POLTAVA STATE MEDICAL UNIVERSITY
THERAPEUTIC STOMATOLOGY PROPAEDEUTICS CHAIR

CARIES TREATMENT

Lecture for 3-rd year students
of international faculty

The lecturer: PhD in Medical Sciences,
Associate Professor
Marchenko Iryna Yaroslavovna

Plan

- Substantiation of a choice of treatment method.
- Remineralized therapy of initial caries.
- Stages of surgical treatment of caries.
- Features of treatment of deep caries. Medical linings: kinds, structure, the action mechanism. One and two-visites treatment method.
- The general treatment of plural caries.

Caries treatment is possible in 2 ways:

- Conservative (remineralized therapy)
- Surgical (preparation with the subsequent restoration of defect)

Conservative treatment

- is possible only at initial caries when still there is no defect of enamel. Remineralization is possible only at certain degree of defeat of tooth tissues. Reversibility of defeat is defined by safety of an proteins matrix. If it is kept, owing to inherent properties of enamel, it is capable to adsorb and incorporate of ions Ca and phosphate.

Initial caries

At initial caries (a stage of a white stain) there is a partial loss of mineral substances by enamel (demineralization), free microspaces are formed in a zone of the maximum damages (the subsuperficial and central layer).

The volume of microspaces is enlarged from 14% to 20-25 % at norm of 1 %. The increased permeability of enamel causes possibility of penetration into a site of the demineralization ions Ca, phosphates, fluorides from a saliva or artificial remineralized solutions with formation in it of crystals hydroxyapatites and filling of microspaces.

Conservative treatment

- Preconditions: it is proved, that enamel is permeable as from a pulp, as from an oral liquid. Ions of various substances (first of all F and Ca) can remineralize an enamel). It is necessary to notice, that reconstruction of enamel prisms does not occur, and deposition Ca and F occurs diffusely or in the form of bow-shaped zones.

Remedies for remineralized therapy

1. **Replacing substances which contain minerals:**
   - **Calcium** containing (10 % sol. gluconate Ca, Calcium chloride, lactate Ca , 2,5 % sol. glycerophosphate Ca,

     5-10 % sol. phosphate calcium;
   - **Fluorine** containing (75 % paste of fluoride Na

     (by Lukomsky), 0,4-1-2 % solutions of fluoride Na, “ Фторлак” (varnishes) (5 % - fluoride Na, 40 % - fir balm, 10 % - shellac, 12 % - chloroform, 24 % - ethyl spirit), «Белак F», “Fluor Protector”, “Duraphat”, “Bifluorid 12”, «Белагель Ca/P”, «Белагель F».
   - 1-2 % gel of fluoride of sodium on 3 % an agar
   - 5 % fluoric phosphate-cement
   - 4 % sol. fluoric tin
   - tabl «Витафтор» (Vitaftor)

Remedy for reminiralized therapy

- Deep fluorization by Knappvost (magnesium-fluoric silicate, then suspension high disperse hydroxide Ca. The complete set: a liquid № 1 – typhenfluoride, a liquid № 2 – enamel-hermetic liquid)
- **Strontium** containing : 25 % water sol. strontium chloride, 75 % paste
- **Phosphorus containing** «Фитин» (Fitin) - a mix calcium and magnesian salts plus to 36 % integrally phosphoric acid
- **“Ремодент” (Remodent)** (a complex of 4,35 % - Ca, 1,36 % - P, 0,15 % - Mg, 0,2 % - K, 16% - Na, 30 % - Cl, 44,5 % - organic substances, microcells Mn, F, Cu). Is produced in the form of a white powder from which prepare 1-2-3 % solutions.

2. The remedies interfering adsorption of organic substances:

desorbent;

waterproof film coverings;

hermet liquid ics.

(Surface-active compounds (surfactants) - chemical compounds which can concentrate on the surface between thermodynamic phase to cause reduction of the surface tension).

Methods of introduction :

- Rinsings
- Oral trays (bath)
- Applications of solutions, densely dissolved powder, gels
- Rubbing in (pastes, fluorine disk)
- electrophoresis (active carrying over of medicinal substances ions under the influence of an electric current) (F – from negative electrode - anode)
- Technique of rhythmic galvanising

Technique of restoration of enamel by Leus-Borovskiy

- a tooth surface clean from a debris mechanically, process by 0,5 % -1 % sol. H_2O_2, isolate from saliva, dry up, apply application by the cotton pallet humidified with a solution calcium gluconate for 20 minutes with 4 multiple replacement. Then application of 2-4 % sol. Na_2F for 5 minutes. After ending of procedure it is not recommended to eat and drink during 2 hours.
- Course of treatment is 15-20 applications.
- Efficiency of treatment is defined by reduction of the area or stain disappearance.

OPERATIVE TREATMENT OF CARIES OF TEETH

- Provides to remove pathologically changed hard tissues of a tooth with their subsequent replacement by filling material.

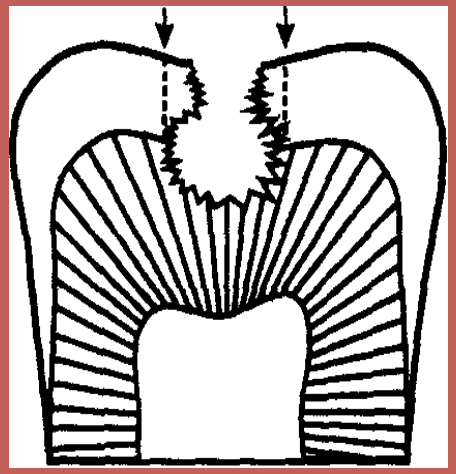
Treatment stages

1. Anesthesia (regime of preparation)
2. Mouth preparation (isolation of work place, remove of a tooth plaque, if necessary – treatment of an inflammation of a gum, parodontitis)

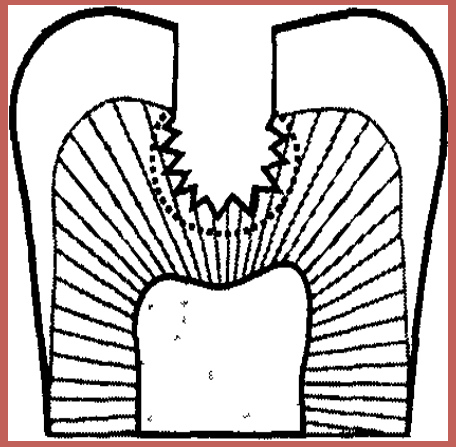
Treatment stages

3. Preparation of caries cavities:
   1) classical;
   2) preparation sub composites;
   3) M.I.- therapy (Minimal Intervention Treatment): tunnel preparation, slot-preparation, Batecave preparation.
   4) ART- techniques; (atraumatic restorative treatment);
   5)«preventive sealing»;

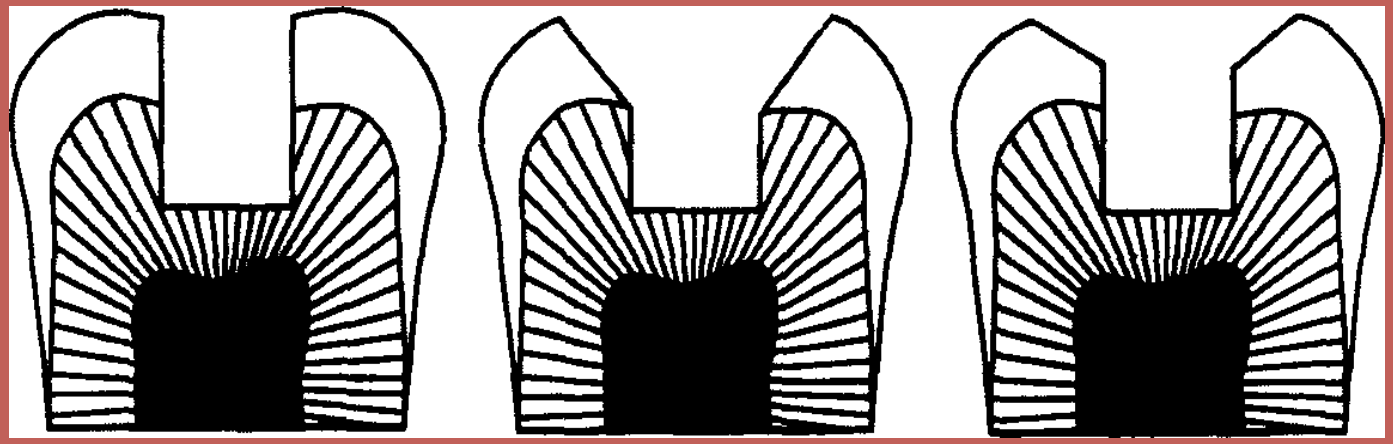
Stage of preparation of caries cavities



1. Disclosing of c/c



2. Necrotomi



3. Formation of caries cavities

A – under cements; B – under an amalgam; C – sub composite

Treatment stages

4. Washing and medical processing of caries cavities.

- You can use 2% sol. chloramini, 1: 5000 (0,02%)sol. furacyllini, 1-2% sol hypochloridi Na, 0,05%-0,1% rivanolum, 0,05% chlorhexidini bigluconas.

- It is not recommended to use spirit or an ether which reduce adhesion of composite materials (spirit destroys a matrix of composites BIS-Gma).
- But it is opinion that Hydrogen peroxide is absorbed in dentine and reduce the polymerization of adhesive systems.

The last recommendations - to wash out by warm water and to dry up by air.

Treatment stages

5. Pulp isolation. The purpose of putting:
   - To provide protection of a pulp against chemical, thermal and galvanic influences;
   - To distribute of chewing loading;
   - To improve fixing constant filling material;
   - It is desirable to possess anticaries action.

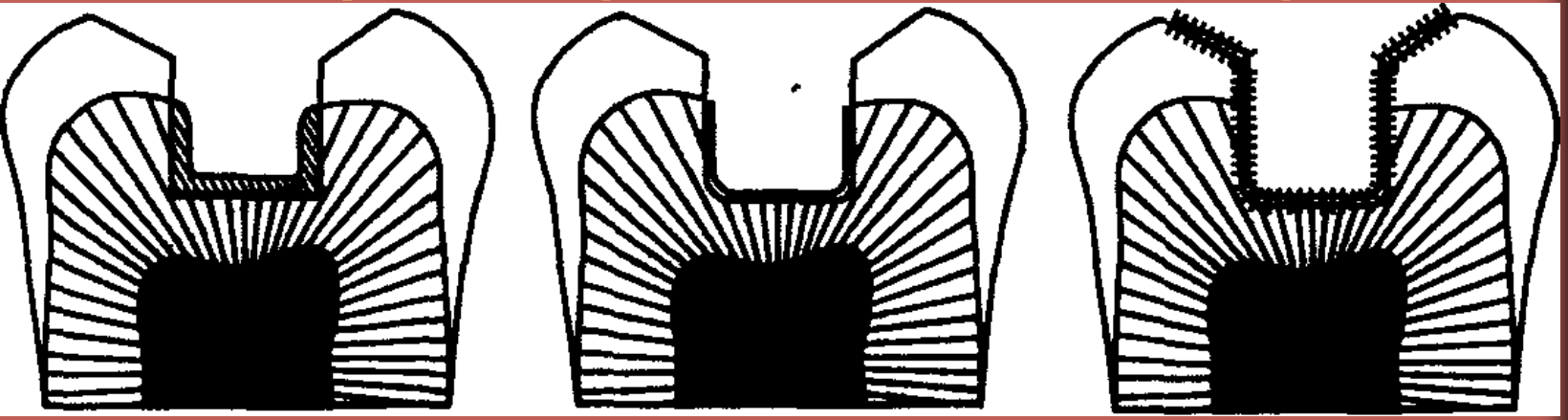
Kinds of linings

- Now, taking into account function of an isolating lining, feature of imposing and applied materials distinguish linings:
  1. **Thin lining (Liner)** (thin layer <1 mm). Its basic function – protection of a pulp against toxic influence of the constant filling material.
  2. **Basic** (more than 1 mm), allows:
     - To protect a pulp from chemical and thermal irritants;
     - To create more convenient form (geometry)
     - To amortize chewing pressure at deep cavities and big filling (that the bottom of caries cavities did not cave in)
     - To economize expensive composites

Materials for isolating linings

Groups of materials	The name (Firm the manufacturer)
Zinc-phosphatic cements	Phosphate-cement, Унифас (Медполимер), Adgesor (Dental Spofa), De Trey Zinc (Dentsply) Bayer Phosphatzement (Kulzer)
Glassionomer cements;	Ionobond (Voko), BaseLine (Dentsply) Vitrebond (3M ESPE) Fuji Lining (GC) Glass-ionomer cement (Heraeus Kulzer) XR-Ionomer (Kerr)
Polycarboxylate cements;	Poly-F plus (Dentsply) Aqualox (Voco)
Varnishes	Contrasil (Septodont), Dentin-protector (Vivadent), Pulpidor (Dentsply)
Adhesive system	Prim&Bond NT (Dentsply) OptiBond Solo Plus (Kerr)

Imposing variants linings

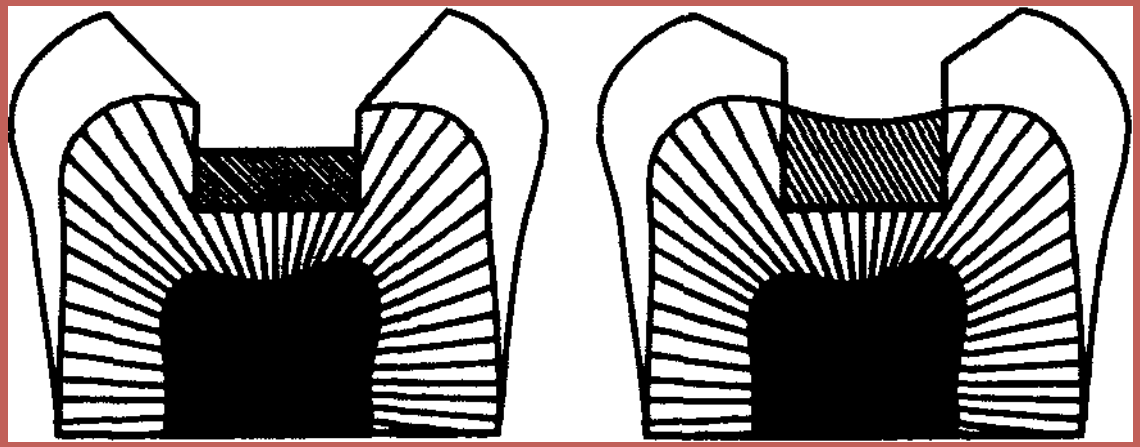


Phosphate-cement (thickness 0,5-0,7 mm)

Isolating varnish

Universal adhesive system

VARIANTS OF BASE LININGS



Under an amalgam (1 – 1,5 mm)

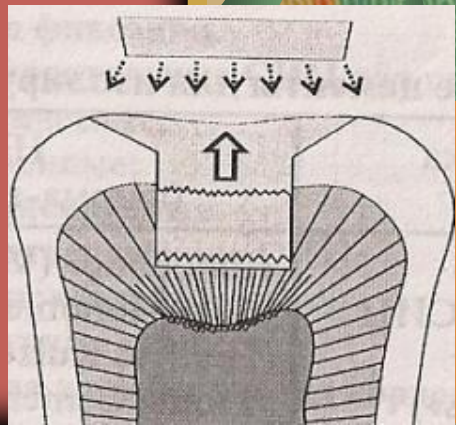
Under a composite (sandwich-technique of restoration of dentine)

Isolating linings

- **Cautiously** we apply GIC sub photopolymers, because it has slowly adhesion to dentine (24 hours). Connection between cement and a composite material is stronger than between lining and dentine. Therefore at polymerizational shrinkage the composite pulls to itself lining from GIC and tears off (away) it from a surface of dentine.

Exit:

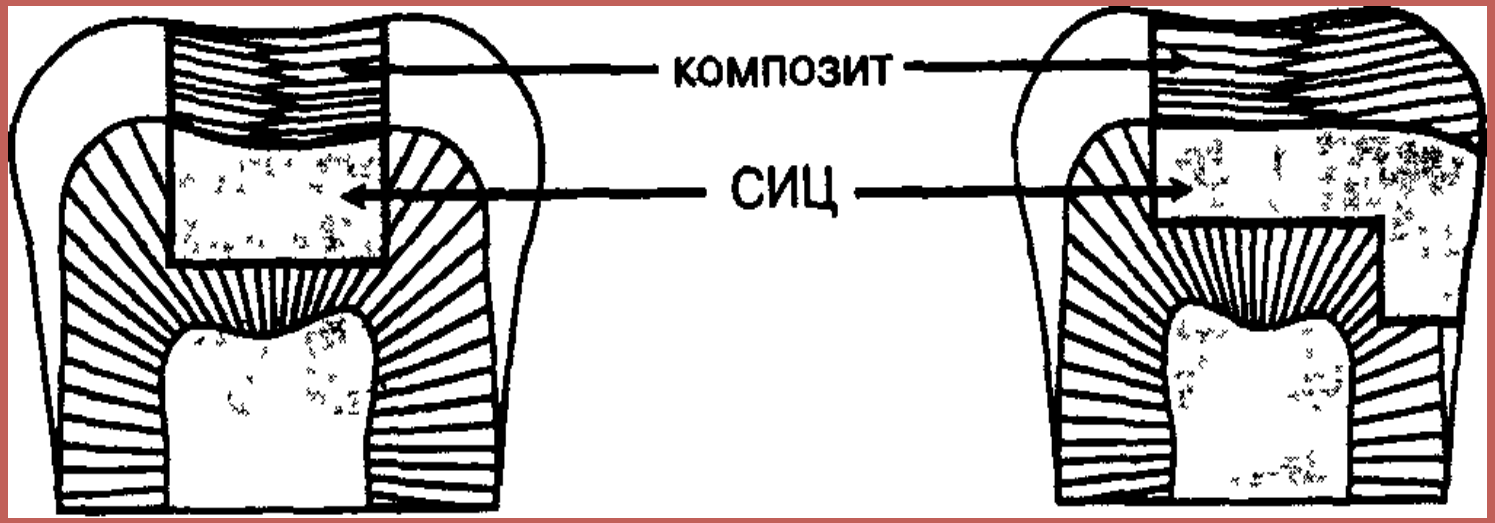
- to apply the directed polymerisation (that is impossible at the bottom of caries cavity);
- To apply light hardening GIC or compomers (Dyract);
- The delayed filling for (after) 1-2 days.



Treatment stages

6. Filling caries cavity by constant material.
7. Polishing of filling.

Sandwich-techniques of caries cavities filling



«The closed sandwich»

«The Open sandwich»

Features of treatment of acute deep caries

- If to remember the pathomorphology of acute deep caries the zone of disintegration and demineralization passes in a zone «changes in a pulp» sometimes without «healthy dentine», thus changes in a pulp have preinflammatory character.
- There is a situation that it is impossible to remove up all demineralized dentine, not having opened a tooth cavity.

Features of treatment of acute deep caries

- There are two exits from this situation :
  1. To strengthen a bottom of caries cavities by remineralization of remained dentine (that is very difficult and it is necessary to apply caries-markers which will prompt which dentine can be remineralizated (organic matrix is not destroyed) or can not be.
  2. To force a pulp to produce tertiary dentine, that will increase durability and a thickness of dentine bottom.

Materials for medical linings

Material type	The name (firm-manufacturer)
Calcium containing	
Water suspension (not hardening)	**Кальрадент (ВладМиВа),** **Calasept (Nordiska Dental),** **Calcium hydroxide (SPAD/Dentsply)** **Calcicur (Voco)** **Calcipulpe (Septodont)**
Varnishes	**Contsasil (Septodont)**

Materials for medical linings

- Water suspensions have feature: they do not hardening, and in 1-1,5 months they resolve under influence dentine liquids. Therefore, it can not be put under a constant filling. We have to apply it under temporal filling, change each 1-1,5 months (treatment 3-9 months).
- Varnishes are applied seldom since have weak stimulating action for pulp (contribute promote to produce of tertiary dentine).

Materials for medical linings

Chemical hardening cements	**Кальцесил (ВладМиВа)** **Alkaliner (3M ESPE)** **Dycal (Dentsply)** **Life (Kerr)** **Calcimol (Voco)** **Septocalcine ultra (Septodont)** **Reocap (Vivadent)**
Light hardening polymeric materials	**Кальцесил LC (ВладМиВа)** **Эстерфил Са (Диас)** **Calcimol LC (Voco)** **Ultra Blend (Ultradent)**

Materials for medical linings

- Calcium-hydroxide cements – are most popular (usually paste-paste = hardening after mixing).

+ Properties:

- Good handling
- Low solubility in dentinal liquids
- Do not change colour of filling
- Do not break polymerisation of composite materials

- Properties:

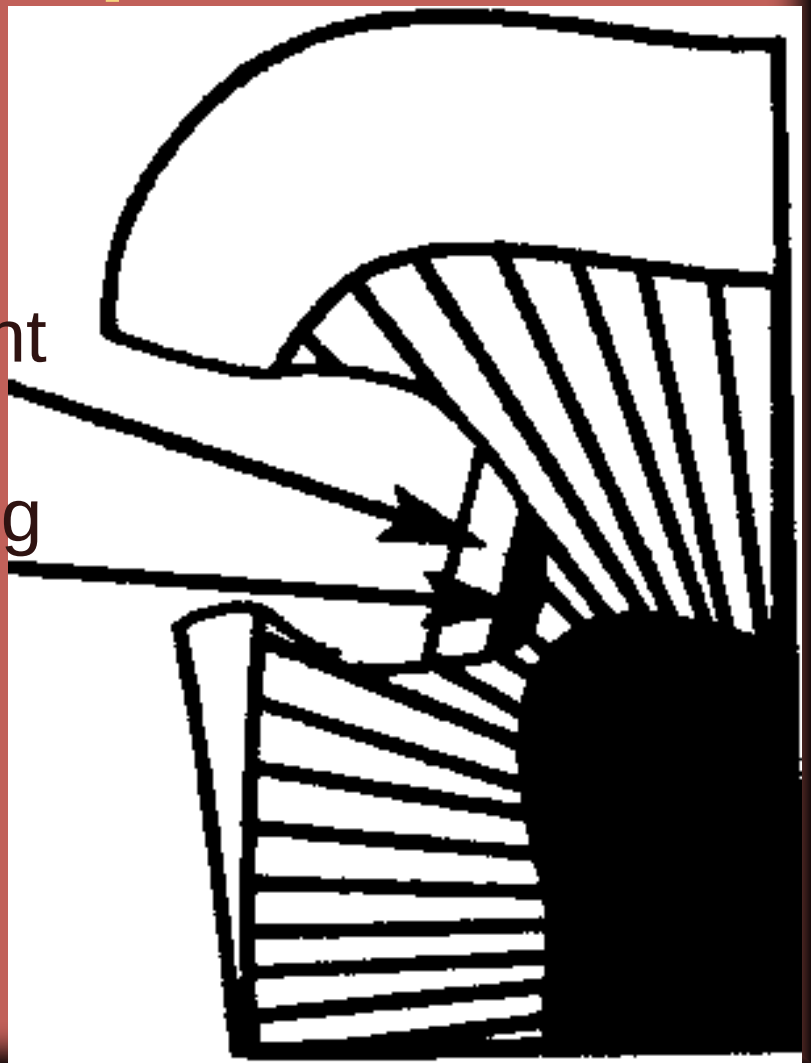
- there is no adhesion to dentine
- are dissolved by components of adhesive systems (acetone, spirit)
- small durability on compression (can be destroyed under action chewing loading)

- Therefore, it is better to bring in a cavity as point, in a minimum quantity with <u>obligatory</u> putting of <u>an isolating lining</u>.

Putting of medical and isolating linings at treatment of acute deep caries

Glassionomer cement

Calcium-hydroxide lining



Materials for medical linings

Eugenol containing	
The pastes prepared ex temporo	Paste with oil of cloves (Olium cariophyllorum) Zinc – eugenol paste
Oficial pastes	Kalsogen Plus (Dentsply) Cavitec (Kerr) Zinoment (Voco)
The combined medical pastes	
	Contain antibiotics, hormones, enzymes, essence.

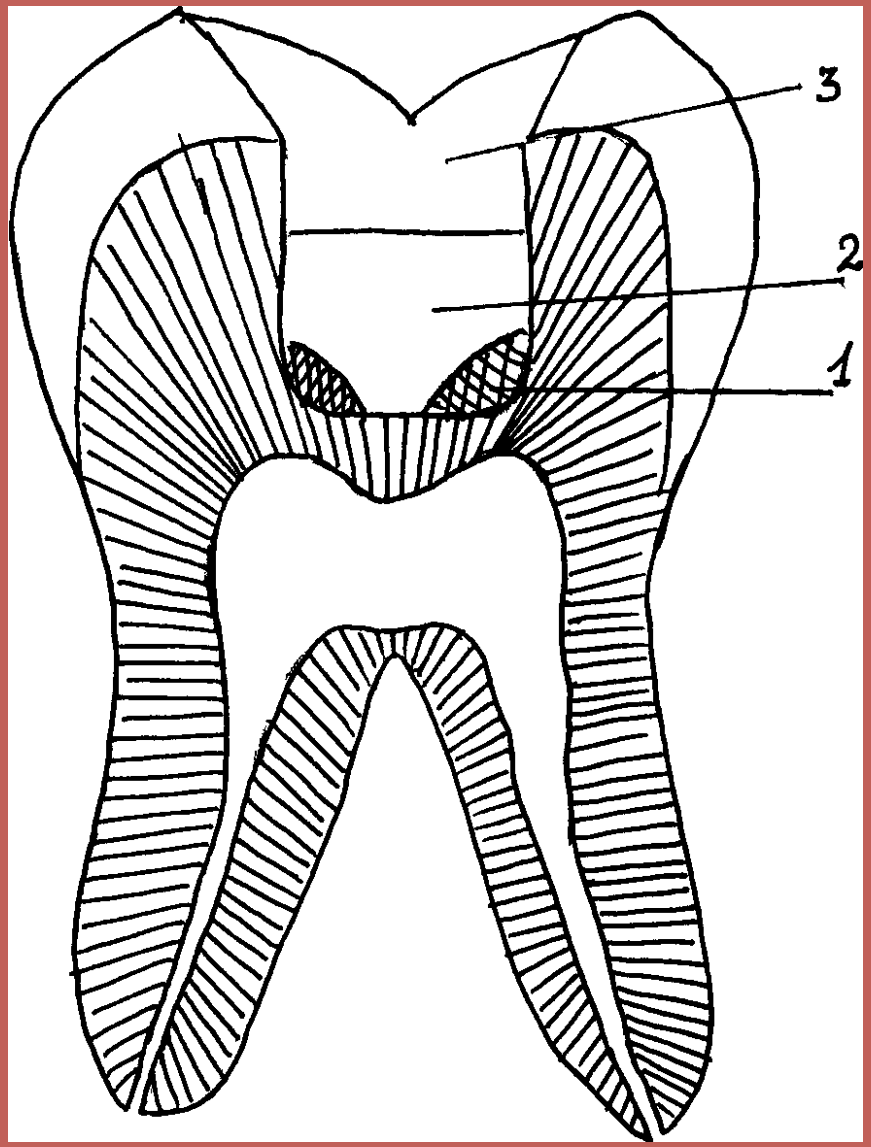
Materials for medical linings

- Materials on a basis eugenol have irritating effect on odontoblasts, therefore have strongly pronounced odontotropical action. Feature: it is necessary mix up very hardly.

Negative properties:

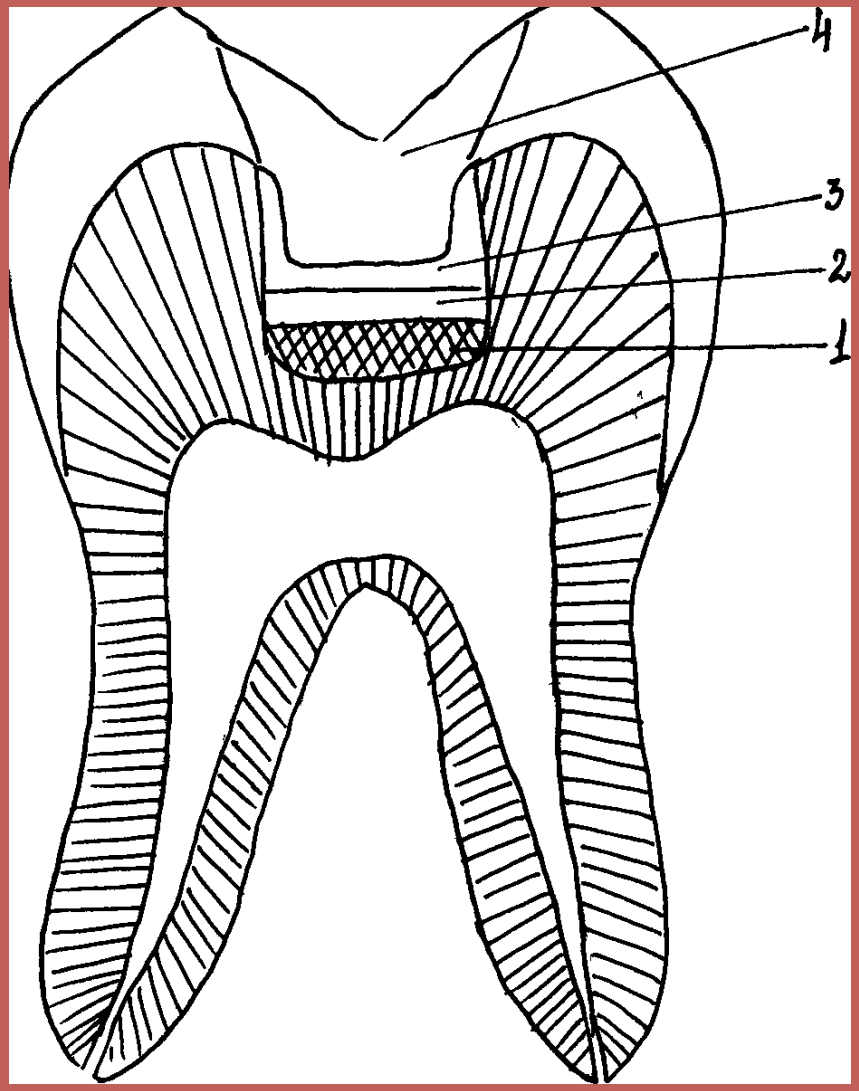
- break adhesion a comp. materials;
- hardening in 10-12 hours, so can be deformed under a lining or a filling. Therefore, it can be used only under a temporal filling.

ONE -VISITING TREATMENT METHOD OF ACUTE DEEP CARIES



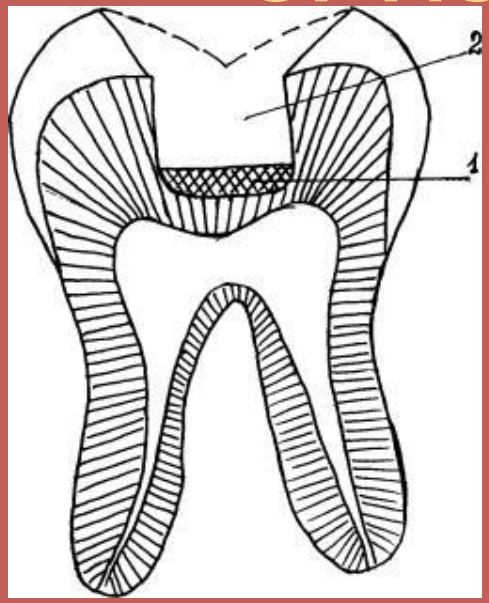
1. Medical contain calcium lining chemical or light hardening;
2. Isolating lining (basic) from GIC;
3. Constant filling material.

ONE -VISITING TREATMENT METHOD OF ACUTE DEEP CARIES



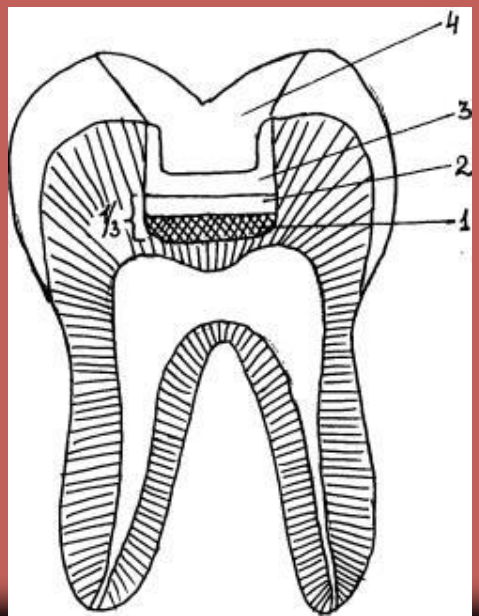
1. Medical contain calcium lining chemical or light hardening;
2. Artificial dentin;
3. Isolating lining (linear) from ZPC;
4. Constant filling material.

TWO-VISITING TREATMENT METHOD OF ACUTE DEEP CARIES



The first visiting

1. Medical lining (any)
2. Material for temporal filling and hermetic bandages (water dentine, dentin-paste)



The second visiting

1. Medical lining;
2. The rest of a temporal filling material;
3. Isolating lining;
4. Constant filling material.

Treatment of acute deep caries

The general treatment of plural caries

- Influence on nonspecific resistance of an organism consists from:

Appointment of a diet with the raised maintenance of protein (1,5 g/kg), vitamins and microelements;

Medicamentous therapy by natrii nucleinas, kalii orotat (0,5 g 3 times a day), riboxinum, pentoxylum (0,2 g 3 times a day), methyluracilum.

Appointment of vitamins or their complexes (acidum ascorbinicum (vitamin C) – 0,1-0,2 g a day, Pyridoxinum (vitamin B_6) – 0,05-1,0 g a day, retinolum acetatis (vit A), ergocalciferolum (D_2), thiaminum (B_1) - 2 mg a day.

The general treatment of plural caries

- Remedy– stimulators the central nervous system:
  - Radix Ginseng (tinctura1:10 on 15-25 drops 3 times a day);
  - Tinctura Schizandrae (0,5 g or on 20-30 drops 2-3 times a day after eating).
  - Extractum Eleutherococci fluidum on 15-25 drops 3-4 times a day before eating.
  - Extractum Leuzeae fluidum (on 20-30 drops 2-3 times a day).
- Course of treatment is 12-15 days.

The general treatment of plural caries

- Regulation of the maintenance of mineral substances: remedy with Ca (glycerophos-phas Ca on 0,5g 2 times a day during a month, Calcii gluconas, CaD_3, Ca lactas per os or by electrophoresis, applications).
- For stimulation of function of salivary glands use diet therapy with the raised maintenance of the firm, sour, spicy food, medicinal gras-ses (Rhizoma Inulae helenii, Herba Thermop-sidis, Folium Farfarae): 3 times a day on ¼ of glass during 2-3 months. In this purpose apply tablets of Bromhexinum: 0,004-0,008 2-3 times a day 2 weeks.


THANKS
FOR ATTENTION!