifurcation of the affected tooth. If there is no fistula, the gingival mucosa is pastose and it has a cyanotic coloring in the sick tooth area.

A destructed alveolar cortical plate and an enlightenment of bone tissue with indistinct contours are defined radiologically in the area of molars' bifurcation and roots apices. Pathological tooth resorption and perforation of the pulp chamber bottom in the bifurcation area are often observed. Destruction of a cortical plate in a permanent tooth follicle occurs in case of the pathological process extension to the permanent tooth germ.

Chronic granulating periodontitis in deciduous teeth should be differentiated with the following diseases:

- chronic moderate caries; it is characterized by pain during preparation of the enamel-dentine junction;
- chronic fibrous and gangrenous pulpitis; in this case probing of an exposed pulp horn and root canal orifices is accompanied with an acute pain reaction; there are no radiological changes;
- pulpitis, complicated with a focal periodontitis; probing of a disclosed pulp horn provokes acute pain and bleeding.

In case of chronic periapical inflammation segments of bone tissue destruction in the periapical and in the bifurcation area are defined radiologically.

There are next differential-diagnostic features of chronic granulating periapical inflammation: presence of a fistula with purulent excretion and grown granulations on the swell, hyperemic gingival mucosa in the area of a pathological process; destructive changes in the periapical and bifurcation area of the affected tooth (radiologically defined), and the absence of pain during preparation of the enamel-dentine junction.

Chronic fibrous periapical inflammation is practically not diagnosed in deciduous teeth.

Chronic granulomatous periapical inflammation is very rare in deciduous teeth. It may develop in the root stabilization period of deciduous tooth development.

Aggravation of chronic periapical inflammation in deciduous teeth is the second frequent disease.

Clinics. Patients complain on a constant pain which increases gradually, especially during biting on the causative tooth.

Children refuse food. In case of purulent inflammation and acute periosteal reaction the patients' general condition worsens rapidly due to fever and general intoxication. Parents notice the following features: facial skin paleness; weakness; headache; disturbed sleep and appetite. An objective examination defines a carious cavity of varying sizes or a filling in the causative tooth. Pulp chamber can be closed or exposed. A purulent exudate can appear during the cavity exposure. The tooth is mobile due to the exudate accumulation in periodontium.

The gingival mucosa in the affected tooth area is hyperemic, swell and painful during palpation. In case of periosteal reaction development, smoothness of a mucobuccal fold is defined near the causative tooth and the adjacent teeth; the fold is painful during palpation. Sometimes a scar from fistula can be noticed on the modified mucosa. Regional lymph nodes

are enlarged, dense, and painful during palpation.

Radiologically bone tissue destruction area with indistinct contours can be detected in periapical and bifurcation areas in case of aggravation of chronic periodontitis.

Aggravation of chronic periodontitis in deciduous teeth should be differentiated with an acute diffuse pulpitis complicated with a perifocal periodontitis. In case of the second one the tooth reacts on thermal irritation; pulp chamber is exposed and accompanied with an acute pain and bleeding; the radiogram shows destructive changes in periodontium.

Acute toxic periapical inflammation in deciduous teeth can develop as a result of an arsenic paste application for pulp devitalization, or the use of strong antiseptics of phenol group (phenol, camphorated phenol, tricresol, pheresol, resorcin and aldehydes (formalin) for the root canals obturation, especially during the root growth/resorption periods.

Acute traumatic periapical inflammation in deciduous teeth may result from an acute injury (bruise, blow), as well from the errors made by a dentist during endodontic manipulations.

Acute infectious periapical inflammation develops as a perifocal process in periodontium in case of serous or purulent diffuse pulpitis in deciduous teeth.

Clinical manifestation of acute periodontitis and aggravated chronic periapical inflammation in deciduous teeth are very similar. Patients complain of a continuous pain in a causative tooth; the pain reinforces at biting or touching it with a tongue. The tooth may be intact in case of an acute trauma or it may have a carious cavity. In case of acute toxic periodontitis pulp chamber is partially or completely disclosed. Acute pain from vertical percussion is the main clinical feature.

The gingival mucosa in the causative tooth area is swell and hyperemic. Features of regional lymphadenitis are not defined in most patients; however, there is insignificant hyperadenosis and soreness at palpation in some children.

There are no radiological changes in periodontium. Acute periodontitis should be differentiated with the aggravation of a chronic periodontitis, basing on the history data, as well as the radiological examination results (presence of destructive changes in periodontium and bone tissues).

Chronic periapicalperiapical inflammation can lead to the following complications:

- expansion of the pathological process on the permanent tooth follicle which can cause its death;
- infication of the permanent tooth follicle on the early stages of its mineralization can cause the local enamel hypoplasia formation;
- spreading of the inflammatory process on the follicle can cause its death, and as the result the sequestration of follicle can occur;
- the long lasting chronic periapical inflammation can lead to the changes of the permanent tooth follicle location which clinically is observed as oral or vestibular tooth location after the tooth eruption or torsivertion;
- destroying of the bone between primary tooth and permanent follicle due to expansion of the granulated tissue can cause the prematurely tooth eruption with low level of the enamel mineralization and risk of caries development;
- premature primary tooth extraction caused by chronic periapical inflammation, especially during the period of the root formation and at the beginning of their stabilization can lead to the permanent tooth retention, delaying of its eruption and formation of the orthodontic anomalies;

- expansion of the chronic inflammatory processes on the adjacent follicle in some causes follicular cyst formation.

Knowledge level control

1. Peculiarities of the clinical course of the acute infectious periapical inflammation of the primary teeth.
2. Peculiarities of the clinical course of the acute toxic periapical inflammation of the primary teeth.
3. Peculiarities of the clinical course of the acute traumatic periapical inflammation of primary teeth.
4. Ways of spreading of the exudate at the acute periapical inflammation.
5. Peculiarities of the clinical course of chronic fibrous periapical inflammation of the primary teeth.
6. Peculiarities of the clinical course of chronic granulating periapical inflammation of the primary teeth.
7. Peculiarities of the clinical course of the chronic granulematousperiapical inflammation of the primary teeth.
8. Symptoms of the chronic periapical inflammation at stage of exacerbation at period of root formation, stabilization and resorption.
9. Differential diagnostics of the acute, chronic periapical inflammation and exacerbation of periapical inflammation.
10. Influence of the periapical inflammation on the general state of the child organism.

Test

1. An 11-year-old boy does not have any complaints. During an examination a large carious cavity connected with the tooth cavity was found in the 46 tooth. Percussion of the tooth is painless. The mucous membrane in the projection of the root apexes of the 46 tooth without the change.probing of the root canal opening is painless. What is the provisional diagnosis?
A. Chronic periapical inflammation
B. Acute periapical inflammation
C. Chronic pulpitis
D. Chronic deep caries
E. Chronic medium caries.
2. A patient complains of continuous, gnawing pain in the 26 tooth which increases during chewing. On the X-ray of the 26 tooth the focus of the bone destruction in the apexes of mesiobuccal root is observed looking as the "tongues of flame". What is the most probable diagnosis?
A. Exacerbation of chronic granulating periapical inflammation
B. Exacerbation of chronic gangrenous pulpitis
C. Chronic fibrous periapical inflammation
D. Chronic granulomatous periapical inflammation
E. Chronic granulating periapical inflammation.
3. A 7-year-old boy,complaints of the presence of a ruined tooth in the lower jaw. Objectively; 2/3 of the crown of the 75 tooth is destroyed; the decayed cavity is connected with the cavity of the tooth, reaction to cold and probing is painless, percussion is painless too. On a mucous membrane in the area of projection of the root is cicatrix from fistula. On X-ray; the destruction area is near bifurcation with unclear contours. Make a diagnosis.

- A. Chronic granulating periapical inflammation
- B. Chronic fibrous periapical inflammation
- C. Chronic gangrenous pulpitis
- D. Chronic granulomatous periapical inflammation
- E. Chronic fibrous pulpitis.

4. A 9-year-old child complains of toothache during eating in a lower left molar. On mesial contact and masticatory surfaces of the 85 tooth there is a deep carious cavity that is connected with the cavity of the tooth. During probing of the connection there is a sharp pain and moderate bleeding. Percussion of the tooth is slightly painful. On the X-ray of the 85 tooth in the bifurcation area and near the root apexes there are areas of bone tissue rarefaction with unclear contours, their uneven resorption is observed. What is the most probable diagnosis?

- A. Pulpitis complicated by periapical inflammation
- B. Chronic granulating periapical inflammation
- C. Chronic fibrous pulpitis
- D. Aggravation of chronic periapical inflammation
- E. Chronic gangrenous pulpitis.

5. An 11-year-old boy, does not have any complaints. Objectively; in the 46 tooth there is a large carious cavity connected with the cavity of the tooth. Percussion of the tooth is painless. Mucous membrane in the area of projection of the root apexes of the 46 tooth is without any changes. Probing of the root canal opening is painless. What is the provisional diagnosis?

- A. Chronic periapical inflammation
- B. Chronic deep caries
- C. Acute periapical inflammation
- D. Chronic medium caries
- E. Chronic pulpitis.

Control questions:

1. Describe the anatomical and morphological features of the structure of periodontal tissues at different stages of the development of the primary tooth.
2. Describe the clinical manifestations of acute purulent periapical inflammation of the primary tooth.
3. List the patterns of clinical manifestations of chronic periapical inflammation in primary teeth.
4. Describe the clinical and radiographic picture of chronic granulating periapical inflammation of the primary tooth.
5. Describe the clinical manifestations of exacerbation of chronic periapical inflammation of the primary tooth.
6. With what diseases it is necessary to carry out differential diagnosis of acute periapical inflammation of the primary teeth.
7. With which diseases differential diagnosis of chronic periapical inflammation of the primary teeth should be done.

List of practical skills:

1. To master the skills of diagnostics of various forms of periapical inflammation of the primary teeth in children.
2. To master the methods of differential diagnosis of various forms of periapical inflammation of the primary teeth in children.

PRACTICAL LESSON № 2

Theme: Roentgenological diagnosis of dental caries and its complication in children. The limits of conservative treatment of primary teeth with periapical inflammation.

Aim of the lesson: To learn with students the roentgenological diagnosis of caries and its complications. To teach the students to diagnose caries and its complications with using roentgenological pictures.

Actuality: Dental caries and its complications account for the largest group of dental diseases. In the diagnosis of these diseases, along with clinical large role belongs to the radiological method, which allows to determine the nature and extent of the pathological process, to identify a number of symptoms that can not be established by other methods of research, to conduct differential diagnosis.

Control of the initial level of knowledge

1. Classification of caries of the teeth in children.
2. Pathomorphological peculiarities of caries.
3. Classification of pulpitis in children.
4. Classification of the periapical inflammation in children.
5. Types of the physiological and pathological resorption.
6. Peculiarities of the course of the pathological process in the periodontium depending on the stage of root formation.

Content of the lesson

Dental X-rays are pictures of the teeth, bones, and soft tissues around them to help find problems with the teeth, mouth, and jaw. X-ray pictures can show cavities, hidden dental structures (such as wisdom teeth), and bone loss that cannot be seen during a visual examination. Dental X-rays may also be done as follow-up after dental treatments.

The following types of dental X-rays are commonly used. The X-rays use small amounts of radiation.

- Bitewing X-rays show the upper and lower back teeth and how the teeth touch each other in a single view. These X-rays are used to check for decay between the teeth and to show how well the upper and lower teeth line up. They also show bone loss when severe gum disease or a dental infection is present.

- Periapical X-rays show the entire tooth, from the exposed crown to the end of the root and the bones that support the tooth. These X-rays are used to find dental problems below the gum line or in the jaw, such as impacted teeth, abscesses, cysts, tumors, and bone changes linked to some diseases.

- Occlusal X-rays show the roof or floor of the mouth and are used to find extra teeth, teeth that have not yet broken through the gums, jaw fractures, a cleft in the roof of the mouth (cleft palate), cysts, abscesses, or growths. Occlusal X-rays may also be used to find a foreign object.

- Panoramic X-rays show a broad view of the jaws, teeth, sinuses, nasal area, and temporomandibular (jaw) joints. These X-rays do not find cavities. These X-rays do show problems such as impacted teeth, bone abnormalities, cysts, solid growths (tumors), infections, and fractures.

- Digital X-rays can be sent to a computer to be recorded and saved.

A full-mouth series of periapical X-rays (about 14 to 21 X-ray films) is most often done during a person's first visit to the dentist. Bitewing X-rays are used during checkups to look for tooth decay. Panoramic X-rays may be used occasionally. Dental X-rays are scheduled when you need them based on your age, risk for disease, and signs of disease.

Knowledge level control

1. Roentgenological signs of the superficial caries.
2. Roentgenological signs of the middle caries.
3. Roentgenological signs of the deep caries.
4. Roentgenological signs of pulpitis in different periods of the development of the primary and permanent teeth.
5. Peculiarities of the roentgenological diagnosis of the chronic granulomatous periapical inflammation.
6. Peculiarities of the roentgenological diagnosis of the chronic fibrous periapical inflammation.
7. Roentgenological diagnosis of the pathological and physiological root resorption.

Test

1. The parents of a 6-year-old child complaining about the presence of cavity in the lower right molars. OBJECTIVE: on the chewing surface of the 74 tooth revealed cavity within parapulpal softened dentine. During the necroectomy by excavator having a sharp pain and bleeding. In the projection of the medial-buccal pulp horn was found connection with the cavity of the tooth. Percussion of the 74 tooth is painless. Which radiographs corresponds to this setting.
 - A. The X-ray observed enlightenment triangular shape on the chewing surface of the tooth, which borders the medial horn pulp chamber. Changes in periodontal projection tops the roots of missing
 - B. On chewing surfaces of teeth found enlightenment round, connected with a pulp chamber. Around the tops and roots at the bifurcation on X-ray observed diffuse thinning of the bone tissue
 - C. In the projection of the distal root apex observed enlightenment bone with distinct contours diameter 4mm
 - D. Found enlightenment of the bone in the projection of the medial root apex rounded shape with a diameter of 6 mm
 - E. The X-ray observed uneven expansion slot periodontitis.
2. A 7-year-old child come to a doctor complaining with a slight enlightenment rounded form within the enamel on a medial surface of the 65 tooth. Put the diagnosis.
 - A. The surface caries
 - B. Middle caries
 - C. Caries in the stage of spot
 - D. Secondary caries
 - E. Deep caries.
3. On the roentgenogram of the 65 tooth the doctor found an enlightenment of round form on distal surface of the tooth that comes to features enamel-dentinal junction. Your diagnosis?
 - A. Middle caries of the 65 tooth
 - B. Deep caries of he 65 tooth
 - C. The surface caries of the 65 tooth
 - D. Caries under spot of the 65 tooth
 - E. Initial caries of the 65 tooth.
4. A 10-year-old boy complains of the presence of the cavity in the 46 tooth. During examination a doctor revealed a cavity in the 46 tooth, connected with the cavity of the tooth. Probe of root canal us painless. Percussion of the 46 tooth is painless. In mucous membrane of the alveolar

process in the projection of the tops of the roots of the 46 tooth is fistula with purulent secretions. Put the right diagnosis?

- A. Enlightenment of the oval form that goes into the tooth cavity. In projection of apex the medial root - enlightenment bone without clear contours
- B. Enlightenment on the distal side of the tooth within the enamel. Changes within the periodontal tops no roots
- C. In medial wall of the tooth - enlightenment of oval form that comes to features enamel-dentinal border
- D. Enlightenment on distal side of the tooth within the enamel. Changes within the periodontal tops no roots
- E. There is no correct answer.

5. On the roentgenogram of the 51 tooth a doctor found enlightenment of the irregular shape, connected with the cavity of the tooth. Rounded, clearly limited liquefaction of root canal clearance and located in the upper third of the root. Your diagnosis?

- A. Intrapulpal granuloma
- B. Cystogranloma
- C. Radicular cyst
- D. Chronic fibrous periodontitis
- E. Chronic granulomatous periodontitis.

Control questions:

1. Describe radiological diagnosis of caries.
2. Name the localization of carious cavities, in the detection of which the possibilities of radiological studies are limited.
3. Name the localization of carious cavities, in the detection of which X-ray examination is given a leading place.
4. Describe the radiodiagnosis of chronic concrementous pulpitis.
5. Describe the radiodiagnosis of chronic apical periodontitis.
6. Describe the radiodiagnosis of chronic apical periodontitis and the growth zone of permanent teeth with unformed root. Differential diagnostics.

List of practical skills:

1. Be able to determine the depth of the carious cavity according to radiological examination.
2. Be able to carry out differential diagnosis of caries, pulpitis and apical periodontitis according to the radiograph.
3. Be able to evaluate the quality of endodontic treatment with the radiological examination.

PRACTICAL LESSON № 3

Theme: Choice of methods of treatment of the periapical inflammation of primary teeth. Peculiarities of the endodontic treatment of the periapical inflammation in primary teeth. Prognosis.

Aim of the lesson: To learn with students the indications for conservative and surgical methods of treatment of the periapical inflammation of the primary teeth. To teach the students

to treat the periapical inflammation of the primary teeth. To learn the peculiarities of the conservative treatment of different forms of the periapical inflammation.

Actuality: Periodontitis of temporary teeth is a complication of caries and a fairly widespread pathology of the dentition system in children. It can develop at all stages of development of the root of a temporary tooth (root formation, stabilization and its resorption). Treatment of periodontitis of temporary teeth is a complicated and long process. A properly selected treatment for periodontitis prevents both early tooth extraction and the development of purulent-inflammatory diseases of the maxillofacial area.

Control of the initial level of knowledge

1. Periods of the development of the primary and permanent teeth.
2. Stage of the root formation of the primary and permanent teeth.
3. Terms of the root formation and resorption of the primary and permanent teeth.
4. Anatomical and topographical peculiarities of the structure of the primary and permanent teeth which impact on choice of treatment of the periapical inflammation.
5. Peculiarities of the endodontic treatment of the primary teeth.
6. The impact of the chronic periapical inflammation on the child's organism.

Content of the lesson

The methods of treatment of the primary teeth:

- Conservative treatment with tooth preservation
- Surgical treatment (the tooth extraction).

Indications for the primary tooth extraction:

- The tooth is responsible of the acute septic state;
- The tooth is the source of the acute odontogenic processes (permanent exacerbated periostitis, osteomyelitis);
- the hosts defence system is weakened;
- arresting of the root formation before ending of the root development;
- damaging of the cortical lamina of the permanent tooth follicle by inflammatory process;
- pathological or physiological root resorption more than for 1/3 of its length;
- tooth mobility (II-III degree);
- The crown of the tooth is destroyed and the physiological tooth changing occurs in 18 month;
- Root or tooth floor perforation;
- Inner resorption of the roots;
- Extensive pathological destroying of the bone;
- The failure of the conservative treatment;
- The patients with complicated anamnesis vitae;
- Retained primary tooth with radiographic evidence of the presence of permanent tooth.

The main goal of the conservative treatment of the primary teeth with periapical periodontitis is to eliminate the infection from the periodontium for the maintenance of the physiological root development and prevention of damaging of the permanent tooth.

It can be achieved due to precise mechanical instrumentation, thorough irrigation and subsequent tight obturation of the root canal system.

The choice of treatment methods depends from the etiology of the inflammatory process

(infection, traumatic, toxic processes), root development stage (stage of the root growth, phase of the root stabilization, phase of the root resorption), size of the bone lesion and somatic health of the child.

Treatment of the primary tooth in phase of the root stabilization.

Conservative treatment of the primary teeth is pointed at elimination of infection in the periapical tissue, pain relief and prevention of proceeding and spreading of the inflammatory process into adjacent tissue and organs. The purulent effluent which is formed in the periodontium can go out from the periapical tissue by the different ways:

- through the root canal system,
- from the apex towards the periosteum (through the bone structure),
- through the fistulae (exacerbation of the chronic granulated periodontitis),
- through the ligamental space,
- through the tooth extraction.

It is essential to provide outflow of the pus from the periapical tissue through the root canal at the first stage of the root canal treatment.

The first appointment treatment includes:

- anesthesia;
- opening of the pulp chamber and canal orifices;
- initial instrumentation of the root canal system (shaping and cleaning) with considerable quantity of irrigation solution;
- careful opening of the root apex without pushing of the debris behind the apex.

The doctor can leave the tooth opened for one day when the considerable quantity of the purulent effluent is present and there are no possibilities to achieve the dry canal at the first appointment.

In these cases the clear recommendation should be referred to the patient:

- frequent mouth soda bath;
- maintenance of the drainage through the root canal (pulp chamber should be opened for all the time; just during feeding it should be closed by the cotton pallet).

The second appointment treatment includes:

- final root canal instrumentation and irrigation with considerable quantity of the irrigation solution;
- drying of the root canal by means of sterile paper points;
- placement of temporary dressing into the root canal;
- placement of temporary crown filling.

The completion of the root canal treatment with the root canal filling can be providing when:

- there is no evidence of edema of the face or transitional fold;
- the tooth is painless;
- there is no tenderness to percussion;
- there is no sensitivity to palpation of mucogingival fold nearby the tooth apex;
- absence of the pus into the root canal;
- the tooth is odour free.

Peculiarities of the endodontic treatment of the temporary teeth.

- Wide opening of the pulp chamber;
- Work-length determination 1-2 mm less than roentgenologically found out;

- There is no necessity to form the tapered canal;
- Mechanical instrumentation should be gently provided as the structure of dentin of temporary root is low mineralized and the root walls are thin;
- Irrigation of the root canal space with un-irritative antiseptic solutions;
- Using of resorbable pastes with antimicrobial effects for permanent root canal obturation.

Knowledge level control

1. Indications for conservative treatment of the periapical inflammation of the primary teeth.
2. Indications for extraction of the primary teeth in case of periapical inflammation.
3. Requirements for antiseptics which are used for medicamentous processing of the root canals of the primary teeth.
4. Requirements to means which are used for the root filling of the primary teeth.
5. Name the paste which are used for the root canal filling of the primary teeth. Indicate their benefits and disadvantages.
6. Principles of treatment of the acute forms of the periapical inflammation of the primary teeth at stage of the root stabilization.
7. Principles of treatment of the chronic forms of the periapical inflammation of the primary teeth at stage of the root stabilization.
8. Peculiarities of treatment of the chronic forms of the primary teeth at stage of root resorption.

Test

1. Parents of a 7-year-old child complained of destroyed 85 teeth. During the examination revealed carious tooth cavity of 85 tooth connected to the cavity of the tooth. Deep probing is painful and accompanied with bleeding. Percussion is painless. Radiological findings in the area of the bifurcation of the roots and apexes of the 85 tooth discovered fire enlightenment bone with unclear contours. Diagnosed chronic granulating periodontitis. How many sessions are optimal for treatment?
 - A. 2 sessions
 - B. 5 sessions
 - C. 4 sessions
 - D. 1 session
 - E. 3 sessions.

2. A 4- year- old child complains about the destruction of her front teeth of the upper jaw. OBJECTIVE:the crowns of 51, 61 and 62 teeth completely destroyed, probing of the orifices of root canals is slightly painfull, accompanied by significant bleeding. The response to cold stimuli is absent. The percussion of the teeth is painless. The mucous membrane of the alveolar process in the area of front teeth of the upper jaw cyanotic,. On the X-Ray - the destruction of an alveolar cortical plate in the periapical root area of the 51,61,62 teeth. What is the most likely diagnosis
 - A. Chronic granulating periodontitis
 - B. Exacerbation of chronic periodontitis
 - C. Chronic gangrenous pulpitis
 - D. Chronic hypertrophic pulpitis
 - E. Pulpitis, periodontitis complicated.

3. A 7- years-old child complaining about the presence of the destroyed tooth on the lower jaw. OBJECTIVE:the crown of the 85 tooth is destroyed on 2/3, carious cavity communicates with the tooth cavity , reaction to cold and probing of the 85 tooth is painless. The mucosa membrane

in the area of the projection of the root of the 85 tooth - scar from fistula. On radiographs: a destructed alveolar cortical plate and an enlightenment of bone tissue with indistinct contours are defined in the area of molars bifurcation of the 85 teeth. Put the diagnosis.

- A. Chronic granulating periodontitis
- B. Chronic gangrenous pulpitis
- C. Chronic fibrous pulp
- D. Chronic fibrous periodontitis
- E. Chronic granulomatous periodontitis.

4. A 7- years-old child complaining about the presence of the damaged tooth on the lower jaw on the left side. OBJECTIVE: the crown of the 75 tooth is destroyed on 2/3, carious cavity communicates with the tooth cavity , reaction to cold stimuli is painless. The mucosa membrane in the area of the projection of the root of 75 tooth- fistula. On radiographs: destruction of bifurcation of the roots of the 75 tooth with indistinct contours. Which filling material should be used for the root canal filling?

- A. Eodont
- B. Sealapex
- C. Phosphate cement
- D. AH-plus
- E. Sealapex and gutta-percha pin.

5. During a preventive examination a 7- years-old child revealed carious cavity in the 75 tooth. After necrosectomy by excavator appeared connection with the tooth cavity, probing is not painful. On radiographs: the 75 tooth area enlightenment of bone tissue in the area of apex medial root and bifurcation with unclear contours. Cortical plate of the 35 tooth is preserved. Which filling material should be selected in this case?

- A. Zinc oxide eugenol paste
- B. Sealapex
- C. Glassionomer cement
- D. Resorcin-formalin paste
- E. Phosphate cement.

Control questions:

1. What is the method of treatment of chronic apical periodontitis in primary teeth during the period of root formation?
2. What is the method of treatment of exacerbation of chronic apical periodontitis in primary teeth during the period of root formation?
3. Name the ways of drainage of the periodontal gap.
4. Name the materials for root fillings used in the treatment of apical periodontitis of primary teeth, requirements for them. What determines the choice of filling material?
5. Name the group of medicines used for the general treatment of exacerbation of chronic apical periodontitis and indications for their appointment.
6. What are the criteria for the effectiveness of the treatment of apical periodontitis of the primary teeth in children?

List of practical skills:

1. To master the method of treatment of chronic apical periodontitis in the primary teeth.
2. To master the method of treatment of exacerbation of apical periodontitis of the primary teeth.

PRACTICAL LESSON № 4

Theme: Periapical inflammation of permanent teeth in children. Peculiarities of the clinical course. Diagnostics, roentgenological diagnosis, differential diagnostics.

Aim of the lesson:

Teach students to diagnose different forms of periodontal teeth in children. To study with students the peculiarities of periodontal structure in children, its changes in the process of formation of permanent teeth roots, classification of periodontitis, diagnosis and differential diagnosis of acute, chronic forms of periodontitis of permanent teeth in children.

Actuality:

Chronic, chronic exacerbated, and acute periodontitis of permanent teeth are very common pathological processes in pediatric therapeutic dentistry. The pediatric dentist should be aware of the regularities of the clinical course of these diseases in children of all ages, be able to diagnose and differentiate diagnostics in order to diagnose and use adequate therapies. It will allow to keep a permanent tooth, as well as to prevent the development of inflammatory processes in the maxillofacial area in children.

Control of the initial level of knowledge

1. Features of periodontal structure in children.
2. Periodontal functions.
3. Anatomical and physiological changes of the periodontium in the process of root formation of permanent teeth in children.

Content of the lesson

In children, the structure of periodontal tissues, and, accordingly, its functions differ instability. At different stages of development of the body of the child as a whole and periodontal in particular, there are progressive and regressive changes that affect the course of physiological and pathological processes.

By Kolesov's classification (1991) etiology of the periodontitis is divided into infectious, traumatic and drug-induced; by localization - apical and marginal; in the clinical course - acute, chronic and exacerbation of chronic; by pathomorphological changes in the tissues acute is divided into serous and purulent, and chronic into fibrous, granulating and granulomatous.

Acute forms of periodontitis of permanent teeth are predominantly toxic, traumatic and infectious in origin.

Acute periodontitis of the permanent teeth is most often the result of trauma (impact or fall of the baby) and is also caused by errors during the treatment of pulpitis. The development of acute toxic periodontitis, especially in the teeth with incomplete root formation, results in the use of devitalizing agents, as well as the use of agents with cytotoxic properties (phenol, camferophenol, tricresol, resorcinol) and aldehydes for antiseptic treatment and filling of root canals. Acute infectious periodontitis accompanies the course of acute or purulent pulpitis of permanent teeth, that is, a perifocal process.

Clinical signs of acute serous periodontitis:

- continuous aching pain in the causative tooth, which is exacerbated by biting;
- feeling of a “grown tooth”;
- the presence of a carious cavity filled with softened dentin, fillings or, rarely, an intact tooth;
- sounding of the caries cavity is painless;
- no response to thermal stimuli;
- vertical percussion is positive;

- slight tooth mobility (as a result of accumulation of exudate in the periodontium)
- regional lymphadenitis;
- the mucous membrane of the gums in the area of the causal tooth is unchanged or has minor signs of inflammation - pasty, swollen, slightly hyperemic, partly painful on palpation;
- radiological signs of periodontal lesions are absent.

In acute periodontitis of permanent teeth, the process quickly becomes diffuse in nature, serous inflammation during the day changes to purulent.

Clinical signs of acute purulent periodontitis:

- worsening of the child's general condition due to fever and intoxication;
- constant intense throbbing pain;
- a half-open mouth, as a slight touch of the tooth provokes sharp pain;
- reduction of pain in case of spreading pus under the periosteum;
- the causative tooth may be intact, previously treated, or have a carious cavity that does not mate with the tooth cavity;
- slight tooth mobility;
- vertical and horizontal percussion is positive;
- percussion examination of the adjacent teeth is painful due to the diffuse spread of the process;
- the mucous membrane of the gums in the area of inflammation is brightly hyperemic, swollen, painful on palpation;

• when the purulent exudate spreads under the periosteum, an abscess is formed, asymmetry of the face (due to the collateral soft tissue swelling), characteristic smoothness of the transitional fold in the area of the causative and adjacent teeth;

- maxillary lymph nodes enlarged in size, dense, painful during palpation;
- X-ray signs of periodontal lesions are absent, sometimes the clarity of the cancellous bone pattern in the causative tooth area may be lost.

Acute periodontitis of permanent teeth should be differentiated from:

- acute diffuse pulpitis, complicated by periodontitis

(Characteristic is pain all over the bottom when probing carious cavity, pain when opening the cavity).

- exacerbation of chronic periodontitis (the presence of radiological signs that are characteristic of the form of chronic periodontitis that led to the exacerbation)

- acute odontogenic periostitis (characterized by pain, swelling and smoothness of the transitional fold in the area of the causal tooth)

- acute odontogenic osteomyelitis (typically - motility of the causative and adjacent teeth, smoothness of the transitional convolution on both sides of the alveolar sprout, isolation of purulent exudate from dentate pockets).

Chronic periodontitis of infectious origin in permanent teeth in children is the first in frequency. The most common form of chronic periodontitis of permanent teeth in children, especially during root formation, is granular.

Clinical signs of chronic granulating periodontitis:

- asymptomatic or complaints of tooth darkening;
- unpleasant sensations in the tooth that occur when chewing solid food
- presence of fistula with pus;
- the causative tooth may be intact, previously treated, or have a carious cavity that connects to the tooth cavity;
- sounding of the caries cavity is painless;
- no response to thermal stimuli;
- percussion of the causative tooth is painless;
- the mucous membrane of the gums in the area of the causative tooth is pasty, swollen, slightly hyperemic, somewhat painful on palpation;
- Lukomsky's symptom of vasoparesis is positive;

- regional lymphadenitis;
- radiographically characterized by destruction of the cortical plate of the alveoli near the apex of the root, the periodontal cleft, as well as the lesion of the bone near the apex of the roots, which has indistinct outlines;

- bone destruction can also occur in the area of permanent bifurcation of permanent molars.

X-ray picture of chronic granulating periodontitis of permanent teeth with incomplete root formation should be differentiated from the area of growth in intact teeth. A differential feature is the integrity of the cortical plate of the alveoli surrounding the intact germinal zone.

Chronic granular periodontitis of permanent teeth should be differentiated from:

- chronic middle and deep caries;
- chronic fibrous and gangrenous pulpitis;
- Pulpitis, complicated by focal periodontitis.

Chronic granulomatous periodontitis of permanent teeth occurs mainly when their roots and periodontium are already fully formed. In the first stages, the development of the granuloma can be regarded as a protective reaction of the body in response to infections from the root canal to the periodontal cleft. However, the granuloma's protective function only takes some time. Gradually, its capsule germinates with blood vessels, causing the barrier between the granuloma and the surrounding tissues to break, and the granuloma begins to play the role of the focus of the chroniosepsis.

Clinical features of chronic granulomatous periodontitis:

- asymptomatic or complaints of pain when biting a tooth, changing its color;
- the causative tooth may be intact, previously treated, or have a carious cavity that connects to the tooth cavity;
- probing the bottom of the carious cavity, its connection with the tooth cavity and the entering of the root canals is painless;
- no response to thermal stimuli;
- percussion of the causative tooth is painless;
- radiographically characterized by destruction of the cortical plate of the alveoli and the periodontal cleft, as well as the center of thinning of bone tissue of round or oval shape with clear and outline, the diameter of which does not exceed 5 mm;

Chronic granulomatous periodontitis in children should be distinguished from the area of growth in intact teeth with unformed roots. The radiological feature of the germinal zone is the integrity of the cortical plate of the surrounding alveoli, as well as the uniform width of the periodontal cleft near the formed part of the root.

Chronic granulomatous periodontitis of permanent teeth should be differentiated from:

- chronic deep caries (characteristic occurrence of pain during the preparation of enamel-dentin junction, sensitivity of the tooth to the action of thermal stimuli);
- chronic fibrous and gangrenous pulpitis, complicated by focal periodontitis (characterized by the appearance of sharp pain during the probing of the connection between the carious cavity and the cavity of the tooth and canal eyes);
- granulating and fibrous periodontitis (radiographically - destruction of bone tissue in the granulating form of periodontitis has no clear outline; widening of the periodontal fissure and preservation of the integrity of the cortical plate in the fibrous form of periodontitis);
- cyst granuloma and radicular cyst (the center of bone destruction is not a radiograph has a large diameter, it is difficult to distinguish radiologically given pathology from periodontitis, diagnosis is made on the basis of histological examination).

Chronic fibrous periodontitis of permanent teeth is diagnosed in comparison with other forms of chronic inflammation of the periodontium and is characterized by the formation in the apical part of the roots of coarse fibrous connective tissue that replaces the periodontium.

Clinical signs of chronic fibrous periodontitis:

- asymptomatic course, no complaints of pain;
- tooth intact or sealed, rarely carious;

- tooth percussion is painless;
- the mucous membrane of the gums is not changed;
- X-ray - deformation of the periodontal gap in the form of its uneven expansion and narrowing - in the areas of hypercementosis.

The radiological symptomatology of chronic fibrous periodontitis is similar to the changes detected on the radiograph of teeth with incomplete root growth, namely, at the stage of the unopened apical opening and unformed periodontium. For the final diagnosis it is necessary to take into account the age of the child, the length of the period of growth and the formation of the roots of different teeth.

Exacerbation of chronic periodontitis of permanent teeth in children with incomplete root growth is diagnosed more often than acute course. In the clinic the differential - diagnostic signs of exacerbation are discoloration of the tooth, the presence of a fistula or scar from it, a combination of a carious cavity with a tooth cavity, mainly in permanent teeth with formed roots. The X-ray shows the destruction of the cortical plate of the alveoli, the deformation of the periodontal cleft, and the foci of destruction of bone tissue from fuzzy outlines near the apexes of the roots.

Differential diagnosis between exacerbation and acute periodontitis is performed taking into account the absence or presence of previous exacerbations in the anamnesis, fistula or scar from it, tooth discoloration, destructive changes in the periodontium radiographically.

Knowledge level control

1. Features of clinical course of acute infectious periodontitis of permanent teeth.
2. Features of clinical course of acute toxic periodontitis of permanent teeth.
3. Features of clinical course of acute traumatic periodontitis of permanent teeth.
4. Name the ways of distribution of exudate in acute periodontitis.
5. Features of clinical course of chronic fibrous periodontitis of permanent teeth.
6. Features of clinical course of chronic granulating periodontitis of permanent teeth.
7. Features of clinical course of chronic granulomatous periodontitis of permanent teeth.
8. Symptoms of chronic periodontitis in the stage of exacerbation, during the formation and stabilization of the roots of permanent teeth.
9. Differential diagnosis of acute, chronic forms of periodontitis of permanent teeth in children.
10. Influence of periodontitis of permanent teeth on the general state of the body in children.

Test

1. The chronic granulating periapical inflammation was diagnosed in a 14-year-old child. Which probable complaints did the child have at this disease?

- A. Discomfort and aching pain in the tooth
- B. Permanent throbbing pain
- C. Pain caused by chemical stimuli
- D. Pain caused by thermal stimuli
- E. Short-lasting throbbing pain.

2. In a 12-year-old child the roentgenologic examination should be conducted for an accurate diagnosis. Which roentgenologic picture is specific for chronic granulomatous periapical inflammation of the 41 tooth?

- A. Dissolving of bone tissue of a round shape with distinct contours
- B. Presence of a resorption area with indistinct contours
- C. No changes
- D. Expansion of periodontal gap

E. Bone sequestration.

3. A 14-year-old girl complains of the presence of the carious cavity. Objectively: there is a big cavity in the 26 tooth, which is connected with pulp chamber, the response to thermal and chemical stimuli is negative, percussion is painless. In the X-ray - expansion of periodontal gap in the area of the palatal root apex. Define the diagnosis.

- A. Chronic fibrous periodontitis
- B. Chronic granulomatous periodontitis
- C. Chronic granulating periodontitis
- D. Aggravation of chronic periodontitis
- E. Acute serous periodontitis.

4. A 7-year-old child had a trauma of upper central incisors 6 months ago. The parents didn't take him to a dentist. A week ago the mother saw a fistula in the area of these injured teeth. What is the most probable diagnosis?

- A. Chronic granulating periapical inflammation
- B. Chronic granulomatous periapical inflammation
- C. Chronic fibrous periapical inflammation
- D. Aggravation of chronic periapical inflammation
- E. Chronic marginal periapical inflammation.

5. An 11-year-old boy does not have any complaints. During the examination a large carious cavity connected with the tooth cavity was found in the 46 tooth. Percussion of the tooth is painless. The mucose membrane in the projection of the area the root apexes of the 46 tooth without the change. Probing of the root canal opening is painless. What is the provisional diagnosis?

- A. Chronic periapical inflammation
- B. Acute periapical inflammation
- C. Chronic pulpitis
- D. Chronic deep caries
- E. Chronic medium caries.

Questions to control:

1. Describe the X-ray stages of permanent tooth root formation.
2. Describe the morphological features of the periodontium at different stages of formation of the permanent tooth root. Describe the structure of the growth zone.
3. Describe clinical manifestations of acute serous periodontitis in permanent teeth in children.
4. Describe clinical manifestations of acute purulent periodontitis in permanent teeth in children.
5. Describe clinical manifestations of exacerbation of chronic periodontitis in permanent teeth in children.
6. Describe clinical manifestations of chronic granulating periodontitis in permanent teeth in children.
7. Describe the clinical manifestations of chronic granulomatous periodontitis in permanent teeth in children.

8. What diseases are necessary for differential diagnosis of acute serous periodontitis of permanent teeth in children?
9. What diseases should be used for differential diagnosis of acute purulent periodontitis of permanent teeth in children?
10. What diseases are necessary for differential diagnosis of exacerbation of chronic periodontitis in permanent teeth in children?
11. What diseases are necessary for differential diagnosis of chronic granular periodontitis of permanent teeth in children?
12. What diseases are necessary for differential diagnosis of chronic granulomatous periodontitis of permanent teeth in children?
13. Describe the radiographic picture of chronic granulating periodontitis.
14. Describe the radiographic picture of chronic granulomatous periodontitis.
15. Name the differential signs of chronic granulomatous periodontitis and growth zone.

List of practical skills:

1. To master methods of diagnostics of various forms of periodontitis in permanent teeth in children.
2. Learn how to perform differential diagnosis of various forms of periodontitis permanent teeth in children and adolescents

PRACTICAL LESSON № 5

Theme: Peculiarities of the endodontic treatment in permanent teeth with unformed root. Prognosis.

Aim of the lesson: To study with students the methods of treatment of periodontitis of permanent teeth in children. To teach students clinical and anatomical - topographic features of permanent teeth structure in children. Require students to diagnose periodontitis of permanent teeth in children, depending on the child's age. To study with students the methods of treatment of periodontitis of permanent teeth with an unformed root.

Actuality: Periodontitis of permanent teeth in children today is a common pathology of the dental maxillary system, which develops due to the shortcomings of the organization and quality of dental care. Occurrence of the inflammatory process in the periodontal teeth at the stage of their formation can lead to the cessation of further growth of the roots. The focus of chronic inflammation in the periodontium may be one of the causes of sensitization of the child's organism, as well as in the case of exacerbation of the development of life-threatening inflammatory processes of the maxillofacial area: periostitis, abscess. To prevent the occurrence of possible complications, the pediatric dentist must be able to correctly determine the therapeutic tactics and perform endodontic intervention.

Control of the initial level of knowledge

1. Anatomical - topographic features of the structure of root canals of permanent teeth in children.
2. Features of the structure of root canals of permanent immature teeth in children.
3. Periods of development of permanent teeth.
4. Clinical - radiological stages of tooth root formation.
5. Classification of periodontitis of permanent teeth.
6. Features of clinical course of chronic granulating periodontitis of permanent teeth in children.
7. Features of clinical course of chronic granulomatous periodontitis of permanent teeth in children.
8. Features of clinical course of chronic fibrous periodontitis of permanent teeth in children.
9. Features of clinical course of acute forms of periodontitis of permanent teeth in children.

Content of the lesson

Special attention is required to know the anatomical and topographic features of immature permanent teeth: the volume of the tooth cavity, low dentin thickness and low degree of mineralization, a significant layer of infected predentin on the walls of the root canal, the absence of physiologic separation root apex, oval cross-section of the lumen of the root canal in the apical area, small root length, the presence of a growth zone determine the features of the endodontic treatment legs - wide opening of the tooth cavity, lack of stage of expansion of the canal, use of large size tools (H - files), careful removal of infected predentin, careful irrigation of the canal with no irritants, accurate determination of the working length by means of X-ray examination with the tool careful work with tools with a secure tip for a fixed length.

There is an ISO 3630 standard approved by Technical Committee 106 of the International Standards Organization that provides basic parameters for root canal tools: shape, profile, length, size, maximum manufacturing tolerances and minimum mechanical strength requirements, color coding and character encoding to identify the type of instrument, an international numbering system for ordering tools.

In endodontic treatment of permanent teeth with incomplete root formation, one of the main tasks is to ensure that it can be completed. This creates a tight barrier. Such a barrier is osteodentin, cellular or cell-free cement, bone, or bone. Creating a tight barrier at the root apex is called apexification. For the purpose of apexification, the following materials are used: pastes based on antiseptics and antibiotics, zinc oxide and metacresyl acetate, tricalcium phosphate, hydroxyapatite, collagen-calcium-phosphate gel, tricalcium phosphate, absorbent, ceramics, hydroxide of calcium Dentsply) or Biodentine (Septodont). In some cases, it is recommended to leave the channel empty and sometimes untreated for one year (Khomeenko LO, 2007).

To date, preference is given to calcium silicate cements such as MTA or Biodentine (Septodont). High pH stops bone resorption by acting on osteoclasts and stimulates bone formation, affecting osteoblasts.

These drugs make it possible to create an apical barrier in one or two visits, in contrast to the method of natural apexification using calcium-containing temporary pastes. In addition, according to recent studies, the use of calcium-containing pastes for more than two months in a row leads to a decrease in the mechanical properties of dentin of the root of the teeth due to the crushing effect of calcium on collagen, which leads to dentin drying.

The basic principles of treatment of periodontitis are as follows:

- influence on the system of macrochannels (elimination of peptide decay, removal of infected pre-dentin, neutralization of microorganisms);
- the influence of the microchannel system (blocking the infection in the dentinal tubules);
- effect on periapical tissues (elimination of inflammatory process and creation of favorable conditions for regeneration of periodontal tissues)

In the treatment of periodontitis of permanent teeth in children, preference is given to the conservative method of treatment.

Knowledge level control

1. What methods of treatment of periodontitis of permanent teeth do you know? What determines the choice of treatment for periodontitis of permanent teeth in children?
2. Name the indications for surgical and conservative-surgical methods of treatment of periodontitis of permanent teeth in children.

Test

1. An 11-year-old child complains persistent pain in the tooth for 11 days. OBJECTIVELY: the 11 tooth is sealed, changed in color. Vertical percussion is sharply painful. The mucous membrane of the alveolar process in this area is hyperemic, edematous, slightly painful to palpation. Which filling material should be selected for permanent obturation of the root canal during endodontic treatment?
 - A. Gutta-percha pins and SealApex
 - B. Zinc oxide eugenol paste
 - C. Iodoform paste
 - D. Paste containing calcium hydroxide.
 - E. Endomethason and gutta-percha pins

2. A 8,5-year-old child complains of a cavity in a tooth on the lower jaw on the left. Objectively: the 46 tooth has carious cavity within the light softened dentin parapulpal dentin. The cavity of the tooth is opened. Probing of the cavity is painless, reaction temperature is not available. Percussion of tooth is painful. Rtg: the root of the tooth 46 is formed by 2/3 of the length. Choose the best material for long time obturation of root canals:
 - A. Paste containing calcium hydroxide
 - B. Iodoform paste
 - C. Thymol paste
 - D. Formacresol paste
 - E. Resorcin-formalin paste.

3. An 8-year-old child complains about the presence of cavity in the lower left tooth. During examination it was revealed a cavity in the 36 tooth, connected with the cavity of the tooth. Probing of connection and orifices of the root canals is painless. There is fistula with purulent secretions on the mucous membrane of the alveolar process in the projection of root apexes. What medications should be used for irrigation of root canals:
 - A. Sodium hypochlorite 3% and hydrogen peroxide 3%
 - B. Solution furacilinum
 - C. Solution rivanol
 - D. Iodine
 - E. Saline solution.

4. A 14.5 year-old teenager complains of intense throbbing pain in the teeth of the upper jaw on the right for 2 days. The pain increases during chewing and touching of the tongue. OBJECTIVELY: there is carious cavity in the 16 tooth, the probing of the bottom of this cavity is painless. The response to thermal stimuli is absent. Vertical and horizontal percussion are sharply

painful. The mucous membrane of the gums in the area of 16 tooth is swelled, hyperemic. What will the doctor's tactics during the first visit?

- A. Mechanical and pharmacological treatment of root canals, opening of the apices
- B. Anesthesia, necrectomia, mechanical and pharmacological treatment of root canals, opening of the apices
- C. Necrectomia, mechanical and pharmacological treatment of root canals, opening of the apices
- D. Anesthesia, mechanical and pharmacological treatment of root canal, opening of the apices
- E. -.

5. A 7.5 year-old child complains of discoloration of the 12 tooth. Objectively: the 12 tooth is sealed, gray, his percussion is painless. Rtg: at the root apex of the 12 tooth the bone is destructed like flame of fire with a clear borders. After the necrectomy, mechanical and pharmacological treatment of root canals, temporary obturation of root with calcium hydroxide (Salasept) was held. A month later replacement of calcium hydroxid was conducted . What time after of conduction radiological control can be possible to determine the formation of dense apical bridge?

- A. 3-6 months
- B. 1 month
- C. over 1 year
- D. 1 month
- E. 2 months.

Questions to control:

1. What is the purpose of conservative treatment of chronic periodontitis of permanent teeth at the stage of unformed root? Define the concept of apexification.
2. What method is used for instrumental treatment of unformed root canals of permanent teeth? What is it?
3. Determine the peculiarities of the opening of cavities and instrumental treatment of root canals in the treatment of periodontitis of permanent teeth with unformed roots.
4. What groups of medicines should be used for root canal treatment in the treatment of periodontitis of permanent teeth with unformed roots? The mechanism of their action.
5. Determine the actions of the dentist in the case of ingrown granulation tissue to the unformed root canals of the permanent teeth.
6. What methods are used to seal unformed root canals in the treatment of periodontitis of permanent teeth in children?
7. Determine the composition, properties and method of application of drugs based on MT in the treatment of chronic periodontitis of permanent teeth with unformed roots.
8. Under what conditions and in what terms is the final obturation of root canals in two-stage treatment of chronic periodontitis of permanent teeth with unformed roots.

List of practical skills:

1. Be able to choose the right tactics for the treatment of periodontitis of permanent teeth, depending on its etiology, the nature of the course, form and period of tooth development.
2. To master the methods of treatment of chronic granulating periodontitis of permanent teeth with unformed roots.

PRACTICAL LESSON № 6

Theme: Peculiarities of the endodontic treatment in permanent teeth with formed root. Prognosis.

Aim of the lesson: To study with students the methods of treatment of periodontitis of permanent teeth with the formed root in children. To teach students clinical and anatomical - topographic features of permanent teeth structure in children. Teach students to diagnose periodontitis of permanent teeth in children, depending on the age of the child. To study methods of treatment of periodontitis of permanent teeth with the formed root.

Actuality: Periodontitis of permanent teeth in children today is a fairly common pathology of the dental-jaw system, which develops due to the shortcomings of the organization and quality of dental care. The focus of chronic inflammation in the periodontium may be one of the causes of sensitization of the child organism, as well as in the case of exacerbation of the development of life-threatening inflammatory processes of the maxillofacial area: periostitis, abscess. To prevent the occurrence of possible complications, the pediatric dentist must be able to correctly determine the therapeutic tactics and be able to properly carry out endodontic treatment of permanent teeth in children.

Control of the initial level of knowledge

1. Anatomical - topographic features of the structure of root canals of permanent teeth in children.
2. Features of the structure of root canals of permanent immature teeth in children.
3. Periods of development of permanent teeth.
4. Clinical - radiological stages of tooth root formation.
5. Classification of periodontitis of permanent teeth.
6. Features of clinical course of chronic granulating periodontitis of permanent teeth in children. .
7. Features of clinical course of chronic granulomatous periodontitis of permanent teeth in children.
8. Features of clinical course of chronic fibrous periodontitis of permanent teeth in children.
9. Features of clinical course of acute forms of periodontitis of permanent teeth in children.

Content of the lesson

Conservative treatment for acute infectious periodontitis is aimed at eliminating periodontal inflammation, eliminating pain and preventing the spread of the inflammatory process to other areas of the maxillofacial region. The presence of serous or purulent exudate necessitates the creation of its outflow from the periodontium in the least traumatic way - through the root canal, which is achieved by the removal of necrotic masses. In the absence of exudate selection, it is imperative to open the apical opening. As a rule, treatment for acute or exacerbation of periodontitis of the permanent tooth in children is carried out in several visits.

Treatment of acute toxic periodontitis of the permanent tooth is aimed at neutralizing or eliminating the toxic substance and eliminating inflammation in the periodontium.

Treatment of acute traumatic periodontitis is carried out according to the scheme of treatment of acute infectious periodontitis, with the use of substances having antibacterial and anti-inflammatory action for temporary obturation of root canals.

Treatment of chronic forms of periodontitis of the permanent tooth at the stage of the formed root in children is carried out in one or more visits. Indications for a one-session treatment are:

- absence in the channel of gangrenous decay with a putrid mass,
- the absence of granulations that have grown into the root canal,
- no exacerbation of the process in history,
- the ability to technically perform in a single visit complete instrumental and medical treatment of the root canal and achieve dryness in the root canal,

- well-being of the child's health, the child does not currently accept cytostatics, hormonal drugs, antibiotics.

In the treatment of periodontitis in several visits, the first visit is performed by necrectomy, carious cavity formation, tooth cavity opening, removal of putrid masses from the root canal by means of a pulp extractor under a layer of antiseptic, in the presence of granulations that have grown into the root canal, removing, topic anesthesia or short-term treatment (up to 5 minutes) with their camphorophenol, complete instrumental root canal treatment, root canal drying, and introduction of a drug into the canal with a antiseptic action on turund (dicamphen), or in the form of paste (based on calcium hydroxide, antibiotics and corticosteroids, metronidazole, iodoform), isolate the tooth cavity by sealing the dentine with a dentin paste or aqueous dentin.

With a two-session method of treatment, the completion of treatment depends on the optimal duration of the medicinal substances that are part of the root filling (usually it is 1-7 days).

Permanent obturation is carried out on the second or third visit by the celeriac with gutta-percha, using one of the methods of permanent obturation, subject to the following conditions:

- absence of spontaneous tooth pain;
- absence of asymmetry of the face, swelling of the mucous membrane, submucosal or subcutaneous abscess,
- painless tooth percussion,
- painless palpation of the gums and transitional convolution in the area of the affected tooth;
- no exudate in the root canal;
- no odor from the canal.

Impressions for permanent teeth removal in children:

- teeth that are the source of acute odontogenic osteomyelitis
- lack of technical ability to implement conservative or conservative surgical treatment.
- significant destruction of the crown of the tooth, the root of which cannot be used under prosthetics.
- irreversible complications associated with dental treatment (extensive perforation of the base of the pulp chamber or root during exacerbation)
- the impossibility of conducting operative-conservative treatment.

Knowledge level control

1. Methods for determining the working length of the root canal.
2. Methods of instrumental treatment of the root canal of the tooth (step back, crown down).
3. Requirements for preparation of the root canal of the permanent tooth in the period root formed.
4. Classification of filling materials used for obturation of root canals of permanent teeth in children.
5. Methods of obturation of root canals of permanent teeth in the period of the formed root.

Test

1. 13-year-old patient complains of sharp pain in 36 tooth, especially during chewing. Five days ago the arsenic paste was imposed in 36 tooth. The child didn't appeal to dentist in time. On examination - the dress is saved in tooth, reaction to cold is absent, X-ray changes in the periodontium weren't found. Which drug should be used to eliminate this complication?

- A. Unitiol
- B. Chlorhexidine
- C. furacilin
- D. sodium hypochlorite
- E. Chloramine.

2. In a 14-year-old patient it was diagnosed a chronic fibrotic periodontitis of the 11 tooth . The preparation, instrumental and medicamentous treatment of canals of the 11 tooth were conducted. How should be conducted obturation of the canals
- By X-ray top
 - Upto 0.5 cm to the top
 - By the anatomic apex
 - Over the top
 - In physiological top.
3. In a 15-year-old patient a chronic granulating periapical inflammation of the 26 tooth was diagnosed . It was decided to use a conservative method of treatment. Which medications should be used in mechanical expanding of root canal?
- EDTA and sodium hypochlorite
 - Sodium hypochlorite and hydrogen peroxide
 - Hydrogen peroxide and chlorhexidine
 - Sodium hypochlorite and chloramine
 - Chloramine and Hydrogen Peroxide.
4. A 10-year-old child was treated on acute serous periodontitis of the 31 tooth. Which material will you choose for obturation of the 31 tooth?
- Seal Apex with gutta-percha pin
 - Resorcin - formalin paste
 - Endoform
 - Phosphate – Cement
 - Paratsyn.
5. A 13-year-old boy complains of a presence of carious cavity in the tooth. Objectively: there is a deep carious cavity in the 26 tooth which is connected with the pulp chamber. Respond to the probing, thermal stimuli and percussion is painless. A dentist suspects the chronic periodontitis of the 26 tooth. What additional diagnostic method should be used for establishment the diagnosis?
- Radiography
 - Rheography
 - TER-test
 - Thermometry
 - EOD.

Questions to control:

- What methods of treatment of periodontitis of permanent teeth do you know? What determines the choice of treatment for periodontitis of permanent teeth in children?
- Name the indications for surgical and conservative-surgical methods of treatment of periodontitis of permanent teeth in children.
- What is the purpose of conservative treatment of chronic periodontitis of permanent teeth at the stage of the formed root?
- Determine the purpose of treatment of destructive forms of chronic periodontitis of permanent teeth with formed roots. Choose the appropriate treatment method.

5. Describe the method of treatment of acute and exacerbation of chronic periodontitis of infectious origin of permanent teeth in children. What is the purpose of first aid?
6. What is the tactic of treating acute toxic periodontitis of permanent teeth at different stages of their development?
7. Describe the step-back technique of root canal tooling.
8. What are the features of root canal tooling using Crow-down?
9. Describe the technique of "reverse pin" for permanent root canal obturation. Under what conditions is it used?
10. Name the groups of materials used for permanent root canal obturation. Their composition, properties, advantages and disadvantages.
11. What do you know about the methods of permanent root canal obturation? Describe the method of lateral condensation of cold gutta-percha. Name the tools you need.

List of practical skills:

1. To master methods of treatment of chronic forms of periodontitis of permanent teeth with the formed roots.
2. To master methods of treatment of exacerbation or acute course of periodontitis of infectious origin in children.
3. Master the method of treatment of acute toxic periodontitis of permanent teeth in children.

PRACTICAL LESSON № 7

Theme: Mistakes and complication of the endodontic treatment of primary teeth in children. Their prevention and elimination

Aim of the lesson: To consider with students the mistakes and complications in diagnosis and endodontic treatment of the periapical inflammation.

Actuality: To teach the students to avoid the mistakes during the diagnosis and treatment of the periapical inflammation of the primary teeth in children. To teach the students the methods of elimination during the endodontic treatment of the periapical inflammation of the primary teeth in children.

Control of the initial level of knowledge

1. Classification of the periapical inflammation of the primary teeth.
2. Methods of diagnosis of the periapical inflammation of the primary.
3. Which diseases should be differentiated with the periapical inflammation of the primary teeth.
4. Requirements for filling materials which are used for root canal obturation.
5. Stages of root canal treatment of the primary teeth.
6. Peculiarities of root canal obturation of the primary teeth.

Content of the lesson

Complications of the endodontic treatment.

I. Complications during access preparation (pulp chamber opening):

- splitting of crown wall
- crown or furcation perforation

II. Complications during root canal preparation:

- excessive enlargement of root canal without changing of form
- zipping(“knee” formation, apical enlargement or ledge)
- lateral canal wall perforation
- apical perforation of the canal wall
- canal wall perforation as a result of thinning – strip-perforation
- excessive enlargement of apical foramen
- instrument separation in orifice part
- instrument separation in mild or epical part
- mechanical injury of periodontium
- chemical injury of periodontium
- infected material ejection through root apex
- subcutaneous emphysema
- aspiration of endodontic instrument
- ingestion of endodontic instrument

III. Complications during root canal obturation and after:

- root canal overfilling with paste or sealer
- insufficient root canal obturation
- longitudinal root fracture
- infra alveolar nerve neuropathy in case of compression or irritation of the nerve in mandibular canal with sealer from root canal.

Knowledge level control

1. Causes of complication during treatment of the periapical inflammation, methods of their elimination.
2. Complication during access preparation.
3. Complication during root canal preparation.
4. Complication during root canal obturation and after.
5. Dentist's tactic in case of root canal overfilling with paste or sealer.
6. Dentist's tactic in case of mechanical injury of periodontium.

Test:

1. To prevent perforation of the wall or bottom of the coronal cavity the doctor have to
 - A. taking into account the topography of the tooth cavity
 - B. regular recapitulation of instrument
 - C. exact working length
 - D. root canal irrigation
 - E. there is no correct answer.
2. Breaking of the wall in the process of uncovering the tooth cavity is a result of
 - A. excessive pressure on the tooth by using of the bur
 - B. lack of depth control of the bur

- C. no correct answer
- D. not filled the root canal
- E. of using an aggressive instruments.

3. During root canal treatment arise the following complications (choose the wrong answer):

- A. breaking of the wall
- B. blockage of the lumen of the root canal dentin them sawdust
- C. excessive expansion of the root canal without changing its shape
- D. excessive expansion of the root canal in the middle third of the inner curvature
- E. change in the shape and placement of the root canal apical opening.

4. Sign of the blockade of lumen root canal dentin sawdust are:

- A. impossibility of introducing small size tool to the entire working length
- B. free movement of large instruments
- C. possibility of introducing a small size tool to the entire working length
- D. pain when administered endodontic instrument
- E. occurrence of bleeding from the root canal.

5. An indication of the lateral wall perforation of the root canal are:

- A. occurrence of bleeding from the root canal
- B. impossibility of introducing small size tool to the entire working length
- C. free movement of tools small size
- D. free movement of large instruments
- E. Pain during endodontic instrument enters the "false door".

Control questions:

1. What mistakes are possible at the stage of opening and antiseptic treatment of tooth cavities? How to prevent them?
2. Specify possible mistakes in determining the working length of the tooth. How to avoid them?
3. Identify the main possible mistakes during root canal processing. How to prevent and eliminate mistakes at this stage of endodontic treatment?
- 4.. Name the most common mistakes during antiseptic treatment and medical treatment in root canals. How to avoid them?
5. What mistakes are possible when choosing the material for the root filling and the method of obturation of the root canals of primary teeth at different stages of their development? How to prevent them?
6. Describe possible common mistakes during root canal obturation.
7. How to prevent and eliminate mistakes during root canal filling?

List of practical skills:

1. To be able to carry out differential diagnostics between chronic granulating apical periodontitis and caries of primary teeth.
2. Be able to differentiate chronic granulating apical periodontitis with chronic fibrous and gangrenous pulpitis of primary teeth.
3. Be able to carry out differential diagnosis between chronic granulating apical periodontitis of permanent teeth with unformed root and growth zone.
4. Be able to choose the right tactics treatment of chronic granular apical periodontitis of primary teeth, depending on its radiological symptoms and the period of tooth development.
5. To be able to choose the correct method of treatment of chronic granulating apical periodontitis of permanent teeth with unformed root.
6. To be able to choose the right tactics of treatment of acute and exacerbation of chronic apical periodontitis of primary and permanent teeth at different stages of their development.

7. To be able to choose the correct method of treatment of acute toxic apical periodontitis of primary and permanent teeth in children.
8. To master the method of opening primary and permanent teeth cavities at different stages of their development.

PRACTICAL LESSON № 8

Theme: Trauma of primary teeth in children. Causes. Clinics. Diagnosis. Treatment tactic

Aim of the lesson: To learn with students the different traumatic injuries of teeth, causes of their occurrence and peculiarities of treatment in children.

Actuality: To familiarize the students with different types of trauma of the primary teeth and causes of their occurrence.

To teach the students the peculiarities of treatment of the traumatic injuries of teeth in children depending on the etiologic factor, clinical course and stage of the root development of the primary teeth.

Control of the initial level of knowledge

1. Anatomical structure of the primary teeth in children.
2. Structure and function of the periodontium.
3. Stages of root formation of the primary teeth.
4. Terms of root formation of the primary teeth.
5. Peculiarities of the bone structure of the jaws in children.

Content of the lesson

Most accidents in the primary dentition occur between 2 and 4 years of age. Realistically, this means that few restorative procedures will be possible and in the majority of cases the decision is between extraction or maintenance without performing extensive treatment. A primary incisor should always be removed if its maintenance will jeopardize the developing tooth bud.

During its early development the permanent incisor is located palatally to and in close proximity with the apex of the primary incisor. With any injury to a primary tooth there is risk of damage to the underlying permanent successor.

A traumatized primary tooth that is retained should be assessed regularly for clinical and radiographic signs of pulpal or periodontal complications. Radiographs may even detect damage to the permanent successor. Soft tissue injuries in children should be assessed weekly until healed. Tooth injuries should be reviewed every 3-4 months for the first year and then annually until the primary tooth exfoliates and the permanent successor is in place.

Traumatic injuries that occur prior to eruption of primary teeth can also interfere with their development.

Uncomplicated crown fracture. Either smooth sharp edges or restore with an acid-etch restoration if co-operation is satisfactory.

Complicated crown fracture. Normally, extraction is the treatment of choice. However, pulp extirpation and canal obturation with zinc oxide cement, followed by an acid-etch restoration is possible with reasonable co-operation.

Crown-root fracture. The pulp is usually exposed and any restorative treatment is very difficult. The tooth is best extracted.

Root fracture. Without displacement and with only a small amount of mobility the tooth should be kept under observation. If the coronal fragment becomes non-vital and symptomatic

then it should be removed. The apical portion usually remains vital and undergoes normal resorption. Similarly with marked displacement and mobility only the coronal portion should be removed.

Concussion, subluxation, and luxation injuries. Associated soft tissue damage should be cleaned by the parent twice daily with 0.2% chlorhexidine solution using cotton buds or gauze swabs until it heals.

Concussion. Often not brought to a dentist until the tooth discolours.

Subluxation. If slight mobility then the parents are advised on a soft diet for 1-2 weeks and to keep the traumatized area as clean as possible. Marked mobility requires extraction.

Extrusive luxation. Marked mobility requires extraction.

Lateral luxation. If the crown is displaced palatally the apex moves buccally and hence away from the permanent tooth germ. If the occlusion is not gagged then conservative treatment to await some spontaneous realignment is possible. If the crown is displaced buccally then the apex will be displaced towards the permanent tooth bud and extraction is indicated in order to minimize further damage to the permanent successor.

Intrusive luxation. This is the most common type of injury. The aim of investigation is to establish the direction of displacement by thorough radiological examination. If the root is displaced palatally towards the permanent successor then the primary tooth should be extracted to minimize the possible damage to the developing permanent successor. If the root is displaced buccally then periodic review to monitor spontaneous reeruption should be allowed and (b)). Review should be weekly for a month then monthly for a maximum of 6 months. Most reeruption occurs between 1 and 6 months and if this does not occur then ankylosis is likely and extraction is necessary to prevent ectopic eruption of the permanent successor

Exarticulation (Avulsion). Replantation of avulsed primary incisors is not recommended due to the risk of damage to the permanent tooth germs. Space maintenance is not necessary following the loss of a primary incisor as only minor drifting of adjacent teeth occurs. The eruption of the permanent successor may be delayed for about 1 year as a result of abnormal thickening of connective tissue overlying the tooth germ.

Sequelae of injuries to the primary dentition

Pulpal necrosis. Necrosis is the commonest complication of primary trauma. Evaluation is based upon colour and radiography. Teeth of a normal colour rarely develop periapical inflammation but conversely mildly discoloured teeth may be vital. A mild grey colour occurring soon after trauma may represent intrapulpal bleeding with a pulp that is still vital. This colour may recede, but if it persists then necrosis should be suspected. Radiographic examination should be 3 monthly to check for periapical inflammation. Failure of the pulp cavity to reduce in size is an indicator of pulpal death. Teeth should be extracted whenever there is evidence of periapical inflammation, to prevent possible damage to the permanent successor.

Pulpal obliteration. Obliteration of the pulp chamber and canal is a common reaction to trauma. Clinically, the tooth becomes yellow/opaque. Normal exfoliation is usual but occasionally periapical inflammation may intervene and therefore annual radiography is advisable.

Root resorption. Extraction is advised for all types of root resorption where there is evidence of infection.

Injuries to developing permanent teeth. Injuries to the permanent successor tooth can be expected in between 12% to 69% of primary tooth trauma and 19% to 68% of jaw fractures. Intrusive luxation causes most disturbances but avulsion of a primary incisor will also cause damage if the apex moved towards the permanent tooth bud before the avulsion. Most damage to the permanent tooth bud occurs under 3 years of age during its developmental stage. However, the type and severity of disturbance are closely related to the age at the time of injury. Changes in the mineralization and morphology of the crown of the permanent incisor are commonest but later injuries can cause radicular anomalies. Injuries to developing teeth can be classified as follows:

1. White or yellow-brown hypomineralization of enamel. Injury at 2-7 years
2. White or yellow-brown hypomineralization of enamel with circular enamel hypoplasia. Injury at 2-7 years
3. Crown dilaceration. Injury at about 2 years
4. Odontoma-like malformation. Injury at 1-3 years.
5. Root duplication. Injury at 2-5 years.
6. Vestibular or lateral root angulation and dilaceration. Injury at 2-5 years.
7. Partial or complete arrest of root formation. Injury at 5-7 years and sequestration of permanent tooth germs.

8. Disturbance in eruption. The term dilaceration describes an abrupt deviation of the long axis of the crown or root portion of the tooth. This deviation results from the traumatic displacement of already formed hard tissue in relation to developing soft tissue.

9. The term angulation describes a curvature of the root resulting from a gradual change in the direction of root development, without evidence of abrupt displacement of the tooth germ during odontogenesis. This may be vestibular, that is, labiopalatal, or lateral, that is, mesiodistal.

Evaluation of the full extent of complications following injuries must await complete eruption of all permanent teeth involved. However, most serious sequelae (disturbances in tooth morphology) can usually be diagnosed radiographically within the first year post-trauma.

Eruption disturbances may involve delay due to connective tissue thickening over a permanent tooth germ, ectopic eruption due to lack of eruptive guidance, and impaction in teeth with malformations of crown or root.

Treatment of injuries to the permanent dentition

Yellow-brown hypomineralization of enamel with or without hypoplasia

1. Acid-pumice microabrasion.
2. Composite resin restoration: localized, veneer, or crown.
3. Porcelain restoration: veneer or crown (anterior); fused to metal crown (posterior).

Conservative approaches are preferred whenever possible.

Crown dilacerations

1. Surgical exposure + orthodontic realignment.
2. Removal of dilacerated part of crown.
3. Temporary crown until root formation complete.
4. Semi or permanent restoration.

Vestibular root angulation

Combined surgical and orthodontic realignment.

Other malformation

Extraction is usually the treatment of choice.

Disturbance in eruption

Surgical exposure + orthodontic realignment.

Injuries to supporting bone

Most fractures of the alveolar socket in primary dentition do not require splinting due to rapid bony healing in small children. Jaw fractures are treated in the conventional manner, although stabilization after reduction may be difficult due to lack of sufficient adjacent teeth.

Knowledge level control

1. Classification of traumatic dental injuries of the primary teeth.
2. Causes of the acute trauma of the primary teeth.
3. Causes of the chronic trauma of the primary teeth.
4. Peculiarities of examination of children with different traumas of the primary teeth.
5. Tooth concussion. Clinics. Diagnosis.

6. Tooth luxation. Classification. Clinics. Diagnosis. Treatment.
7. Tooth fracture. Classification. Clinics. Diagnosis. Treatment.
8. Chronic trauma of the primary tooth. Causes. Clinics. Diagnosis. Treatment.
9. Peculiarities of treatment of trauma the primary teeth. Prognosis.

Test

1. Parents of a 3.5-year-old child complain of the change in position of the maxillary anterior teeth due to trauma. OBJECTIVELY: THE 51 tooth is slightly shifted in the vestibular direction, mobile, its coronal part is intact, percussion is sharply painful. The mucous membrane in the projection of the 51 tooth roots is edematous, hyperemic. Palpation revealed the pain and bleeding from gingival sulcus. Select the optimal therapeutic approach.
 - A. Reposition the tooth
 - B. Extraction of the 51 tooth
 - C. Devital extirpation
 - D. Vital amputation
 - E. Vital extirpation.

2. The parents appealed to the dentist with complaints of injured primary frontal teeth on the upper jaw. What type of complications should doctor tell parents about?
 - A. All answers are correct
 - B. Enamel hypoplasia of permanent teeth
 - C. Anomaly position of permanent teeth
 - D. Late eruption of permanent teeth
 - E. Death of permanent tooth germ.

3. A 10-year-old child complains of pain after acute injury of the central incisors of the upper jaw, which increases during chewing. OBJECTIVELY: coronal part of the 11 tooth is intact, percussion is painful, abnormal mobility is not defined. There is no changes of the 11 tooth on the X-ray . What additional tests should be conducted for choosing method of treatment
 - A. EOD
 - B. Reoperiodontography
 - C. An additional research is not necessary
 - D. Shillera-Pisareva test
 - E. Vital coloring.

4. Parents of an 11-year-old child asked the dentist for dental help. Diagnosis: crack of the enamel of the 11 tooth . What method of treatment should be used?
 - A. Medical intervention is not required
 - B. Physiotherapy
 - C. Isolating liner, the elimination of defects with composite material
 - D. Perform endodontic treatment
 - E. Polishing of the sharp edges, cover with fluoride varnish.

5. An 8-year-old child complains of a fracture of the maxillary central incisor due to trauma a few days ago. On examination it was revealed the fracture of the coronal part of the 21 tooth at the level of enamel and near parapulpal dentin. Probing od the line of the fracture is painful, especially in the projection of the pulp horn. The response to cold stimuli is painful but the pain is short-lasting . Percussion is painful. Choose best material for indirect pulp capping.
 - A. Paste containing calcium hydroxide
 - B. Iodoform paste
 - C. Glass ionomer cement

- D. Zinc-eugenol cement
- E. Thymol paste.

Control questions:

1. What are the main causes of dental trauma in children?
2. Name the features of the clinic for acute dental trauma in children at different ages.
3. Specify the features of the course of the clinic for fracture of the tooth crown within the enamel.
4. Specify the clinical course of the diagnostic methods for fracture of the tooth crown within the enamel and dentin.
5. Specify the clinical features of additional diagnostic methods at a fracture of a tooth crown with exposure of a pulp.
6. Describe the clinic, additional methods of diagnosis with full dislocation of the tooth, fracture of the root of the tooth subluxation of the tooth.
7. Name possible complications after trauma of the primary teeth.

List of practical skills:

1. To master the procedure of collecting anamnesis in children and parents with acute trauma of the primary teeth
2. To acquire the technique of additional diagnostics in case of acute trauma of the primary teeth.
3. To curate a child with acute trauma of primary tooth.

PRACTICAL LESSON № 9

Theme: Trauma of permanent teeth in children. Treatment tactic

Aim of the lesson: To learn with students the different traumatic injuries of the permanent teeth, causes of their occurrence and peculiarities of treatment in children.

Actuality: To familiarize the students with different types of trauma of the permanent teeth and causes of their occurrence. To teach the students the peculiarities of treatment of the traumatic injuries of the permanent teeth in children depending on the etiologic factor, clinical course and stage of the root development of the permanent teeth.

Control of the initial level of knowledge

1. Anatomical structure of the permanent teeth in children.
2. Structure and function of the periodontium.
3. Stages of root formation of the permanent teeth.
4. Terms of root formation of the permanent teeth.
5. Peculiarities of the bone structure of the jaws in children.

Content of the lesson

The most accident prone times for dental trauma are between 2 and 4 years for the primary dentition and 7 and 10 years for the permanent dentition. In the primary dentition coordination and

judgement are incompletely developed and the majority of injuries are due to falls in and around the home as the child becomes more adventurous and explores its surroundings. In the permanent dentition most injuries are caused by falls and collisions while playing and running, although bicycles are a common accessory. Sports injuries usually occur in teenage years and are commonly associated with contact sports. Injuries due to road traffic accidents and assaults are most commonly associated with the late teenage years and adulthood.

Infraction

Definition: incomplete fracture (crack) of the enamel with-out loss of tooth structure.

Diagnosis: normal gross anatomic and radiographic appearance; craze lines apparent, especially with transillumination.

Treatment objectives: to maintain structural integrity and pulp vitality.

Crown fracture–uncomplicated

Definition: an enamel fracture or an enamel-dentin fracture that does not involve the pulp.

Diagnosis: clinical and/or radiographic findings reveal a loss of tooth structure confined to the enamel or to both the enamel and dentin.

Treatment objectives: to maintain pulp vitality and restore normal esthetics and function. Injured lips, tongue, and gingiva should be examined for tooth fragments. When looking for fragments in soft tissue lacerations, radiographs are recommended.¹ For small fractures, rough margins and edges can be smoothed. For larger fractures, the lost tooth structure can be restored.

Crown fracture–complicated

Definition: an enamel-dentin fracture with pulp exposure.

Diagnosis: clinical and radiographic findings reveal a loss of tooth structure with pulp exposure.

Treatment objectives: to maintain pulp vitality and restore normal esthetics and function. Injured lips, tongue, and gingiva should be examined for tooth fragments. When looking for fragments in soft tissue lacerations, radiographs are recommended.

- Primary teeth: Decisions often are based on life expectancy of the traumatized primary tooth and vitality of the pulpal tissue. Pulpal treatment alternatives are pulpotomy, pulpectomy, and extraction.

- Permanent teeth: Pulpal treatment alternatives are direct pulp capping, partial pulpotomy, full pulpotomy, and pulpectomy (start of root canal therapy). There is increasing evidence to suggest that utilizing conservative vital pulp therapies for mature teeth with closed apices is as appropriate a management technique as when used for immature teeth with open apices.

Crown-root fracture

Definition: an enamel, dentin, and cementum fracture with or without pulp exposure.

Diagnosis: Clinical findings usually reveal a mobile coronal fragment attached to the gingiva with or without a pulp exposure. Radiographic findings may reveal a radiolucent oblique line that comprises crown and root in a vertical direction in primary teeth and in a direction usually perpendicular to the central radiographic beam in permanent teeth. While radiographic demonstration often is difficult, root fractures can only be diagnosed radiographically.

Treatment objectives: to maintain pulp vitality and restore normal esthetics and function.

- Primary teeth: When the primary tooth cannot or should not be restored, the entire tooth should be removed unless retrieval of apical fragments may result in damage to the succedaneous tooth.

- Permanent teeth: The emergency treatment objective is to stabilize the coronal fragment. Definitive treatment alternatives are: to remove the coronal fragment followed by a supragingival restoration or necessary gingivectomy; osteotomy; or surgical or orthodontic extrusion to prepare for restoration. If the pulp is exposed, pulpal treatment alternatives are pulp capping, pulpotomy, and root canal treatment.

Root fracture

Definition: a dentin and cementum fracture involving the pulp.

Diagnosis: Clinical findings reveal a mobile coronal fragment attached to the gingiva that may be displaced. Radiographic findings may reveal 1 or more radiolucent lines that separate the tooth fragments in horizontal fractures. Multiple radiographic exposures at different angulations may be required for diagnosis. A root fracture in a primary tooth may be obscured by a succedaneous tooth.

Treatment objectives:

- Primary teeth: Treatment alternatives include extraction of coronal fragment without insisting on removing apical fragment or observation. It is not recommended to reposition and stabilize the coronal fragment.

- Permanent teeth: Reposition and stabilize the coronal fragment in its anatomically correct position as soon as possible to optimize healing of the periodontal ligament and neurovascular supply while maintaining esthetic and functional integrity.

General prognosis: Pulp necrosis in root-fractured teeth is attributed to displacement of the coronal fragment and mature root development. In permanent teeth, the location of the root fracture has not been shown to affect pulp survival after injury. Therefore, preservation of teeth with root fractures occurring in the tooth's cervical third should be attempted. Young age, immature root formation, positive pulp sensitivity at time of injury, and approximating the dislocation within 1 mm have been found to be advantageous to both pulpal healing and hard tissue repair of the fracture.

Concussion

Definition: injury to the tooth-supporting structures without abnormal loosening or displacement of the tooth.

Diagnosis: Because the periodontal ligament absorbs the injury and is inflamed, clinical findings reveal a tooth tender to pressure and percussion without mobility, displacement, or sulcular bleeding. Radiographic abnormalities are not expected.

Treatment objectives: to optimize healing of the periodontal ligament and maintain pulp vitality.

Subluxation

Definition: injury to tooth-supporting structures with abnormal loosening but without tooth displacement.

Diagnosis: Because the periodontal ligament attempts to absorb the injury, clinical findings reveal a mobile tooth without displacement that may or may not have sulcular bleeding. Radiographic abnormalities are not expected.

Treatment objectives: to optimize healing of the periodontal ligament and neurovascular supply.

- Primary teeth: The tooth should be followed for pathology.
- Permanent teeth: Stabilize the tooth and relieve any occlusal interferences. For comfort, a flexible splint can be used. Splint for no more than 2 weeks.

Intrusion

Definition: apical displacement of tooth into the alveolar bone. The tooth is driven into the socket, compressing the periodontal ligament and commonly causes a crushing fracture of the alveolar socket.

Diagnosis: Clinical findings reveal that the tooth appears to be shortened or, in severe cases, it may appear missing. The tooth's apex usually is displaced labially toward or through the labial bone plate in primary teeth and driven into the alveolar process in permanent teeth. The tooth is not mobile or tender to touch. Radiographic findings reveal that the tooth appears displaced apically and the periodontal ligament space is not continuous. Determination of the relationship of an intruded primary tooth with the follicle of the succedaneous tooth is mandatory. If the apex is displaced labially, the apical tip can be seen radiographically with the tooth appearing shorter than its contra-lateral. If the apex is displaced palatally towards the permanent tooth germ, the apical tip cannot be seen radiographically and the tooth appears elongated. An extraoral lateral radiograph also can be used to detect displacement of the apex

toward or through the labial bone plate. An intruded young permanent tooth may mimic an erupting tooth.

Treatment objectives:

- Primary teeth: to allow spontaneous reeruption except when displaced into the developing successor. Extraction is indicated when the apex is displaced toward the permanent tooth germ.

- Permanent teeth: to reposition passively (allowing re-eruption to its preinjury position), actively (repositioning with traction), or surgically and then to stabilize the tooth with a splint for up to 4 weeks in its anatomically correct position to optimize healing of the periodontal ligament and neurovascular supply while maintaining esthetic and functional integrity. For immature teeth with more eruptive potential (root $\frac{1}{2}$ to $\frac{2}{3}$ formed), the objective is to allow for spontaneous eruption. In mature teeth, the goal is to reposition the tooth with orthodontic or surgical extrusion and initiate endodontic treatment within the first 3 weeks of the traumatic incidence.

Extrusion

Definition: partial displacement of the tooth axially from the socket; partial avulsion. The periodontal ligament usually is torn.

Diagnosis: Clinical findings reveal that the tooth appears elongated and is mobile. Radiographic findings reveal an increased periodontal ligament space apically.

Treatment objectives:

- Primary teeth: to allow tooth to reposition spontaneously or reposition and allow for healing for minor extrusion (<3 mm) in an immature developing tooth. Indications for an extraction include severe extrusion or mobility, the tooth is nearing exfoliation, the child's inability to cope with the emergency situation, or the tooth is fully formed.

- Permanent teeth: to reposition as soon as possible and then to stabilize the tooth in its anatomically correct position to optimize healing of the periodontal ligament and neurovascular supply while maintaining esthetic and functional integrity. Repositioning may be accomplished with slow and steady apical pressure to gradually displace coagulum formed between root apex and floor of the socket. Splint for up to 2 weeks.

General prognosis: There is a lack of clinical studies evaluating repositioning of extruded primary teeth.⁶ In permanent mature teeth with closed apices, there is considerable risk for pulp necrosis and pulp canal obliteration.⁵⁷ These teeth must be followed carefully.

Avulsion

Definition: complete displacement of tooth out of socket. The periodontal ligament is severed and fracture of the alveolus may occur.

Diagnosis: Clinical and radiographic findings reveal that the tooth is not present in the socket or the tooth already has been replanted. Radiographic assessment will verify that the tooth is not intruded when the tooth was not found.

Treatment objectives:

- Primary teeth: to prevent further injury to the developing successor. Avulsed primary teeth should not be replanted because of the potential for subsequent damage to developing permanent tooth germs.

- Permanent teeth: to replant as soon as possible and then to stabilize the replanted tooth in its anatomically correct location to optimize healing of the periodontal ligament and neurovascular supply while maintaining esthetic and functional integrity except when replanting is contraindicated by:

1. the child's stage of dental development (risk for ankylosis where considerable alveolar growth has to take place);
2. compromising medical condition; or
3. compromised integrity of the avulsed tooth or supporting tissues.

Flexible splinting for 2 weeks is indicated. Tetanus prophylaxis and antibiotic coverage should be considered. Treatment strategies are directed at avoiding inflammation that may occur as a result of the tooth's attachment damage and/or pulpal infection.

Sequelae of injuries to the primary dentition:

- pulpal necrosis;
- pulpal obliteration;
- root resorption;
- injuries to developing permanent teeth:
 - local enamel hypoplasia to the permanent tooth;
 - different malformation to the permanent tooth;
 - disturbance in eruption;
- injuries to supporting bone.

Sequelae of injuries to the permanent dentition:

- tooth discoloration;
- pulp canal necrosis;
- pulpal necrosis;
- arrest of root development;
- periapical inflammation;
- external and internal inflammatory root resorption
- loss of tooth.

Knowledge level control

1. Classification of traumatic dental injuries of the permanent teeth.
2. Causes of the acute and chronic trauma of the permanent teeth teeth.
3. Peculiarities of examination of children with different traumas of the permanent teeth.
4. Tooth concussion. Clinics. Diagnosis.
5. Tooth luxation. Classification. Clinics. Diagnosis. Treatment.
6. Tooth fracture. Classification. Clinics. Diagnosis. Treatment.
7. Chronic tooth trauma. Causes. Clinics. Diagnosis. Treatment.
8. Peculiarities of treatment of trauma the permanent teeth. Prognosis.

Test

1. An 8.5-year-old child complains of pain in the frontal teeth on the upper jaw on the left, because of its injuries two days ago. Objectively: almost half of coronal part of the 21 tooth is missed, pulp is significantly exposed, red, swollen, painful and bleeding during probing. Percussion is painful. Choose the optimal method of treatment.
 - A. Vital amputation
 - B. Vital extirpation
 - C. Biological method
 - D. Devital amputation
 - E. Devital extirpation.

2. A 10-year-old boy injured a tooth. Objectively: absence of the lateral angle of the 21 tooth. In history: sharp edge of the tooth injuries tongue, slight pain response to thermal stimulus. What is the most probable diagnosis?
 - A. Crown fracture (damage of the enamel)
 - B. Fracture of crown and root of the tooth
 - C. Crown fracture (damage the enamel and dentin)
 - D. Combined injury
 - E. Complicated crown fracture with pulp exposure.

3. An 8-year-old girl has injured tooth. OBJECTIVELY: absence of the lateral angle of the 11 tooth. In history: a sharp edge injuries the tongue, slight pain response to thermal stimulus. The diagnosis: fracture of the tooth crown (damage the enamel). What treatment should be used?
- Polishing the sharp edges, covering with fluoride varnish
 - Perform endodontic treatment
 - Therapeutic liner, the elimination of defect with composite material
 - Prescribe physiotherapy
 - Medical intervention is not required.
4. A 14-year-old child complains of pain and mobility of the anterior teeth of the upper jaw as a result of the fall. On examination, it is determined the mobility of the 21 tooth in the vestibular and oral directions. Coronal part of the tooth is intact. Percussion is sharply painful. On the X-ray- no pathological changes. EOD = 22mkA. Define the diagnosis.
- Subluxation of tooth
 - Contusion tooth
 - Complete dislocation of the tooth
 - Intrusive dislocation
 - Extrusive dislocation.
5. A 10-year-old child complains of pain after acute injury of the central incisors of the upper jaw, which increases during chewing. Objectively: coronal part of the 11 tooth is intact, percussion is painful, abnormal mobility is not defined. There is no changes of the 11 tooth on the X-ray. What additional tests should be conducted for choosing method of treatment
- EOD
 - Reoperiodontography
 - An additional research is not necessary
 - Shillera-Pisareva test
 - Vital coloring.

Control questions:

- What are the main causes of dental trauma in children?
- Name the features of the clinic for acute dental trauma in children at different ages.
- Specify the features of the course of the clinic for fracture of the tooth crown within the enamel.
- Specify the clinical course of the diagnostic methods for fracture of the tooth crown within the enamel and dentin.
- Specify the clinical features of additional diagnostic methods at a fracture of a tooth crown with exposure of a pulp.
- Describe the clinic, additional methods of diagnosis with full dislocation of the tooth, fracture of the root of the tooth subluxation of the tooth.
- Name possible complications after trauma of the permanent teeth.

List of practical skills:

- To curate a child with acute trauma of the permanent tooth.

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