



**IMPROVING THE BIOLOGICAL METHOD OF TREATING ACUTE
PARTIAL PULPITIS**

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ANNOTATION

For a long time, dentistry has been conducting research on the development and improvement of methods for treating pulpitis, ensuring the preservation of the pulp not only in a viable, but also in a functioning state. Meanwhile, successful treatment is impossible without an accurate diagnosis of the condition of the pulp. To date, dentists still do not have enough objective intravital research methods in their arsenal to assess the functional state of the pulp. Despite significant advances in recent years in the treatment of pulpitis using the vital extirpation method, the problem of preserving the root pulp in various forms of inflammation remains unresolved. The current stage of development of biological therapy for pulpitis is characterized by an intensive search for the most effective means that preserve the root pulp and stimulate dentin formation. For this purpose, many different therapeutic drugs have been proposed (dentin sawdust, antibiotics, their combination with corticosteroids, calcium hydroxide, etc.), but so far this has not led to a complete solution to the problem of healing and preserving the inflamed pulp.

Key words

acute partial pulpitis, electroodontodiagnostics (EOD), biological treatment method, preservation of pulp viability, odontotropic therapeutic pad.

Introduction. Dental caries, as the process progresses and the carious cavity deepens, causes changes in the pulp that lead to a decrease in the sensitivity of nerve receptors: deposition of replacement dentin, changes in the odontoblast layer, initial degenerative processes in the nerve elements. The listed phenomena can gradually lead to a slight decrease in electroodontodiagnosis (EOD) indicators. In



many clinical cases, pulpless teeth turn out to be latent and then active foci of infection and intoxication. They are also one of the causes of odontogenic infection of the maxillofacial area. In this regard, it is very important to use conservative treatment methods to eliminate and suppress the inflammatory process in the dental pulp.

Main part. Acute forms of pulpitis are accompanied by severe pain, however, EDI indicators, as a rule, decrease slightly, and sometimes remain at the level of the physiological norm. This is due to the fact that the sensitivity of nerve receptors is influenced, first of all, by the duration of the pathological process and the degree of dystrophic changes in the dental pulp, and not by the severity of inflammatory phenomena.

Complications also arise as a result of treatment of pulpitis, so studying the immediate and long-term results of treatment is of great diagnostic and prognostic importance. When treating pulpitis, complications arise immediately or shortly after treatment. These include spontaneous pain and pain on percussion; paroxysmal pain and pain from temperature stimuli; breakage of endodontic instruments in the root canal [5,11].

As is known, in acute forms of pulpitis, significant degenerative processes in the nerve elements of the pulp do not occur due to the transience of the process. At the same time, a significant decrease in the electrical excitability of the pulp and the absence of positive dynamics of EDI indicators during the therapy (for example, with the biological method of treating pulpitis) indicate the irreversibility of the pathological process and the ineffectiveness of the ongoing therapeutic measures, which is an indication for the use of extirpation methods of treatment [7].

The main advantages of EDI are: simplicity, accessibility, information content, the ability of a doctor to work independently, without resorting to the conditions of a physiotherapy office or a doctor of another specialty. The negative side of this technique is the need to take into account many factors that can affect EOM indicators and cause difficulty in interpreting the results [7,13].

Indicators of electrical excitability of the pulp in the anterior and chewing teeth are different. Electrical odontometry (EOM) values for incisors are lower than for premolars and molars. The electrical excitability of the pulp of premolars and molars does not differ significantly. A parameter such as a person's gender does not affect measurement indicators. What cannot be said about age, depending on which, the electrical excitability of the pulp changes depending on the group affiliation of the teeth. In incisors, higher EOM values are observed at 20-30 years of age, and in premolars and molars at 41-60 years of age [13].

An EDI device should be in every dental clinic office; its use is necessary when diagnosing caries (if necessary) and pulpitis (required). At first glance, the method



of work is simple and informative, but this method has a sufficient number of disadvantages and contraindications. The technique requires material and time costs, as well as accuracy of manipulations. Despite all the complexities of this technique, EDI is suitable for use by dentists during everyday clinical visits in every clinical situation; it helps in making the correct diagnosis and further treatment plan. [6].

Pulpless teeth turn out to be latent and then active foci of infection and intoxication. They are also one of the causes of odontogenic infection of the maxillofacial area. In this regard, it is very important to use conservative treatment methods to eliminate the inflammatory process in the dental pulp [9].

It should be noted that the use of a biological treatment method is advisable only for initial, reversible inflammatory phenomena in the dental pulp. Indications for this method of treatment are: acute mechanical trauma to the tooth with exposure of the pulp when seeking medical help in the first 3-4 hours; acute focal pulpitis. The effectiveness of treatment of reversible forms of pulpitis using a biological method is largely determined by an adequate assessment of the condition of the "causal" tooth and the general status of the patient, the correct selection of treatment tactics and the rational use of medications in a specific clinical situation [13].

Scientifically proven recommendations are the following: the use of materials in the case of an accidentally exposed pulp during the treatment of a carious cavity, the use of materials in case of pulp hyperemia, in case of mild complaints and an EDI of no more than 23 μ A [9,20].

But it is not always possible to use this technique, since expanding the indications for using the biological method leads to complications during treatment. Contraindications to the use of this method with a more precise diagnosis are: acute diffuse pulpitis, chronic and exacerbation of chronic forms of pulpitis, widening of the periodontal fissure on an x-ray [2,8].

Method of biological treatment of pulpitis: I visit. 1. Local anesthesia (without a vasoconstrictor). 2. Isolation of the surgical field (cofferdam or modern analogues). 3. Dissection, necrosectomy in compliance with asepsis and antiseptics (gradual change of used burs to sterile burs). 4. Abundant irrigation with sterile antiseptic solutions at 38°-39° C. 5. One should not strive to open the pulp. 6. The use of drugs that have an antimicrobial effect: S helping to normalize metabolic disorders in the pulp. "Pulpomixine" (Septodont, France) ointment on a sterile cotton ball applied into the cavity under the GIC (delayed filling). It is possible to use other antibiotics, sulfonamides, nitrofurans, antiseptics, or combinations thereof.

II visit. After 6-7 days, in the absence of complaints of pain, it is advisable to put an odontotropic (stimulating the production of replacement dentin) drug on the bottom of the carious cavity after removing the temporary filling under aseptic conditions: "Calcidont", "Calcesil", developed by the company "Vladmiva", "Calcipulpa" ("Septodont"), "Life" ("Kerr"), "Dycal" ("Dentsply"), "Kaptsikur" ("Voco"), "Septocalcin ultra" ("Septodont"), etc. A modern remedy is the use of MTA Prohoo (mineral trioxide aggregate) from Dentsply, the high efficiency of which has been proven in direct pulp coating, an analogue of Trioxident (Vladmiva), Radocem -P (Raduga R LLC). The characteristics of the drugs are described below [15,16].

In some cases, with deep caries (pulp hyperemia), primary chronic fibrous pulpitis, or accidentally exposed pulp horn, treatment can be completed in one visit. Then, a medicinal paste, a glass ionomer cement lining and a permanent filling are immediately applied to the bottom of the aseptically treated, as mentioned earlier, carious cavity. However, in the absence of clinical skills, delayed filling (for 1.5 months) with glass ionomer material for dynamic observation is advisable. When final filling a tooth after successful biological treatment of pulpitis, it is not recommended to use amalgam, plastics, silicate cements and chemically cured composite materials [10]

The most common method of preserving the vitality of the pulp at present is the method of direct and indirect coating of it with preparations containing calcium hydroxide. Currently, a new range of new biomaterials have emerged that consist of hydrophilic microparticles containing modified mineral oxides, the hydrophilicity of which allows them to achieve effective hardening even in a humid environment, in the presence of blood and other organic liquids. Their highly alkaline pH, which appears at the moment of hardening, limits the growth of bacteria. And the high biocompatibility of the material accelerates the process of tissue regeneration. They have impeccable sealing properties and are ideal for closing root perforations. When used for pulp capping, it stimulates the formation of a dentinal bridge [7,19].

There are many drugs that are used in the treatment of pulp hyperemia. Calcium-containing preparations. The basis of calcium-containing materials is calcium hydroxide $\text{Ca}(\text{OH})_2$, which is one of the oldest drugs in dentistry. Calcium hydroxide is a base, slightly soluble in water (1.2 g per 1 liter of water at a temperature of 25°C). When dissociated, it forms calcium ions Ca^{2+} and hydroxide OH^- . Due to the release of ions, the pH increases (12.5-12.8), which provides an antimicrobial effect, which manifests itself only in an aqueous solution until hardening; when water is added, this effect resumes. The antimicrobial properties of calcium hydroxide are due to damage to the bacterial cytoplasmic membrane;



hydroxyl ions promote lipid peroxidation, which leads to the destruction of phospholipid structural components of the cell membrane. An increase in pH leads to the breaking of ionic bonds that provide the tertiary structure of protein molecules. These changes cause the loss of biological activity of the enzyme and disruption of cellular metabolism, resulting in protein denaturation [1,4,18].

Osteoplastic drugs are also used. A.K. Biragova (2011) developed compositions of two medicinal pastes for the treatment of deep caries and acute focal pulpitis. The composition of the combined medicinal paste for the treatment of deep caries included: rosin, unvulcanized rubber, zinc oxide, chloroform 0.2%, sodium fluoride, 20% dimexide solution, osteoplastic preparation "Indost -gel". Composition of a combined medicinal paste for the treatment of acute focal pulpitis: lysozyme, oil solution of vitamin A, zinc oxide, 30% dimexide solution, dexamethasone, neomycin, Collost -gel. When using the developed pastes, rapid restructuring of the suprapulpal layers of dentin, relief of the inflammatory reaction within 7-14 days, and significant activation of the dentinogenetic function of the pulp within 30-60 days were noted. Clinically, the success of treatment after 3 years was 90.6-87.1%, and with the use of GIC and calcium hydroxide - 75.4-62.5% [6,7].

Trioxide aggregate (MTA) (pro-root MTA, Dentsply) has been widely used since its introduction and approval in 1998 by US Food and Drug Administration (American Association for Food and Drug Control), and is still widely used in clinical practice. The basis of the material is: S Portland cement 75% - a mixture of calcium silicates, mainly tricalcium silicate, as well as calcium-containing compounds of iron and aluminum; bismuth oxide 20%; hydrated calcium sulfate (gypsum) 5% [11,14].

A new promising direction for use in the biological treatment of damaged dental pulp in children and adults are single-component and self-etching adhesive systems with high insulating ability, insolubility in biological fluids, low toxicity, a positive effect on the proliferation process, and sometimes pronounced antimicrobial properties [3]. In this case, it is necessary to take into account the patient's age: he should be under 35 years old, he should not have concomitant diseases, and the EOM indicators of the "causal" teeth should be no more than 20-30 μ A [1,20].

Treatment of damaged pulp in case of pulp hyperemia and accidental opening using biological method that ensures complete preservation of its structure and functions, has not yet received proper distribution, as it is associated with frequent the occurrence of complications during treatment and the lack of opportunity post-treatment follow-up and rehabilitation [5,12,17].



Pulpitis is quite often complicated by focal periodontitis: according to the nature of pathological changes in the periodontium, fibrous periodontitis accounts for 24.42%; granulating - 15.03% and granulomatous - 1.94%. X-ray changes in periapical tissues more often occur with chronic pulpitis and with its exacerbation; quantitatively and qualitatively they are more pronounced in incisors and canines and, as a rule, develop in people under 20 years of age and in elderly patients [3,12].

Conclusions. Based on the above, today there are many developments and means that are aimed at preserving the vitality of the tooth. Our domestic manufacturers are improving this area in the development of drugs that stimulate odontoblast function. Based on analysis of literature data, improvement of endodontic treatment methods and development of new dental materials to preserve the vitality of the dental pulp opens up wide opportunities in solving this problem.

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