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ADVANTAGES AND DISADVANTAGES OF THERAPEUTIC PADS BASED ON CALCIUM HYDROXIDE IN THE TREATMENT OF DEEP CARIES

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The abstract

One of the most common diseases of the hard tissues of the tooth is caries. The development of the pathological process begins immediately after teething. The number of adults suffering from caries and having already cured carious cavities reaches 98%. Currently, both children and adolescents have a high prevalence and intensity of dental caries, and there is a tendency to increase the increase in complicated forms of caries. One of the most common forms of caries is deep caries. The task of a dentist in the treatment of deep caries (pulp hyperemia) is not only to restore the integrity of the tooth, but also to stimulate the production of replacement dentin with the help of therapeutic pads, to ensure reliable isolation of the pulp from the toxic effects of materials. In the presence of a wide range of different therapeutic pads and the absence of methods for an objective assessment of the pulp condition, doctors have to "blindly" give preference to one manufacturer or another.

Keywords

therapeutic pads based on calcium hydroxide, deep caries, dentinogenesis, pulp necrosis

Currently, deep caries is classified as pulp hyperemia according to the ICD classification, which emphasizes the fact that initial changes occur in the pulp, initial pulpitis. Pulp hyperemia is extremely difficult to diagnose clinically. Currently, it is known that with this pathology, microcirculation disorders of the pulp occur, characterized by congestive hyperemia.

Treatment of deep caries is carried out using medical pads. There is a wide variety of materials for gaskets that have a therapeutic effect on tooth tissues: calcium-containing, zinc-eugenol and combined pastes. The need to use gaskets is due to their bactericidal, odontotropic, antiseptic effect. The drugs included in the pads perform the following functions: they stimulate the growth of replacement dentin, eliminate the inflammatory process in the tooth pulp, and have an antiseptic effect due to chlorhexidine and metronidazole. The dentist needs to know the changes that occur in the dental pulp when applying a particular type of gasket for prognostic purposes. This issue needs to be considered from two perspectives. On the one hand, the therapeutic gasket should isolate the pulp from the toxic effect of the permanent filling material, on the other hand, it should stimulate the formation of replacement dentin and preserve its viability.

It has been established that preparations containing calcium hydroxide stimulate dentinogenesis. Calcium hydroxide is partially water-soluble, it dissociates and acts as an alkali. Since the environment in the focus of inflammation is acidic, the neutralization reaction stops the inflammatory process. Due to the release of ions, the bactericidal effect persists until the moment of solidification. When water is added to the solidifying preparation, its antimicrobial effect is resumed. Therapeutic calcium-based pads, due to their high pH = 12.4, initially lead to the development of a zone of degeneration and aseptic necrosis at a depth of up to 50-150 microns. Subsequently, normalization of blood supply to the pulp is observed, after 1-3 months — the formation of dentine bridges in the area of the opened pulp horn. When the pulp is indirectly coated, calcium hydroxide leads to the sealing of dentinal tubules and the formation of replacement dentin. The high alkalinity of the preparation provides antiseptic activity and neutralizes the acids released from the cements. It should be noted that the interaction of calcium

hydroxide and carbon dioxide in the air can form calcium carbonate, which leads to the deactivation of the drug. The calcium hydroxide applied to the dentin diffuses through the dentinal tubules and penetrates through a thin layer of dentin into the pulp. With prolonged exposure, diffusion is blocked due to the precipitation of insoluble calcium salts in the dentinal tubules.

The therapeutic lining can be destroyed by the dentinal fluid flowing through the underlying dentinal tubules. This does not happen if the gasket lies in a cavity protected from permeability: with dentin sclerosis, dentinal tubule obturation, or rapid formation of irregular dentin. Such an unregulated process of dentin formation can lead to the formation of conglomerates (denticles) in the pulp chamber, which mechanically act on the pulp and can cause its inflammation.

Positive properties of preparations based on calcium hydroxide:

1) Anti-inflammatory, antiseptic and analgesic effect: they reduce inflammation and reduce pain, especially with pulp hyperemia.;

2)stimulate regeneration: stimulation of the formation of replacement dentin (odontotropic effect);

3)Reduces the risk of secondary caries: when used correctly, the cavity is hermetically sealed, reducing the risk of microcracks and infection.;

4)Ductility and fast hardening: provide ease of use and quick creation of a protective layer.

Negative properties of preparations based on calcium hydroxide:

1) Toxicity: the high alkalinity of some materials (calcium hydroxide) can cause necrosis (necrosis) of the pulp.

2) the formation of denticles and petrifications is possible, which leads to obliteration of the tooth cavity.

3) poor adhesion: they stick weakly to the dentine, which reduces the reliability of fixing the permanent seal and can lead to its separation.

4) Solubility: the material eventually dissolves under the action of liquids, requiring replacement after 1-1.5 months.

5) The need for a change: due to dissolution and other factors, the pads often need to be replaced frequently, which increases the number of visits to the doctor.

Calcium hydroxide preparations come in various forms. Aqueous solutions (Hypocal, Calxyl) are prepared from calcium hydroxide powder and water or a solution of table salt (PH = 12.4). The powder is partially mixed with calcium, potassium, sodium chloride, and sodium bicarbonate (Calxyl). Sometimes radiopaque substances are added. It is difficult to use aqueous solutions of calcium hydroxide, therefore, a thickener is added during their industrial manufacture. Ready-made solutions and powders of calcium hydroxide must be stored in tightly sealed containers in order to prevent the formation of calcium carbonate when exposed to carbon dioxide in the air.

Method of application:

The prepared carious cavity is isolated from saliva (cofferdam, sterile rollers), washed with distilled water, dried with a weak stream of air or a sterile cotton ball. A therapeutic pad is prepared according to the instructions for the material, a probe or a corkscrew is applied pointwise to the projection site of the pulp horn or the deepest part of the carious cavity. It should be noted that the therapeutic cushioning material is applied only to the projection area of the pulp horn, since a microscopic amount of material is sufficient to carry out a therapeutic effect on the tooth pulp. A thick layer of material should not be applied, as it does not have sufficient adhesion to the tooth tissues, it impairs the fixation of the filling. Sealing materials

based on calcium hydroxide should be introduced into the cavity in a minimum amount with the obligatory application of an insulating gasket. After the material has solidified, a temporary seal or insulating gasket is applied and then the sealing is performed according to the indications.

Conclusion. In the treatment of deep caries, medical pads are the "last frontier" of protection, which allows you to keep the tooth alive and avoid nerve removal (pulpitis). But it is important to know not only the advantages but also the disadvantages of therapeutic pads based on calcium hydroxide. Decisions about the installation of a medical pad are made by the dentist based on the clinical picture of the patient's illness.

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