UKRAINIAN MINISTRY OF HEALTH
Odessa National Medical University

Dentistry Faculty
Department of therapeutical dentistry

APPROVED
Vice-rector for scientific and pedagogical work

Eduard BURYACHKIVSKY

September 1, 2023

GUIDELINES For lectures From the academic discipline

Odessa – 2023

Approved:
Meeting of the Department of Therapeutic Dentistry
Odessa National Medical University
Protocol No. 1 dated August 28 , 2023 .
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(signature)

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ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Therapeutic Dentistry

METHODICAL DEVELOPMENT OF LECTURES

The academic discipline "Propedeutics of therapeutic dentistry"

SECTION № 1 "Propedeutics of therapeutic dentistry"

Lecture number 1 "Introductory lecture. Historical stages of development Therapeutic dentistry. The importance of congresses, Works of scientists of Ukraine. Relationship with theoretical and other dental disciplines "

Course 2 Faculty of Dentistry

Approved
at the methodical meeting of the Department
"__03__" _____09_____ 2023
Protocol № ___1__
Head of the Department

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Odessa – 2023

1. THE TOPIC OF THE TOPIC. JUSTIFICATION.

Students who study in the second year are not yet clearly aware of what "Dentistry" is, and also what the therapeutic dentistry is doing. Knowledge of these issues is quite important for the student in terms of further choice of future specialization. An urgent issue is the history of the development of dentistry, including the therapeutic one. A significant number of common diseases have a close connection with odontogenic foci of infection, and therefore the role of the dentist in the overall system of medical examination is important. The achievements of domestic dentistry allow the dentist to carry out diagnostics and treatment of dental diseases at a modern level. Modern capabilities of the dentist are based on the developments of our domestic scientists (II Novik, IA Belegman, NF Danilevsky, AI Marchenko, RG Sinitsin, VR Okushko, AV. Borisenko, PTMaksimenko, AKNikolishin, ISMashchenko, others). Significant achievements of domestic dentistry are associated with NIIS in Odessa (AI Marchenko, VE Sklyar, GN Varava, KN Kosenko, SA Schneider).

The materials of the lecture can give you a basis for further participation in the development of the most significant issues of therapeutic dentistry and the choice of dental specialization.

The aim of the lecture is to form the concept of the term "dentistry", to justify the importance of this specialty, its place in the general health system, the population, the current state of therapeutic dentistry and the prospects for its development.

2. OBJECTIVES OF THE LECTURE:

Educational:

- to acquaint students with the main stages of dental development;

- to form the basic principles of organization of dental care to the population in Ukraine and the CIS;

- to reveal the prospects of training dental staff and forms of rendering dental care to the population;

- to acquaint students with the most relevant modern problems of therapeutic dentistry.

Educational:

- to reveal principles of formation of progressive outlook at medical workers;

- to draw the students' attention to the high moral and ethical qualities of outstanding figures in the national medicine, incl. And dentistry, which gave all the strength and knowledge to preserve the health of the people;

- to reveal the role and importance of the deontological aspects in ensuring the high quality of rendering dental care to the population.

3. PLAN AND ORGANIZATIONAL STRUCTURALUCATION

No. Main stages of the lecture and their content Objectives at the level of abstraction Type of lecture, equipment Time distribution

1. Preparatory stage.

1. Definition of learning objectives 2

2. Providing positive motivation 3

2. The main stage. The presentation of lecture material. Plan:

1. History of development of dentistry I 10

2. The main organizational principles of dental care in Ukraine and CIS III 30

3. Preparation of dental specialists II 10

4. Current state of scientific problems of dentistry II 10

5. Contribution of the Department of Therapeutic Dentistry in solving the main scientific problems II 10

6. Prospects and tasks of modern dentistry

3. The final stage

Summary lectures, general conclusions 2

Lecturer's answers to possible questions 2

Self-study task 1

4. CONTENT OF LECTURE MATERIAL.

The history of dentistry goes back to the depths of the centuries, because in the Neanderthal skulls from the early Paleolithic epoch (100-50 thousand years BC) paleoanthropologists discovered traces of caries. That is, the problem of toothache accompanied a person, almost from the very beginning of history.

How did Neanderthals treat their sick teeth (and have they been treated), we unfortunately do not know

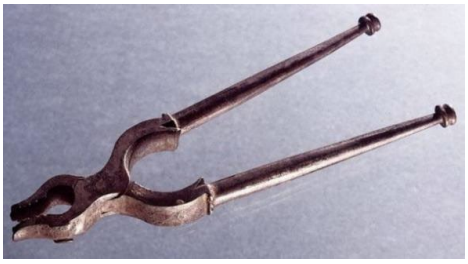
It is believed that for the first time people who started to treat the teeth appeared about 9000-8000 years ago - in 2001, during the archaeological excavations in Pakistan, the most ancient in the history of a tooth drill, which lay underground for 9 thousand years! It was made similar to a tool for obtaining fire and looked like this:

In addition, eleven people buried there have been found to have traces of dental surgery. Now this is the first known page of the history of dentistry.

With the advent of the oldest developed civilizations, there was also quite developed dentistry. Especially significant development of it (however, as in general medicine) was in ancient Egypt. So the Egyptian priests-stomatologists were the first to learn how to put dental fillings, to make artificial teeth (they were tied with a special wire to neighboring healthy teeth). A detailed description of tooth diseases is mentioned in the ancient Egyptian medical document - the papyrus of Eber (1550 BC). Also, it was in Egypt that the first toothpaste in history appeared made of a mixture of pumice, egg shell, myrrh and ash from the burnt internals of the bull .

In addition to Egyptians, skilful dentists of ancient times were Etruscans who knew how to make dentures. They made them by cutting out of the appropriate teeth of animals. Inserted in a special way, they differed in strength and fit perfectly even for chewing rough food. Later, the dental skill of the Etruscans was adopted by the ancient Greeks and Romans.

Since the era of Antiquity before us, many works of Greek and Roman physicians, dedicated, including the treatment of patients with teeth, have come down. A new page in the history of dentistry already in the 1st century AD. E. Discovered the ancient Roman surgeon Archigen, who was the personal physician of the Roman emperor Trajan - he was the first to drill the tooth cavity with a trephine for the medical purpose. Later with the onset of the Middle Ages, this technique was forgotten for several centuries.



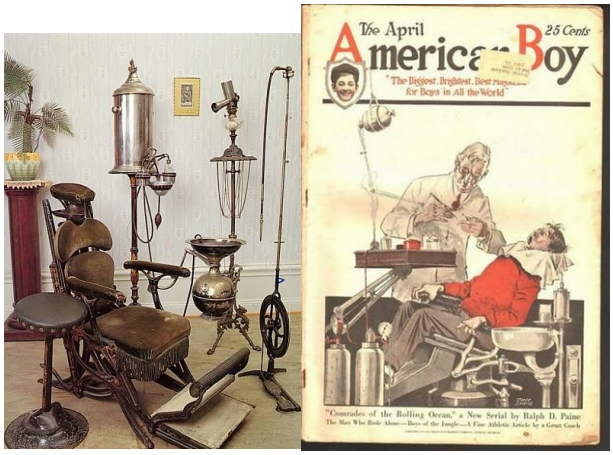
In front of you, the picture shows the usual forceps. It is this tool for many centuries has become a universal therapeutic tool for dentists of the Middle Ages. Medical treatises of Antiquity were somehow forgotten, and with them there were forgotten and various methods of dentistry, such as sealing, dentures, etc. Dental treatment of the Middle Ages was reduced to the removal of sick teeth with the help of such forceps.

The place of the same dentists in the Middle Ages was occupied not even by doctors, but ordinary bath attendants, horses, barbers, the latter could not only cut and shave, but remove the tooth.

However, in the general medieval-dental darkness of ignorance there were also pleasant exceptions, glimpses of the light of knowledge. One such glimpse was the professor of the University of Bologna, Giovanni di Arcoli, who lived in the 15th century. He again applied the method of Archigen, and several centuries later again took up the treatment of teeth.

Another next page in the history of dentistry was discovered by a personal dentist of George Washington himself - John Greenwood, who in 1790 invented the first dental drill. He was the first to make a drill, which was activated with the help of a foot.

But that's what the dental office of that time looked like. Later another American doctor - James Morrison improved the Greenwood machine, and importantly - patented this invention. On the calendar was already 1871, 5 years later, the company created by him SS White launched a dental novelty in mass production and soon it spread all over the world.



And this is already a picture from the beginning of the 20th century, such a transformation has undergone dentistry in a relatively short time and has come to the form by which we perfectly know it now.

A significant step in the training of the dentistry has done dental schools. The first dental school in Russia was opened in 1881 in St. Petersburg, VI. However, these schools had many shortcomings, and in 1900 the preparation of dentists was officially banned through apprenticeship. The first course on odontology in the institutes of Russia at medical faculties was introduced on the recommendation of prof. NV Sklifasovskogo. He is the founder of the study of dental caries in Russia in the epidemiological aspect. He first established the prevalence of dental caries in urban residents.

In Ukraine, dentists TA. Tychynsky (1893) and I.I. Margolin (1896) organized a school in Odessa, L.S. The form is in Kiev (1897). Later, the odontological school appeared in Kharkov.1919 - Nationalization of private dental schools with 4 years of education.1920. - Medical academies are formed in Kharkov, Kiev and Odessa with two faculties: medical and odontological. In1928 - the scientific research institute of stomatology was organized in Odessa.

Dental faculty in the Odessa Medical Institute. N.I. Pirogov was opened in 1958.

1-й декан Стоматологического факультета
доц. Васильева Н.Г., 1958 год.

The organizer and the first head of the department of therapeutic dentistry was the director of the Odessa Research Institute of Dentistry, Ph.D., Assoc. Alexey Ivanovich Marchenko, a student of the Kiev School of Dentists.

Since 1.09.1960. The first assistants - BV Bashkirov and LF Tishchenko - began their work at the department. Veterans gave many forces and energy to the chair - G.N. Varava, I.V. Shvets, V.N. Pinchuk, M.A. Nikitin, J.I. Tarasenko, N.M. Yesina. In 1966, A.I. Marchenko defended his doctoral dissertation, and in 1967. He was awarded the title of professor.

Они были первыми: доц. А.И. Марченко
асс. Б.В. Башкиров
Л.С. Тищенко
лаб. Е.О. Матвейко
кафедра терапевтической стоматологии, 1960 год.

During the leadership of the department (1960 - 1977), the staff defended 1 doctoral (A. I. Marchenko) and 15 candidate dissertations.

Коллектив кафедры терапевтической стоматологии 1962 год.

The first of the assistants defended candidate's theses BV Bashkirov (1965), G.N. Varava (1966), IV Shvets (1967). Professor A. I. Marchenko (1966) first studied the physiological mechanisms of absorption of the oral mucosa by drugs used in the clinic of therapeutic dentistry. The results of these studies formed the basis for new methods for treating periodontal diseases and oral mucosa. B.V. Bashkirov (1965) conducted a

comparative evaluation of existing methods of treating periodontitis with high-frequency currents, perfected them, first applied a solution of pancreatin in combination with furacillin. An original electrosurgical method for treating periodontal diseases, based on the use of bioactive diathermocoagulation of hypertrophied gingiva, was developed by GN Varava (1966). An effective technique for the treatment of inflammatory periodontal diseases, applications and electrophoresis of vitamins C and P was suggested by IV Kuznetsov. Shvets (1967). VE Sklyar studied the age-related changes in the oral mucosa and their influence on the clinical course of chronic recurrent aphthous stomatitis, substantiated the metabolic foundations of pathogenesis, clinic and treatment of this disease (1982). VN Pinchuk has developed a complex method of treating red flat lichen, based on the use of galascorbine, prednisolone and vacuum (1969). The department also worked out the issues of effective treatment of periodontal diseases with herbadent - alcohol extract from medicinal plants (ASKushnir, 1969), catarrhal and ulcerative gingivostomatitis with aerosols of medicinal substances (MA Nikitina, 1971). The investigation of the influence of copper on the process of mineralization of teeth and bones in white rats under conditions of experimental caries is devoted to the study of A. N. Balashov (1971). LS Kostenko summarized the results of studying the sensitivity of pathogenic properties of coccal microflora to certain antibiotics, developed specific recommendations for the selection of antibiotics and control of their effectiveness in the treatment of inflammatory diseases of the oral mucosa (1972). NM Esina proposed a method for treating pulpitis in children with calcium hydroxide and calcium glycerophosphate in combination with vitamin D2 and sodium sulfatiazol (1973). The research of the assistant NVTaryanik (1980) is devoted to the development of the method of desensitizing therapy of periodontal diseases. The questions of organizing dental care for the population are not ignored. Corresponding post graduate student IS Filipchik (1974) developed organizational principles of rendering dental care to the rural population, assistant AV Gorodenko (1980), rational forms of dental care for industrial workers were proposed and approved. From 1977 to 1978, the duties of the head of the department were performed by Associate Professor B.V. Bashkirov, and from 1979 to 1989, the department was headed by Professor Rostislav G. Sinitsyn, a student of the Kiev School of Dentists.

From December 1989 to November 1990. And from November 1991 to December 1993. The duties of the head of the department were performed by the senior lecturer V.I. Potyko. Since October 1990. To November 1991. The head of the department was the doctor of medical sciences VE Sklyar, a pupil of our department who worked as deputy director for science (1976-1990) and the director of ONIIS (1990-1991). Prof. RGSinitsyn is the author of about 200 scientific works, including 2 manuals, 12 methodical recommendations, 6 manuals, 17 inventions. During the work at the department, under his supervision, 1 doctoral thesis and 13 candidate dissertations were completed. In 1979, the department was included in the development of an all-Union comprehensive program for the prevention of dental diseases. The main scientific direction of the department is the development of methods for diagnosis, treatment and prevention of dental caries and periodontal diseases. Studies, first performed by prof. RGSinitsyn, allowed to obtain fundamentally new data on the pathogenesis of dental caries and the clinical features of the manifestation of the initial stage of the disease. Experimental studies, data from electronic, infrared, luminescence and polarization microscopy, micro-radiography, histochemical studies have shown that pathological changes in caries develop simultaneously in the mineral and organic substances of hard tooth tissues. Under his leadership, the original method of luminescent diagnostics of the initial caries was developed, the methods of targeted influence on the main links of the pathological process in caries with the help of new remineralizing therapy, methods of treatment and prevention of periodontal tissue diseases. Associate professor AA Bass experimentally substantiated the advisability of using a remodent cyanoacrylate lacquer providing a high caries-prophylactic effect (1987). NI Putintsev developed a method for diagnosing an initial caries, based on determining the degree of demineralization of tooth enamel by measuring the optical

density of the dye treated tissue, which increases the accuracy of diagnosis by 2-3 times (1992). Treatment of hyperesthesia of hard tooth tissues with a pantogam of prolonged action was suggested by Associate Professor A. Zherebko (1992). Graduate student Kh.I. Iftekhar who investigated the mechanism of disturbance and correction of specific humoral immunity to actinomycetes in the pathogenesis of periodontitis proposed the method of anti-relapse therapy (1987). Associate Professor NA Ivchenko developed a method of preventive treatment of periodontitis with a medium-sized focal dose dosed vacuum and determined indications for its use (1995). The method significantly increases the duration of remission, which creates real opportunities for the expansion of periodontal care to the population. S. Koval first identified 10 complexes of professionally important actions related to the diagnosis and treatment of dental diseases, disclosed the psychological mechanisms of the influence of the orientation of motivation, the level of intelligence, the emotional aspects of students on the effectiveness of mastering professionally important actions (2001). The methodology for assessing the level of formation of professionally principled actions among students - dentists has been created, the psychological and pedagogical system of directional formation and fixing them in educational activity has been developed, which significantly increases the level of practical skills and theoretical preparation of students. At the department, original ways of introducing therapeutic and prophylactic agents into dental tissues and the oral mucosa protected by copyright certificates were developed. Devices for introducing remineralizing agents into the dental tissue for the prevention of caries and the treatment of the initial stages of the disease have been designed. Devices are proposed for applying to the tooth surface and the mucous membrane of the oral cavity of therapeutic and prophylactic agents in the form of aerosols, which provide a persistent positive effect.

In 1994 the department was headed by the member of the corr. NAMS of Ukraine, Honored Worker of the National Academy of Science of Ukraine, Professor KN Kosenko.

The main directions of his scientific activity are related to the development of scientific bases for the prevention of dental caries and periodontal diseases, the sialotrophic concept of the pathogenesis of diseases of the oral cavity, the development of the scientific organizational basis for reforming dental care for the population of Ukraine. Organized and held several international scientific and practical conferences, exhibitions on dentistry and the First Congress of the Association of Dentists of Ukraine, where he proposed the concept of reforming dental care for the population of Ukraine. Kosenko K.N. Co-author of the dental sections of the program of the National Center for Human Rights of Ukraine "Human Health", the initiator and supervisor of the "National Program for the Prevention of Dental Diseases among the Population of Ukraine". Under his leadership, a number of complex topics were held on epidemiology, prevention and treatment of major dental diseases, using new methods, tools and organizational measures.

K.N. Kosenko is the author of more than 250 scientific papers, 27 inventions, 6 innovations, 3 departmental criteria (standards) aimed at developing and improving the work of dental services in Ukraine. Directly under his leadership, 14 candidate dissertations were defended and defended at the department. I proposed a lacquer composition with tin fluoride for prophylaxis of caries. He studied in detail the monitoring of dental diseases in Ukraine, for the first time created a national bank of dental diseases in various regions of Ukraine, studied the dynamics of morbidity depending on age, social and economic conditions, outlined specific ways of their prevention. The results of the research formed the basis of the program of dental care for the population of Ukraine. This problem is also devoted to the dissertation work carried out under his leadership.

Professor V. Skiba (1996) proposed, experimentally substantiated and introduced into clinical dentistry a new biogenic stimulator "Biotrit", a dental elixir "Biotent-2" and a complex antioxidant preparation "Catomas", which significantly accelerates the regeneration of the oral mucosa.

Associate Professor V.S. Burdeyny (2000) developed the composition and experimentally substantiated the technique of sublingual use of "Biotrit-Denta" tablets for the prevention of caries and periodontal diseases in children.

Associate Professor I.K. Novitskaya (2003) developed a method of exogenous prophylaxis of dental caries, which combines the effect on dental plaque and the active introduction of the basic mineral components of the enamel with the help of electrophoretic toothbrushes and specially designed remineralizing toothpastes. For the first time, the possibility of using the developed complex for the remineralization of tooth enamel in children, orthodontic treatment in which was carried out with the help of bracket systems, was justified. An original, effective scheme for stimulating the mineralization of enamel by the method of sequential introduction of mineral components in the hard tissues of teeth: calcium, phosphorus and fluorine was developed.

Associate Professor O.I. Aksinorskaya (2004) theoretically substantiated, she proved by experimental and clinico-laboratory studies that dobezilate-calcium enhances the processes of mineralization of tooth enamel, normalizes the homeostasis of oral fluid, improves microcirculation in periodontal tissues, increases non-specific resistance of the oral cavity. Has developed the scheme of application of a preparation at treatment of a chronic catarrhal gingivitis in a combination to caries of a teeth.

Assistant N.N. Zaporozhets (2005) has proved that with chronic catarrhal gingivitis there is a violation of local immunity of the oral cavity, factors of nonspecific resistance decrease, and antibody production increases. A method of pharmacological correction of immunity disorders in the oral cavity with imunomodulators of local action ("Lisobakt", "Imudol") has been developed.

Assistant ON Davidenko suggested using magnetophoreznamacite and cholecalciferol (vitamin D3) with generalized periodontitis, showed their high efficiency.

Associate Professor AA Sedletskaya (2005) substantiated the necessity of complex application of lecithin in elderly patients with periodontitis, proved their high efficiency.

Assistant NA Bas (2005) developed a method for the treatment and prevention of inflammatory diseases of periodontal tissues, based on the combined effect of an electrophoretic toothbrush and biologically active components of the toothpaste "Pelodex".

Applicant OI Anshukova (2006) for the first time studied the possibility of directing the effect on osteogenesis-salveolar bone in patients with generalized periodontitis of the toothpaste "Garant", containing osteoapatite with osteoconductive properties and other biologically active substances with pronounced osteotropic properties.

The graduate student O.Skiba (2007) studied in detail the pathomorphological changes in the JOS and bone tissue of the jaws in diabetes type I, which served as a rationale for the creation of the "Soflipin" gel on the basis of Japanese, α-lipoic and inulin chicory fruit with antioxidant, Anti-inflammatory and membranotropic properties.

Assistant I.A.Panenko (2007) theoretically substantiated and confirmed in practice the expediency of using in chronic candidiasis of the oral cavity in persons with removable prostheses "Lactogel", containing lactobacterin, chlorhexidine, sodium tetraborate and Biotrit C.

Assistant O.V. Goncharenko (2008) studied the influence of hygiene products on oral microbiocenosis in persons without dental diseases, and in patients with tooth decay and chronic catarrhal gingivitis. Has told different degrees of antibacterial influence of toothpastes on a microflora of an oral cavity, influence of brushes for cleaning of tongue on a microbiocenosis of an oral cavity. She offered recommendations for the optimal choice of personal oral hygiene products.

Associate Professor LV Goncharuk (2009), studied the features of the clinical course and treatment of inflammatory periodontal diseases in patients with urolithiasis, studied the effectiveness of ozone therapy and magnetotherapy in the complex treatment of patients with this pathology.

Associate Professor EL Zagradskaya (2011) developed a scheme for the prevention of chronic candidiasis of the oral mucosa depending on the level of contamination with Candida fungi and the severity of clinical symptoms: differentiation of antifungal and immunomodulating medications (tincture of echinacea, dental elixir "Lizomukoid", 1% of "Orasept" , 5% levorin ointment and lactobacterin), which contributes to the activation of natural defense mechanisms of the oral cavity, reducing the intensity of the inflammatory process, increasing the speed with livatsii.

Assistant KP Rozhko introduced laser correlation spectroscopy to assess the functional state of periodontal tissues, which reflects tissue homeostasis, permeability and blood filling of the capillary bed, and the severity of the pathological process. She has proven the effectiveness of toothpastes Colgate® Medicinal Herbs and LacalutFitoformula for chronic periodontitis, and Forest Balm and Parodontax® Classic for exacerbating the process.

Assistant I.V.Luchak found that the functional activity of the salivary glands of children has a significant impact stressful hormones. It proved the intensity of

salivation caries process level. The regularity of the reduction of salivation in case of somatic morbidity was revealed, especially when using holinoblokatorov, frequent and prolonged intake of drugs with atropine. The necessity of carrying out such activities aimed at increasing salivation is proved: use of a tincture of a centiparous gargle, toothpaste "Colgatetotal", tablets "Revit".

Since 2014 the department is headed by Dr. med. Sci., Associate Professor Yu.G. Romanova

In her thesis, Yu.G.Romanova found that candidiasis should be considered as a violation of immune and microbial homeostasis systems of the oral cavity, which have a direct causal relationship with removable acrylic dentures. She said that if the oral homeostasis system is disturbed, the functional activity of the salivary glands decreases, which causes the development of dryness of the SDR, there is a deficiency in the oral cavity of biologically active substances that take part in the processes of maintaining the constancy of the medium, which leads to inflammation, activation of lipid peroxidation, Intensification of the action of toxins of aggressive microorganisms, incl. Candida. Clinically proved the effectiveness of the use of probiotic and plant prebiotic and adaptogenic agents for the prevention of candidiasis. Created a tooth elixir "Biodent-4", "Lactogel" and gel "Profial", which reduce the degree of adsorption of Candida fungi and normalize the homeostasis of the oral cavity.

At the department since its organization (1960) and up to the present (2014), 12 doctoral and 52 candidate dissertations were performed by employees and competitors. Pupil of the department, prof. GNVarava headed ONIIS (1973-1990), currently he manages the organizational and methodical department of the Institute of Stomatology of the Academy of Medical Sciences of Ukraine. Corresponding Member of the Academy of Medical Sciences of Ukraine, Professor KN Kosenko was simultaneously Director of the Institute of Stomatology of the Academy of Medical Sciences of Ukraine, Professor V.Ya. Skiba heads the Department of Therapeutic Dentistry at the same Institute. The majority of assistants and associate professors who defended their Ph.D. theses and who currently work at the department took an active part in the work of the SSS (AA Bas, VA Chumachenko, A. Zherebko, NA Ivchenko, S.N. Koval, IK Novitskaya and others). At the department 30 graduate students, 25 clinical residents, 17 masters have been trained.

For the years of the department's existence, the employees carried out 22 planned research works, published 12 monographs and manuals, more than 650 scientific articles, 50 methodological recommendations and information sheets, received 43 copyright certificates and patents, 186 scientific developments were introduced into practical dentistry. Employees of the department regularly deliver reports at all-Union and republican congresses and conferences, take an active part in the work of the regional scientific society of dentists, the Association of Dentists of Ukraine.

Therapeutic dentistry is an independent section of dentistry, which includes the main dental diseases - diseases of teeth, periodontal and mucous membranes of the mouth. Therapeutic dentistry is the basis of dentistry, because timely treatment of diseases of teeth and periodontal tissue contributes to their preservation.

The leading place in therapeutic dentistry is occupied by the problems of caries treatment and its complications, as well as periodontal diseases. Dental care is the most massive type of medical care and occupies one of the leading places in the overall system of measures aimed at preserving the health of the population.

Literature:

- basic;

1. Therapeutic stomatology: A textbook for students of stomatological faculties of higher medical educational institutions of IV level of accreditation in two volumes / Podred.Prof. A.K. Nikolishin. - T. I. - Poltava: "Brave", 2005. - 392 sec. + 24 inc. : Il ..

2. Therapeutic dentistry: A textbook for students of dental faculties of higher medical educational institutions of the IV level of accreditation in two volumes / Podred.Prof. A.K. Nikolishin. - T. II. - Poltava: "Marvelous", 2007. 280 s. + 32 inc. : Il ..

- additional (scientific, methodical):

1. Nikolicin A.K. The modern endodontics of a practical doctor. - Poltava, 2008. - 156 sec.

2. Guide to dentistry. Podred. K.M. Kosenko. Odessa "Astroprint" 2010. – 277p.

ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Therapeutic Dentistry

METHODICAL DEVELOPMENT OF LECTURES

The academic discipline "Propedeutics of therapeutic dentistry"

SECTION № 1 "Propedeutics of therapeutic dentistry"

Lecture number 2 **" Dental department, dental office Sanitary - technical requirements for them. Principles of ergonomics. Norms of providing Junior and middle medical staff "**

Course 2 Faculty of Dentistry

Approved
at the methodical meeting of the Department
"___02_" _____09_____ 2023
Protocol № _____
Head of the Department

Professor Skyba V.Y.

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Odessa – 2023

Lecture
"Dental office, dental office. Sanitary - technical requirements for them. Principles of ergonomics. Standards for provision of junior and mid-level medical personnel ".

Lecture plan

1. Organization of dental care

2. Structure of the dental clinic.

3. Structure of the therapeutic department.

4. Dental surgery

- standards and requirements for its organization (area, decoration, lighting, ventilation and heating system).

- the organization of the doctor's unit (installation, a table for the tray with tools and materials, a doctor's chair)

-organization of a nurse or doctor's assistant unit

- organization of a nurse's unit

5. The concept of ergonomics. Ergonomics of a dentist.

6. Normative provision for junior and middle-level medical personnel.

1. Dental care is one of the most massive types of specialized medical care. In the Soviet era, it was based on the principles of statehood and planning, accessibility and free of charge, preventive focus, communication of science and practice.

The management of dental care is carried out by the Ministry of Health of Ukraine, regional, provincial, city and district health departments.

In the organization of medical and preventive care of the administrative territory an important role belongs to the external chief dentist of the Ministry of Health of Ukraine, the region, etc.

The network of dental outpatient clinics has the following nomenclature:

- independent dental clinics (regional, city, district);

- Dental offices in the multidisciplinary polyclinics;

- dental offices;

- self-supporting dental clinics;

- Private.

2. Dental clinics, departments, offices and dental laboratories are located in stand-alone standard buildings or, in exceptional cases, in adapted premises built into buildings, subject to certain rules.

In the basement premises of buildings can be placed only sanitary facilities for staff (cloakrooms, showers, storage rooms, etc.), which have natural lighting through windows, as well as compressor installations and ventilation chambers, illuminated by artificial light. Control over the implementation of the Sanitary Regulations is carried out by the health authorities and the sanitary service, as well as by the technical inspection of labor and the trade union committee.

Dental clinic, as a rule, consists of: surgical, therapeutic, orthopedic departments with dental laboratory, can have a periodontal office. Each dental clinic has a registry. If there is a children's department in the clinic, then it should have separate entrance, a wardrobe, a waiting room, a bathroom and not communicate with the adult department.

The therapeutic department includes medical rooms, a physiotherapy room and sometimes an x-ray room. Often in the therapeutic department, a periodontist room is allocated.

3. Dental office. According to existing regulations, the area of the dental office for one doctor should be at least 14 m2. If several chairs are installed in the office, then its area is calculated based on 7m2 for each subsequent chair. If an additional chair has a universal dental unit, the area of the additional chair is increased to 10m2.

The height of the cabinets must be at least 3 m, and the depth with unilateral natural light should not exceed 6 m.

In therapeutic and orthopedic dental offices should be placed no more than three chairs with the obligatory separation of doctors' workplaces with opaque partitions up to 1.5 m high.

Walls of dental offices should be smooth, without cracks. All corners and junctions of walls, ceilings and floors should be rounded, without cornices and ornaments.

All materials used for interior decoration of premises must be only from the number of authorized Ukrainian Ministry of Health for use in construction. The color of the surfaces of walls and floor in treatment rooms should be light tones with a reflection

coefficient of at least 40% (salad, ocher). It is desirable to use a neutral light gray color that does not interfere with the proper coloration of the hues of coloration of mucous membranes, skin, blood, teeth (natural and artificial), filling and denture materials.

Floors in dental offices should be covered with roll PVC material (vinyl plastic, linoleum) and do not have any gaps, for which all seams are welded with special burners or high-frequency welding. Covering the floor of the linoleum should climb to the walls at a height of 5 - 10 cm and be sealed with a wall flush; Plinth should be internal (under linoleum);

Doors and windows in all rooms are painted with enamels or oil paint in white. Door and window fittings must be smooth, easy to clean.

The walls and ceilings of the cabinets are plastered (brick) or rubbed (panel) with 5% sulfur powder added to the solution to bind the sorbing mercury vapor to a strong compound (sulphurous mercury) that is not desorbed and stained with water-based or oil paints.

In the newly organized dental clinics, the windows of the dental offices should be oriented to the northern directions (C, CB, NW) in order to avoid significant differences in brightness at workplaces due to direct sunlight in other types of orientation, as well as overheating of the premises in summer, especially in Southern regions of the country.

When installing dental chairs in existing rooms in two rows in one-sided natural lighting, one should use artificial light even in the daytime in the second row of chairs and physicians should periodically change their workplaces.

In offices with one-sided natural lighting, dental chairs are installed in one row along the light-bearing wall.

Dental offices should be equipped with a centralized system of compressed air, vacuum, oxygen supply, depending on the capacity of the clinic.

Heating devices in the system of central water heating, as a rule, should be cast-iron radiators with a smooth surface that allows easy cleaning, placed only under the windows, with the exception of the corner rooms.

In the buildings of dental clinics, dental offices, offices and dental laboratories should provide general exchange intake and exhaust ventilation with a rate of air exchange 3 times per hour for hood and 2 times per hour for the influx. There should be easily openable transoms or windows in all rooms.

The decoration of the dentistry in connection with the possibility of using amalgam fillings has a number of features:

For work with amalgam and polymeric materials in the cabinets of therapeutic and orthopedic dentistry there should be a hood that meets the following requirements: a) in an open working opening of a cabinet measuring 30 '60 cm, an autonomous mechanical draft should provide an air speed of at least 0.7 m / s ;

B) the air must be removed from all areas of the cabinet;

C) the internal surfaces of the cabinet must be mercury-permeable;

D) the floor of the cabinet should have a slope of 1 to 2 cm per running meter in the direction of the trough connected to a vessel for collecting spilled drops of mercury;

E) a washbasin with a mercury trap must be installed in the cabinet;

E) a cabinet must be installed inside the cabinet to store the daily supply of amalgam, mercury and utensils for the preparation of amalgam, as well as demercurization facilities.

Cleaning dishes from traces of mercury requires careful processing of the chromium mixture, rinsing with clean water and subsequent washing with a 2.5% solution of iodine in a 30% solution of potassium iodide.

Preparation of silver amalgam by any method should be carried out only in a fume hood with traction included.

The amalgam mixer, which eliminates the manual operations of preparation of silver amalgam, must always be in the fume hood.

In the premises where work is performed with amalgam, all working furniture should have legs not less than 20 cm high from the floor level to ensure high-quality cleaning and relief, demercurization.

The tables for work with mercury should be covered with mercury-impermeable materials (vinyl plastic, relic, linoleum) and have edges at the edges, preventing the mercury drops from rolling to the floor; Under the working surface of the tables there should not be drawers.

The finished amalgam should be in a fume hood in a wide glass or porcelain vessel with water with a ground lid, in which it is necessary to wring out excess mercury and collect all surpluses of amalgam in the process of tooth filling.

Accidentally spilled mercury should immediately be collected with a rubber pear, and fine drops - with a brush of fine copper wire and placed in a vessel with water in the cabinet; The mercury contaminated surface must be immediately demercurized with a

20% solution of ferric chloride or with an acidified solution of potassium permanganate (5 ml of concentrated hydrochloric acid are added to 1 liter of a 0.2% potassium permanganate solution).

When filling the cavity of the tooth, excess amalgam should be collected in a tray with water, not allowing it to be scattered around the workplace.

Descent into the sewerage of water containing mercury, without special siphons is prohibited. Purification of siphons from mercury should be done once every 3 to 4 months.

Mechanized washing of clothes contaminated with mercury is produced once in 7 days in public laundry according to the method recommended by the "Sanitary Rules for the Design, Equipment, Operation and Maintenance of Industrial and Laboratory Premises Designed to Work with Mercury, Its Connections and Mercury Filling Devices" No. 780-69; Removal of contaminated laundry for washing the house or in urban laundry is strictly prohibited; Workers engaged in cooking and the use of amalgam should be given surgical gowns without pockets; The clothing of workers who have contact with amalgam should be kept separate from the home clothes and clothing of other employees.

In premises where they work with amalgam, once every two weeks, a qualitative air analysis should be conducted for the content of mercury vapor by means of indicator papers placed at the level of breathing in the working area and at the places of possible release of mercury vapor into the air of the room

When working in the offices of therapeutic dentistry with amalgam, once a month requires special cleaning, consisting in processing the entire room, furniture and equipment, especially in the workplace of doctors at the chair and near the hood, acidified with potassium permanganate by spraying or rubbing with a rag, Wetted in this solution. After an hour, everything is wiped dry, the used material is removed into the garbage collecting bin on the territory of the institution. All inventory for this cleaning should be separate, not used in other premises and stored in the lower compartment of the hood.

Dental surgery equipment

In the dental rooms of the therapeutic reception are: a dental unit, a patient's chair, two rotating chairs for a doctor and an assistant, a doctor's table (on wheels), a storage cupboard, a drybox, a sink and sometimes a compressor.

Dental unit is a complex of electrical, mechanical and hydraulic elements that converts external energy into energy of dental instruments and is designed to provide the necessary conditions for dental treatment.

Consider the main elements of the dental unit - the patient's chair, the doctor's unit (has an electric and air drive for the operation of the tips, an oil-free compressor, it is connected to the water and sewerage, equipped with air and water cooling of the boron), the assistant's unit (hydroblock and aspiration system "saliva ejector "," Vacuum cleaner "), an operating dental lamp and a pedal (or pedals) of a doctor. In addition, the units can be equipped with additional devices and equipment: a system for illuminating the carious cavity through the tip, a built-in lamp for the polymerization of light-curing materials, a computer, a radiovisiograph, an endodontic microscope.

The dental unit must meet the following requirements:

- The design of the installation should meet the requirements of ergonomics and best meet the individual physiological characteristics of the dentist

- The design of the installation should meet the requirements of a specific treatment process (enough "necessary" functions, there are no redundant, "extra" functions);

- the installation should be convenient and safe for the patient, its appearance and comfort should positively influence the patient's subjective perception of the quality of dental care rendered to him;

- the cost and design of the installation should correspond to the price category and the general interior of the clinic, as well as the personal taste of the doctor

- The brand, design and construction of the installation should help to increase the professional image of the doctor both in the eyes of patients and in the eyes of fellow dentists;

- the installation must be reliable, the risk of equipment failure should be minimal;

- the installation should be easy to repair, it should have an accessible service, the time of delivery of spare parts should be minimal. In accordance with this requirement, when purchasing an installation, it is necessary to provide for the possibility and availability of service, warranty and post-warranty repair.

Dental units currently on the Ukrainian market, depending on their configuration, design, clinical capabilities and price group, can be divided into three classes:

- Economy class - installation of low cost, high enough quality, but limited by the minimum number of functions required by the physician. In addition, they are convenient for the doctor and patient, they are functional, but they do not have an exclusive design.

- Business class - the installation of an average price category, improved quality, allowing the use of any tool and achieve the required adjustments. Such installations

have additional functions and are equipped with additional tools (photo, ultrasound, illumination of the tips, etc.). In addition, such installations are equipped with a more convenient and ergonomic control system with programming functions.

Elite is a class. - This class includes installations of a high price category, created on the basis of the latest technologies and original design and design solutions. Such installations have a number of additional functions, are equipped with additional tools, computers and a control system with programming functions. The comfort of such facilities for the doctor and patient is enhanced, they are highly functional, characterized by Patient chair

There are two types of chair drives in dental units: hydraulic and electromechanical.

The doctor's block is the main element of the dental unit, which determines the entire work of the doctor.

Modern dental units have different types of drives. From the drive, the rotation with the tip is transferred to the cutting tool.

The most common are three options: stationary, with top and bottom feeds of tools and mobile. All three types of the doctor's block have their advantages and disadvantages: when the tool sleeves are positioned from above, the mechanism for returning the tool to its original position after application is provided, but the sleeves are short, so the work with the tip on the instrument table is complex and inconvenient. When returning the tool, make sure that the tip is in its original position. When placing the sleeves from the bottom, it is also necessary to ensure that the tip does not fall when inserted into the socket. Also, in the cells can be accumulated insignificant pollution. The mobile unit, based on the name, easily moves around the cabinet, simulating the layout of the doctor's work area. It can also be used with any other seat.

Another thing that affects the doctor's work is how many instruments are on the doctor's block. This is directly related to the time needed to treat one patient. If the sleeves are small, the time is wasted and the tool is replaced. You can install tools on the physician's block:

- air-water gun (it usually goes in the base configuration);

- Turbine tip;

-air or electric micromotor;

- ultrasonic scaler;

-additional tip (second micromotor or turbine);

-electrothermocoagulator;

- photopolymer lamp.

For a typical set of therapeutic works, a minimum set of tools is recommended (the presence of three sleeves - for an air-to-water pistol, for a micromotor and for a turbine). Further equipment of the unit with instruments depends on the type of installation, the desire of the doctor and, the range of therapeutic measures carried out by him and his financial capabilities. Additional characteristics of the doctor's unit include management of the unit itself, its interaction with the management of the patient's chair, as well as the ability to additionally install any equipment.

Assistant unit:

The assistant's unit consists of two interrelated elements: a hydroblock (with a spittoon bowl and a glass filler) and a saliva ejector system. Also on the assistant's block there can be an additional control panel and various auxiliary tools. Usually, the assistant's tools and the control panel are carried separately on the movable bracket.

Hydroblock (or spittoon block)

It can be made in the form of a stand-alone autonomous unit, which is mounted on the basis of the installation or on the patient's chair. The main elements of the hydraulic unit are the bowl of the spittoon bowl, the spittoon washer and the glass filler. Bowls of the spittoon bowl can be stationary and removable. They are made of ceramics, metal or plastic. Ceramic, although the most expensive, but meet high hygienic requirements.exclusive design

The rinse aid serves to clean the bowl and is usually turned on after the patient spits the liquid out of the mouth. Adjust the rinse aid according to the time of action and the power of the water flow. The filler of the cup serves to install and fill the glass on the hydroblock for rinsing the patient's mouth. The filler is adjustable either by filling time or by weight. Also in the hydroblock you can use additional options:

Collector of solid particles - separates solid particles from the water flow and prevents clogging of sewerage. Separator amalgam - allowing to retain amalgam and collect it in a separate container. The system of heating water and air for an air-to-water gun. Hygienic system - monitors the cleaning of the suction hoses. Disinfecting system - allows disinfection of incoming water with 3% hydrogen peroxide, and a system for supplying saline or autonomous water to tools, etc.

For the evacuation of liquids (saliva, blood, etc.) and solid particles (fragments of teeth, filling materials) from the oral cavity of the patient there is a so-called. Suction system (suction and absorption pump). According to the principles of operation, the suction system is divided into two large groups: injector and vacuum. The injection system is based on the principles of hydrodynamics. A specially created airflow

captures air from a given volume, thereby reversing the flow of air. When choosing an injection system, it must be remembered that when an air pump is used, an additional airflow occurs, which affects the capacity of the compressor.

The vacuum system of the pump is based on the creation of a vacuum by the compressor in the system. When using a vacuum system, it is necessary to use a pump separator.

In addition to saliva, secretion and blood sucking, additional instruments can be installed on the assistant's unit: air-water gun, light-curing lamp, etc.

On the control panel of the assistant unit, you can control the patient chair and activate some functions of the assistant's instruments (backlight, spray, etc.).

The operating lamp.

The operating lamp is designed to illuminate the working area during treatment (the lower part of the patient's face). There are three options for placing fixtures: on the ceiling, on the installation or on the floor. Placing the luminaire separately from the installation will require wiring of additional communications, so it is optimal to place it on the unit so that the luminaire moves with the patient's chair. This arrangement minimizes the adjustment when moving the patient's chair. Recently, companies engaged in the production of dental units, began to produce shadowless lamps. The effect is that even when the doctor blocks the working area with his hand, the shadow of the illuminated area does not fall.

Control Pedals

Pedals can control the following functions:

Patient chair management tool management.

The chair can be moved "by hand" with the help of the pedal, programming the necessary positions of the chair, and calling them into working mode. Tools with the help of the pedal can turn on / off, adjust the speed, turn on / off the backlight, spray, etc. In dental units a whole series of pedals are used: one-, two-, three- or more key pedals. If the unit is designed to perform various kinds of work, it is rational to use a pedal with a large set of functions, for example, a touch type. Additional options for the dental unit include diagnostic and visualization systems (eg radiovisiograph, intraoral camera, LCD display, negatoscope), doctor's and assistant's chairs.

Summing up, I would like to remind you that when choosing a dental unit, you should observe not only the technical requirements, but also the requirements of the sanitary-hygienic and epidemiological regime for the dental profile working in non-governmental medical institutions.

Ergonomics in dentistry

The term "ergonomics" is made up of two Greek words - "ergon" (work) and "nomos" (law). It was first proposed by the Polish scientist V. Jastrzesbowski in 1857.

Ergonomics is a science that studies the functional capabilities of a person in labor processes in order to create optimal working conditions for him, making labor highly productive and reliable, while at the same time providing the person with the necessary amenities and retaining his strength, health, and working capacity.

Being an integrated integrating science, ergonomics in dentistry solves the following problems:

1. Investigates the influence of various factors of the surrounding production environment on the functional state and working capacity of a person and on this basis develops effective protection against their harmful effects.

2. Examines the anthropometric, physiological data of a person and on this basis develops requirements for the design and construction of workplaces.

3. Explores the physiological and psychological data of the analyzers' work and on this basis evaluates the effectiveness of various types of indications used in the design of equipment.

The influence of ergonomics on improving the dental instruments and facilitating work with it has been expressed in the following areas:

- in standardization, which helps to reduce the number of instruments;

- in a special arrangement of tools, convenient for the doctor and the nurse;

- in the design of the handles of instruments, taking into account the anatomical and physiological features of the doctor's working brush;

- in the color marking of the handles of tools with the minimum dimensions of the working parts to facilitate their discrimination;

- in the corresponding modes of storage, disinfection and sterilization.

The main tasks of ergonomics in dentistry

1. The construction of equipment, furniture, clothing and tools should take into account anthropometric measurements and anatomical and physiological characteristics of the health worker's body.

2.Rational design of dental offices and workrooms on the basis of scientifically-based standards.

3.Optimal organization of the workplace staff.

4. Differentiation of ergonomic studies in accordance with the profile of work in the specialty.

5. Improvement of work with personnel through medical and professional selection of entrants depending on the profile of future medical work.

6. The correct organization of the regime of work and leisure, the study of occupational factors harmful to health, the prevention of occupational diseases.

Staff standards of middle and junior medical staff:

Positions of nurses of the doctor's office of dental establishments are established from the calculation of 1 position of the medical secretary for 2 posts of dentists of therapeutic reception. If the staff schedule provides for 1 position of the dentist therapist, 1 position of the medical. Sisters.

Positions of nurses are established at the rate of 1 position for 3 posts of dentists of therapeutic reception.

ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Therapeutic Dentistry

Methodical recommendation for lecture

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

Lesson number 3 "Filling materials. Classification. Basic requirements for filling Materials. Insulating and medical pads. Cements, amalgams, polymer materials, Composites. Indications for use, technique Preparations »

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved
at the methodical meeting of the Department
"__02__" _____09_____ 2023
Protocol № _____
Head of the Department

Professor Skyba V.Y.

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Odessa – 2023

Lecture: "Filling materials. Classification. Basic requirements for filling Materials. Insulating and medical pads. Cements, amalgams, polymer materials, composites. Indications for use, technique preparations.»

1. Relevance of the topic: Treatment of complicated dental caries - inflammation of the tooth pulp (pulpitis) and periodontal (periodontitis) is a very important and at the same time a difficult problem in dentistry. This is due to the high prevalence of these diseases, a large number of complications, duration and complexity of treatment. By treating these diseases, the doctor works within a small space - the cavity of the tooth and the root canals. The success of the treatment determines the doctor's ability to correctly use the endodontic instruments, the qualitative knowledge of the technique of preparation of the tooth cavity, the technique of mechanical and chemical expansion of the root canals.

2. Objectives of the lecture.

A. Training: to present a general description of filling materials.

To familiarize students with the modern classification of filling materials. Form the basic requirements for permanent filling materials - level 2.

To familiarize students with isolating and healing pads, the features of their use - level 3.

Determine the final result of superposition of medical and insulating pads, correctness and probable errors - level 2.

To familiarize students with permanent filling materials, the peculiarities of their use - level 3.

Bring the composition of metal seals (amalgams), polymer materials, composites - level 2.

Teach students how to properly choose and use cements, amalgams, composites, compomers - Level 3.

B. Educational: emphasize the importance of the choice of filling materials, the technology of preparation and use for the successful treatment of caries and its

complications. Conduct comparative characteristics of domestic and imported materials, note their positive properties and shortcomings.

To emphasize the students' attention to the adequacy of the choice of filling materials in certain clinical situations, taking into account the psychological state of patients.

To pay attention of students to observance of the basic principles of deontology, careful and trustful attitude to the patient.

To form students psychological, legal and professional responsibility for the fate of the patient, his work capacity and a beautiful aesthetic appearance.

3. The plan and organizational structure of the lecture

№	The main stages of the lecture, Its content	Aims	Type of lectu	Time (min)
1	**Preparatory stage** **Definition of learning objectives**		educational	2
2	Ensuring a positive Motivation			3
3	**Basic stage**			
	Plan **General characteristics of filling materials**	2		5
	Modern classification of filling materi	2		5
	Requirements for permanent filling materials	3		5
	Requirements for temporary filling materials	2		5
	Insulating gaskets, Application features	3		5
	Medical pads, purpose, method of application.	3		5
	Features of glass- Ionomer cements	3		5
	The modern concept of	2		5

	The use of gaskets			
	General characteristic of amalgams	3		5
	Composition, positive properties and disadvantages of silver, copper amalgams, halogen - M	2		3
	History of creation of polymeric filling materials	2		5
	Composition, classification of composite materials, representatives	2		2
	Mechanism of hardening, adhesion of composites to tooth tissues	2		5
	Adhesive binders	2		5
	Characteristic of chemical hardening composites	2		5
	Characteristic of photocomposites	2		5
	Features of the use of composite materials	2		5
	Possible errors and complications when using composites	2		5
	Concluding stage			2
	Lecture summary			2
	The answers of the lecturer to the questions			1
	Task for self-preparation			
	Content of lecture material			

4. The text of the lecture.

The final stage in the treatment of caries and its complications is tooth filling, that is filling the carious cavity with filling material with the purpose of restoring the

anatomical shape and physiological function of the tooth. In modern dental practice a wide range of filling materials is used, which have both positive and some negative properties. In order to obtain the optimal clinical effect, the physician must be informed of the main properties of the filling materials - chemical nature, physical, chemical and biological properties, and the like. All filling materials can be divided into 5 groups according to their purpose: permanent, to restore the anatomical shape and function of the tooth;

- temporary, for temporary closure of the cavity of the tooth during its treatment;

- medical, for lining under the filling materials in the process of treatment;

- sealants, to cover the teeth for the prevention of caries; - materials for filling the root canals of teeth.

The above clinical classification is to some extent conditional, but facilitates the practical use of filling materials. From the position of materials science, depending on the chemical origin, the filling materials can be divided into 4 groups: cements, amalgams, plastics and composites. Plastics and composites refer to polymeric materials and at present composites constitute the bulk of permanent filling materials.

Dental restorative materials must meet the following basic medical and technical requirements:

- Do not dissolve in oral fluid;

- have plasticity within 15-20 minutes;

- coefficient of thermal expansion should correspond to that of the real and dentin;

- harden in the presence of water or saliva;

- have a low thermal conductivity;

- to have color stability;

- it is good to imitate tooth tissues (transparency, gloss);

- be indifferent to the tissues of the tooth (not toxicity, not allergic);

- have a pH close to 7.0 during and after hardening;

- do not have shrinkage;

- have a hardness close to the hardness of the enamel, while not being fragile;

- very slowly erase and do not have abrasive properties;

- have good adhesion to the tooth tissues;

- to be radiopaque;

- have antiseptic, anticaries properties.

It is obvious that it is impossible to create an "ideal" filling material that would meet all the above requirements. Therefore, the correct selection of the material, careful preparation of the carious cavity and exact observance of the technology of preparation and use of the material make it possible to obtain a high clinical effect.

Temporary filling materials

Designed for short-term hermetic closure of carious cavity (for 2-3 weeks, rarely 4-6), isolation of medications that are applied to the bottom of the cavity, the mouth of the canals or left in the root canals. For this purpose, zinc-eugenol cement, hydrophosphate cement, dentine paste, vinoxol, gutta-percha can be used.

For longer closure of the carious cavity phosphate cements (phosphate cement, visphate cement, unifas cement, Adhesor, Litark and others) are used.

Most permanent restorative materials have significant toxicity, so they can not be used to cover dentin without gaskets. The main criterion for assessing cushioning materials is the insulating capacity. It is necessary that the cushioning material permanently isolates dentin and pulp from the penetration of toxic substances. The best properties have a thin layer of cushioning material that covers the entire dentin. At the same time, it must be connected with the filling material, so that in the case of shrinkage of which during the polymerization (hardening), no detachment of the lining material occurs, which leads to the appearance of microcracks. This can be prevented to some extent using intermediate bonding systems (bond): Gluma, Scotchbond, Scotchbond-2, Primer and others). To this end, a number of hydrophilic and hydrophobic materials have been proposed.

Requirements for cushioning materials.

The cushioning materials should provide a dense and prolonged coating, dentin sealing, prevent the penetration of fluid from the oral cavity, and with it - microorganisms and products of their vital functions, which can cause irritation of the tooth pulp and the development of secondary caries.

The requirements for cushioning materials are quite diverse. They should not only adhere well to dentin, but also perform well all the microcracks and irregularities between the filling material and the tooth tissue. It is especially important that during the polymerization shrinkage the gasket does not come off from the dentin.

Cushioning materials should be well superimposed with a thin layer, which should not exceed 10-20 μm. They should not smooth out the retention points in the prepared cavity, which is very important when filling the cavities of the 2nd and 5th classes in the Black.

When it is necessary to create retention points in the cervical and lateral walls in order to hold (fix) the filling material and to resist the masticatory load, it is recommended to apply a thin layer of cushioning material, since a rough overlay significantly limits the ability of the surface to bind to the filling material. The gasket should not be destroyed under the action of the gingival and dentine fluid, and in the case of micro-prisms, it should break down under the action of the fluid in the mouth cavity.

The cushioning materials should be easily inserted into the carious cavity, quickly hardening so that the liquid that seeps from the dentinal tubules can not penetrate into the gasket during hardening.

The cushioning material should not cause toxic effects on the dental pulp. It should have a prolonged anti-caries effect, not to be influenced by liquids, which are used for etching enamel and binding systems. The lining should be biocompatible with a permanent filling material.

Zinc-phosphate cements are often used for gaskets (zinc oxide is 75-90%, magnesium oxide is 5-13%, silicon dioxide is 0.05-5%, bismuth trioxide is 0.001% powder, and liquid is a solution of 70% Orthophosphoric acid, which contains the residues of ammonium and zinc oxide). Phosphate cements are finely dispersed, as well as fast and normal hardening (phosphate, visphate, unifas, Adhesor, Scitark). In addition, it is possible to use so-called bactericidal cements, which are modified phosphate cements with additives (salts of silver, copper and others).

Polycarboxylate cements consist of two components: powder and liquid (or two). The liquid is polyacrylic acid.

Polycarboxylate cements are one of the first filling materials in which adhesion to the tooth tissues is manifested as a chemical bond with enamel and dentin due to the chelate coupling of carboxylate groups of the polymeric PAA molecule with calcium of apatites and the formation of complexes with the tooth protein that occurs only under conditions Ideal cleanliness of the tooth surface. Hardening of cement mouth moisture does not harm.

The study showed the complete biological harmlessness of the PCC, one of the reasons for which is that in just 3-5 minutes after mixing the cement the pH reaches 4.8-6.0, while in cementitious cement it is 3.6-4.3 .

PKC are:

1 - conventional PCC - "Carbofin (Voco), Adgesor Carbofine (Spofa), Selfost plus (Septodont), Durelon (ESPE), Polycarboxylate cement.

P - PACs that are kneaded on water - Agualox (Voco),

I - hybrid PCCs, which include acrylate or monomer composites - Carbodent (Kharkov), Bondalcap C (Vivadent).

Quite widely used are pastes based on calcium hydroxide, the beneficial properties of which are the therapeutic effect and the ability to delay the penetration of microorganisms to the tooth pulp, but the poor mechanical properties of conventional pastes prevent their use, especially since under the influence of polymerization shrinkage of the composite material, Calcium from the bottom of the carious cavity. More widely used are photopolymer gaskets based on calcium hydroxide, however, in acute deep caries, inflammation of the pulp can sometimes occur due to the temperature rise under the action of the photopolymer lamp.

Layered cement cements are recognized as the best cushioning materials. They belong to the material of the "powder-liquid" type. Cement powder is a finely dispersed aluminofluorosilicate glass that contains a large amount of calcium and fluorine, a small amount of sodium and phosphates, with a particle size of about 40 μm. The cement liquid is a 50% aqueous solution of polyacrylic acid.

The first glass ionomer cement Aspa-IV (aluminosilicate polyacrylic) was manufactured in the USA in 1971. The purpose of creating this group of cements was to replace the less perfect plumbing material with a more perfect one, which would not have the disadvantages of silicate cement - high solubility and poor adhesion to the tooth tissues.

After mixing, the hardening reaction takes place in 3 phases:

1-ion formation

2 - primary gelling

3 - final hardening

All slope ionomers have properties that have advantages over other materials:

- high chemical adhesion to dentin and enamel;

- the seal for a long time secures fluoride in the adjacent tissues, preventing the development of caries;

- chemical adhesion to all materials used for restoration work (composites, cements, amalgams, materials containing eugenol);

- non-toxic and, as a rule, do not require insulating pads;

- do not require etching and additional binding systems;

- minimal preparation of the tooth, which consists only in the removed tissues affected by caries without the formation of retention depressions and bevels;

- convenient working time and pasty consistency, do not stick to the tool when kneading and modeling;

- a significant part of the ionomers are mixed with distilled water.

Glass ionomers are used:

- for sealing carious cavities of dairy and permanent teeth;

- with defects of hard tissues of teeth of non-carious origin;

- for the purpose of fixing crowns, bridges and orthodontic devices;

- to create crown-root tabs;

- as a cushioning material for permanent seals made of composite materials (Sandwich-technology).

Conventionally, the JRC can be divided into 4 groups:

1- for permanent fillings and restoration of teeth - Fuji IX JP, Miracle Mix, Fuji Ionomer Type II (GC Dent. Ind. Corp.); Chelon - Silver (ESPE); Gem Core, Ceram Core Silver, Ceramfil P, Iono Gem (PSP); Chem Fil Superior (Dentsply).

2- for gaskets - Base Line (Dentsply); Ketac-Bond (ESPE); Ionobond, Agua Ionobond (Voco); GC Lining Cement (GC Dent, Ind. Corp.).

3- to fill the root canals - Ketac - endo aplicap (ESPE); Endion (Voco); Endo Gen (Gendental).

4- for fixing crowns, bridges, inlays, sealing of fissures - Meron, Agua Vtron (Voco); Agua Cem (Dentsply); Fudji Ionomer Tip 1, Fudji Ionomer Tip W (Sealant) (GC Dent. Ind. Corp.).

Glass ionomers are expediently used for the purpose of prophylaxis "after operating" hyperesthesia, since these materials, used as an insulating composite padding, minimize the toxic effect of the latter.

The peculiarities of glass ionomers work include the need to cover the surface of a permanent seal with waterproof varnish in order to avoid excessive hydration of the material during the initial stage of solidification. In the future, contact with moisture will not perform any harmful action. This manipulation is necessary when sealing the cervical cavities, modeling tabs, setting permanent and temporary seals. During the cementation of the crowns, it is also necessary to apply a coat of lacquer along the bottom edge of the crown to protect the "fresh" glass ionomer from the action of the moist environment of the oral cavity, at least for the first time of hardening (1 hour).

In the case of the use of glass ionomer cements in combination with composites (Sandwich), a protective varnish is not used, since the varnish layer will interfere with the acid pickling process. In this case, the composite that covers the surface of the slope ionomer will protect the glass ionomer from hydration.

In the table are the names of the slope ionomer materials and compomers of the leading import companies - manufacturers of dental materials.

Water glass ionomers (powder-water system) have significant advantages over glass ionomer materials, which consist of a powder mixed with special fluids. The use of aqueous glass ionomers removes the problem of over-or underdosing of the liquid. The use of aqueous glass ionomers avoids such unacceptable phenomena as increasing the solubility of the filler material in the oral cavity of the patient, reducing the strength of the finished work, insufficient connection of the material to the tooth tissues, and toxic effect on the pulp of the tooth of the polyacrylic acid residue (in case of overdosing of the liquid).

In addition, the use of water systems eliminates the problem of careful implementation of modes of transportation and storage of glass ionomeric materials, increases the time for their suitability.

Water glass ionomers are prepared for use simply by mixing powder and water. Manufacturers recommend using distilled water for this, nevertheless, tap water of room temperature is also suitable.

Separate glass ionomers (in particular, materials created by P.S.P. Dental) are capable of rapidly reaching the gelling stage. This feature allows us to extend the phase of the most active formation and exchange of fluoride ions and other trace elements. During molecular binding to the tooth tissues. The increase in the duration of the initial hardening stage helps to reduce the degree of dehydration of the tooth tissues and cement material and, accordingly, increases the wear resistance of cement, its physical

and aesthetic characteristics. The probability of complications such as hyperesthesia of hard tooth tissues decreases.

All subsequent steps of the robot (acid dressing, modeling and processing of the seal) can be performed during the hardening step of the glass ionomer. The prolongation of the hardening time of the material does not affect the final result of the dentist's work. Moreover, it improves its quality due to the reduction of dehydration processes and the strengthening of the chemical bonding of tooth materials and tissues.

Recently, a new generation of filling materials has been developed, the so-called "compomers". Materials of this class combine the main advantages of photopolymer composites and glass ionomers.

Positive properties of the compomers:

Is a one-component, ready-to-use material that does not require dosing and mixing;

- Thermal expansion is more similar to hard tooth tissues than in composites;

- Ability to work in conditions of high humidity;

- has aesthetic properties of the composite, opaqueriness, color up to 8 shades behind the scale "Vita";

- a seal from the compomer enriches the fluoride with nearby tooth tissues;

- Adhesion to tooth enamel occurs without acid dressing;

- the material does not require multi-layer knitting systems;

- reduction in volume shrinkage by 40% in comparison with composites;

- polymerization occurs under the influence of visible light (which greatly reduces the operating time in comparison with glass ionomers);

- the newly completed restoration construction does not require isolation with a protective varnish, since the material absorbs the cauldron from the environment for some time;

- significantly exceeds the glass ionomers in strength (impact load, wear resistance, thermal and chemical stability, and on

Chewing surface of the tooth seal from the composter in strength reminds an amalgam).

Some disadvantages of compomers:

- in the first 24 hours absorb water from the dentin;

- Colored gamma to a lesser degree corresponds to tooth tissues than composites.

The true compomers include: Diract, Diract AP (Dentsply); F 2000 (3M); Compoglass (Vivadent); Amherst (NY); Hytac (ESPE).

Hybrid ionomers include: Vitremere (3M); Fudji P LC (GS Dent, Ind. Corp.); Ceramlux BL (PSP); Photoc Fil (ESPE) /

Some practical recommendations when working with glass ionomer materials.

1. Although glass ionomers mostly do not irritate the pulp of the tooth, a small number of patients experienced complications in the form of hypersensitivity of the sealed tooth to a variety of irritants. Mostly these were patients whose tooth filling was performed with fast-hardening cements. This fact can be explained as follows: significant pH changes with rapid cement hardening lead to dehydration of the dentin and a sensation of pain. The increase in gelation time during hardening of glass ionomers significantly reduces the risk of "postoperative" hyperesthesia. Therefore, at the bottom of the carious cavity in the case of deep caries impose medical-insulating pads containing calcium hydroxide.

2. The glass ionomer layer as a composite padding must have a sufficient thickness to be, on the one hand, a strong base for a permanent seal, and on the other hand a cushion for a harsh composite. In addition, the glass ionomer is molecularly bound to the tissues of the tooth, forming a single system with it. This increases the reliability of the edge seal of the composite material.

3. The release of fluorine glass ionomers reduces the risk of secondary caries.

4. Glass ionomers by their nature belong to very strong materials. Covered on top of a layer of composite material, practically not erased.

5. The use of glass ionomers reduces the volume of the applied composite material and, thus, reduces the internal stress and deformation of the seal. In addition, the volume of the glass ionomer material reduces the thickness of the composite, which serves as a guarantee of photopolymerization over the entire thickness of the material.

6. Successfully selecting the color of the underlayer from the glass ionomer you can achieve a high aesthetic quality of the seal.

A spacer photopolymer material based on Vitrebond glass ionomer is used, but it has a fairly high contact allergic effect.

Under the lacquer lacquers we mean a solution of natural or artificial resins in organic solutions (ether, acetone, chloroform or alcohol). The thickness of the lacquer film is sufficient to isolate the tooth's tissues well from physical, chemical and somewhat less from thermal stimuli. They are recommended to be applied to prevent the harmful effect of phosphate acids, in order to avoid the formation of microcracks, to protect the walls of the carious cavity from the influence of amalgam corrosion products. Therefore, the most appropriate use of lacquers when filling cavities with amalgams and cements. At the present stage of dentistry development, synthetic varnishes should be used together with bonding systems. Lacquers: zinc-acrylate, Tubulicid, Copalit, Palitique, Tarmolin, and bonding systems (bond) - Clearafil.

To date, a fairly rich selection of linking systems that compact dentin and lble with a chemical bond with filling materials. They tightly cover the dentin and close the dentinal tubules. Without them, it is practically impossible to use composites.

Modern concept of the use of gaskets.

In the presence of shallow carious cavities (up to 0.5 mm deep), it is recommended to use only material that covers the dentinal tubules (intermediate adhesive factor) well, followed by overlapping of the filling material. This can be an amalgam or a composite material.

When the carious cavity reaches a depth of 1 to 2 mm, it is recommended to use a dentin binding system, then a photopolymer cushion cement, and a fixed seal. If a microcrack appears between the filling material and the gasket of glass ionomer cement, the binding system will prevent the entry of microorganisms into the depth of the dentinal tubules.

If the carious cavity does not reach the pulp of the tooth by 1 mm, it is recommended to apply a thin layer of cement based on calcium hydroxide to the bottom of the cavity, which in this case will have an antimicrobial effect, and help to compact the dentin. Next, a binder system is used, a layer of glass ionomer cement is applied, and a permanent filling material is completed to complete.

conclusions

Despite the fact that gaskets and lacquers have been used for a long time, the main attention was paid to their ability to isolate the tooth pulp from thermal and chemical

stimuli. Previously created materials are used for compaction of dentinal tubules. Further research on the development of lining materials should be aimed at eliminating shrinkage during polymerization. Researchers and manufacturers are inclined to develop more and more complex filling systems each time, which require the observance of precise technique of application and a great time. As is known, the simpler the technique of imposing a seal, the fewer errors at different stages of filling. A simplified filling technique will lead to a wide application of linking systems, not only for research purposes, but also for wide practical use.

For permanent seals, silicate cements are used, the basis of which is a finely divided acid-soluble glass, which contains aluminosilicates, fluoride compounds and pigments. They are used for sealing caries cavities 3 and 4 class, as well as 2 classes, as they have rather high cosmetic and aesthetic properties. But such materials shrink, have high solubility, do not have adhesion to the tooth tissues. These include silicin-2, vitacryl, and fritix.

Silicophosphate cements, by chemical and physical properties, occupy an intermediate position between phosphate and silicate cements, and are used to fill the carious cavities of the 3, 2, 1, and 5 classes in the Black. This is Sylidont 2, Aristos. Silicophosphate cements are less brittle than silicate, so they can be used instead of amalgam with thin walls of carious cavities.

Of great importance for the physico-chemical properties of cements is the technology of preparation and the method of use.

At the present stage, practical dentists, considering many of the negative properties of most cements, prefer to use composite materials when filling carious cavities, and glass ionomer cements and compomers are used as a rather high authoritat of cements.

For countries with a transitional economy and high tooth lesion caries, amalgam remains one of the most commonly used fixing materials. About 150 million US residents have metal seals, which is about 75% of restorations. A similar situation is observed in other countries. The use of amalgam is indicated primarily in children with immature enamel and unsatisfactory hygiene of the cavity of the company. At the same time, the doctor's time to provide dental care is considerably saved, because a seal of amalgam can be put in 5-7 minutes, whereas from a composite material for 1-1.5 hours. In addition, amalgam is 3-4 times cheaper for composites.

Amalgam is a rapidly hardening alloy of mercury with metals. In dentistry, silver and copper amalgams are used.

The powder (sawdust) of silver amalgam contains about 65-70% of silver, 18-29% of tin, and also 3.5-11.0% of copper and up to 3% of zinc.

Silver amalgam remains one of the best filling materials for carious cavities of the 1st, 11th and 5th grades on the lateral teeth, especially with extensive therapeutic and prophylactic measures.

Amalgam has high mechanical properties, a stand for chemicals and oral fluid, has a slight shrinkage.

Negative properties of amalgam include color, volume change, high thermal conductivity, the possibility of corrosion, amalgamation of gold, allergy, discoloration of hard tooth tissues.

Previously, the amalgam was prepared by hand, in a glass or porcelain mortar, and then started using mechanical amalgam mixers. In this case, intermetallic compounds are formed: Ag3Sn - gamma phase; Ag3Hg4 - gamma-1 (γ-1) phase and Sn8Hg-gamma-2 (γ-2) phase. The Gama-2 phase is the least durable and most resistant to corrosion.

Modern amalgams of P and W generations are produced in polyethylene capsules without a gamma-2 phase, and the amalgam of the generation III contains atomic copper, which gives it increased strength. In addition, the powder particles have different shapes: needle-shaped, globular and mixed, which also provides high strength of the seal, resistance to corrosion, less brittleness. With the use of silver amalgam, the color of the tooth remains almost unchanged.

Copper amalgam is produced in the form of solid cubes, it must be heated before use and mixed well (grinded), it is mandatory in a fume hood. When the copper amalgam is heated, toxic mercury vapor is released, which is cumulated in the body. In addition, copper amalgam causes a darkening of the tooth.

Toxicity of amalgam should be considered in two aspects:

- influence on the patient's body;

- the impact on the body of medical personnel.

A small fraction of the mercury is from a mixed, or improperly prepared

Amalgams can penetrate into the hard tissues of the tooth, possibly in the pulp, but this does not matter much. The possibility of toxic effects of mercury from a fresh seal, and the longer the old one, is very unlikely. This is possible only with idiosyncrasy to mercury (hypersensitivity).

A greater possibility of the toxic effect of mercury vapors on medical personnel, especially when manually preparing amalgam (especially copper!), Filling capsules, inadvertently preparing or using amalgam - that is, not observing safety rules for working from mercury. Therefore, medical personnel should be fully aware of and

strictly implement safety techniques and observe the necessary conditions of robots with amalgam.

Stages of work with amalgam without gamy-2 phase:

1. Dissection of carious cavity, adhering to the basic requirements.

2. Application of an insulating gasket, thickness not less than 1,5-2,0 mm.

3. Preparation of amalgam in a polyethylene capsule in an amalgam mixer (ASD-02; AC-1; DMS-410 and others).

4. Insertion of amalgam into the carious cavity with a layer of up to 2-3 mm with the help of an amalgamtranger, a special gun, an ironing machine.

5. Thorough condensation of the amalgam by an amalgam-tracer, a shtopfer.

6. Modeling the surface of the seal with a trowel, a screw, a carver, a cotton ball.

7. After 24 hours, grinding and polishing the seal with carborundum heads, finishers, finishing burs, polishes, rubber hoses with polishing pastes.

In order to avoid secondary caries, it is recommended that after total isolation caries it is recommended to conduct total conditioning (etching) and thoroughly rinse the carious cavity, dry and apply the 1-V or V-generation enamel-dentine adhesive (Scjtchbond Multipurpose, 3M; Opti Bond, Kere; Prime and Bond 2.0, Dentsply, One Step, Bisco & al.).

Reduces the likelihood of secondary caries and 3 times increases the adhesion of the filling material to the tissues of the tooth Amalgambond Plus (f. Parcuel Production), which includes a powder of highly active NDA. Amalgambond is a universal bonding system that can also be used with chemical and photopolymer composite materials.

The company Bisko (USA) produces a multi-purpose hybrid ionomer cement of double hardening Resinomer. When using Resinomera, an insulating pad is not needed, it reliably protects the pulp from temperature and toxic irritants. On the surface of the rubberizer, an oxygen-inhibited layer forms, which ensures a reliable bonding of the bonding system to the amalgam.

Galadent-M also applies to metal fillings. M. The filling material based on the Gali-nickel mouth, without mercury. It has good adhesion to the tooth tissues, while hardening slightly widens in the volume, which significantly improves the edge fit of the seal. The material is quite effective when filling carious cavities1 and II classes of permanent and temporary (milk) teeth. Halodent - M is also toxic to pulp, as well as

amalgam, has a high thermal conductivity, a dark color, and therefore has not received wide application.

Rapid development of industry, the space industry, the possibility of conversion led to the emergence of a new generation of materials - composites, which quickly began to be used in dentistry. Special distribution of composite materials was received in the last 10-15 years, replacing other classes of filling materials (cements, amalgam) and modern restoration technology is impossible without composites.

For successful use of modern composite materials in practice, prevention of errors and complications, you need a perfect knowledge of the structure and properties of different types of composites, indications and contraindications to use, possible errors and complications, particular clinical applications.

The history of composites.

1. 40-50 years of the 20th century - unfilled acrylic plastics (powder-liquid) were created.

2. 1955 Buonokore proposed acid etching of enamel, and in subsequent years - the creation of adhesive systems.

3. 1962 - Bowen synthesized a new type of acrylic monomer - bisphenol A - diglycidyl methacrylate - Bis-GMA, which firmly held the inorganic filler in the monomer, that is, in fact, the first composite was created.

4. 1975 Fujiyama suggested etching dentin with orthophosphoric acid - 15 sec, with compulsory sealing of the dentinal tubules.

Later, organic acids, which are now part of the primers, began to be used for this purpose.

Composition of composite materials.

Composites consist of at least 3 components: an organic matrix, a dispersed phase (inorganic filler), a binding phase (silanes, copolymers), and other fillers.

1. Organic matrix (multifunctional methacrylates): BIS - GMA, IDMA, D3MA, TEG - DMA.

2. Inorganic filler: colloid - silica (amorphous silica), porcelain flour, plastic, silicone ceramics, ground quartz, barium, strontium, aluminofluorosilicate glass, silicon dioxide, baked silicon, inorganic silicon dioxide.

3. Binding agent, or aprite - provides the bond between the organic matrix and the inorganic filler. As a rule, silanes (silane, silanevinyl, dimethylchlorosilane) are used.

4. Initiators of polymerization. For CM chemical approval - benzoyl peroxide, tertiary amines. For photocomposites - camphorohinone, 1,2 diketedimethyleneaminoethyl methacrylate, methyl benzoyl ether.

5. Stabilizers (inhibitors) - sterol phenols, hydroquinone-monomer ether ether, color stabilizers, UV adsorbents, which provide premature polymerization, long-term preservation and stability of CM properties. (Oxygen of air is also a good inhibitor, so the surface layer of a seal with CM is called oxygen-inhibited, not polymerized!)

6. Paints, pigments.

According to the polymerization method, the composites are:

- thermal hardening;

- chemical hardening;

- light hardening:

A) UV - 365 nm

B) visible light - 400 - 500 nm, optimally 470 - 480 nm

- CM of mixed type of hardening, chemical and light - dual composites.

To date, composite materials (CM), in contrast to conventional plastics, are called such materials, which include 50% and more inorganic fillers (by weight).

Classification of composite materials

1. Macro-filled CM (macrophyles). The size of the filler particles is 8-12 μm and> (1 - 100 μm), the fillability reaches 75-82% (Adaptic, Concise, Evicrol, Prismafil, Valux (ZM), Estilux, Profile, Evicrol, Epacryl, Epoxidant).

The materials have high hardness, small coefficient of thermal expansion, rather high aesthetics, edge fit. But large particles of filler do not allow you to polish the seal well, it quickly changes its color, and-due to intensive deposition of dental plaque, secondary caries occur. In addition, macrophilic CM themselves rapidly erase, as well as erase the antagonists. Therefore for today macrophiles have rather limited sphere of use: carious cavities of 1 class with the big masticatory load when cosmetics are not so important, in particular as the first stage at reconstruction, restoration of the destroyed teeth.

2. Minimized CM. The size of the filler particles is 1-5 μm. (Microrest, Estilux, Cmadent).

3. Microfilled CM (microfilae). The particle size of the filler is 0.007-0.04 μm, the filling is 46-68% (Visio Dispers, Silux Plus, Isopast, Estic microfill, Durafil VS, Multifil VS).

Microfila very well polished, have high aesthetic properties, evenly erased. But they have rather low hardness and mechanical properties, low modulus of elasticity, high coefficient of thermal expansion, significant permeability and water sorption. Designed for sealing cavities C, V and IV classes.

4. Hybrid CM.

A) are inhomogeneous microfilled CM. For greater strength of microfilms, pre-polymerized filler particles of 18-20 μm in size are added to their composition. (Silux, Isomolar, Helioprogress, Heliomolar, Durafill, Alfa-dent). Designed for sealing carious cavities III, V and IV classes and some for sealing cavities of I and II classes (Heliomolar, Isomolar).

B) - macrohybrid CM. The size of the filler particles is 8-12 μm and 0,04-0,1 μm, they have properties similar to those of macrophils, but considerably exceed them, they are used mainly for filling of the lateral teeth (Brilliant, Estiluxe hibride, Prismafil, Bis-fil P, Alfa- Comp.molar, P-10, P-30, P-50, Estilux Posterior, Valux, Occlusin).

B) - microhybrid CM. The size of the filler particles is 1-5 μm and 0.04-0.1 μm. (Brilliant, Estiluxe hibride, Prismafil). In their properties, they resemble microfilae, but much better quality, they are used for sealing carious cavities III, V and limited IV classes.

D) - totally filled with CM (universal microhybrid KM). The size of the filler particles is 5-8 μm, 1-5 μm and 0.01-0.1 μm (Degufil Ultra, Degufil Mineral, Arabesce, Aelitfil, Valux Plus, Z 100, Charisma PPF). Very strong, cosmetic, have great color stability, low abrasiveness, it is possible to seal almost all varieties of carious cavities.

This class includes the so-called elite group of universal microhybrid (Cyarisma, Charisma F, Herculite XRV, Prodigy, Prisma TRH, Spectrum, Tetric, Brilliant Estetic Line and others) that fully mimic the color, mechanical and other properties of hard tooth tissues that And determines the universal purpose of these CMs.

Much better quality, are used for sealing carious cavities III, V and limited IV classes.

Some fluid photopolymer CMs are also used here, which are used as a basis for universal microhybrid, in sandwich technology, in the restoration of small chips of enamel, restorations, for splinting teeth, and sealing fissures. These are materials such

as: Revolution (Kerr); Aeliteflo, Aeliteflo LV (Bisco); Durafil flow, Tekpro Flowable Hybrid Composite; Dyract Flow (Dentsply); Filtek Flow (ZM) and others, but their shrinkage is 5-7% or more.

A completely new material among composites is Solitare (Kulzer) - condensed CM. The filler in this material has a spherical shape with spike-like processes, thereby condensation of the filling material is possible. It is fluid, has a slight shrinkage, it resembles amalgam in its mechanical properties, and its cosmetic properties are not inferior to composites. Used for sealing carious cavities in the chewing teeth.

Comparative characteristics of CM of chemical curing and photocomposites

General clinical properties of composite materials:

- hardness and durability of seals;

- strength and great adhesion to the tooth tissues (due to the binding systems, and the CM themselves do not have a chemical bond with the tooth tissues!);

- a sufficient modulus of elasticity;

- coefficient of thermal expansion corresponds to CTE of tooth tissues;

- Insignificant micro permeability, porosity;

- color fastness and resistance to coloring;

- minimal shrinkage, good marginal fit;

- the ability of polishing to shine and its long-term preservation;

- Biocompatibility, but also toxicity;

- possibility of fragmentary connection of materials (composite - composite, composite - compomer, composite - glass ionomer, composite - metal, composite - porcelain, etc.);

- stability and absence of solubility in the oral fluid.

The positive properties of chemical curing composites:

- uniform shrinkage, which does not depend on the amount of material;

- the possibility of introducing large portions of the filling material, which reduces the number of stages of filling;

- polymerization of CM begins from the wall of the carious cavity, which prevents PM detachment from the tooth tissues;

- relative cheapness.

Negative properties of chemical curing composites:

- the possibility of incorrect dosing and uneven mixing of the base and catalytic pastes, which can lead to increased porosity, deterioration of other properties;

- imperfection of adhesion systems of 1 - II generations, which provide adhesion only due to micromechanical retention of PM to enamel;

- limited simulation time;

- limited color scale, absence of opaque and tinting colors;

- the need for an insulating seal.

The positive properties of photocomposites:

- homogeneous consistency, low porosity, which are provided by the form of material release (one-component paste);

- a wide range of colors, the availability of materials of varying degrees of transparency, which makes it possible to layer-by-layer reproduction of the tooth structure;

- possibility of long time modeling;

- ability to control the polymerization time;

- the presence of enamel, enamel-dentine adhesive systems (adhesives IV and V generations);

- the availability of adhesives IV and V generations allows in most cases to dispense with medical and insulating pads;

-

Negative properties of photocomposites:

- uneven shrinkage of the PM along the direction of the light beam complicates the polymerization regime, requires directional polymerization of the material, sometimes through the wall of the tooth, in order to prevent polymerized separation of the material from the walls and bottom of the carious cavity;

- the thickness of the polymerized layer of CM should not exceed 2-3, and sometimes 1 mm (otherwise the entire thickness of the material will not harden), there is a need to increase the stages of sealing,

Stamping the seal;

- relative high cost.

It should be pointed out that all composite materials are highly hydrophobic, very afraid of moisture. If it falls under the material, or between its layers, adhesion is significantly reduced, which can lead to the chip or peeling of the material. In some CM remains high polymerization shrinkage (6-1,7%).

Mechanism of adhesion of CM to tooth tissues

There are such types of KM fixation to the tooth tissues: chemical, physico-chemical, micromechanical.

Adhesive Binding Systems

First generation

This generation was characterized by the use of ionic and chelational bonds with inorganic components of dentin, primarily with calcium. The most common approach was the use of glycerophosphoric acid dimethacrylate, the bifunctional molecule of which interacts with calcium hydroxide ions. In this case, methacrylate groups are able to bind the acrylic resins of the composite. However, the adhesion strength was small 2-5 MPa and significantly decreased in the presence of moisture released from the dentinal tubules. Other systems of this generation used surfactant monomers. This was based on the additional reaction product of N-phenylglycidin and glycidyl methacrylate (NPG-GMA). The binding with calcium was carried out by means of chelation.

The second generation

Adhesives of the second generation provided a connection with dentin, which is 3 times greater than that of the adhesives of the first generation. Some of them reached 30-50% of the strength of the union of natural enamel with dentin and an average of 7-15 MPa. In most of them, chlorosubstituted phosphate esters of various monomers were used as active groups. Additionally, pre-treatment of dentin and introduction of iron ions were attempted. The main mechanism of this compound was the ionic binding of calcium dentin by chlorophosphate groups.

The third generation

Adhesive systems of the third generation for attaching the composite to the dentin used the lubricated layer, modifying it. They provided a bond strength of up to 15-18 MPa, which was almost equal to the strength of the composite compound with etched enamel. The chemical composition varied, but usually aluminosilicates, aluminonitrates, 4-META, HEMA and other substances were used as active groups. Preliminary etching of dentine EDTA, maleic acid and other acids was also used. The first widely used adhesive of this generation was GLUMA.

Fourth and fifth generation

Adhesive systems of the fourth generation penetrate deeply into the dentin and form a hybrid zone in it. They usually contain PENTA-dipentaerythrolapentacrylate ester of phosphoric acid or dipentaerythrolol pentacrylate monophosphate, a substance containing active hydrophobic and hydrophilic groups in its molecule. This allows him to actively combine both with calcium ions of hydroxyapatites of enamel and dentin, and with active collagen groups of the organic part of the basic substance of dentin. This double chemical bonding along with the micromechanical compound in the dentinal tubules made it possible to achieve a very significant attachment force of these PENTA-containing adhesive systems to dentine, up to 25-27 MPa.

In addition to PENTA, the fourth generation adhesives contain dimethacrylates such as TGDMA-triethylene glycol dimethacrylates, UDMA-urethane dimethacrylates and some others with a lower molecular weight (eg HEMA-hydroxyethyl methacrylate). For better penetration into the dentinal tubules of adhesive systems, or rather, their primers, they were introduced into their composition of organic solvents - acetone, alcohols. They are good carriers for acrylates, dissolve some organic substances. To impart the necessary elasticity to the adhesive system, resin elastomers were introduced into their composition, long crimped molecules of which prevent the composite from breaking off from the adhesive system during polymerization. To reduce postoperative sensitivity of teeth and imparting anticarious properties to them, fluorine-containing substances (for example, cetylamine hydrofluoride) were introduced into the composition of adhesive systems.

Thus, the main features of the fourth-generation adhesion systems are their following properties:

- they are multi-purpose, provide the connection of composite material with enamel, dentin, metal, porcelain, compomer;

- provide micro-retentions due to the formation of a hybrid zone. At the same time, a significant strength of the composite with dentin is achieved, comparable with the strength of the enamel-dentine compound;

- thanks to them, a new quality is achieved (due to a deeper penetration of the primer into the dentin), sealing the dentinal tubules.

A characteristic feature of the fourth generation adhesion systems is that they, as a rule, consist of two components: a primer and an adhesive. The primer is applied to the etched dentin and penetrates deeply into the dentinal tubules, and then the adhesive itself is applied to this treated surface. Thus, the polymerized primer, deeply penetrated into the dentinal tubules, seals them and provides a stronger adhesion of the adhesive to the dentin. On the surface of the dentin, the polymerized adhesive forms a single conglomerate of the composite and collagen fibers of dentin. A dentin layer impregnated with a composite (primer) is formed, on the surface of which there is a layer of an adhesive composite joined to it and the fibers of the basic substance of dentin. The dentin impregnated with the primer and the adhesive layer on its surface and form a hybrid zone together.

Adhesive systems of the fourth generation were deserved recognition and distribution among dentists. The most common representatives are "Pro Bond" ("Dentsply"), "Scotchbond MP Plus" ("3M"), "Syntac" ("Vivadent"), "OptiBond" ("Kerr"), etc.

The further development of adhesive systems led to the creation of odocomponent, easily cured, non-mixing binders. They combined the features of both the primer and the adhesive. Their chemical composition is almost the same as that of the fourth-generation adhesive systems, but due to the creation of new stabilization systems, it was possible to combine the properties of the primer and the adhesive in one liquid (one bottle). The clinical application of these adhesion systems is the same as that of the fourth generation, the only difference is that the first portion applied to the etched dentin serves as a primer, and the second is an adhesive. This facilitates and simplifies their clinical application and eliminates errors that can arise from accidental entanglement of the bottles of the adhesive system.

Such one-component adhesive systems are known as the fifth generation systems, which are represented by Prime & Bond 2.0, Prime & Bond 2.1 (Dentsply), One Step (Bisco), Single Bond (3M), "Optibond Solo" ("Kerr"), etc. Some of these adhesives additionally contain substances that exert an anticarious effect due to the release of fluorine, for example, cetylamine hydrofluoride in "Prime & Bond 2.1" ("Dentsply").

Particularly fine filler particles are introduced into the composition of adhesive systems, so-called nanofillers, which can penetrate the dentinal tubules [One Step (Bisco), Optibond Solo (Kerr), Prime & Bond NT ("Dentsply")]. The nanofiller acts as a cross-linked structure, strengthening the adhesive layer and enhancing the micromechanical retention of the adhesive. The average particle size of the nanofiller is 0.001-0.008, which allows them to easily penetrate into the dentinal tubules of any size (the average diameter of the dentinal tubule is 0.8 mm). The presence of the filler

increases the hardness of the adhesive and approximates it in composition to the composite and at the same time to the dentin. In general, all this improves the strength of the attachment of the nano-filled adhesive system and provides an improved edge fit of the composite to the hard tissues of the teeth.

Sixth, seventh generation.

The desire of some companies to develop adhesive systems of the sixth and seventh generation encounters such problems as insufficient enamel etching, increased hydrophilicity, leading to destruction of the adhesive layer, and most importantly - the lack of compatibility with all kinds of composite materials.

Given the delicacy of the wet bonding technique, and already having such a powerful universal adhesive as One-Step, Bisco went for the first time in a unique way, developing a two-step adhesive system that includes a Tyrian self-etching primer and an One-Step plus adhesive.

While most of the newer systems of the 6th and 7th generation are unable to etch enamel sufficiently, especially if they are unevaporated, since they do not have sufficient acidity, Tyrian has Ph = 0.4 (for comparison: 32% phosphoric acid 0.4, and 10% - 0.8), which allows you to prepare both the surface of the dentin and enamel, having received the usual picture of etched enamel prisms and promoting a good hybridization and binding force.

There is an opinion that one of the reasons for postoperative sensitivity is due to the fact that, in the traditional method, the primer and the adhesive do not fill all the etched space. Tyrian also acts on the lubricated layer, creating conditions for the penetration of the adhesive precisely at the depth of the dressing, and the time-tested universal One-Step adhesive or its rich version of One-Step Plus creates conditions for a strong bond.

After that, any composite material, whether light curing, self-curing or dual curing, can be used for direct or indirect (cement, pins) restorations. This is made possible by a combination of the unique properties of Tyrian, affecting both the dentin and the etching enamel (both prepared and intact for orthodontic fasteners) and the One-Step universal properties.

Tyrian, combining the dressing and the primer in one application, eliminates the need for separate steps of etching, washing, drying, moistening and the uncertainty of wet bonding. Not only additional steps are eliminated, but also postoperative sensitivity.

Adhesives of the sixth generation no longer require etching, as a separate operation, at least the dentin surface. Adhesives of the 6th generation are self-etching and self-draining.

Advantages of 6-generation adhesive systems:

- self-etching with respect to enamel

- there is no need for acid etching (as a separate step)

- self-draining in relation to dentine, there is no "dentine etching"

- there are no problems with "dampened" dentin

- demineralization and the process of priming occur in parallel.

To date, the last and most promising proposal in dentistry is the 7-generation adhesive system. In this generation, the stages of clinical application of the sixth generation adhesives are simplified by combining them into a single complex, i.e. In a system placed in one bottle.

Adhesives 7 generations light-curing, one-component, in its composition contain desensitizer. Unlike the total etching methods and total adhesion, self-etching adhesion, made possible by the adhesives of the 7th generation, does not completely open the dentinal tubules. The lubricated layer dissolves and, due to its highly hydrophilic properties, it becomes possible for the adhesive to penetrate into the tubules and peritubular dentin, forming structural bonds. In the case of enamel, the adhesive forms a solid structure with a hardened surface that promotes improvement. A representative of the seventh generation adhesive systems is the I-Bond firm (Heraeus Kulzer).

Deep penetration of the components of the adhesive system into the dentin and the reliable sealing of the dentinal tubules served as the basis for the empirical use of adhesive systems in the treatment of hypersensitivity to enamel and dentin. The clinical results obtained were encouraging, which served as an incentive to create special materials for this purpose. In addition to eliminating sensitivity, the task was also to protect the dentin surface from increased erosion. Recently, dentists were offered such a special drug - "Seal & Protect" ("Dentsply"). It is a mixture of methacrylate resins on an acetone base, contains a nanofiller and a highly effective antibacterial triclosan. Quite importantly, the preparation is firmly attached to the tooth surface without acid etching of hard tissues. A layer of material is applied to the cleaned surface of the dentin, dried and polymerized with light.

METHOD OF WORKING WITH COMPOSITES

1. Professional teeth cleaning using the indicator varnish (for example Plague-Test-Liquid). Applied hygienic toothpastes without F (Zirkate and others) with mandatory advice, recommendations to the patient on the specifics of oral care (how to use flosses, the choice of toothpastes, professional oral hygiene, treatment of gingivitis, periodontitis, etc.).

2. Choice of the color of the filling material (neck, body, cutting edge of the tooth, base layer, etc.).

3. Dissection of carious cavity with obligatory enamel slanting (finishing).

4. Drug treatment of KP (do not use alcohol, ether, phenols, fats, you can not use retraction threads containing iron, aluminum sulfate, chlorides). Washing the carious cavity with water. With the use of modern turbine plants, air conditioners and adhesive systems of IV, V generations, medical treatment, washing the CP can be avoided.

5. Use of saliva ejector, co-feldam, (kvidam, ribs, koferdam kerchief, piercings for punching holes, clasps, clamping forceps, coferum frame). Sometimes the work begins from the imposition of co-feldam, and then they carry out all manipulations.

6. According to the indication of the application of medical, insulating pads. It is better to use a material with Ca hydroxide (hardening!) As a curative material, and glass ionomer cement or a compomer for an insulating liner.

7. Etching enamel, enamel and dentin (total etching), depending on the used adhesive and primer.

8. Washing the carious cavity from the remains of the air conditioner, drying.

9. Treatment of TTZ by adhesive systems.

10. Composite material injection and polymerization.

10. Final processing and polishing of seals from CM.

ERRORS AND COMPLICATIONS WITH KM, THE METHOD OF THEIR SOLUTION

Common errors (compressor, turbines, lighting, humidity, room temperature, etc.).

2. Insufficient, incorrect preparation of the CP.

3. Chipped enamel.

4. Discovery of the tooth cavity.

5. Wrong choice of medical, insulating pads,

Materials for medical treatment.

6. Not observance of the etching, washing, KP, saliva, blood, etc.

7. Wrong choice of CM.

8. Non-compliance with the technology of preparation, superposition, polymerization conditions of CM.

9. Lack of contact point, overhanging edges of the seal and stuff.

10. Infringement of rules of finishing processing of seals.

11. Inconsistency of the color of the CM to the tissues of the tooth.

12. Recurrence of caries.

13. Gasket detachment, lack of adhesion.

14. Seal failure.

15. Seizure failure.

16. Damage to the mucous membrane of the mouth, eyes.

5. MATERIALS OF STUDENT ACTIVATION DURING LECTURING

To activate and increase the motivation of students to the topic of the lecture, it is necessary periodically to raise the issue for individual students and jointly find answers. For example:

A). What defects in teeth can cause stiffness and feeling

Trouble when talking to the patient?

B). How do you know the classes of carious cavities on the frontal teeth?

AT). Is it possible for a 21 tooth patient to put a seal of amalgam?

If not, why?

D). When you were last in the dentist and from what material

Have you been given a permanent seal?

E). Are you satisfied with the quality of the seal? If not, why?

Є). What material would you recommend to put a seal on the 37 tooth

His girlfriend? Justify your advice.

G). Can I put a seal without caries tooth preparation? If it is possible, in what cases?

H). What kind of filling material can be considered "ideal"?

AND). Do composite adhesives adhere to enamel? To the dentin?

TO). In what cases can the KP be filled without preliminary preparation?

L). What methods of dissection of hard tooth tissues do you know? Advantages and disadvantages.

6. GENERAL MATERIAL AND METHODICAL PROVISION OF LECTURES

The audience for the lectures of the Department of Therapeutic Dentistry is located on the bases of the OOKSP has all the conditions for using modern projection equipment, video and film equipment (use of educational films and video films).

- VCR, TV.

- Video films: "Clinical possibilities of the material" Karizma "of the firm" Jereus Kulzer "," Modern adhesive systems of DENTSPLY "; "Clinical possibilities of the material Karizma. Jerez Külzer "," Restoration of defects of hard tooth tissues with composite material of Karizma ", S. Radlinsky. "Filling with composites. Finishing the seals. "

- Tables:

A) Classification of filling materials;

B) classification of glass ionomer cements;

C) Preparations based on calcium hydroxide chemical and light hardening;

D) Photopolymer glass ionomer cements

E) metal seals;

E) composition of composite filling materials (CM);

G) classification of CM;

H) mechanisms of adhesion of CM;

I) adhesive bonding systems;

K) the positive and negative properties of chemical CM;

L) the positive and negative properties of photopolymers;

M) the methodology of working with CM;

N) errors and complications when working with CM;

- The Kadoscope

- Kadograms:

A) Logical-didactic structure of the topic;

B) Classification of carious cavities;

C) Requirements for filling materials;

D) Requirements for cushioning materials;

E) Properties of glass ionomer cements;

G) Properties of compomers

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ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Therapeutic Dentistry

Methodical recommendation for lecture

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

Lesson number 4 "Endodontia. Definition of the concept. Anatomical features of the structure of the tooth cavity. Modern endodontic tools. Stages of endodontic treatment »

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved

at the methodical meeting of the

Department

"__02__" _____09_____ 2023

Protocol № _____

Head the department _____

Professor Skyba V.Y.

Odessa – 2023

Lecture "Endodontia. Definition of the concept. Anatomical features of the structure of the tooth cavity. Modern endodontic tools. Stages of endodontic treatment »

2. Relevance of the topic: Treatment of complicated dental caries - inflammation of the tooth pulp (pulpitis) and periodontal (periodontitis) is a very important and at the same time a difficult problem in dentistry. This is due to the high prevalence of these diseases, a large number of complications, duration and complexity of treatment. By treating these diseases, the doctor works within a small space - the cavity of the tooth and the root canals. The success of the treatment determines the doctor's ability to correctly use the endodontic instruments, the qualitative knowledge of the technique of preparation of the tooth cavity, the technique of mechanical and chemical expansion of the root canals.

2. Objectives of the lecture.

A. Educational:

Provide a general description of filling materials for root canals. Formulate requirements for filling materials for root canals - level 2;

To familiarize students with the modern classification of filling materials for root canals - level 2;

Teach students the peculiarities of the use of filling materials for sealing dairy and permanent teeth with unformed roots - level 3.

Determine the final result of root canal filling, correctness and efficiency - level 2.

3. Questions:
4. 1. Endodontia.
5. 2.Pulpa of a tooth (anatomical and histological structure).
6. 3. Topographic anatomy of the pulp chamber of separate groups of teeth.
7. 4. Endodontic treatment, its purpose and objectives.
8. 5. Stages of endodontic treatment.
9. 6. Endodontic tools - classification, standardization.
10.
11. 1. Endodontics is the science of anatomy, pathology and methods of treating the cavity of the tooth and root canals.
12. 2. Pulp of the tooth. Anatomically, tooth pulp is divided into coronal and root, the border between them in multi-rooted teeth are the mouth. In the crown part, pulp horns are distinguished, which topographically repeat chewing mounds of the tooth.

13. The tooth pulp is a loose connective tissue that contains many cells, intercellular substance, fibers, blood vessels and nerve fibers. Peculiarity of the pulp consists in the fact that along with the cellular elements it contains a large number of fibers of collagen, oxitalane and reticular fibers. Collagen fibers are located in the entire pulp without special orientation. Diffuse form a loose network in the central part of the pulp, bundles - a dense frame around the periphery. With age, collagen is formed more, because of which the pulp acquires a white shade. The apical part of the pulp is denser than the coronal due to the greater content of collagen. The pulp also contains reticular fibers of Korf, which originate in the pulp and pass between the odontoblasts form the fibrillar base of dentin. In the pulp there are oxytolane fibers, mainly along the periphery, are located chaotically. There are no elastic fibers in the pulp.
14. The intercellular substance consists of mucopolysaccharides: hyaluronic acid, which regulates the enzyme hyaluronidase (with the increase in the amount of hyaluronidase, the depolymerization of the basic substance occurs, which causes a greater permeability of the connective tissue for microorganisms and their toxins) and chondroitin sulfuric acid - on the degree of polymerization that depends on the viscosity and turgor of the pulp. Also in the intercellular substance are mucoproteins, glycoproteins and other organic compounds. Cellular composition is represented by three layers:
15. 1. Peripheral - formed by cells odontoblastami.
16. These are highly differentiated and specialized pulp cells, arranged in two to four rows. The cell is oblong, cylindrical, which changes to pear-shaped or bulbous with age. It has two processes - central and peripheral. The central process does not go beyond the pulp, and the peripheral penetrates into the dentin, is located in the dentinal tubules and completely fills its lumen (Toms fiber). The cell has a two-circuit plasma membrane, the cytoplasm contains a nucleus of elongated form, an endoplasmic reticulum with a large number of ribosomes and mitochondria is developed, and contains alkaline phosphatase. The main function of odontoblast is dentine-forming, delivery of mineral salts to dentine and enamel, calcification of dentin. Between the first and second layers in the crown part is the Weyl zone rich in nerve fibers.

2. The intermediate or subodontoblastic layer is represented by a large number of stellate cells, which have a large number of processes that are larger than the cell itself. Cells intertwining, form a cellular syncytium. Cells are capable of differentiation and transformation into odontoblasts. The intermediate layer also contains cells such as fibroblasts, which are also precursors of odontoblast, histiocytes and macrophages that perform protective and barrier functions.

3. The central layer is rich in fibroblasts that surround the collagen and reticular fibers that they produce. Histiocytes of this layer have long processes, which they easily lose and turn into a macrophage. Macrophages that ensure the renewal of pulp, the capture and digestion of dead cells, microorganisms and components of the intercellular substance. Mast cells are present mainly in the inflamed pulp of the tooth and are carriers of biologically active substances - heparin, histamine, eosinophilic chemotoxic factor.

Blood supply and innervation of the pulp are abundant. Through the apical aperture of the root, a large arterial vessel enters it, accompanied by 1-2 veins and several nerve trunks. In the root canal a neurovascular bundle is formed, which passes farther, odontoblasts interlace, capillaries pass into veins that have thin walls and a much larger diameter than the corresponding arteries and exit through the apical opening.

Nerve fibers on their way give branches to the odontoblast layer and root pulp, but the most extensive branching occurs when passing from the root pulp to the coronal pulp. The plexus located near the subodontoblastic layer of the pulp is called the Rashkov wreath.

Topographic anatomy of the pulp chamber of separate groups of teeth.

The tooth cavity of the upper incisors, as a rule, has a chisel shape and passes directly to the root canal. In the region of the neck of the tooth, the canal is usually widened in the vestibulo-oral direction, and in the middle and apical part it acquires a rounded shape.

The canine cavity of the upper jaw repeats the shape of the crown and directly passes into the straight longest root canal, which is somewhat flattened in the mediodistal direction.

The tooth cavity of the first premolar upper jaw repeats the shape of the crown of the tooth, and, as a rule, ends with two indentations that pass into the root canals. In 62% of cases, the first premolar has two roots and two root canals.

The second premolar of the upper jaw usually has one root and one root canal.

In 25% of cases, there is a split root canal and in 15% two separate root canals.

In the first molar of the maxilla, there are three roots and three root canals.

The palatine canal is usually straight and has a rounded shape. Distal buccal straight, and on the transverse section occupies the central part of the root. The medial buccal root in 60% of cases has two root canals, curved in the cheek-palatal direction, in the form of a narrow slit.

The cavity of the tooth of the second molar of the upper jaw resembles the shape of the cavity of the first molar, oblate in the cheek-palatal direction. 3 roots and 3 root canals are usually 1-2 mm shorter than in the first molar. The cheek canals are somewhat narrowed, and the palatine canal is usually straight, round or oval, and we pass well. The first and second molars of the upper jaw are located close to the maxillary sinus (an average of 2-4.5 mm), which should be remembered in the treatment of destructive forms of periodontitis, in order to avoid a serious complication - odontogenic sinusitis.

The third molar of the upper jaw has different variants of the structure up to one root with a different number of branches in the root canal and presents special difficulties in endodontic treatment.

The lower central and lateral incisors have a narrowed coronal part of the pulp and roots flattened in the mediodistal direction and root canals. Channels if they are single have an eight-shaped shape and gradually taper towards the apex of the root.

The canine of the lower jaw, as well as the canine of the upper jaw, refers to the longest teeth, usually has one well-traversed root canal, which is somewhat narrowed in the mediodistal direction and bent distally in the region of the apex of the root.

The tooth cavity of the first premolar of the lower jaw repeats the shape of the crown and directly passes into the root canal, which is slightly narrowed in the mediodistal direction. In 27% of cases in the first premolar there are two channels. Dividing the root canal occurs most often in the buccal lingual direction. The shape of the canal is oval in cross section, and near the apex of the root it approaches the rounded one.

The second premolar of the lower jaw most often has one root, which in the apical part bends to the distal side and one root canal.

The first molar of the lower jaw has two roots. In 87% of cases in the medial root there are two root canals. As a rule, the medial buccal canal is more curved than the medial lingual canal.

The second molar of the lower jaw resembles the first, but it has a lower branching of the root canals.

The third molar of the lower jaw can have different variants of the structure.

The roots of the lower molars are close to the mandibular canal (3,6-6 mm).

4. Endodontic treatment is a surgical intervention in the cavity of the tooth in order to preserve it, and the subsequent restoration of the shape and function of the tooth

with therapeutic or orthopedic methods. The goal of endodontic treatment is the passage of the root canal, its mechanical and medicamentous treatment and filling all along the canal, i.e. Up to the physiological apical opening.

From a medical point of view, in the process of endodontic treatment it is necessary to solve the following tasks:

- maximum removal of necrotic, infected tissues from the root canal;

- reduction of the number of pathogenic microorganisms in the channel lumen, periapical tissues and parietal dentin to the minimum level;

- Sealed root canal filling.

5. Stages of endodontic treatment.

1.Creating a plan for endodontic treatment.

2. Anxiety.

3.Isolation of the tooth from saliva. Use cofferdam and cotton rollers.

4. The opening of the tooth cavity (the creation of endodontic access), the amputation of the coronal pulp, is carried out in several stages:

A.Preparation of carious cavity. At this stage, all tissues affected by the carious process are removed, as well as old fillings.

B. Forming a trephine hole - a cavity that provides convenient and easy access to the root canals. The location of the trepanation hole is determined by the topographic anatomy of the tooth and does not depend on the localization of the carious cavity. The incisors and fangs trepan in the middle of the lingual surface closer to the cutting edge. On the chewing teeth - trepanation hole should be located approximately in the center of the chewing surface.

C. Opening of the tooth cavity.

A thin fissure or globular boron creates a point-like communication of the formed cavity with the cavity of the tooth. This operation allows you to specify the topography and height of the arch of the cavity of the tooth.

G. The opening of the cavity and amputation of the coronal pulp.

Fissure boron excised the "roof" of the cavity of the tooth, while, as a rule, the corona pulp is also removed. The amputation of the coronal pulp is performed by boron during the opening of the cavity, the removed fragments of the navel are then removed by an excavator. The main criterion for the correct opening of the tooth

cavity - endodontic instruments should be free, without bending to enter all root canals.

5. Detection and expansion of the root canal mouths (Gates Glidden type burses, Peeso type replicas, machine and manual B1 and B2 rimers).

6. The passage of the root canal and determination of the working length (K-rimery and files, H-files).

A. A tabular method for determining the working length.

B. The anatomical way. As is known, the ratio of the length of the crown to the length of the root of the tooth is approximately equal to 1: 2 (in canines 1: 2.5).

B. Determination of the approximate length of the channel from the diagnostic

Roentgenogram.

D. Electrometric method using apexlocator.

D. Tactile method.

E. Method based on subjective feelings of the patient.

Irrigation of the root canals is not carried out by a separate stage, and it is constantly carried out during the mechanical treatment of the root canal (irrigation endodontic syringes). For this purpose, solutions of antiseptics, EDTA, sodium hypochlorite are widely used.

7. Determination of working length.

The working length is the distance from any landmark on the crown of the tooth to the physiological tip. The most accurate, objective and reliable method of determining the working length is the production of a measuring X-ray of the tooth with endodontic instruments inserted into the channels.

8.Mechanical (instrumental) and medicamentous treatment of the root canals for this use K, H, files and K-rimery.

Methods: 1) Apical-coronal, when the root canal is consistently prepared from the tip to the mouth with instruments of increasing size.

2) Coronal - apical, when the root canal is prepared from the mouth to the apex with instruments of diminishing size.

9. The root canal is dried using paper pins.

10. Sealing of the root canal (conduit, condenser for gutta-percha, spreader, plagger, heating plagger).

11. X-ray quality control of root canal filling.

Endodontic instruments The first endodontic instrument was created in 1746. Pierre Fochard. It was a steel string from a piano with notches and a pen.

The endodontic tool consists of a handle (shank) and a metal rod with a working part. The working part of the endodontic instrument is the portion of the metal rod intended for performing endodontic manipulations.

ISO standardized tools on several parameters

- the total length of the metal rod L-2 (may be 21, 25, 28, 31).

- the length of the working part L-1 - most of the hand tools is 16 mm.

- diameter of the tip of the working part of the tool d1, denoted by the number. For example, No. 35, indicates that the instrument d1 = 0.35 (denoted in hundredths of a millimeter) and is encoded in green.

- designation of tool types by graphic symbols.

- In recent years, standards have been foreseeing the release of instruments with a non-aggressive tip (watt-type) to reduce the risk of step formation.

1st group: tools for manual use only. It includes: K (Kerr) and H-files (Headstrom), K-Rimers, R-rasps (channel expanders), pulp extractors, probes (root needles), applicators, condensers (pluggers) and spreaders for sealing.

2 nd group: machine tools having a shank and a working part. It includes tools that have a shank intended for use in straight, angled or special endodontic tips. The working part is the same as for files, rimers, rasps and pulp extractors of the 1st group or as special tools for the root canals.

The third group: machine lights. It includes rimers B-1, G-type (Gates Glidden), P-type (Peeso), A-, D-, O-, Co-, T-, and M-types, as well as a root treatment tool (Root - facer).

4th group: endodontic pins. It includes absorbent (paper) and sealing pins.

A somewhat different classification was proposed by Borovskii and Zhokhova in 1997, according to which, depending on the purpose, the endodontic instruments are divided into 5 groups:

1. To expand the mouths of the root canals (gave).

2.For the passage of the root canal (K-Rimers, K-flexorimers).

3. To expand the root canal (K-files, K-flexo files).

4. Tools for determining the channel size (root needle, depth gauge).

5.Tools for filling the canal (conduit, spreader, condenser, plugger).

I. Tools for extending the root canal.

The purpose of using these tools is to expand the mouths of the root canals (in which there is anatomical narrowing) and the upper third of the channels and giving them a funnel shape.

1.Gates Glidden- work with a corner piece at low speed. The recommended rotation speed is 450-800 rpm. Has a working part spear-shaped with a non-aggressive tip.

2.Peeso Reamer (Largo) - has an extended working part with a non-aggressive tip. It is designed for the treatment of direct wide root canals: 1-root, palatine upper molars and distal lower molars. The angular tip is used at V 700-1200 rpm.

3.Beutelrock Reamer

ISO also approved the symbols for identifying the type of instrument and the international number coding system in order to create amenities for the doctor's work.

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ODESSA NATIONAL MEDICAL UNIVERSITY

Department of Therapeutic Dentistry

Methodical recommendation for lecture

Academic discipline "Propaedeutic of therapeutic dentistry"

SECTION 1 "Propaedeutic of therapeutic dentistry"

Lesson number 5 “Filling materials for root canals. Requirements for them. Modern technology of root canal filling “

Course 2 Faculty of Dentistry

Specialty (name code) 7.12010005-dentistry

Approved
at the methodical meeting of the Department
"__02__" _____09_____ 2023
Protocol № __1___
Head of the Department

Professor Skyba V.Y.

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Odessa – 2023

Lecture „Filling materials for root canals. Requirements for them. Modern technology of root canal filling''.

3. Relevance of the topic: Treatment of complicated dental caries - inflammation of the tooth pulp (pulpitis) and periodontal (periodontitis) is a very important and at the same time a difficult problem in dentistry. This is due to the high prevalence of these diseases, a large number of complications, duration and complexity of treatment. By treating these diseases, the doctor works within a small space - the cavity of the tooth and the root canals. The success of the treatment determines the doctor's ability to correctly use the endodontic instruments, the qualitative knowledge of the technique of preparation of the tooth cavity, the technique of mechanical and chemical expansion of the root canals.

2. Objectives of the lecture.

A. Educational:

Provide a general description of filling materials for root canals. Formulate requirements for filling materials for root canals - level 2;

To familiarize students with the modern classification of filling materials for root canals - level 2;

Teach students the peculiarities of the use of filling materials for sealing dairy and permanent teeth with unformed roots - level 3.

Determine the final result of root canal filling, correctness and efficiency - level 2.

B. Educational:

To draw the students' attention to domestic root canal filling materials, the priority of Ukrainian scientists in the development of endodontic treatment of teeth. To emphasize the importance of the choice of filling materials for successful final treatment of P and Pt, prevention of possible errors and complications. To focus on the correct choice of filling materials and an adequate method of filling root canals with a specific condition of the root canals and the subalic processes, taking into account the psychological state of patients.

To pay attention of students to observance of the basic principles of deontology and ethics at dialogue with patients.

To form students psychological, legal and professional responsibility for the fate of the patient, his further ability to work and the corresponding appearance.

17.The plan and organizational structure of the lecture.

№	The main stages of the lecture, Its content	Aims	Type of lecture equipment	Time (Min)
1.	Preparatory stage Definition of learning objectives		Educational	2
2.	Providing positive motivation			3
3.	Main Stage The presentation of the lecture material Plan General characteristics of filling materials for root canals. Classification of root canal filling materials: - plastic non-curing; - Plastic hardening; - Primarily solid (pins). Tools for root canal filling. Requirements for root canals before filling. Root canal filling with pastes. Features of filling root canals with fillers. Errors and complications during root canal filling.	2 2 2 2 2 2	Слайды – 4; Набор инструментов; таблицы, кадограммы;	10 3 10 10

	Modern trends in filling root canals. 3 2 3 2 2		рентгенограммы, визиограмы Кадограммы, рентгенограммы, визиограммы	5 10 15 10 7
	The final stage Summary of the lecture			2
	The answers of the lecturer to the questions			2
	Self-study task			1
	Structural-logical scheme of the lecture			

The final stage of pulpitis treatment after pulpal or periodontitis extirpation is root canal filling. Its purpose is to block, isolate the root canal, the infected layer of preentin from the periapical tissues.

Basic requirements for filling materials

For filling the root canals

1. Biological requirements:

- antiseptic properties;

- bactericidal properties;

- Do not irritate periodontal tissue.

2. Physico-chemical requirements:

- high adhesion, ensuring adherence to the walls of the channel;

- Close tightly the apical opening and dentinal tubules;

- minimal shrinkage;

- not dissolve in the tissue fluid;

- Be X-ray Contrast;

- Do not stain the tooth.

3. Technological requirements:

- plasticity;

- it is easy to enter into the root canal;

- if necessary - be amenable to removal from the channel.

Materials for PKC are subdivided into plastic non-hardening, plastic hardening - sealers (fillers or sealants) and pins - fillers or fillers.

I. Plastic non-hardening pastes:

- iodine form;

- Thymolic.

II. Cements:

1. Zinc phosphate cements: "Phosphate cement", "Adhesor", "Argil", (Czech Republic), etc.

2. Zinc oxide-eugenol cements: Evgentsent-V, Evgentsent-P (VladMiVA, Russia), Endobtur (Septodont, France), Cariosan (Spofa Dental, Czech Republic) and etc.

3. Glass-ionomer cements: Ketak Endo (ESPE, Germany), Endo-Jen (Jendental, USA), Endion (VOCO), Germany), and others.

III. Plastic curing pastes:

1. Materials based on epoxy resins: epoxy sealant NKF "Omega" (Russia), "AN-26", "AN Plus", "Topseal" (Dentsply), Intradont (CIS), etc.

2. Pastes with calcium hydroxide: "Endocal" ("Septodont"), "Seal apeks" ("Kerr"), "Biocalex" ("SPAD"), "Diaket" ("ESPE"), "Calasept" ("Scania Dental ").

3. Pastes based on resorcinol-formalin: resorcin formalin mixture (ex tempore), "Rezident" (JSC "VladMiVA", Russia), "Forferan" ("Septodont"), etc.

4. Pastes that contain antiseptics and anti-inflammatory agents: Cresodent (VladMiVA, Russia), Esteson (Septodont), Foredent (Spofa Dental), Treatment Spad (SPAD) , USA), etc.

5. Pastes based on zinc oxide and eugenol: zinc oxide-eugenol paste (ex tempore), Evgedent (VladMiVA, Russia), Biodent (Medpolimer, Russia), Endometason (Septodont) and Other

It should be noted that most endogermetics have certain drawbacks:

- cytotoxicity in a plastic form (after solidification - relative bioinerticity);

- solubility and violation of marginal contact to the walls of the root canal, tightness of its obstruction;

- penetration of individual components of the material into the periapical tissues and their irritation;

- incomplete sealing of the root canal system;

- the need to use fillers (fillers).

The materials used to fill the root canals must meet certain requirements:

1. Easily introduced and, if necessary, removed from the root canal;

2. Have a certain consistency, ensuring the filling of the root canal throughout the continuation;

3. Ensure a dense root channel ablation;

4. Do not decrease in volume in the root canal;

5. Do not resorb in the root canal.

6. Be impervious to tissue fluid;

7. Do not irritate periodontal tissue (biological inertia);

8. Do not change the color of the tooth;

9. Be radiopaque;

10. Do not serve as a breeding ground for bacteria, but it is better to have bacteriostatic, bactericidal properties;

11. Have the ability to stimulate reparative processes in periodontics.

Thus, none of the existing sealed materials meets all of the above requirements.

Depending on the formation, patency, the process in the root canal, or in periodontium, fillings are used that have the most suitable properties in each specific case (Table 1).

Classification of filling materials for root canal filling:

I. Plastic non-curing. Basis as a rule - white clay, artificial dentin and glycerin, aromatic oils. Active substances - norsulfazole, asphalin, iodoform, tricresol, formalin, phenol, thymol and others (mummifying, disinfecting effect, etc.).

- resorption - formalin (without alkali);

- calcipulp (f. Septodont);

- sulfate;

- sentocalcin ultra;

- Silk;

- pulpoxine;

- Endoflas (USA)

- KRU - paste;

- Maisto paste;

II. Plastic hardening:

- phosphate cement, visphate, adhezor, infantide;

- resorcinol-formalin paste;

- zinc-eugenol cement;

- paracine; Endodent; Cebanite (expanding);

- Guaiacrylic cement (6% methacrylate solution in guaiacryle and powder - zinc oxide);

- Bakelite paste;

- the cream paste;

- endometasone;

- estezon;

- Forten;

- Endoptur;

- plethysic;

- a cradle;

- dexodent;

- grinassol;

- endogenous;

- Hey, hey, the plas;

- Ruth - kanel the dealer;

- Cohen - lax.

III. Solid materials (pins): silver, copper, gold, titanium, plastic, polyamide, gutta-percha, thermoplastic obturator "Thermophile".

Table 1. Materials for filling (obturation)

Root canals (sillers).

Name	Made by	Description
1	2	3
Phosphate cement	**UIC**	Zinc-phosphate cement for filling the root canals.

Adhesion	Slovakia	Zinc phosphate cement for filling root canals.
Intradont	UIC	Intradont CIS countries The drug is based on epoxy resins. It has high adhesion, tolerance to periodontal tissues, antibacterial properties, is simple and convenient to use.
Etonic paste	UIC	Provides bactericidal and fungicidal action. Stimulates reparative processes.
Endobtur	«Septodont», France	Eugenol-containing antiseptic filling cement for canal filling. Zincoxide-eugenol cement with the addition of enoxolone, diiodothymol and precipitated silver is weaker than antiseptic, good applicability, good sealant (pulpitis, less periodontitis).
Estesone	«Septodont», France	Has antifungal and antiallergic effect. It mixes with eugenol. It is used for sealing channels with incomplete pulp extirpation. paste without paraformaldehyde, with hydrocortisone. It has an intensive short-term bactericidal action.
Canason	«Voco», **Germany**	Filling material for filling the root canal with a zinc-eugenol base. Contains cortisone and paraformaldehyde. Has bacteriostatic and anti-inflammatory effect. The package contains 30 g of powder and 20 ml of liquid.
Diaket	«ESPE», Germany	Siller for filling root canals based on calcium hydroxide, 1 pack contains 18 g of powder and 10 ml of solution.
Sealapex	«Kerr», Germany	Polymerizable material for filling root canals based on calcium hydroxide. The material does not contain eugenol,

		a flowable consistency. The curing time is 24 hours. In the package there are 2 tubes of 12 g each and a block for mixing.
Endofill	Brazil	Siller for ablation of root canals based on eugenol.
Tubti – SeaI	«Kerr», Germany	Siller based on zinc oxide and eugenol. In the package there are 2 tubes and a mixing unit.
Pulp Canal Sealer	«Kerr», Germany	Material for filling root canals based on zinc oxide and eugenol. It is produced in 2 bottles (powder and liquid).
Endometasone	«Septodont», France	Material for filling the root canals based on eugenol and corticosteroids - dexamethasone and hydrocortisone. As an antimicrobial preparation, tetraiodothymol is included, mimifying effect is provided by trioxymethylene. It is available in powder form (42 g) and liquid (10 ml) in vials.
Biocalex	«Spad»	A material for sealing the root canals of infected teeth based on calcium hydroxide and cortisone. In the package, 10 tubes of calcium hydroxide powder of 0.9 g and a bottle with a liquid of 10 ml.

Treatment Spad	«Spad»	For treatment and filling of infected channels. Promotes resorption of granulomas and radicular cysts within 48 hours. R - contrasting, harmless for periodontal disease. Produced in the package: 2 liquids of 9 ml and powder of 20 g.
Calasept	«Scania Dental»	Pasta based on calcium hydroxide in sterile packaging in carpules. Contains isotonic solutions of calcium chloride - 8 mg, sodium hydrogen carbonate - 4 mg, sodium chloride - 350 mg, potash - 8 mg, calcium hydroxide - 56 g. Sterile water to 100 g paste. PH = 12.5. It is used for disinfection and sealing of canals, restoration of bone tissue during periodontitis.
Endocal	«Septodont», France	Gel on the basis of calcium hydroxide for endodontic recovery. It is produced in 30 single-dose doses of 0.2 g each, intended for use by a dosage syringe.
Apexit	«Vivadent», Germany	Siller based on calcium hydroxide. In the package 4 syringes with the main and catalyst paste.

Thermascat	“Tuisa Dental Products”, USA	Siller based on epoxy resin. It is used when sealing the root canal with thermophil.
Topseal	“DENTSPLY International Inc”	Siller based on epoxy resin. It is used for permanent channel ablation in combination with gutta-percha pins and termafil. Mix with a metal spatula on a paper substrate.
Endion	“Voco”, Germany	Glass ionomer siller for filling root canals.
Endo-Jen	“Jendental”, USA	New glass ionomer siller for root canal obturation.
AH-Plus	“DENTSPLY International Ins”	Пломбировочный материал для корневых каналов на основе эпоксидной смолы.
Ketac-Endo Aplicar	“ESPE”, Germany	Glass-inomer cement for filling root canals, consisting of a two-component system (Ca, Al, F, Si- glass) and a copolymer solution of acrylic and maleic acids.

To date, gutta-percha is most often used to fill the root canals.

Gutta-percha is the condensed milky juice of a gutta-percha tree. Known since the 17th century. In dentistry used for more than 100 years. Usually, you can find three varieties of gutta-percha: alpha, beta and gamma forms.

At room temperature gutta percha is in beta form. If it is heated above 650 C and slowly cooled (0.50C per second), then the alpha form is obtained, flowing, sticky and too soft.

Dental gutta percha consists of:

20% gutta-percha betta - form;

60-75% - zinc oxide;

1.0 - 4.1% - wax or resin;

1,5 - 17,3% - sulfates of metals (contrast).

Benefits:

- Bioinert;

- has a light antibacterial effect;

- unproblematically entered and displayed;

- shrinkage is observed only with the thermoplastic method;

- Immune to moisture;

- good X-ray contrast;

- does not affect the color of the tooth.

Disadvantages:

- can not be sterilized (except gamma-sterilization);

- requires thorough drying;

- can not fill the branched system of microchannels, therefore it is used together with sillers.

When filling the root canal with pins, sillers are used. As a rule, they are made on the basis of zinc-eugenol, calcium hydroxide, polymeric materials and resins, glass ionomers. Sillers must tightly fill the microchannels, compensate for the shrinkage of the gutta percha, fill the irregularities of the root canals, have adhesion to the filler and the root wall of the root canals, if necessary, be able to dissolve and dissolve (Tublisael, Wach Cement, Spad, Edomethon, Scotchbond, Top-sil. Ca: CRCS (Calcibiotik Root Canal Sealer), Seal Apex, Apexit, Dycal, Life. Polymeric: AN-plus, Therma Seal, Tap seal, Endofil, Ketac Endo.

Tools and devices for root canal filling.

- channel-fillers (Lentullo, French, 1928);

- paper pins;

- guttakondensor;

- spreader, finger-spreader;

- Plagger heating the plagger;

- To. Rimmer;

- ultrasonic plaguer;

- root needle, drill;

- flexofile, flexorimer (especially thin);

- a carrier of heat - Hear-carier (hit carier);

- a ruler for calibration of gutta-percha pins;

- stopper for retrograde filling of the root canal;

- a special syringe, tweezers (for gutta-percha);

- endo M - block; Wedge - stand (for cleaning and fixing endozontic tools);

- A device for bending endodontic instruments (flexodend);

- coffers, ribs;

Saliva ejector, vacuum cleaner;

- diathermocoagulator;

- apex locator;

- Visiograph;

- apparatus for in / to electrophoresis;

- Endodontic tip (ultrasound). For example: endodontic wireless tip with autonomous power supply and built-in apex locator FU.MORITA (Japan): "TRYAUTOZX" - Autostart / stop; Autorevers, apex, the light and sound warning, speed 250-400 rpm, Crown Down technique (from the crown down), the use of profiles 0.4; 0.6.

Basic requirements for root canals before filling:

- the working length of the tooth must be taken into account ("measuring the length of the channel electrically, but checking the quality of the ablation - radiologically!);

- good, visible, direct access to the root canals;

- absence of overhanging edges of the PC roof;

- taking into account the initial anatomical shape and length, the root canals should be relatively expanded, have a round, pronounced conical shape;

- the walls of the root canals must be perfectly smooth;

- Observance of a rather narrow apical opening (creating an apical ledge);

- Completely removed necrotic dentin;

- Absence of a characteristic (gangrenous) smell;

- lack of sensitivity (soreness) to percussion;

- The channel must be clean and dry.

Features of filling the root canals of infant teeth and permanent with unformed roots.

1. Milk teeth:

- mechanical treatment of the root canal should be carried out not reaching the apex of the root by 2-3 mm;

- use of non-hardening, absorbable pastes, non-toxic

For the rudiments of permanent teeth (zincoxide-eugenol, iodine

Form-containing, based on Ca hydroxide).

2. Permanent teeth with unformed roots:

- root canals - reverse constriction (bell);

- the use of pastes based on Ca hydroxide for 2-3-6 months. As a rule, within 1 year a dense barrier forms at the apex of the root - apexfixation. Ca promotes the growth of the root in length in the case of preservation of the functional activity of the growth zone - apexogenesis.

Ca (OH) 2:

- pH 12.4 - termination of bone resorption due to exposure to osteoblasts, neutralization of lactic acid;

- Stimulation of bone formation by activation of osteoblasts;

- antibacterial action;

- licking effect on necrotic tissues;

- in the presence of moisture, increases in volume by 2-3.5 times, ensuring tightness.

Principles of application of various substances

With temporary obturation of the CC.

The data in Table 2 demonstrate that drugs with antimicrobial activity, their combinations with corticosteroid hormones and calcium hydroxide preparations are used as substances for temporary obturation of CC. In the case of acute and exacerbated processes, it is advisable to leave the tooth briefly open for the purpose of draining, only in the case of pronounced purulent exudation, in most cases, pasta with antibacterial and anti-inflammatory action for several days is introduced into the canal. Acute toxic periodontitis is treated only by a closed method with the use of antidotes (unithiol and iodine preparations for arsenic periodontitis, neutral oils such as castor oil after periodontal burns with phenols), replaced in the canal daily until acute events are eliminated.

Table. The use of various substances in temporary obturation of the root canal

Indication	Action	Composition of materials for obturation
Acute toxic periodontitis	Anti-inflammatory, neutralization of toxic substance	Antidotes, corticosteroid hormones

Acute traumatic, acute infectious periodontitis and exacerbation of chronic periodontitis	Antimicrobial, anti-inflammatory	Antiseptics, antibiotics, corticosteroid hormones
Chronic periodontitis in cases of: - prevalence of anaerobic microflora	Antimicrobial	Drugs that affect the anaerobic microflora the humidity of the canal (impossibility of its qualitative drying)
- presence of periapical bone defect	Regeneration of bone tissue	Preparations containing calcium hydroxide for long-term obturation
Incomplete formation of the root or its ver¬hushki with the need for endodontic treatment of the tooth	Alexogenesis or apexification	Preparations containing calcium hydroxide for long-term obturation
Traumatic Tooth Damage	Anti-inflammatory, stabilization of fragments, prevention of development of pathological resorption	Preparations containing calcium hydroxide for long-term obturation
Perforation of the root wall, internal and external root resorption	Suspension of resorption, regeneration of bone tissue	Preparations containing calcium hydroxide for long-term obturation

The table shows preparations, as well as their individual components with antibacterial and antiseptic-anti-inflammatory action, used for endodontic diseases. In addition to pastes, there are also liquid forms used for short-term binding on turundas and for root canal treatment after its instrumental opening and shaping. But with the usual washing of the canal with such drugs, the duration of their stay in the canal is too small to fully realize their therapeutic effect, therefore, their use as washing antiseptic solutions is ineffective.

The mechanism of action of calcium hydroxide when it is introduced into the root canal is as follows:

1. Highly alkaline medium (pH about 12.4), supported by the presence of hydroxyl ions, ensures: the termination of bone resorption due to the effect on osteoclasts; Stimulation of bone formation by affecting the activity of osteoblasts; An antibacterial and lysing effect in relation to necrotic tissues; When coating live pulp - the formation of a section of coagulation necrosis followed by dystrophic calcification of its fibers and the formation of a surface dentin barrier.

2. Calcium ions participate in the reaction of bone formation (however, they are not included in the composition of new tissue), as well as in the blood coagulation reaction.

3. When combined with moisture contained in the canal, the material increases in volume by a factor of 2.5, encapsulating macro- and microchannels, and thus ensuring their temporary isolation.

Indications for the use of calcium hydroxide:

1. Indirect coating of the pulp.

2. Direct pulp coating.

2. Coating of pulp stump after vital am¬putation.

4. Significant periapical damage to the bone.

5. Lysis of the apex of the root.

6. Wet channels (in this case, short-term obturation

Channel - during several days).

7. Internal resorption of the root.

8. Transverse fracture of the root and other injuries of the teeth.

9. Perforation of the root wall and bottom of the tooth cavity.

10. Pulpitis and periodontitis with incomplete formation of the root.

11. Replantation of the tooth.

Calcium hydroxide for endodontic purposes can be used as a pure powder of Ca (OH) 2 (for example, Calcium hydroxidum, Septodont), mixed ex tempore on distilled water, saline solution or non-irritating antiseptic. The preparation Calasept (Nordiska) is a sterile suspension of calcium hydroxide, packaged in syringes and delivered to the canal through a sterile needle. Most drugs are available in plastic syringes with needles or thin plastic cannulae (Table 2). The company Roeko produces gutterapters pins containing 58% calcium hydroxide, which begins to be released under the influence of moisture after placing the pin in the canal (usually for 3 weeks).

The drug Hy-Cal (Pierre Holland) contains 65.5% calcium hydroxide and is used for antiseptic treatment of the root canals.

A separate group consists of hydro-calcium preparations containing iodoform. These include Vitapex materials (Neo Dental Chemical Prod, contains 30.3% calcium hydroxide, 40.4% iodoform, 22.4% silicone oil) and Apexdent (VladMiVa, contains 40% iodoform, calcium hydroxide and phosphates) . They are applied, in addition to traditional for calcium hydroxide and iodine-form indications, for sealing the channels of temporary teeth.

Like preparations of calcium hydroxide, calcium-based drugs are used. So, for example, with the preparation Biokaleks (Spad, P. Bernard, 1960, improved in 1978) after its entry into the root canal occurs two chemical reactions:

1. Slow reaction when interacting with moisture to form calcium hydroxide - CaO + H2O = Ca (OH) 2 - provides dehydration of the system of channels and necrotic tissue.

2. Rapid reaction with carbon dioxide, secreted by living cells - CaO + CO2 = CaCO., -provides the formation of a protective shell from calcium carbonate around living cells.

Calcium oxide is the main component of the materials Phosphadent-bio (VladMiVa), Biopulp (Chema-Electromet).

Tactics of a dentist with temporary filling of root canals (examination in 2-3 months):

A - the continuation of the formation of the root, the absence of inflammation - the replacement of the paste;

B - the completion of the formation of the root, the absence of inflammation - the removal of paste and the usual sealing of the root canals;

B - root growth is not observed. In the region of the tip - X-ray contrast bridge - replacing the paste on the root seal. In case of bridge perforation - paste replacement;

G - there are no signs of inflammation, there is no dynamics from the bone tissue - expectant management, repeated examination after 3 months;

D-signs of inflammation - re-treatment with the excretion of the filling material by the tip (as an exception!);

Methods of obturation of the root canal of the tooth with the pins

Obturation of the root canal is a dense filling with sealing materials of its sex and additional branches in order to stop the communication of periodontal disease with the cavity of the tooth (the establishment of the focus of infection and irritation), curing the foci of chronic inflammation in the bone with the formation of a cement plug in the region of the top Hole.

Before obturation of the root canal, it is advisable to remove from its walls a dense layer of dentin formed as a result of preparation. This procedure can be carried out with the use of acids - citric, phosphoric, lactic or EDTA. Kanaul must be disinfected and dried.

Methods of obturation of root canals:

1. Obturation with cold gutta-percha pins:

A) the technique of a single pin;

6) lateral condensation of gutta-percha and its variants.

2. Obturation of chemically plasticized cold gutta-percha with the use of special materials and solvents.

3. Obturation of the heated gutta-percha:

A) vertical condensation of gutta percha;

B) Obturation of fragmented gutta-percha;

C) lateral-vertical condensation;

D) thermomechanical condensation:

- using a gut-condenser;

- using the Quickfill system;

- with the use of ultrasonic plasticization of gutta-percha.

4. Obturation of thermoplasticized gutta percha:

A) syringe injection or use of Obtura and Ultraphil systems;

6) application of two-phase gutta-percha;

C) hard-core insertion:

- with the use of systems such as Thermafil and Soft-Core; 150

- with the use of the Successfil system.

Obturation of the channels heated gutta-percha predpolagaet gutta-percha heating directly in the root canal, when obturatsii thermoplasticized gutta-percha, its heating is performed before entering the canal.

The method of one pin

Can be used when the walls of the channel are relatively parallel, and the main pin densely enters the apical third of the channel. The method consists in obturation of the root canal with a single pin with a sealer. Disadvantages are the difficulty of achieving a dense obturation (only the macrochemical is obturated) and the possibility of washing cement out of the canal. It is usually used for circular sections of canals. The pin must correspond to the size of the last file that processed the channel for its entire working length (the last apical file). The working length is marked on a gutta-percha or a silver pin by squeezing a pair of tweezers. Before the introduction of the pin, it is treated with a force, cement is also introduced into the channel (channel-filler, file). Silver pins pre-bend in the shape of the channel.

The method of lateral condensation of gutta-percha

Tactics of a dentist with temporary filling of root canals (examination in 2-3 months):

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The method of lateral condensation of gutta-percha

The method of warm lateral condensation of gutta-percha is also widespread, consisting in that after the usual introduction and lateral condensation of the main and several additional pins, the heated spreader part of the heat-carrier plugger is introduced into the channel, rotated by 45 ° and removed, followed by the standard Condensation with a cold spreader. This manipulation is performed with each additional pin until the root canal is fully obturated.

The method of lateral condensation of gutta percha is more effective in the obstruction of uniformly narrowed channels than in filling channels with unequal narrowing.

The disadvantage of lateral condensation of gutta-percha is that the main pin can qualitatively enclose only a round apical opening, which is not always the case. Even with a round section of the apical otverstiya obturation can be incomplete because of

the presence of additional channels outlets. For elimination of this deficiency, you can dab 1 mm of its tip into chloroform (or any other gutta-percha solvents) for 1 second before and after the selection and calibration of the main pin and apply it to the pre-moistened root canal for the entire working length. The humidity of the channel does not allow the tip of the pin softened by the solvent to adhere to the wall, and the tip of the pin, after extraction from the channel, is a relatively accurate impression of the apical section and, thus, after inserting the siller, it will be able to tightly encircle the apical hole of this shape.

It should also be taken into account the presence of the hazard of root dissolution with very intense condensation and thin channel walls. A disadvantage is also the relatively large unproductive consumption of gutta-percha due to the cut ends of the pins.

Obturation of the canal using an automatic plugger

It is carried out with the use of a special tool Canal tinder plugger (Laser Medical Technology), tapering with steps the shape of the working part of which is remembered by a telescope. Used in the tip, performing vertical movements with an amplitude of 0.3-1.0 mm. Due to its design and movement, the tool completes vertical and lateral condensation of the basic gutta-percha pin, and then additional ones.

Obturation of channels of chemically plasticized cold gutta-percha

The method provides a good edge fit of the obturating material and thanks to it a more accurate repetition of the anatomy of the canal and apical opening. It is a variant of the technique of using gutta-percha with chloroform Callahan-Johnston (1911) and is based on the property of gutta-percha softened by some solvents (chloroform, eucalyptol, halothane). Initially, such a solution ("chloropurce", "eucarpcha") was used as an obturating material or siller for the root canal, but later the technique was modified.

The initial pin is selected 2 mm shorter than the working length of the channel, adjusted in the channel and pumped into the solvent for 1 s. After the pin is removed into the channel, the dealer enters. During this time, the solvent is partially evaporated. The pin is inserted into the channel and condensed with a spreader (plasticity is maintained for 15-30 seconds). Then, additional hard pins are inserted.

Vertical condensation of hot gutta percha

The technique was proposed by Shilder about 30 years ago. It assumes a maximum filling of the channel with a minimum amount of a silo. Terms of implementation of the method:

1. Use of non-standard gutta-percha coils, which are better suited to the shape of the channel, or individually produced pins (such pins are made from several thick heated

standard pins by rolling with a spatula or between two panes, followed by spraying with chloroethyl or ice water for curing) .

2. Use of three, in extreme cases - two pluggers: a large size - in the crown third of the channel, medium - in the middle and small in the apical ¬ thal third. The plugger should fill the maximum cross-sectional area of the channel to ensure high-quality condensation of the gutta-percha, but not abut the canal walls.

3. Use of cements (sillers) having a short solidification time, independent of temperature increase, and low solubility (Kerr Pulp Canal Sealer, Rickert cement).

4. It is possible to use a heating plugger or its electronic version (for example, System B, developed by Analytic).

Stages of obturation of the canal:

1. Drying the channel with a paper pin and checking the apical opening with a tool that is smaller than the posterior apical file.

2. Fit the pin to the radiologic opening (filling the entire working length) and cut the thick end. 3. Remove the pin and cut 0,5-1,0 mm ver¬hushki. Re-introduction and verification of retention.

4. Preparation of the pluggers: the first must enter the channel 15 mm from the top, the second - 10 mm, the last 3-4 mm. The designation of the working length of each plugger.

5. Irrigation and drying of the canal.

6. The introduction of a small amount of siller with the help of a manual channel filler and easy covering of walls (cement when filling with a heated gutta percussion is necessary, in particular, to compensate for its contraction upon cooling).

7. Covering the apical third of the pin with a thin film of the siller.

8. Inserting the pin, marking its length by squeezing with tweezers of tweezers.

9. Removal of the excess pin in the mouth of the canal by means of a hot excavator or a heating plugger (the first warm wave leading to an increase in the temperature of the gutta percha by 5 ° -8 ° C, which allows it to deform during condensation).

10. Beginning of condensation: the largest plugger is lowered into the powder of cement and then the gutta-percha is condensed in the apical direction (thus occluding the lateral channels in the middle third of the canal).

11. Creation of the second warm wave by immersion into the channel of the hot pointed part of the heating plagger for 2-3 seconds.

12. Vertical and lateral pressure by the middle plugger (the filling of the lateral channels continues). Compartment up to a distance of 3-4 mm from the top.

13. Second heating with a heating plugger.

14. Vertical condensation by the thinnest plugger.

15. End apical filling (removal of gutta-percha residues from the walls with a plugger).

16. Backpacking - filling the channel with cut-off fragments of gutta-percha, their cold condensation with a plugger, heating, condensation and further repetition of these actions until the final filling of the channel. At this stage, it is also possible to administer gutta-percha with a syringe or fill the remaining space with the lateral condensation method of gutta-percha.

17. Cleaning the cavity of the tooth to the enamel-dentine border, temporary restoration. In molars, cement is sometimes added to the cervical part (sealing of the bifurcation).

The method is inefficient in curved channels due to the relatively low flexibility of the pluggers.

Obturation of warm fragmented gutta-percha

The method consists in using small heated pieces of gutta percha (Webster, 1911). Its name is "Chicago-Technique". Method includes the following stages:

1. Selection of the plugger (3 mm less than the working length).

2. The fit and insertion of the gutta percha pin is 1 mm shorter than the working length.

3. X-ray inspection of the correspondence of the pin.

4. Removing the pin and cutting 3 mm of its vertex; Place the cropped top on top of a warm plugger.

5. Insertion of the siller into the channel.

6. Heating of the gutta-percha top on the spirit lamp and its introduction into the kanal.

7. Pressure and rotation of the plugger.

8. Radiographic control of the obturation of the apical hole.

9. Filling all the channels with heated fragments of gutta-percha.

The described technique can also be performed using a softened chloroform or halothane gutta percha.

Lateral-vertical condensation of heated gutta-percha

The method involves the use of an electronic analogue of a heating plagiar - a temperature con- denser in the form of a handpiece with a battery that enables the heating of a plugger or spreader working part (Endotec). The beginning of work repeats the method of lateral condensation of gutta-percha; The main pin and one or two additional adapters with the help of a manual spreader. Then the heated spreader Endotec is introduced over the entire length of the channel and moves clockwise. After cooling, it is removed from the channel by counter-clockwise movements. After the introduction of an additional pin, the tool is again placed in the channel, and the movements of the plugger are carried out for 10-15 seconds. Then a vertical condensation is carried out with a cold plugger, another heating and lateral condensation to introduce the next pin.

Thermomechanical seal of gutta-percha with

Using a gutta condenser

The method was proposed by McSpadden in 1979. It is implemented with the use of a special McTpadden sealant or gutter condenser, reminiscent of the shape of the reverse H-file and adapted for fixation in the angular tip. The method is based on the softening of the gutta percha in the canal under the influence of heat generated during the rotation of the tool at a speed of 8,000-10,000 rpm. Condensation is effective within 1.5 mm anterior and lateral to the axis of the instrument, so the working length of the gutter condenser should be 1 mm smaller than the length of the treated channel, and its size should correspond to the size of the last apical file. Gutta-percha pin is chosen for 1 or 2 sizes larger than the size of the last apical file. After the introduction of the siller and the gutta-percha pin, the tool is placed in the channel until the resistance feels (to a depth of 3-4 mm) and begins to rotate (without pressure). Approximately 1 second later, gutta percha acquires sufficient plasticity, allowing The softened gutta percha is condensed by the facets of the instrument, which itself is pushed out of the root canal after the compaction is completed. In the crown part of the channel, it is often necessary to use an extra- large size of the condenser. The work should be conducted carefully, taking into account the probability of the fracture of the tool and the removal of the gutta percha for the apical otverstie.

Other constructions of gutt-condensers (described above) can be used in this technique.

Thermomechanical seal of gutta-percha with

Using the Quickfill system

Close to the described system, Quickfill presupposes the use of tools (guttakompacters) with the application of a-phase gutta-percha (without heating) on them. Heating and softening of the material also occurs in the channel when the tool rotates.

Use of ultrasonic gutta-percha plasticization

The method consists in plasticizing the gutta-percha pin by activation with ultrasound without cooling the endodontic instrument (file) inserted into the channel with the pin. Thus, the gutta-percha is sufficiently compacted in the channel. The final condensation is carried out by a manual plugger.

Obturation with thermoplastic gutta-percha injection

The method was proposed in 1977. It is concluded in the introduction into the channel of the heated gutta-percha from a syringe, heated to 160 ° C (the temperature of the state of fluidity of the material through the needle). The needle of the syringe should not reach the apical opening 3.5-5 mm. Use a siller to fill the space between the gutterapa and the canal wall. After the introduction of the first batch of material, the gutta percha in the apical part is rapidly compacted with a pre-selected hand plagger, 3.5-5 mm short of the apical opening. After obturation of the apical part, her X-ray examination is carried out. At present, Obtura II Heated Hutta-Percha System (Unitek) is used for this method with the temperature levels from 1 ° C to 200 ° C.

The use of the Ultrafil (Hygienic) system, like the previous method, consists in the introduction of gutta¬perchi, plasticized by heating, into the canal, but the gutta percha is in the cannula and is plasticized in them with the help of a special heater. The heated cannula is inserted into a gun of a special design, after which the material is injected into the channel.

Obturation of the root canal with a two-phase gutta-percha

Obturation is carried out using a condenser, the construction of which resembles a gutta condenser and ensures the pressure of the filling material is not apical, but on the walls, which prevents overfilling the canal. Two phases of heated gutta-percha are prepared, prepared by processing primary raw materials in various ways: first, using a special heating device and a syringe, a more dense phase of β-gutta percha is applied to the instrument), on top of it a more liquid phase (α-phase). The con- denser is introduced into the channel, while rotating (3000-5000 rpm) it compacts the gutta-percha and, due to its design and resistance, the gutta percha itself is removed from the channel. As a result of the filling, the macro-canal is filled with a dense gutta-percha, and the lateral canals and parietal areas are more fluid, which allows achieving optimal obturation.

Obturation of the canal using Thermafil and Soft-Core systems

The method was developed B.W. Johnson in 1978. It is based on obturation of the gutta-percha canal (usually its a-phase) deposited on a steel, nickel-titanium or plastic rod. Provides sufficient channel obturation, accurate apical control and a good reverse tactile connection during channel obturation.

The modern method, modified by Tusla Dental Products, assumes the presence of a "Ter-masystem", including obturators of the Thermafil type (flexible plastic rods with longitudinal sectional cut along the entire length, evenly covered with prepared gutta-percha a-phase; Performs the role of carrier and con- densor, the siller (ThermaSeal, which possesses optimal viscosity, adhesion and minimal shrinkage, TopSeal and AH Plus can also be used, no quick-hardening cement of TubliSeal type is used), a programmable heat source for equal Nogo heating obturators Thermaprep.

Before obturation, the channel is calibrated (checking the correspondence between the size of the treated channel and the size of the prepared obturator) using verifiers (now nickel-titanium). For curved canals, it is recommended that the obturator be used 1 time less than the last apical file. Obturator is prevented from heating up the device, and then injected into the canal. The a-phase gutta-percha heated to operating temperature becomes sticky and adhesive, acquiring maximum flow characteristics, so that it does not separate from the central rod during the introduction and is carried deep into the system of the root canal. The rod is cut at the level of the mouth of the canal, after which the process is terminated by condensation with a cold plugger for 30 seconds.

The representative of the next generation of hard-core obturators of the root canals is the Soft-Core system. Unlike Thermafil, the carrier with gutta-percha connects with the handle not rigidly, which allows to bend the obturator, using it in molars and with difficulty opening the mouth.

Obturation of the channel using the SuccessFil system

The principle of the method is the same as in the Thermafil system. The difference is that gutta-percha alpha-phase in the heated plasticized state is applied using a special syringe onto the rod-carrier only before its introduction into the canal.

Filling the apical third

Dentin shavings (dentinoplasty)

The method provides stimulation of osteogenesis and cementogenesis. Technique: after completion of the treatment of the channel, additional movements are made by burs such as Gates-Glidden and H-files without removing the formed sawdust that is pierced to the apex by a blunt endodontic tool or a paper pin with subsequent condensation.

Unsealing channels obturated using gutta

Methods of rasplombirovaniya:

1. Mechanical - the use of endodontic instruments.

2. Physical heating of gutta-percha and its subsequent softening.

1. Chemical - application of solvents gut¬ tamerchi (halothane, eucalyptol, xylenol, chloroform): introducing them with a syringe into the previously released mouth of the canal and, as softening the gutta percha, progressing deeper with the use of the K-file. Gutta-percha is removed with K-files of appropriate sizes, the wall part of it with H files after compaction with sodium hypochlorite solution. When removing the pin by the tip, its softening should be stopped at a distance of 3-4 mm before it, and the extracted fragment is removed by an H-file screwed into it.

Errors and complications during sealing of QC:

In 60% of cases, the failure in treatment of P and Pt is due to incomplete abortion of the apical foramen of the root.

It is considered the best method of ablation of the apical third of the root canal with dextrin sawdust, preferably hydroxyapatite, tricalcium phosphate.

Implications:

- secondary infection;

- Aspiration;

- swallowing the instrument;

- tool failure;

- the excretion of the filling material into the perialal tissue,

N / ch channel, maxillary sinus;

- nedoplombirovanie root canals;

- fracture, perforation of the root;

- allergic reactions;

- burn, toxic effect;

Bleeding from the root canal;

- pain after filling;

- excess number of siller in the channel;

- Trauma of periapical tissues, nerve trunks.

CONCLUSION.

To date, the most reliable method of root canal obturation is the combination of special intrachannel sillers based on glass ionomer cements or calcium hydroxide and gutta percha condensed in the channel in one way or another (preferably a multi-cone method). In this case, an important role is played by the individual technique of the dentist and the correct choice of the siller, which should provide a stable effect for a long time.

If it is necessary to use a composite material for the restoration of the tooth crown in one visit, after the inevitable sealing of the root canals with eugenol-containing materials, it is advisable to fill the upper third of the root canals with a phosphate-cement or light-cured glass ionomer.

3. Materials activating students during the presentation of the lecture.

In order to activate and increase the motivation of students to the topic of the lecture, it is necessary to periodically raise questions for individual students and the audience as a whole and jointly find answers. For example:

A. After extirpation of the pulp from the root canals, is it worth it to seal them? What happens if I put a seal without sealing the channels?

B. At what level is it necessary to remove pulp in various forms of pulpitis, to prevent complications from the periodontal disease?

Q. What materials can be used to fill root canals?

D. What is gutta-percha, where is it used, what varieties do you know?

D. In what terms of resorption of the roots of milk teeth can treat P, Pt, and when is it better to remove such teeth?

E. Features of the structure of periapical tissues in permanent teeth during the formation of roots and their influence on the methods of root canal filling.

G. What do you know of complications after root canal filling? How can they be avoided, eliminated?

4. General material and methodical support of the lecture.

The audience for the lecture of the Department of Therapeutic Dentistry is located on the base of the OOKSP and has all the conditions for using modern video, film, projection equipment (use of educational video, movies, kadograms, sightograms, slides).

- VCR, TV;

- Video: N.S. Shokhov. Determining the length of the tooth and root canals. Variants of the structure of the root canals. Use of alexlocators.

- Sadovsky. New technologies in the expansion of hard-to-penetrate root canals (Ca, Cu, and endodontic hydroxide depophoresis);

- Tables, kadogramy, videograms, a kadoscope:

- logical and didactic structure of the topic;

- tools for root canal filling;

- Requirements for root canals before filling;

- classification of filling materials for root canals;

- plastic non-hardening filling materials;

- plastic hardening filling materials;

- Primarily solid (pins);

- Features of filling the root canals of baby teeth;

- features of filling the root canals of permanent teeth with unformed roots;

- mistakes and complications during root canal filling;

7. Recommended literature:

Basic literature:

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Information resources on the Internet:

-http://nasbol.com/2011041354397/propedevtica-stomatologicheskihzabolevanii-skorikova-l-a-volcov-v-a-bajenova-n-p.html

-http://www.booksmed.com/stomatologia/2393-propedevtika-stomatologicheskih-zabolevaniy-skorikova.html

-http://dental-ss.org.ua/load/kniga_stomatologia/terapevticheskaja/8.

-http.www.stomatkniga.ru/index.php?start=48.

-http://stomatbook.blogspot.com/p/blog-page_14.html.

-http.www.mosdental.ru/Pages/Page28.1.html.

8. Literature used in the preparation for the lecture:

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