Poltava State Medical University
Department Propaedeutics of Orthopedic Dentistry
stomatolog-umsa.poltava.ua

Lecture

Indications and clinical and technological stages of manufacturing artificial crowns

Lecturer: docent Kozak RV

Plan lectures

1. Drugs to reduce dentin sensitivity.
2. Classification artificial crowns.
3. Clinical and laboratory stages of manufacturing various artificial crowns.
4. Clinical and laboratory stages production different veneers.

***Artificial crown** is a fixed orthopedic structure that covers the clinical crown of a natural tooth and restores its anatomical shape, size and function.*

General principles of tooth preparation

Preparation - an important stage of prosthetics, the quality of which depends on the success of the work performed as a whole.

Dissection as a process is a surgical intervention on the hard tissues of the tooth with abrasive tools.

As a result of preparation, a certain layer of hard tissue is removed and remains **injured surface.**

Dissection should be carried out taking into account the safety zones **Abolmass N.G.** and **Gavrilov EI (front section)** and for **Klyuyev BS (lateral areas).**

Do not forget about the slightest trauma to the gingival margin in the cervical region, as well as the constant use of antiseptic solutions for rinsing the mouth.

Theories of pain during dissection dentin

- Classic (neurogenic) theory.
- Theory of vascular receptors (Fomin's theory).
- Theory odontoblast degeneration.
- Hydrodynamic theory (theory Brems tröm).

Drugs to reduce dentin sensitivity

The problem of dentin sensitivity has led to the creation of a whole class of drugs to eliminate the hypersensitivity of the teeth.

These materials have different chemical nature, mechanism of action and even indications for use, but have one purpose, which allows you to combine them into one group and name **desensitizers**.

Indication to application desensitizers and dentin-protectors in orthopedic dentistry

Desensitizers and dentin protectors - drugs designed to protect the tissues of prepared teeth with different mechanisms of formation of barrier functions.

Despite the apparent similarity (drugs in the form of a solution) - applied to the surface of the prepared dentin with a brush, the mechanism of their protective action is significantly different, and the indications for their use also differ.

DESENSITIZERS

Desensitizers - drugs that cause obstruction dentinal tubules through the formation of a biological seal inside it (from inorganic crystals or conglomerates of protein molecules).

Mechanism of action desensitizers:

- cause the deposition of protein molecules from the cytoplasm of the disclosed odontoblasts, form a conglomerate only inside dentinal tubules;
- the formation of various crystalline substances, forming them both inside the tubules and on the surface of the dentin.

Unfilled desensitizer,,
which contains NO, without glutaraldehyde (1 group)

Preparations 1st groups (the most numerous) contain in to his warehouse NO - hydroxyethyl methacrylate.

Properties NO:

- **acts as a wetting agent;**
- **prevents decline collagen fibers;**
- **creates the necessary humidity of dentin.**

Except NO,, preparations this one groups contain water, a third component is usually anywhich antiseptic or fluorine.

Indication to application the first groups desensitizers:

- ***Non-removable prostheses based on alive teeth (after preparation and before cementation temporary or permanent crowns, adhesive prostheses, tabs, overlays, veneers).***
- ***Increased cervical sensitivity.***
- ***Leveling root.***

Shopping brands

the first groups desensitizers:

1. HurriSeal,, firm Beautiful Pharmaceuticals LP, USA.
2. AquaPrep F firm BISCO, USA.
3. Hemaseal & Cide Desensitizer firm Advantage Dental Products, Inc.. USA.

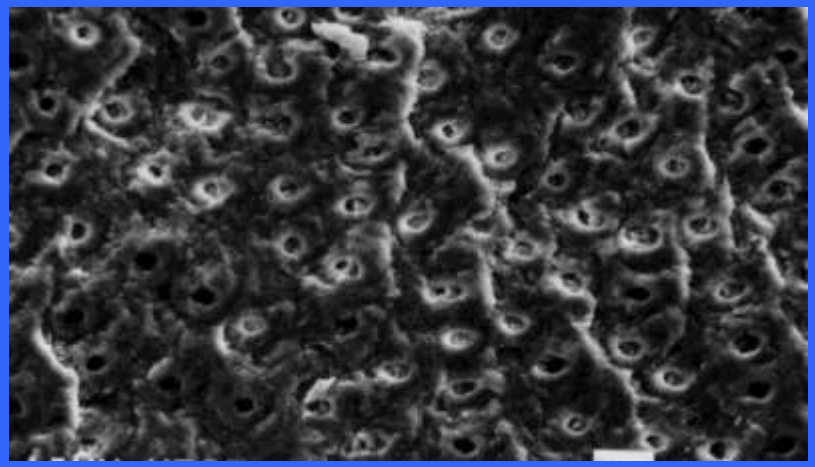
Unfilled desensitizer,,

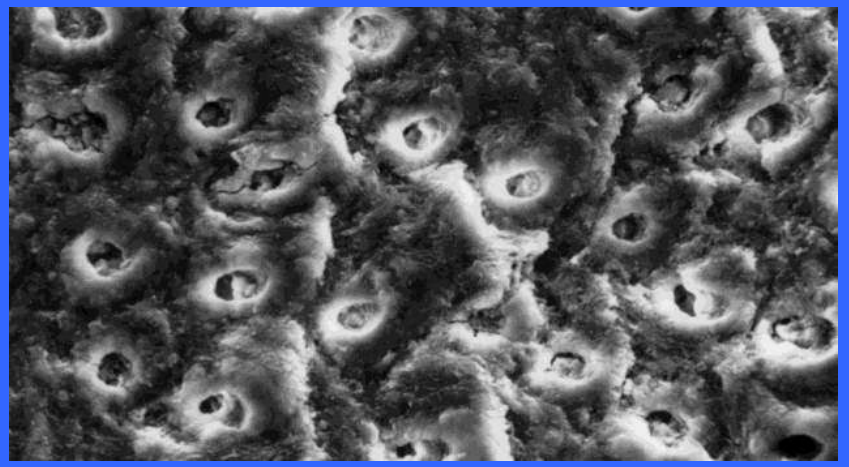
contains NO, 3 glutaraldehyde

Basic component - glutaraldehyde.

Appointment glutaraldehyde:

- ***causes precipitation (coagulation) proteins in dentinal tubules.***
- ***depressed growth bacteria.***





Dentin surface after treatment
unfilled desensitizer
with glutaraldehyde from various manufacturers

Indication to application:

- *at elevated cervical sensitivity;*
- *at postoperative sensitivity after preparation under crowns at sufficient thickness dentin;*
- *at cementation zinc crownsphosphate cement.*

Trace avoid application if thickness dentin too small.

Shopping brands:

- Acting Desensitizer company Heraeus Kulzer,, Acting Desensitizer firm Heraeus Kulzer,, **Germany**.
- Quadrant FiniSense firm CAVEX, **Holland**.
- Quadrant FiniSense company CAVEX,, **Holland.**

Full desensitizer,,
contains NO (2 group)

Preparations contain nanofillers **on basis compomer** or **ormokera.**

Except moreover, to their composition included **fluorides and antiseptic (triclosan),** what contributes reduction formation dental plaques.

Indication to application

- ***increased sensitivity naked necks teeth.***

Shopping brands:

- Admira Protect firm VOCO, Germany.
- Seal & Protect firm Dentsply.

Desensitizers,, what contain PAR and weak acid (3 group)

Desensitizers this one groups act:

- how wetting agent before using adhesive (contains South Africa);
- as an antiseptic;
- cleaned dissecting surface (contains weak acid);
- for prevention caries (contains fluorides).

Shopping brands:

- Admira Protect company VOCO,, Germany.
- Seal & Protect company Dentsply.

Desensitizers,, which forms complex salt on surface dentin (4 group)

Desensitizers this one groups:

- *form solid film with macrocrystals on surface dentin;*
- *block movement liquid in tubules.*

They not contain No NO, No glutaraldehyde,, No anywhose toxic substances,, and therefore:

- not cause irritation gum tissue;
- not require application special protective means;
- not require activation light and treatment dentin.

Indications for use:

- ***Non-removable dentures based on live teeth (after preparation and before cementation of temporary or permanent crowns).***
- ***Increased cervical sensitivity.***
- ***Delete over- and subgingival dental stone,, alignment root.***
- ***Bleaching teeth.***

Shopping brands:

- Pain Free firm Plot,, USA.
- D /Sence 2 firm Centrix,, USA.
- Overgrown firm Cetylite Industries Inc.,, USA.
- rm Amalga tralia.

Great diversity desensitizers testifies about that what universal the drug does not exist. The doctor necessary do choice in dependencies from clinical situations:

General indication to application:

- under restoration with composite or glass ionomer materials better use preparations with 1 and 3 groups;
- at treatment hypersensitivity naked necks teeth better apply preparations of 2 and 4 groups;
- at elimination hypersensitivity after preparation alive teeth under crowns better use preparations of 1 or 4 groups.

***Allergic status doctor and patient** (at known allergic reactions on the monomer at the doctor or patient) preparations 1 groups better not use.*

Decentizers shown apply at once g after end operations preparation teeth by conditions:

- **removal enamel-dentin plots;**
- **autopsy dentinal tubules with located they shoots odontoblasts.**

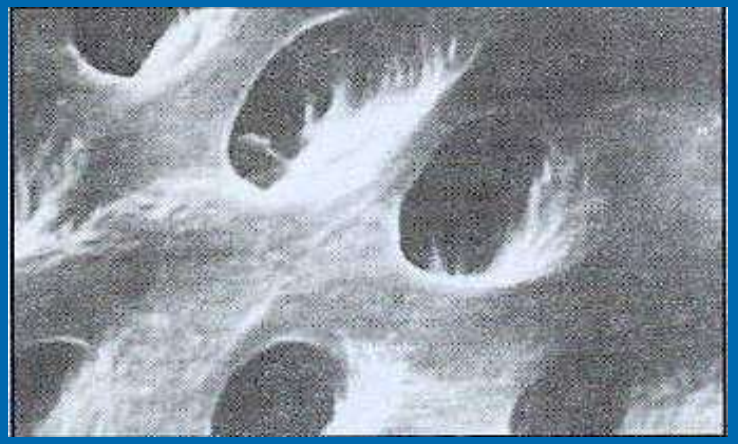
IN this situations exist threat development "phenomenon migration nuclei odontoblasts in dentinal tubules".

For the first time this histomorphological effect was described K. Langeland.

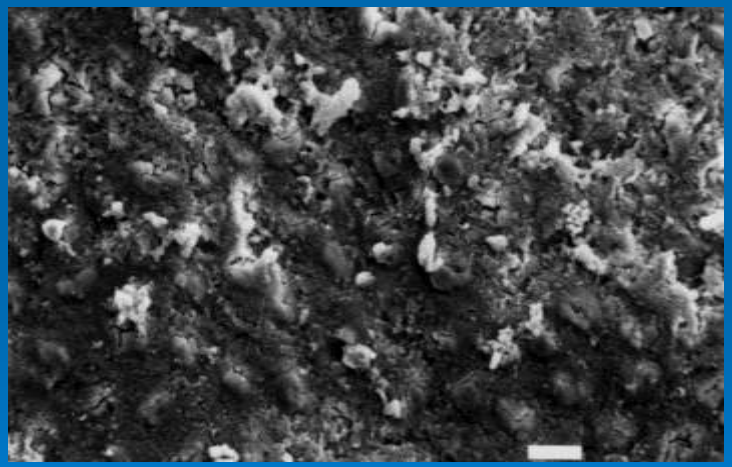
Dentine-protectors - it film-forming preparations on basis natural or synthetic resins. **Mechanism actions.** After evaporation solvent on surface dentin is formed thin resinous film.

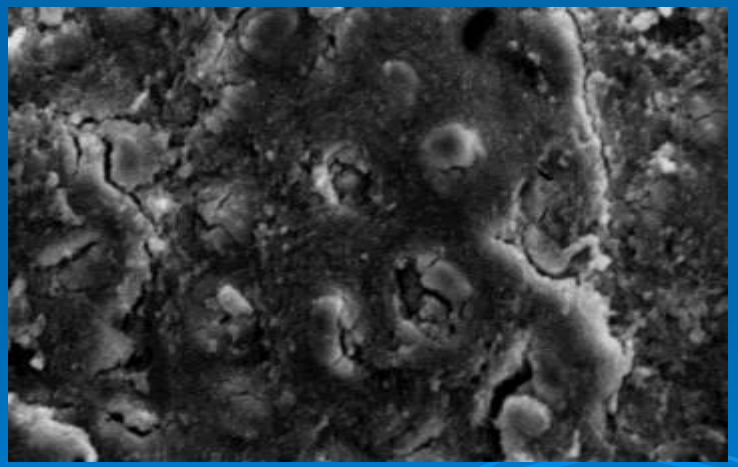
Application: for warning irritation pulp orthophosphoric acid at constant fixation artificial zinc crownsphosphate cement.

Surface dentin after poisoning. Well visibleseparate collagen fibers



Burned collagen fibers after drying the dentin





Dentin surface after treatment with unfilled desensitizer without glutaraldehyde

Classification artificial crowns

1. For appointment:

- ***restorative - are applied for restoration anatomical forms natural teeth;***
- ***supporting - use for bridge support prostheses;***
- ***fixing - for fixing temporary and permanent devices and prostheses (partial removable lamellar, clasps prostheses or special devices (orthodontic,, maxillofacial and those.).***

2. By design:

- ***full - cover all surface clinical tooth crowns (including hip crowns, crowns with a pin and telescopic);***
- ***cover only part clinical tooth crowns (half-crowns,, three-quarters,, equatorial).***

Classification artificial crowns

3. By method production:

- **stamped;**
- **cast (seamless);**
- **milling;**

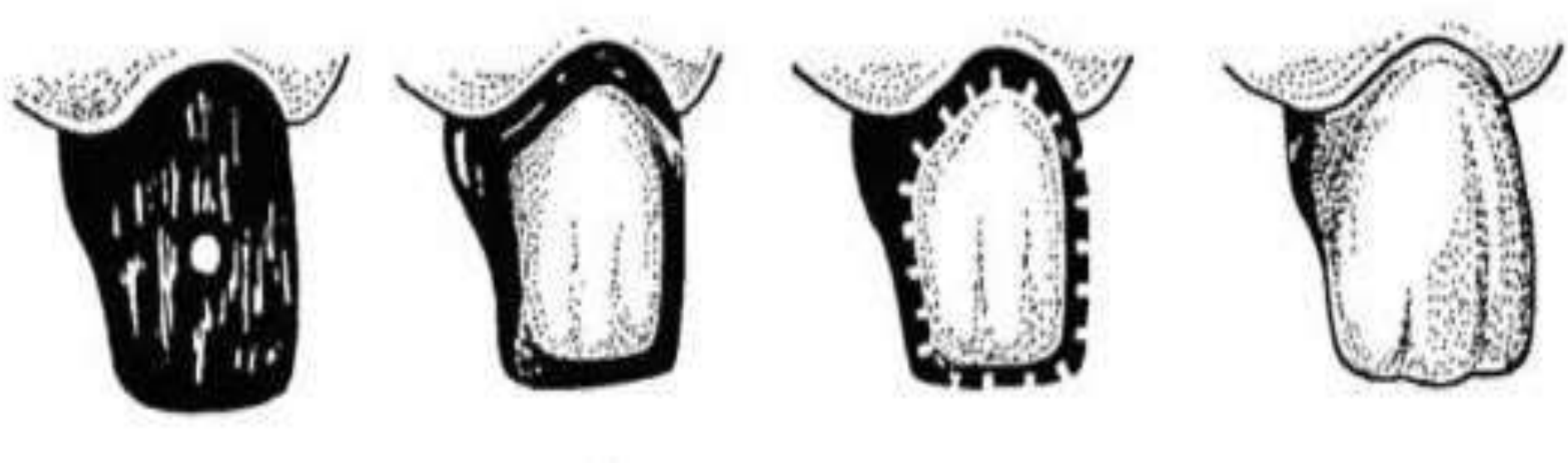
4. For material:

- **metal (gold,, steel,, silver-palladium and etc..);**
- **non-metallic (plastic,, photopolymer,, porcelain);**
- **combined (metal + plastic, metal + photopolymer, metal + porcelain).**

5. For duration actions:

- ***temporary - for protection dissected teeth from impact external environment,, warning development inflammatory changes pulp,, maintenance medicinal substances and fixation different devices on period carrying out special preparatory measures before prosthetics);***
- ***permanent - apply for bridge support prostheses or coating supporting teeth before manufacturing partial removable prosthesis with clamp fixation).***

CROWNS WITH STAMPED FRAME (for Belkin)



PLASTIC CROWNS

Plastic crowns give advantage at:

- **Recovery color,, forms and functions frontal groups teeth,, violated because of pathological changes solid tissues, depulped,, injury,, anomalies forms and position.**
- ***Widely applies how temporary construction at prosthetics porcelain and metal-ceramic crowns.***
- ***Deep overlap front teeth.***
- ***It is possible use at prosthetics incisors lower jaws, when no conditions for grinding large layer solid tissue.***
- ***At diseases periodontium, especially when availability low crowns or depulped teeth,, maybe perform function temporary or constant tires.***

Contraindication:

- **Children's and youthful age, when thickness solid tooth tissue insignificant.**
- **Sharply expressed compensated form pathological abrasion.**
- **Bruxism.**
- **Deep bite.**

Clinical and laboratory stages of making plastic crowns

1. Anesthesia.

2. Preparation of teeth with a ledge or without a ledge - depends on the specific clinical picture, the degree of destruction of the tooth and the location of the defect, the height of the crown and its shape.

3. Removal of a two-layer working imprint and an auxiliary imprint from the opposite jaw.

Clinical and laboratory stages of making plastic crowns

4. Obtaining models.
5. Modeling of a crown with wax.
6. Plastering in the ditch of the model, including modeled tooth together with adjacent teeth.
7. Replacement of wax with plastic.
8. Crown processing and polishing.
9. Fixation of the crown with cement on the tooth in the patient's mouth.

Plastic crown

Solid crowns

Material - base and precious metals.

Manufacturing method - precession casting.

Group affiliation - molars of the upper and lower jaws.

This design has good strength parameters, but at the same time "suffers" aesthetics.

Solid crowns

Technology of making solid crowns:

- ***Tooth preparation, obtaining a two-layer working impression and alginate auxiliary imprint;***
- ***Production of a collapsible model;***
- ***Modeling of wax reproduction, crown casting;***
- ***Fitting and fixing the crown in the mouth.***

Solid cast crowns

Solid crown for
multi-rooted teeth
for V.M. Kopeikin

Fraserbath crowns

Milled temporary crowns have a fairly high accuracy of manufacture due to the use of modern comp'ютерних technologies.

Material:

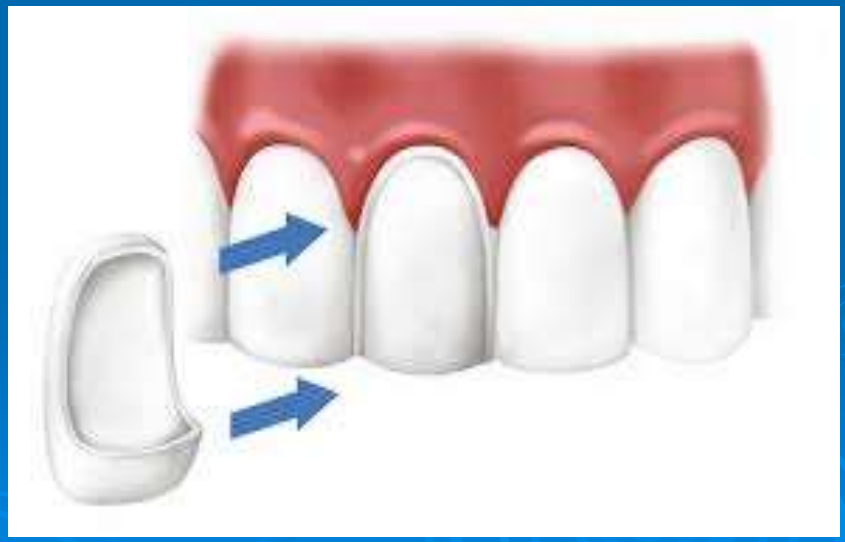
- **alloys on titanium based or cobaltochrome alloys *(for facing by ceramic weight).***
- ***alloys based on alumina or dioxide zirconium (without ceramic lining)*.**

Fraserbath crowns

A novelty in the field of orthopedic dentistry is using *gum mask technology.* When using this method is made *silicone model with the maximum accurate reproduction shape and size m'which gum tissue.*

VENEER

Veneers **- these are thin porcelain or composite plates, which are placed on the teeth to correct the shape and color of natural teeth.**



Indications for the manufacture of veneers

1. ***Elimination of aesthetic defects of teeth:***

- **diasma and three between the teeth;**
- **violation of the shape of the teeth;**
- **wedge-shaped defect;**
- **progressive abrasion of teeth;**
- **spots and darkening on the enamel surface;**
- **cracks and chips of tooth enamel.**

Materials and technology

Veneers come in different types - ***composite*** and ***ceramic***.

Composite veneers can be made:

- **in a direct way** (in the dentist's chair in one visit);
- **indirectly** (in the dental laboratory).

Ceramic veneers

Made of different types of ceramics:

- **most often used *feldspar ceramics (porcelain) and glass ceramics*;**
- **less often made of blocks *dioxide zirconium*.**

Ceramic veneers produced only in conditions dental laboratory.

Veneers from feldspar ceramics

This type of pottery allows *perfectly mimic the optical properties of the tooth* (shade and translucency of enamel). They have a lot*quality aesthetic properties*.

Porcelain veneers are made in three laboratory ways:

1. ***Method of layer-by-layer application of porcelain mass***, when after application of each layer of porcelain carry out sintering of porcelain at a high temperature in the special furnace (flexural strength **50-75 MPa**).
2. ***Method of pressing porcelain under conditions of high pressure and temperature (maximum transparency).***
3. Method c'appeared relatively recently it is ***milling of blocks of feldspar ceramics*** (for example, blocks "Vita Mark 2") on devices of type CEREC (CAD / CAM technology) (flexural strength - **about 150 MPa**).

Veneers from IPS Emax glass ceramics (manufacturer Ivoclar Vivadent)

It consists of crystals *lithium disilicate* (has the same coefficient of transparency as natural tooth enamel).

There are 2 types of IPS Emax material:

1. *Material Emax PRESS*- for making veneers. They are the strongest (index of flexural strength near*400 MPa*), which almost completely eliminates the risk of chips. From this material are made so-called"Thin veneers"which have a thickness of all *0.3-0.4 mm* (standard ceramic veneers are thick *0.6-1.0 mm*).

Veneers from IPS Emax glass ceramics (manufacturer Ivoclar Vivadent)

2. ***Material Emax CAD*** **- is issued in the form of special blocks for milling on machines with software control of type CEREC (CAD / CAM technology).**

The strength of veneers made of Emax CAD material is also very high - *near 360 MPa*, but veneers can be made from this material *not thinner than 0.6 mm*.

Veneers from zirconium dioxide

Made from blocks of zirconium dioxide by them *milling (CAD / CAM technology)*.

Strength such veneers are highly dependent on type of zirconium dioxide blocks:

1. Blocks of the so-called сирого м'soft zirconium dioxide (bending strength will be around 900 MPa), but it will be bad aesthetics that pov'due to the lack of transparency of the material and its milky white color.
2. Blocks zirconium dioxide with the addition of yttrium - veneers at the same time are translucent, have good aesthetics, but their transparency on a bend will be already less (around 550 MPa).

Luminaires

These are ultra-thin ceramic veneers patented by the company *Cerinate (USA),* called Lumineers.

This type of veneer is made exclusively in the laboratory of Cerinate, which is located in the state California (USA).

The advantages of this type of veneers over the classic ones are:

- ***non-invasiveness*** **- it is not necessary to dissect hard tissues of teeth;**
- ***increased aesthetics*****in the style of the so-called "Hollywood smile";**
- ***possibility of removal and replacement of the established veneers without damage of fabrics of teeth.***

It is not recommended to use in cases of "spotted" or multi-colored enamel as the luminaire is transparent.

Advantages of veneers

- ***Production speed*** **(for composite veneers, one visit is enough).**
- ***Durability*****, especially in the manufacture of ceramic veneers.**
- ***Excellent cosmetic effect*** **due to the absence of metal and other opaque materials.**
- ***Modern veneers let light through*****because the teeth have a natural appearance.**

Disadvantages of veneers

- ***Low strength*, especially composite veneers.**
- ***She had a masking ability* with a significant change in tooth color.**
- ***High price* ceramic veneers.**
- ***Enamel preparation is irreversible*. In case of complete removal of veneer there is a need for additionalrestoration tooth.**

THANK YOU FOR LISTENING!!!