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# Use of New Silers In the Treatment of Apical Periodontitis of Permanent Teeth

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**Abstract:** To obtain clinical experience of using new silers in treatment of apical periodontitis of permanent teeth. Treatment of chronic apical periodontitis of permanent teeth with root canal obturation with new siler based on epoxy resin and bioceramic siler has been carried out.

**Keywords:** Endodontic treatment, root canal obturation, sealer, new materials.

**Introduction:** The experience of using new sealers in endodontic treatment of permanent teeth allows us to state that they are convenient in work and allow to obtain good clinical results in treatment.

Endodontics is one of the most difficult sections of therapeutic dentistry. Significant difficulties in endodontic treatment create a variety of nosological forms of pulp and apical periodontal diseases, complexity and variability of the anatomy of the root canal system, a variety of approaches to mechanical and medical intervention in the endodontium, methods and systems for obturation of root canals and methods of post-endodontic restoration. The tasks of filling the system of root canals elimination of communication between the root canal and the crown part of the tooth cavity and isolation of microorganisms left preventing the ingress of tissue fluid from periapical tissues into the canal. Filler (gutta-percha is currently preferred) and siler are used for filling. Siler functions are considered to be filling of microspaces and dentinal tubules, smoothing of irregularities of the canal wall, providing sliding of gutta-percha pins. At present the following groups of silers are distinguished: resin-based

("AH Plus", "Acroseal", "EndoRez"); mineral trioxide aggregate (MTA) and its base ("MTA-Fillapex", "Aureoseal"); silicone-based ("RoekoSeal", "GuttaFlow"); glass ionomer cements ("Ketac Endo", "Endosil"); zinc-oxide-eugenol cements ("Roth", "Kerr PCS", "Endomethasone N", "Canason"); containing calcium hydroxide ("Sealapex", "Apexit"); based on dentin adhesives ("Epiphany"); bioceramic ("Sure-Seal Root"). At present in clinical practice the most widespread are silers based on organic resins. Their advantages include biocompatibility, good germetism, low viscosity and convenient working time. The disadvantages of this group of silers are sensitivity to moisture (the canal should be perfectly dried before filling), sensitivity to traces of oxidants in the canal (the last instillant should not be hydrogen peroxide), post-filling pain during effusion (dynamic verification of the working length is necessary). The epoxy resin-based sealer "BJM Root Canal sealer" (BJM) is one of the latest developments in this group. The IABT (Immobilized Antibacterial Technology) makes this material unique. The technology is based on the addition of "Biosafe HM4100" (BioSafe Inc., USA) molecules (quaternary ammonium compound) to the siler. The mechanism of action of these positively charged molecules is associated with electrostatic interaction with negatively charged bacterial cells, which leads to a change in the permeability of their membranes and subsequent death. Among the important properties of BJM Root Canal sealer are high radiopacity, good wetting and flowability (more than many other epoxy-based sealers!), long-term stability due to good hermeticity and moderate flexibility, which prevents cracking of the cured material, as well as low shrinkage. In the cold gutta-percha technique, the following steps of working with BJM Root Canal sealer can be distinguished: - drying of the root canal (after mechanical and medical treatment), - introduction of the siler (e.g. on a paper pin), - introduction of gutta-percha pins moistened with siler (and their condensation). It should be emphasized that this siler is universal, as it can also be used with all types of heated and thermoplasticized gutta-percha.

Clinical case 1 Patient M. came for consultation regarding the possibility of therapeutic treatment of tooth 3.6. From the anamnesis: the tooth had been previously treated for caries. Due to the loss of a filling, the patient applied to a general dentist, who was directed to extract tooth 3.6. Clinical picture. On the chewing surface of tooth 3.6 there is a deep carious cavity, on the distal surface there is a fragment of an old filling. Probing along the bottom of the carious cavity and percussion are painless. The mucous membrane in the projection of tooth 3.6 is unchanged. On the

radiograph: a fragment of a filling and a deep carious cavity in tooth 3.6, communicating with the tooth cavity. The lumen of root canals is visualized. In the area of apices there are foci of bone tissue destruction with indistinct contours, 0.4x0.5 and 0.6x0.7 cm in size (Fig. 1). Diagnosis: Chronic apical periodontitis of tooth 3.6. The patient was proposed a treatment plan for tooth 3.6 including the following steps.

Primary mechanical and medical treatment of root canals with apexlocation and subsequent filling with aqueous calcium hydroxide for 2 weeks.

Repeated mechanical and medical treatment of root canals with apexlocation and subsequent filling with gutta-percha pins with "BJM Root Canal sealer". Delayed filling with photocomposite material.

Dynamic follow-up in 3, 6, 12 months. Informed consent of the patient was obtained for the above plan, after which items 1-2 were performed. The patient came for a control examination 4 months after filling. She had no complaints (including post-restoration pain). On clinical examination, the restoration in tooth 3.6 was tight, percussion of the tooth was painless and there was no mucosal reaction in the projection of the tooth. On the radiograph: root canals were filled densely, with contrast, throughout the whole length; in periapical tissues there was a decrease in the size of foci of destruction with signs of healing. The next control examination took place one year after filling. The patient did not present any complaints, during visual and tactile examination the condition of tooth 3.6 was unchanged. The radiograph showed a slight widening of the periodontal gap in the area of the apex of the mesial root of the tooth.

Bioceramic sizers are a new group of materials, which include zirconium oxide, calcium silicates, calcium dihydroorthophosphate, calcium hydroxide and other components. The first material from this group registered in the Republic of Belarus was "Sure Seal Root" ("Sure Dent"). The most important properties of this material are:

Absence of shrinkage.

Provision of 3D obturation.

Hydrophilicity. Formation of hydroxyapatite.

Biocompatibility and osteogenicity.

Chemical bonding with dentin.

Antibacterial action (pH>12).

Radiopacity.

Convenient working time and curing time (25 minutes to 2.5 hours).

Ease of use (ready-to-use paste).

Clinical Case 2 Patient M. complained of discoloration of the crowns of the upper central incisors. From the anamnesis: these teeth were treated endodontically at school age. Clinical picture. The crowns of teeth 1.1, 2.1 are discolored, on the proximal and palatine surfaces there are complete fillings. Cold test is negative. Percussion is painless. The mucous membrane in the projection of the upper incisors is unchanged. On the radiograph: in the root canals of teeth 1.1, 2.1 there are traces of obturation materials, in the periapical area there are foci of bone tissue destruction with clear contours 0.4-0.5 cm in size.

Diagnosis: Chronic apical periodontitis of teeth. A treatment plan was proposed and agreed upon for the patient. The treatment included the following stages:

Isolation of teeth. cofferdam, removal of old fillings.

Filling of root canals and their passage with K-file #15.

Determination of apexlocator working length and its verification radiologically (1.1 - 24 mm, 2.1 - 25 mm).

Treatment of cervical and middle thirds of the canals with SX/S1 and S2 protapers, respectively.

Treatment of the apical third of the canals and their shaping with protapers F1, F2, F3, F4, F5.

Verification of the working length with an apex locator after each instrument and medicalization with sodium hypochlorite (3%) and EDTA (17%). After completion of treatment - additional treatment with iodides, hydrogen peroxide, distilled water. Activation of all solutions with endoactivator for 30-60 seconds. Obturation of canals by the method of lateral condensation of gutta-percha with bioceramic sealer "Sure Seal Root" and delayed filling with glass ionomer cement.

## CONCLUSION

The experience of using new silers in the treatment of apical periodontitis of permanent teeth allows us to say that they are convenient in operation, effective and can be recommended for wide clinical use in dental practice.

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