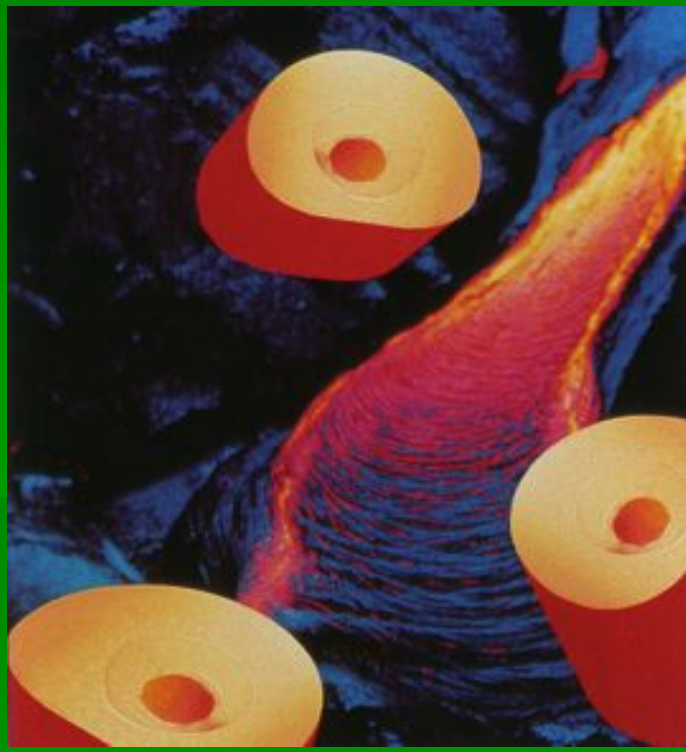
"Plastics.

General characteristics. Classification. Composition. The main types of plastics, their appointment. Usage in technology in the manufacture of dental prostheses and devices "



- Plastics - materials, which are based on polymers which are in the period of formation of products in the viscous fluid or highly elastic, and in the operation - in the glassy or crystalline state.
- Polymers - a substance whose molecules consist of a large number of repeating units.

- The main starting materials for polymer dental materials are monomers and oligomers (mono, I-D, tri-, tetra acrylates).

- Monocrylat volatile, so they are using in combination with high molecular weight esters, thereby reducing shrinkage of the polymer.

- Polymerization - reaction interconnection monomer compounds with double bonds without the formation during the reaction of any new substances.
- The reaction generated a high molecular compound that is different from the original size of a molecule.
- The mechanism of the polymerization reaction is to activate some of the monomer molecules by the action of light, heat or catalysis torus and subsequently joining the already activated molecules to other molecules to form longer chains.
- This connection continues as long as the energy is initially activated molecule dissipates.

- **Classification of plastics:**
- **1. origin include:**
- **• natural or biopolymers (proteins, nucleic acids, natural number rubber);**
- **• synthetic (polyethylene, polyamides, epoxy resins).**

- 2. By nature:
- • organic;
- • inorganic;
- • organ elemental.

- **Main, which are used for removable and fixed dentures:**
- • base (rigid) polymers;
- • elastic polymers or elastomers;
- • polymer (plastic) artificial teeth;
  • polymers for replacement of dental hard tissue defects, materials for fillings, pin teeth and tabs;
- • polymeric materials for temporary non-removable dentures;
- • facing polymers (for permanent fixed prosthesis);
- • restoration polymers

- **B) Support, which are used at different stages of the manufacture of dentures:**
- **• polymer impression material;**
- **• polymer standard impression trays;**
- **• polymeric materials for the manufacture of individual spoons;**
- **• plastic caps and temporary crown to protect the prepared teeth.**

- B) Clinical
- the temperature conditions of polymerization plastics are "hot" curing;
- cold curing plastics ("self-hardening", "quick-hardening").
- In the presence of "pink" plastic pigments;
- “colorless" plastics; plastic different color impressions.

Physical properties of materials

- Specific gravity - density of the material, the amount of substance per unit volume and mass of one cm3 of the body, expressed in grams.

- Melting point - the temperature at which the substance passes from a solid to a liquid.

- Shrinkage of the material - material volume reduction during cooling after casting.

Mechanical properties of materials

- Durability - solid body's ability to resist the impact of external forces seeking to deform.
- Viscosity - the ability of a material under load to stretch, lengthen.
- Hardness - The ability of the solid material to enter the soft material under pressure.

- Elasticity - material property again to return to its original state, acquiring its original shape after the termination of the deforming force.
- Plasticity - the ability to change shape and save it as a final deformation.
- Fatigue of materials (metals, plastics) occurs when prolonged load, which creates tension.
- Removing the friction arises from solid soft material

KEY (CONSTRUCTION) MATERIALS

- They should be harmless, solid, not collapse under the action of an oral liquid, various nutrients, air, and the pressure withstand chewing process during manufacture in which the prosthesis is subjected to tension, bending, distortion, temperature action.

- Dentures should be a natural color, not to have an unpleasant taste and smell are also important availability and cost of material.

The basic materials include:

- Plastic

- Porcelain

- Artificial teeth

- Metals

The major components of this type of plastic compositions are:

- 1) monomer - based plastics;
- 2) binder (phenol-formaldehyde resin, or other);
- 3) fillers (wood flour, asbestos, glass fiber);

Compound of plastic

- The main component fluids "monomer" is a methyl ester of methacrylic acid stabilized inhibitor.
- Each liquid contains a specific modifier to the polymerization type resins and plastics to impart desired performance properties.

- Compound of plastic

  Filler - a substance that affects the strength, hardness, shrinkage, thermal conductivity, resistance to aggressive media. Sometimes minimal and organic, powdery and fibrous (silica flour, silica gels, silicates, various grades of finely ground glass).

- Pigment - a substance imparting dental polymeric compositions and shades of colors, imitating the tooth tissue and mucosa.
- Requirements: harmlessness, distribution uniformity, stability in maintaining the color under the influence of external factors, good optical properties.

- The catalyst - a substance that accelerates a chemical reaction.
- The Initiator - a substance which when exposed to heat or other factors (activator) decomposes into free radicals polymerization reaction beginning (benzoyl peroxide).

- Activator - an agent that causes the decomposition of the initiator with the formation of active growth promoting radical polymer chain and polymerization (dimethylparatoluidine, a tertiary amine).

- Plasticizer - a substance that increases the ductility and elasticity of the material (dibutyl phthalate, dioctyl phthalate).

- Inhibitor (retarder) - a substance that slows the chemical reactions, preventing spontaneous polymerization during transport and storage (hydroquinone, diphenylolpropane).

- Radiopaque material - barium sulphate, barium fluoride, barium and bismuth glass. Their presence helps to detect polymer fragments with injuries maxillofacial area and the introduction of elements of the prosthesis into the soft tissue.

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Basic (BASIC) CONSTRUCTION MATERIALS

- The materials used for manufacturing bases removable plate prostheses, called basic materials.

- **The basis - the foundation of the denture: it strengthened artificial teeth, clasps and other components of the prosthesis.**

Basic materials must have the following characteristics:

- 1) sufficient strength and elasticity necessary to ensure the integrity of the prosthesis without deformation under chewing forces;
- 2) high bending resistance;
- 3) high resistance to impact;

- 4) a small specific gravity and low thermal conductivity;
- 5) sufficient rigidity, low abrasion;
- 6) indifference to the action of saliva and various nutrients

- 7) does not change color when exposed to light, air and other environmental factors;
- 8) does not adversely affect oral tissue and organism as a whole;
- 9) no adsorption of nutrients and microflora in the mouth.

In addition, the base material must meet the following requirements:

- 1) firmly connected with porcelain, metal, plastic;
- 2) are easily processed into a product with a high accuracy and maintain the shape imparted;
- 3) be easy to fix;
- 4) well painted to imitate the natural color of the gums and teeth;
- 5) can be easily disinfected;
- 6) does not cause unpleasant taste and odorless.

For bases used plastic prostheses following types:

acrylic;

vynilacril

modified polystyrene;

copolymers or mixtures of appropriate plastics.

- Dental copolymers comprise 80% of all medical copolymers comprise copolymers acrylmetacrylate - double or triple copolymers.

It is now widely used acrylic plastic base

- “Этакрил "

- "Акродент"

- "Фторакс"

- "Акронил"

Colorless plastic base

- Plastic-based stabilizer purified from polymethylmethacrylate containing Tinuvin which prevents aging of the plastic under the influence of an aggressive environment.

- Colorless base plastic used for manufacturing dental prostheses bases in cases where counter-stained basis as well as for other purposes prosthodontics when necessary a transparent base material.

ELASTIC LINING MATERIALS

- Need to improve the adhesion of the denture to the oral mucosa, as well as combined production of dental prostheses resulted in the appearance of soft elastic lining materials for denture base.
- They are also used for the production of obturators, maxillofacial prosthetics, elastic pilots, etc.

Materials must meet the following medical and technical requirements:

- 1) is firmly connected with the base material;
- 2) be non-toxic;
- 3) to maintain the elasticity;
- 4) good wetting;
- 5) does not dissolve in the mouth;
- 6) have a high resistance to wear;
- 7) does not change color;
- 8) to be technologically advanced.

Indications for use

- 1) with a sharp ridge atrophy of alveolar processes when contraindicated for all the usual methods of fixation of the prosthesis
- 2) in the presence of bony protrusions and ridges on the prosthetic bed, so that a solid basis for the prosthesis causes pain;
- 3) for the reduction of saliva in a patient worsens the fixation and stabilization of the prosthesis;
- 4) in the anomalous form of bite;

Indications for use

- 5) the need to create an increased adhesion of the prosthesis (for musicians playing wind instruments);
- 6) to create a new form of an old or bad adjacent denture base;
- 7) for manufacturing obturators;

Resilient Lining materials for denture bases, depending on the nature of the material is divided into four types:

- acrylic
- pliable
- silicone based
- fluorine rubber

Methods of polymerization of basic plastics

- Plastics made acrylic-based - is the main structural material for the manufacture of removable plate dentures and orthodontic appliances.

- **Methods for forming plastic powder in pasty condition divided into two types: casting and compression molding.**

Plastics Polymerization

- Polymerization - a chemical reaction in which there is an association of molecules of the same low molecular weight substances.

- Because this reaction produces high molecular weight compounds that are similar in composition to the primary material, but it differs from the quantity and properties of molecules.

To study the basic acrylic resin polymerization quality using three methods:

- 1. Polymerization for "water bath" in the cell in a plaster mold;

- 2. The polymerization to dry under pressure;

- 3. Polymerization an improved apparatus for foundry molding.

Plastics for fixed prostheses

- Most plastics used
- "Sinma-M" and
- "Sinma-74."

- This acrylic hot curing plastic such as "powder-liquid."

Artificial teeth

Sets the front teeth are divided into 17 sizes.

The main part of the headset upper anterior teeth is made up of 3 styles: rectangular, wedge-shaped and oval.

Sets the lower anterior teeth are available in two styles: rectangular and wedge.

Sets of posterior teeth are available in 5 styles with increasing size. Teeth are available 7 colors.

- Thank you