GUIDELINES
FOR INDEPENDENT WORK OF STUDENTS
WHILE PREPARING FOR THE PRACTICAL LESSON

<table>
<thead>
<tr>
<th>Academic discipline</th>
<th>Propaedeutics of operative dentistry</th>
</tr>
</thead>
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<tr>
<td>Module № 1</td>
<td>Propaedeutics of operative dentistry</td>
</tr>
<tr>
<td>Content module № 1</td>
<td>The basic dental tools and equipment. The anatomical structure of the permanent teeth</td>
</tr>
<tr>
<td>Lesson Focus</td>
<td>Light curing composite materials. types, properties, indications for use, features of filling stages.</td>
</tr>
<tr>
<td>Course</td>
<td>II</td>
</tr>
<tr>
<td>Faculty</td>
<td>Dental</td>
</tr>
<tr>
<td>Number of hours</td>
<td>1</td>
</tr>
</tbody>
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Compiler: prof. Lynovitskay O.V.
Methodist: ass.prof. Kolenko Y.G.

Kyiv – 2016
LIGHT CURING COMPOSITE MATERIALS. TYPES, PROPERTIES, INDICATIONS FOR USE, FEATURES OF FILLING STAGES.

I. Actuality of theme

Composition materials of light polymerization allow to prolong time of design of stopping, carry out restoration of tooth, that not only to remove a defect but also pick up thread the anatomic form of crown, create contact points, pick up thread the cosmetic parameters of tooth. Compos of this group are high физико-механические characteristics. They are packed up in syringes and non-permanent компьютры, does not require mixing of components, accelerating the process of restoration of teeth, allow maximally to adhere to the асепсис.

II. Educational aims of employment

General: to capture the method of stopping of carious cavities composition materials of light polymerization.
Concrete: To have (?-I):
- picture of classification of stoppings materials;
- picture of requirements to preparing of carious cavities for stopping composition materials;
- picture of requirements to stoppings materials;
- picture of физико-механических properties of stoppings materials.
- picture of basic компонентах of composition stoppings materials;
- picture of classification of composition materials;
- picture of физико-механических properties of compos;
- picture of stainsing: kinds, technique of leadthrough;
- picture of classification of the адгезивных systems.
To know (?-II):
- физико-механические properties of composition materials of light polymerization;
- advantages and lacks of composition materials of light polymerization;
- testimony and contra-indication to stopping of carious cavities by composition materials of light polymerization;
- stages and features of work with composition materials of light polymerization;
- modern composition materials of light polymerization.
Able (?-III, ?-IV):
- to do the correct choice of material depending on the class of carious cavity on Bleku;
- to shade stopping material with the use of colour scales;
- to capture skills of therapeutic manipulations during work with composition materials of light polymerization.
III. Aims of development of personality

During employment to assist development for the students of picture of technological and clinical aspects of work with composition materials of light polymerization; to form for students sense of professional responsibility for the rightness of the conducted medical manipulations.

IV. Mezhdistsiplinarnaya integration

<table>
<thead>
<tr>
<th>Disciplines</th>
<th>To know</th>
<th>Able</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous disciplines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td>Chemical nature of composition materials, адгезивных systems.</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>Physical and mechanical properties of composition materials, адгезивных systems.</td>
<td></td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Reaction of fabrics of tooth and mash on composition materials and адгезивные systems.</td>
<td></td>
</tr>
</tbody>
</table>

Inwardly-subject integration:

- to accomplish the correct choice of material depending on a clinical situation;
- to conduct stainsing;
- to capture skills of therapeutic manipulations during work with the адгезивными systems;
- to shade stopping material with the use of colour scales;
- to capture skills of therapeutic manipulations during work with composition materials of light polymerization.

V. Table of contents of theme of employment

Fotokompozity (composition materials of light polymerization) are materials which are polymerized under the action of light. Classification of composition materials of light polymerization and dependence of their properties from the size of particles of наполнителя is presented in a table 16.1.

Advantages of composition materials of light polymerization (фотополимерных materials):
- does not require mixing of components;
- does not change viscosity in the process of work;
- allow in the process of stopping to combine materials of different colors and degrees of transparency;
- allow to prolong time of design of stopping;
- fast, deep and reliable polymerization of material - during 40 with reliably the layer of material hardens in from 2,0 to 4-7 мм thick (depending on properties of material);
- controlled polymerization (in moment necessary a doctor, after the conducted design of material);
- allows to work "without wastes", that to outlay exactly so much materials, how many it is needed;
- improved stability of color, comparatively with materials of chemical polymerization: unsteady connections, able to decolorize restoration, fully disintegrate during light polymerization;
- polymerization light provides the high (to 80-85%) degree of polymerization which diminishes the level of remaining monomers.

**Lacks of composition materials of light polymerization (фотополимерных materials):**
- considerable expenses of time at laying on of stopping from these materials;
- relatively large cost of stoppings from фотополимеров;
- light of фотополимерной lamp is harmful for eyes.
## DEPENDENCE OF PROPERTIES OF COMPOSITION MATERIAL ON SIZE OF PARTICLES OF NAPOLNITELYA

<table>
<thead>
<tr>
<th>COMPOSITION</th>
<th>POSITIVE PROPERTIES</th>
<th>NEGATIVE PROPERTIES</th>
<th>TESTIMONIES TO APPLICATION</th>
<th>REPRESENTATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACROGAP-FILLING COMPOS</td>
<td>high durability; optical properties are characteristic for an enamel and dentine; photography-contrasty.</td>
<td>polishing complication; absence of dry brilliance; considerable roughness of surface; possibility of rapid accumulation of dental raid; at elimination of surface it becomes more rough as a result loss of particles of largeness; enhanceable elimination of teeth-antagonists.</td>
<td>stopping of cavities I and II classes; stopping of cavities of the V classes is in lateral teeth; stopping of cavities is in foreteeth, if a cosmetic effect is not needed (for example, at localization of carious cavity on a language surface); renewal of the strongly blasted crowns of frontal teeth with next revetment of vestibular surface more cosmetic, for example, by a микронаполненным компо; design of культи of tooth under a crown.</td>
<td>Adaptic (DeTrey/Dentsply); Evicrol (Spofa Dental); Concise (3M ESPE); Simulate (Kerr); Kompodent (Medpolimer); Фолакор-с (Rainbow of Р); Epakril (Stoma); Rebilda (VOCO); Coradent (Vivadent); Estilux (Kulzer); Valux (3M); Prismafil (Caulk).</td>
</tr>
</tbody>
</table>

Particles of inorganic наполнителя of largenesses (8-12 мкм. As наполнителя a quartz, ground glass, porcelain flour, comes forward usually.

As наполнителя a quartz, ground glass, porcelain flour, comes forward usually.
### МИНИНАПОЛНЕННЫЕ COMPOS

<table>
<thead>
<tr>
<th>Size of particles of 1-5 мкм.</th>
<th>These materials occupy intermediate position between микро- and macrogap-filling compos. These materials are satisfactory cosmetic and физико-механические characteristics.</th>
<th>Small cavities of lateral teeth and stopping of frontal group of teeth.</th>
<th>Permaplast (M+W); Bisfill (Bisco); Marathon V (Den - Mat); Visio - Fil (ESPE); Profile TLC (S.S. White).</th>
</tr>
</thead>
</table>

### МИКРОНАПОЛНЕННЫЕ COMPOS

<p>| Size of particles of 0,01-0,1 мкм | - good polishing; - firmness of glossy surface; - high firmness of color; - good aesthetic properties; - low abrasive wear. | - less mechanical durability; - polymerization усадка scope by 3%; - high coefficient of thermal expansion; - persorption of water. | - stopping of cavities III, V classes; - stopping of uncarious defects of teeth (erosion of enamel, hypoplasia, wedge-shaped defects et cetera); - making of cosmetic адгезивных revetments (виниров) without ceiling of cutting edge of tooth; - cosmetic stopping of cavities of the IV classes, traumatic defeats in combination with hybrid, macrogap-filling compos and парапульпарными штифтами. | Degufill - SC (Degussa); Isopast (Vivadent); Filtek A110 (3M ESPE); Silux Plus (3M ESPE); Durafill (Heraeus/Kulzer); Durafill VS (Heraeus/Kulzer); Helio Progress (Vivadent); Heliomolar Radiopaque (Vivadent); Amelogen Microfill (Ultradent); Micronew (Bisco); EcuSphere - Shine (DMG); |</p>
<table>
<thead>
<tr>
<th>HYBRID COMPOS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mixture of particles of наполнителя of different sizes (0,04-5 мкм) and different chemical composition (barium and strontium glass, oxide of silicon, connections of fluorine).</strong></td>
</tr>
<tr>
<td>- quite good cosmetic properties;</td>
</tr>
<tr>
<td>- high durability;</td>
</tr>
<tr>
<td>- quality of surface of stopping is better, than at макронаполненных compos;</td>
</tr>
<tr>
<td>- photography-contrasty.</td>
</tr>
<tr>
<td>- satisfactory quality of surface (worse, than at микронаполненных compos);</td>
</tr>
<tr>
<td>- polishing weight.</td>
</tr>
<tr>
<td>- stopping of carious cavities of the I -V classes;</td>
</tr>
<tr>
<td>- stopping of uncarious defects on lateral teeth;</td>
</tr>
<tr>
<td>- fixing of ортодонтичних constructions.</td>
</tr>
<tr>
<td>- satisfactory quality of surface (worse, than at микронаполненных compos);</td>
</tr>
<tr>
<td>- polishing weight.</td>
</tr>
<tr>
<td>- stopping of carious cavities of the I -V classes;</td>
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<td>- stopping of uncarious defects on lateral teeth;</td>
</tr>
<tr>
<td>- fixing of ортодонтичних constructions.</td>
</tr>
</tbody>
</table>

- Multifil VS (Heraeus/Kulzer); Evicrol Solar LC (Spofa Dental); Bisfil M (Bisco); Prizmafil (Stomadent).

- Alfacomp (VOCO); Alfacomp Molar (VOCO); EP — 10 RBC (3M ESPE); Compolux (Septodont); P - 50 RBC (3M ESPE); Pertac - Hybrid (3M ESPE); Visio Molar (3M ESPE); Plofiill (VOCO); Plofiill Molar (VOCO); Glacier (SDI); Evicrol Molar (Spofa Dental); Prism (StomaDent/dentsply); Prizmafil (StomaDent/dentsply).
**МИКРОГИБРИДНЫЕ COMPOS**

| Ультрамелкий наполнитель с частицами размером от 0,04 до 1 мкм (средний размер — 0,5-0,6 мкм) и модифицированной полимерной матрицей. | - good cosmetic values;  
- high физико-механические properties (firmness at a compression, bending, low водопоглощение, KTR near to KTR of hard fabrics);  
- good polishing;  
- good value of surface;  
- stability of color;  
- photography-contrasty;  
- wide scale of tints;  
- high stability (safety) of quality of restoration. | - complication of clinical application:  
layer bringing, directed polymerization;  
- high polymerization усадка;  
- elasticity less than, than hard fabrics of tooth. | - stopping of carious cavities of all classes on Bleku in frontal and lateral teeth;  
- stopping of uncarious defects of teeth (erosions, wedge-shaped defects, traumas);  
- correction of form and color of tooth;  
- splintage of teeth at the diseases of paradontium;  
- fixing of ортодонтичних constructions;  
- direct and indirect making of insets;  
- making of vestibular cosmetic адгезивных revetments (виниров);  
- restoration of сколов of porcelain crowns. | - complication of clinical application:  
layer bringing, directed polymerization;  
- high polymerization усадка;  
- elasticity less than, than hard fabrics of tooth. | - stopping of carious cavities of all classes on Bleku in frontal and lateral teeth;  
- stopping of uncarious defects of teeth (erosions, wedge-shaped defects, traumas);  
- correction of form and color of tooth;  
- splintage of teeth at the diseases of paradontium;  
- fixing of ортодонтичних constructions;  
- direct and indirect making of insets;  
- making of vestibular cosmetic адгезивных revetments (виниров);  
- restoration of сколов of porcelain crowns. | Valux Plus (3M ESPE);  
Filtek Z250 (3M ESPE);  
Venus (Heraeus/Kulzer);  
Charisma (Heraeus/Kulzer);  
Charisma PPF (Heraeus/Kulzer);  
Degufill - Ultra (Degussa);  
Degufill Mineral (Degussa);  
Degufill SC Micro Hybrid (Degussa);  
Definite (Degussa);  
Spectrum TPH (Dentsply);  
Prisma TPH (Dentsply);  
Esthet - X (Dentsply);  
Herculite XRV (Kerr);  
Prodigy (Kerr);  
Point 4 (Kerr);  
Artemis (Vivadent);  
Tetric Ceram (Vivadent);  
Te - Econom (Vivadent);  
SERAM Fill (Vivadent); |
<table>
<thead>
<tr>
<th>НАНОНАПОЛНЕННЫЕ COMPOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contain the particles of наполнителя of three sizes: more than 1 мкм, within the limits of 0,1-</td>
</tr>
<tr>
<td>- high durability of material;</td>
</tr>
<tr>
<td>- high косметичность;</td>
</tr>
<tr>
<td>- excellent polishing;</td>
</tr>
<tr>
<td>- artistic renewal of frontal and lateral teeth;</td>
</tr>
<tr>
<td>- making of insets and protective straps;</td>
</tr>
<tr>
<td>- design of культи of tooth;</td>
</tr>
<tr>
<td>- making of виниров by a</td>
</tr>
</tbody>
</table>

| Miris (Coltene); Synergy (Coltene); Brilliant Esthetic Line (Coltene); Arabesk (VOCO); Arabesk TOP (VOCO); Polofil Supra (VOCO); Admira (VOCO); Amelogen Universal (Ultradent); Vitalescence (Ultradent); AELITE All - purpose body (Bisco); AELITE LS Posterior (Bisco); Gradia Direct (GC); Unirest Comfort (Stomadent); Prizmafil plus (Stomadent). | Filtek Supreme (3M ESPE); Filtek Supreme XT (3M ESPE); Ceram X (Dentsply); Grandio (VOCO); |
0,01 мкм and less than 0,001 мкм are nanochaстицы by sizes from 20 to 75 нм. Part of наномеров is agglomerated in нанокластеры (particles to 1 мкм).

<table>
<thead>
<tr>
<th>FLUID (&quot;FLOWABLE&quot;) COMPOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modifitsirovan-nuyu have polymeric matrix on the basis of resins of high fluidity. Degree of filling - 50-60% from weight (inorganic наполнитель - микрогибридные or микрофильные particles).</td>
</tr>
<tr>
<td>- high elasticity; - high fluidity; - high thixotropy - high photography-contrasty;</td>
</tr>
<tr>
<td>- considerable polymerization усадка; - less mechanical durability, what микрогибридных and нанонаполненных composition materials.</td>
</tr>
<tr>
<td>- stopping of teeth &quot;on the method of layer restoration&quot;; - stopping of small cavities on a masticatory surface, invasion and uninvasion pressurizing of фиссур; - stopping of cavities II class at the &quot;tunnel preparing&quot;; - stopping of small cavities III class; - stopping of cavities of the V classes including wedge-shaped defects, erosions of enamel and т.д.; - stopping of cavities of VI of class is in frontal teeth;</td>
</tr>
<tr>
<td>Revolution eormula 2 (Kerr); Point 4 Flowable (Kerr); Filtek Flow (3M); Filtek Supreme XT Flowable (3M); Charisma Flow (Heraeus/Kulzer); Venus Flow (Heraeus/Kulzer); Flow Line (Heraeus/Kulzer); X - Flow (Dentsply); Аeliteflo (Bisco); Aeliteflo LV (Bisco); Ultraseal XT plus</td>
</tr>
</tbody>
</table>
**VIscid (Condensed, "Packable") Compos**

| On the basis of модифицированной of "dense" polymeric matrix and hybrid наполнителя with the size of particles as at микрогибридных materials. | - enhanceable mechanical durability (to 450 MPa), near to durability of amalgam; - high firmness to elimination; - dense consistency: material is condensed in a carious cavity, does not flow, does not stick to the instruments, the surface of stopping can be modelled to фотополимеризации of material; - low polymerization усадка (1.6-1.8%): the directed polymerization is not needed; - improved manipulation qualities, simplicity of work; - insufficient косметичность; - low plasticity; - considerable decline of regional permeability; - possible polymerization more thick layers (3- | - stopping of carious cavities I and II classes on Bleku; - stopping of teeth the "method of layer restoration"; - design of вульти of tooth; - splintage of teeth; - making of indirect restorations is in lateral teeth (insets et cetera). | 1. Compos, increased a fiberglass: Solitaire (Heraeus/Kulzer); Sure Fill (Dentsply); Alert (Jeneric Pentron). 2. High-gap-filling compos: Pyramide (Bisco); Synergy Compact (Coltene); Filtek P - 60 (3M); Prodigy Condensable (Kerr); Tetric Ceram (Ultradent); Tetric Flow (Vivadent); Grandio Flow (VOCO); Admira Flow (VOCO); Arabesk Flow (VOCO); GC Gradia Direct Flo (GC) |
### ORMOKERY

| 4 мм);  
- optimum in forming of contact point;  
- possible use of metallic matrices, wedges. | (Vivadent);  
Ariston pHc  
(Vivadent);  
Quixfil (Dentsply). |

A new matter of basis is an inorganic silicon net (- Si - O - Si -) with built-in organic метакрилатными groups.

| - high biocompatibility (content of organic monomers is diminished to 12%);  
- low polymerization усадка;  
- high durability;  
- elimination is maximally close to elimination of hard fabrics of tooth;  
- firmness on a fracture and to development of cracks. | - stopping of carious cavities of all classes on Bleku and uncarious defects of hard fabrics;  
- renewal of frontal teeth after a trauma;  
- correction of form and color of teeth for the improvement of Cosmetology;  
- renewal of виниров;  
- splintage of mobile teeth;  
- renewal of fasings;  
- design of культи of tooth under a crown;  
- making of insets. | Admira (VOCO);  
Definite (Degussa);  
Ceram X (Dentsply). |
Basic testimonies to stopping (restorations) of teeth фотокомпозиционными materials:
- renewal of cosmetic and functional parameters of tooth in the process of treatment of caries, his complications, uncarious defeats, consequences of traumas of teeth and т.д.;
- correction of cosmetic parameters of tooth (usually, at will of patient).

Absolute contra-indications to the leadthrough of restoration of teeth фотокомпозиционными materials:
- allergic reaction of patient on компоненты of the адгезивной system or компо;
- presence for the patient of electro-cardiostimulator, as hertzian waves, generated in the process of work of фотополимерной lamp, can violate work of this vehicle;
- impossibility to insulate a carious cavity from moisture (to the mouth liquid, blood, gingival liquid).

Relative contra-indications to the leadthrough of stopping (restorations) of teeth фотокомпозиционными materials are related mainly to the enhanceable loadings on restoration:
- combination of pathological elimination of teeth and direct bite;
- deep chisel ceiling which combines with a dense contact between overhead and lower teeth;
- bruxism;
- ceramet constructions on teeth-antagonists;
- absence of teeth is in lateral departments (it is necessary to give up restoration in behalf on rational протезирования);
- destruction is a more than half of hard fabrics of tooth;
- destruction of fabrics of tooth below than level of gums;
- heavy general of patient, presence of heavy общесоматической pathology;
- use of фотополимерных materials for patients with an enhanceable sensitiveness to light;
- stopping of teeth for patients with uncompleted минерализацией of hard fabrics of teeth;
- intensifyed flow of генерализованного пародонтита;
- presence of harmful habits;
- professional harmfulness (playing the wind instruments, "aggressive" professions, boxing);
- insufficient level of hygiene of cavity of mouth by a patient;
- in addition, it should be remembered that compos can not be combined with an eugenol, phenol, Iodoformium and other matters which have a phenic ring in composition the molecule, as these matters violate the process of polymerization of composite matrix.
### VI. Plan and organizational structure of employment

<table>
<thead>
<tr>
<th>№ п/п</th>
<th>Basic stages of employment, their functions and maintenance</th>
<th>An educational purpose is in the levels of mastering</th>
<th>Methods of control and teaching</th>
<th>Materials of the methodical providing</th>
<th>Raspredelenie of time (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>I. Preparatory stage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Organizational measures</td>
<td>–</td>
<td>Greeting, verification of presence of students and necessary educational materials, original appearance etc</td>
<td>Academic magazine</td>
<td>2 minutes</td>
</tr>
<tr>
<td>2</td>
<td>Raising of educational aims and motivation</td>
<td>–</td>
<td>–</td>
<td>&quot;Educational aims&quot;, &quot;Actuality of theme&quot;</td>
<td>2-3 minutes</td>
</tr>
<tr>
<td>3</td>
<td>Control of initial level of knowledges, skills, abilities:</td>
<td></td>
<td></td>
<td></td>
<td>20 minutes</td>
</tr>
<tr>
<td></td>
<td>3.3. Testimonies and contra-indications of stopping of carious cavities composition materials of light polymerization.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3.4. Stages and features of work with composition materials of light</td>
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</tbody>
</table>
### II. Basic stage

<table>
<thead>
<tr>
<th>4</th>
<th>Formings of professional skills and abilities:</th>
<th>90 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. To do the correct choice of material depending on the class of carious cavity on Bleku</td>
<td>III, IV</td>
<td>Method of forming of abilities: the professional training is in the decision of offtype clinical situations.</td>
</tr>
<tr>
<td>4.2. To shade stopping material with the use of colour scales.</td>
<td></td>
<td>Algorithm for forming of professional abilities. Plaster casts, equipment. Text offtype situational tasks. Reference maps (professional algorithms) for forming of new professional abilities.</td>
</tr>
<tr>
<td>4.3. To capture skills of therapeutic manipulations during work with composition materials of light polymerization.</td>
<td></td>
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</tbody>
</table>

### III. Final stage

<table>
<thead>
<tr>
<th>5</th>
<th>Control and correction of level of professional skills and abilities.</th>
<th>III</th>
<th>Individual control of skills or their results. Decision of offtype situational tasks, test control.</th>
<th>Job performances. Text situational tasks of the IV levels. Tests of the IV levels.</th>
<th>20 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Working out the totals of employment (theoretical, practical, organizational).</td>
<td>–</td>
<td>Evaluation of success of student (diagnostics of level of knowledges, skills and abilities).</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Home task</td>
<td>–</td>
<td>–</td>
<td>Reference map for independent work with</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>literature.</td>
<td></td>
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</tbody>
</table>
VII. Materials of the methodical providing of employment

VII.1. Control materials for the preparatory stage of employment

VII.1.1. Theoretical questions (?-II)

1. Физико-механические properties of composition materials of light polymerization.
4. Stages and features of work with composition materials of light polymerization.

VII.1.2. Tests (?-I)

1. What basic компоненты of the system of initiation of polymerization of composition material of light polymerization:
   A. ions of oxygen and peroxide of benzoyl;
   B. free радикалы and камфарохинон;
   C. free радикалы and peroxide of benzoyl;
   D. камфарохинон and tertiary amines;
   E. ions of oxygen and камфарохинон?
   Answer: D

2. As necessary to bring in stopping composition material of light polymerization in a carious cavity at its stopping:
   A. by small portions, grinding in to the walls;
   B. by small portions;
   C. by slanting layers;
   D. by 1-2 portions;
   E. by horizontal layers?
   Answer: With

3. Why stopping it is necessary necessarily to polish from composition material:
   A. as a result of presence on its surface of пигментированного layer;
   B. as a result of presence on its surface ингибитированного oxygen слоя;
   C. as a result of presence on its surface of hybrid layer;
   D. as a result of presence on its surface of the smeared layer;
   E. as a result of presence on its surface of hard-cured layer?
   Answer: In

4. What substantial sign of the адгезивных systems of fourth-generation:
   A. modify the smeared layer of dentine;
   B. form the smeared area in a dentine;
   C. form a ингибитированную oxygen area;
   D. праймер and adhesive is combined in one bottle;
   E. form a hybrid area in a dentine?
   Answer: E
5. What basic lacks of фотокомпозиционных stoppings materials:
   A. have high polymerization усадку;
   B. have a high heat-conducting;
   C. have low polymerization усадку;
   D. have considerable solubility in water;
   E. have a high level of elimination of surface of stopping?

Answer: And

6. Мининаполненые композ contain particles:
   A. 8-12 мкм and 0,04-0,1 мкм;
   B. 8-12 мкм;
   C. 1-5мкм;
   D. 0,04 мкм-0,1 мкм;
   E. 20-22 мкм.

Answer: C.

7. Макроприход композ have particles:
   A. 1-5 мкм and 0,04-0,1 мкм;
   B. 8-12 мкм and 0,04-0,1 мкм;
   C. 0,04- 0,1 мкм;
   D. 1-5 мкм;
   E. 20-22 мкм.

Answer: A.

8. Макроприход композ it is better to use for:
   A. pressurizing of fissур;
   B. stoppings of cavities I class;
   C. of stopping of cavities III class;
   D. stoppings of cavities of the V classes;
   E. stoppings of cavities on the vestibular surface of frontal group of teeth.

Answer: B.

9. To the lacks of composition materials attribute:
   A. solubility is in a mouth liquid;
   B. polymerization усадка;
   C. heat-conducting;
   D. адгезия;
   E. bad aesthetics.

Answer: B.

VII.1.3. Tests (?- II)

A. Какие chemical matters and medicines can ингибитировать polymerization of composition materials:
   A. chlorhexidine;
   B. eugenol;
   C. alcohol;
   D. фурацилин;
   E. peroxigen;
F. метрогил;
G. there are not such matters.
Answer: B, C, D.

V. Kakie the groups of materials are included in the system of composition materials:
A. dentine;
B. адгезивная system;
C. materials for defence of mash;
D. silicate цементы;
E. basic composition material;
F. materials for insulating gaskets.
Answer: B, C, E, F.

S. Naydite the logically constrained pair between the size of particles of material and name of group:

<table>
<thead>
<tr>
<th>Size of particles</th>
<th>Name of group of composition material</th>
</tr>
</thead>
<tbody>
<tr>
<td>And. 8-45 мкм, sometimes - to 100 мкм</td>
<td>I. Mininapolnennye compos</td>
</tr>
<tr>
<td>V. Razmer particles of 1-5 мкм</td>
<td>II. Mikrogibridnye compos</td>
</tr>
<tr>
<td>S. Razmer particles of 0,01-0,1 мкм</td>
<td>III. Hybrid compos</td>
</tr>
<tr>
<td>D. Ot 0,04 to 1 мкм (middle size - 0,5-0,6 мкм)</td>
<td>IV. Macrogap-filling compos</td>
</tr>
<tr>
<td>E. Mixture of particles of наполнителя of different sizes (0,04-5 мкм) and different chemical composition</td>
<td>V. Nanonapolnennye compos</td>
</tr>
<tr>
<td>F. Particles of наноразмеров from 20 to 75 нм</td>
<td>VI. Mikronapolnennye compos</td>
</tr>
</tbody>
</table>

Answer: And - IV; In - I; With - VI; D - II; E - III; F - V.
### VII.2. Materials of the methodical providing of the basic stage of employment

#### VII.2.1. Reference map for forming of professional abilities and skills

<table>
<thead>
<tr>
<th>Educational task</th>
<th>Sequence of implementation of actions at a capture skills</th>
<th>Warnings on self-control</th>
</tr>
</thead>
</table>
| To capture the technique of stopping of carious cavity composition material of light polymerization. | **1. Cleaning of surface of tooth.**
Before preparing not containing butter and fluorine clear all surfaces of the stopped tooth and nearby teeth pastes. | The surface of tooth is not painted at the use of indicators of dental raid. A failure to observe of this stage results in errors at determination of color of restoration. |
| | **2. Determination of necessary color of stopping material.**
By a colour scale (the surfaces of tooth and scale must be water-wets). Conduct the choice of color at daily illumination. | The color of restoration must coincide on tone with the restored tooth, nearby teeth and teeth-antagonists. |
| | **3. Preparing of carious cavity.**
Advantages of application of composition materials of light polymerization:
- possibility of the sparing preparing
- the complete delete of pigmenteirovanych areas of hard fabrics which can detain light during polymerization and conduce to the incomplete hot-setting of material in these areas is desirable. | Conduct preparing of cavity with the maximal maintainance of the unstaggered fabrics of tooth, following the method of the "prophylactic stopping". An edge of enamel can be:
- formed according to natural direction of enamel prisms (his increase improves aesthetic restorations and усилиют fixing);
- unformed. Does not recommend to form the slant of enamel at stopping of carious cavities I and the II classes - the skim of compo of occlusal surface of |
4. **Isolation of the operating field.**
Isolation of tooth from a mouth liquid (saliva), gingival liquid and blood by waddings rollers or коффердама, слюноотсоса.

5. **Medicinal treatment and drying of carious cavity.**
Abundant washing a cavity by the distilled water or 0,02% by water solution of chlorhexidine, water-air спреем and drying of the stomatological setting a "pistol".

7. **Staining.**
Inflict acid gel a flatter, brush or applicator and evenly distribute on all surface. Display of etchant gel – 15-30 п. wash off acid running water (15-20 with) and dry out the surfaces of cavity.

8. **Application of the адгезивной system.**
Apply the адгезивную system in obedience to instruction of firm-producer.
Composition materials of light polymerization usually produce in opaque syringes (contain 3-4 gs) or in the special capsules (компьюлах) which contain 0,2-0,25 gs of compo. Squeeze out the necessary amount of material from a syringe on the special plate (which recommend to cover the special transparent lid of red color) and bring in instruments by small portions in a carious cavity. At the use компьюл (capsules) material from them squeeze out directly in a cavity by the special adaptation – «пистол». Fotopolimery bring in a cavity layer with a thickness слоя on instruction. It is necessary for complete light polymerization of material and prevention of his considerable polymerization усадки.
At filling of cavity it is necessary to aspire not to horizontal (in relation to the bottom of carious cavity), but to more vertical, at an angle to the location of layers of material, disposing them nearer to the walls of cavity.
Conduct light polymerization a lamp from the side of wall (more precisely through it) of cavity which this portion of material must register to.
Lay on next portion from the side of opposite wall, that allows to attain the optimum attaching of material to the walls of cavity.
Such method of light polymerization of фотокомпозита got the

| Занятие №13 | Longevity, durability and reliability of restoration, depend On the exact and careful observance of all stages of treatment the адгезивной system. |

The brought in portion of compo must sufficiently easy glued to the surface of bodied adhesive.

Ray of polymerization lamp in the first 10-20 with it is necessary to send to material through an enamel, and then - from the nearest to stopping distance. At the use of composition materials with редуцированной усадкой the rule of the directed polymerization it is possible to ignore.

Fotopolimernye compos are lately created with the improved system of polymerization which guarantees complete polymerization of material regardless of direction of ray of light of фотополимерной lamp.

To the rightness of connection of bodied layers of material absence of light bars testifies in the layers of material and monolithic nature of
name of the directed polymerization.

<table>
<thead>
<tr>
<th>10. Treatment of stopping:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- contour treatment (macrocontouring) is a correction of stopping taking into account occlusal correlations. Conduct it the мелкоабразивными diamond (yellow ring) coniferous forests with the air-water cooling. Conduct control of occlusal correlations by a copypaper and probe.</td>
</tr>
<tr>
<td>- микроконтурирование is smoothing out of transition &quot;stopping-tooth&quot; and giving a smoothness to stopping. 10-12-гранными hard-alloy финирами or мелкоабразивными diamond coniferous forests of 8-15 мкм conduct (white ring on the coniferous forest).</td>
</tr>
<tr>
<td>- polishing and polishing is giving stopping of ideal smooth and shiny surface, carbidic-tungsten финирами conduct, by silicon heads, polishing brushes, pastes, disks and strips (штрипсами).</td>
</tr>
<tr>
<td>- final «light-striking» of stopping (restorations): on completion, polishing conduct finish light polymerization: thus spoil every surface of restoration during 10-20 р.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Postbonding. With the purpose of filling of микротрещин, which arise up on a border a «stopping-tooth» process them the special superficial герметикомй, gap-filling to 30% on weight, for example, «Fortify» (Bisco).</th>
</tr>
</thead>
<tbody>
<tr>
<td>- probe without not caught slides on all surface, including the lines of transition of «композит/твердые fabric of tooth»;</td>
</tr>
<tr>
<td>- «dry brilliance» of restoration (the dried up surface of restoration must have a brilliant kind);</td>
</tr>
<tr>
<td>- restoration must not have superficial and subsuperficial pores;</td>
</tr>
<tr>
<td>- a dental filament (dental флосс) must with effort to be entered in a межзубный interval, slightly to stay too long near an equator, and with effort to hatch, freely sliding on a surface; thus a filament must not break a secret and розволокняться.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. To recommendation a patient.</th>
</tr>
</thead>
<tbody>
<tr>
<td>If conducted treatment under anaesthesia, a patient must hold</td>
</tr>
</tbody>
</table>
back from mastication of hard food or chewing-gum to the complete palinesthesia of soft fabrics in order to avoid their injuring (biting).
In the case of restoration of frontal teeth recommend a patient during days to hold back from smoking and use of products with dyes.
Women it does not follow to use lipstick during 24 hours after restoration.

13. **Control examination of patient, estimation of quality of restoration.**
In 2-3 day after restoration recommend to conduct control examination of patient with the purpose of estimation of efficiency of treatment (cosmetic and functional results of restoration) and exposure of defects, not noticed during making.
VII.3. Control materials for the final stage.

VII.3.1. Classification test (?-IV).

Conduct comparative description of materials of chemical and light polymerization:

<table>
<thead>
<tr>
<th></th>
<th>Materials of chemical polymerization</th>
<th>Materials of light polymerization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymerization усадка</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability of color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polymerization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colour gamut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homogeneity and viscosity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is a comfort in-process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time, expended in stopping</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: descriptions of materials are inscribed by a student.

Answer:

<table>
<thead>
<tr>
<th></th>
<th>Materials of chemical polymerization</th>
<th>Materials of light polymerization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymerization усадка</td>
<td>1,0 – 5,68%</td>
<td>0,5 – 2,0%</td>
</tr>
<tr>
<td>Stability of color</td>
<td>Darkening of stopping, which is</td>
<td>High firmness of color.</td>
</tr>
<tr>
<td></td>
<td>related to the remain of amine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>connections.</td>
<td></td>
</tr>
<tr>
<td>Polymerization</td>
<td>Complete, not controlled and</td>
<td>Heterogeneous, controlled,</td>
</tr>
<tr>
<td></td>
<td>directed to the center.</td>
<td>directed to the source of light.</td>
</tr>
<tr>
<td>Colour gamut</td>
<td>Limited, is not in a position of</td>
<td>Wide choice of tints, exact</td>
</tr>
<tr>
<td></td>
<td>exact choice of the coloured tints.</td>
<td>choice.</td>
</tr>
<tr>
<td>Homogeneity and</td>
<td>A change is possible during</td>
<td>Does not change during</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Занятие №13

<table>
<thead>
<tr>
<th>Viscidity</th>
<th>Preparation, at the increase of ambient temperature – hardens quick.</th>
<th>Work, at the increase of temperature – viscosity goes down.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Relatively low</td>
<td>Relatively high</td>
</tr>
<tr>
<td>There is a comfort in-process</td>
<td>Less easy-to-use: limitation of working hours of material within the limits of 1,5-2 mins</td>
<td>Easy-to-use: controlled polymerization (in moment necessary a doctor, after the conducted design of material).</td>
</tr>
<tr>
<td>Time, expended in stopping</td>
<td>Relatively small</td>
<td>Large enough</td>
</tr>
</tbody>
</table>

VII.3.2. Offtype situatioonal task (?-IV).

Sick P. treatment of caries was three month back conducted in a 16 tooth. Stopping was put from фотореактивного material of "Herculite". stopping fallen out 2 day back. Name possible reasons of fall of stopping and desirable prophylaxis for avoidance of this complication in future.

Answer:
Reasons:
- application at treatment of cavity of drastic antiseptics;
- application of pastes, containing an eugenol;
- not well to do proper dryness of the operating field;
- violation of method of stopping;
- wrong polymerization;
- use of materials with overdue shelf-life.
Preventives:
- at application of pastes which contain an eugenol, the process of polymerization is violated;
- providing of dryness of the stopped cavity by коффердама, слюноотсоса;
- severe accordance pointing of producer;
- application of the directed polymerization, techniques of "soft start". During polymerization it is necessary to adhere to time, indicated in instruction of application of material;
- it is necessary to watch after terms and shelf-lives of material.

VII.3.3. Situatioonal tasks (?- II).

Task №1. A patient, 25 years, grumbles about a defect 11 tooth which arose up as a result of trauma. Objectively: absent corner of crown 11 tooth within the limits of cloak dentine. What class of carious cavity on Bleku? What material befits for renewal of corner of crown of the tooth?
Task №2. To the patient 28 years for restoration 11 and 12 teeth a микронаполненный компо was used. There was отлом of restoration in a week. What an error of doctor is in? What stopping material it is better to choose in this case?

Answer. Stopping material is unright select. It is necessary to use a totally gap-filling компo with the technique of ламинации a микронаполненным компо.

Task №3. A patient appealed with complaints about a carious cavity in a 47 tooth, which arose up about year that. Objectively: on a masticatory surface 47 tooth carious cavity within the limits of cloak dentine. What class of carious cavity on Bleku? What stoppings materials can be used in this case?


VII.4. Materials of the methodical providing самоподготовки of students

VII.4.1. Reference map for organization of independent work of students with educational literature on the topic:

«Composition materials of light polymerization. Kinds, properties, testimonies to application. Features of the stages of stopping»

<table>
<thead>
<tr>
<th>Educational task</th>
<th>Pointing</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>To learn:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Name физико-механические properties of composition materials of light polymerization.</td>
<td>To describe физико-механические properties of composition materials of light polymerization</td>
<td></td>
</tr>
<tr>
<td>3. Name testimony and contra-indication to stopping of carious cavities by composition materials of light polymerization.</td>
<td>To offer testimony and contra-indication to stopping of carious cavities by composition materials of light polymerization.</td>
<td></td>
</tr>
<tr>
<td>4. Name the stages and features of work with composition materials of light polymerization.</td>
<td>To offer the stages and features of work with composition materials of light polymerization.</td>
<td></td>
</tr>
</tbody>
</table>
VIII. Literature on the topic of employment

Basic

Additional
Electronic sources