



Steoplastic Materials Used In Surgical Dentistry

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ABSTRACT

Modern surgical dentistry faces an acute problem of bone tissue regeneration after inflammatory, traumatic diseases and extraction interventions, which lead to its deficiency. Physiological regeneration often does not produce the required volume of new bone. And local bone deficiency makes dental implantation difficult. There are different groups of materials that stimulate osteogenesis: autogenous, allogeneic, xenogeneic and synthetic. The osteoinductive potential, osteoconductive properties and tolerance by the tissues of the receiving bed are expressed differently in the groups. It is difficult for a clinician to choose an osteoplastic material with optimal parameters from the many offered options due to the wide variety of bone regeneration stimulators.

Keywords:

dentistry, dental surgery, osteoplasty, osteoplastic materials, bone deficiency, bone material

Introduction.

Research in the field of bone tissue regeneration is one of the most promising and in demand in modern surgery and traumatology. This issue is also acute in surgical dentistry. Deficiency of bone tissue in the maxillofacial region occurs as a result of many reasons, such as traumatic diseases of the bones of the facial skeleton, intraosseous formations of an inflammatory nature, complications of extraction and reconstruction interventions in dental implantology, and during various osteoplastic operations.

Restoring bone deficiency through physiological regeneration is not always possible to the desired extent, and it can also take a long time. Local bone deficiency can cause long-term adverse consequences: deformation with further loss of the bone structure of the alveolar process of both jaws, exposure of the roots of the teeth in the area of the defect, the development of complications in

the form of postoperative neuritis of the second and third branches of the trigeminal nerve.

The consequence of local bone tissue deficiency may be the impossibility of dental implantation and the need for additional surgical interventions, the duration of treatment and its traumatism. Carrying out surgical interventions on the bones of the facial skeleton has its own characteristics, due to the obvious infection of the operating area, since surgical treatment is often performed due to the occurrence of an inflammatory process. Bacterial contamination of bone defects during the treatment of jaw neoplasms such as cystogranulomas and cysts is 87%.

Currently, new biologically active osteoplastic materials intended for surgical treatment are of scientific and practical interest. For this purpose, it is possible to use special forms of already known drugs of this pharmacological group, used in maxillofacial surgery.

Osteoplastic materials intended for use in dental surgery belong to the group of bioactive

agents that can be included in the metabolic processes of bone tissue.

Bone substitutes have the following properties:

- **Osteoconductivity.** The ability of the material to adhere and bind osteogenic cells, to create conditions for the development of the vascular system, tissue proliferation, as well as the formation of a connection with bone tissue and gradual replacement with newly formed tissue.
- **Osteoinductivity.** The property of bone proteins of the transplanted material to influence the transformation of limitedly differentiated cells into osteoblasts with the formation of bone tissue.
- **Osteogenicity.** The property of transplant osteoblasts to be active participants in the growth of new cells (osteocytes).

The classification of osteoplastic materials in dentistry involves division into the following types of bone material:

- **Autogenous.** A bone fragment that is obtained from the intra-, extra-oral areas (ribs, lower jaw, chin, directly from the surgical site, etc.) of the patient himself.
- **Allogeneic.** Another person acts as a donor of bone material. As a rule, transplants are collected in the event of a person's death, after which they undergo special processing and are sent for storage in special conditions.
- **Xenogeneic.** Material of animal origin based on bovine or pork bones. Xenomaterial is available in the form of granules or bone blocks.
- **Alloplastic.** Artificial bone material in dentistry based on calcium phosphate.

A separate group includes collagen membranes of animal origin, which are used to isolate the defect from the gums and stimulate regenerative processes in bone structures.

Currently, alloplastic materials are most often used in dental practice. The main component of alloplastic materials (APM) used in dental surgery is synthetic calcium orthophosphate - hydroxyapatite (HA). Tricalcium phosphate (TCP), collagen, growth factors, as well as antibacterial and corticosteroid drugs are added to the preparations as additional ingredients.

The use of bone material is widespread in dental surgery. Thanks to this, specialists are able to perform a number of manipulations aimed at restoring bone volume, which reduces the risk of further tissue destruction and the development of complications.

The purpose of this study is to systematize information about the composition and basic properties of osteoplastic preparations and the possibilities of their clinical use in surgical dentistry.

Increasing the osteoinductivity of bone implants and enhancing the regeneration of connective tissue can be achieved by creating biocomposite materials that should contain basic tissue components and active growth factors. It has been proven that demineralized bone causes new formation of young bone tissue due to the activation of proteins in its composition. It is promising to add to it bone morphogenetic proteins (BMP), which play a huge role in the process of restoration of bone and cartilage tissue. In terms of their reparative capabilities, they are equal to or superior to autologous bone material. Recent biomedical advances make it possible to use osteoinductors in the form of recombinant proteins (rhBMPs) fixed on various carriers. Participating in the processes of formation of bone and cartilage tissue, BMPs stimulate bone formation in a sequence similar to embryonic morphogenesis

Conclusion.

Drawing an analytical conclusion from the review, we can conclude that restoration of bone tissue in the area of the postoperative defect will occur without the use of regeneration stimulants. But bone tissue restoration does not always occur to the required extent, and regenerative processes occur at a relatively low speed. It is possible to increase the efficiency of regenerative processes by using osteoconductive materials in the work. When using osteoplastic materials, it is necessary to take into account not only their composition, dispersion and quality characteristics, but also the characteristics of the receiving bed, namely: the nature of the damage, the size of the formation, the density

of the bone tissue surrounding the defect. Thus, to obtain optimal results from the use of osteoplastic materials, a preliminary treatment plan is necessary. It is necessary to take into account the characteristics of a particular patient and carry out individual selection of an osteoregeneration stimulator in accordance with each clinical case.

Modern bone material for teeth is designed to create conditions in which regenerative processes will occur without intermediate reconstruction and atrophy of the alveolar process. It is harmless to the body, does not contain infections, and is effectively replaced by bone tissue.

Developers pay close attention to the creation of new synthetic materials and, above all, to the combination of different substances. Collagen, polylactide, and polyglycolide can act as an organic base. Thanks to the composite composition, it is possible to combine the positive characteristics of individual components, and there are many such examples. For example, tricalcium phosphate with hydroxyapatite and purified collagen or collagen with hydroxyapatite, etc.

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