

SANDWICH TECHNOLOGY IN RESTORATIVE DENTISTRY: CLINICAL RATIONALE, ADVANTAGES AND DISADVANTAGES**Gaffarova O.R.**

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Annotation: This article discusses a combined method of restoring hard tooth tissues, known as the "sandwich technique". The method is based on the combined use of glass ionomer cements and composite resins. The biomechanical properties of the materials used are analyzed, the variants of the technique (open and closed sandwich) are described, and the objective advantages and disadvantages of this approach in comparison with monolayer restorations are presented.

Keywords: sandwich technology, glass ionomer cement, composite materials, adhesion, edge fit, biocompatibility.

Introduction.

One of the central problems of modern therapeutic dentistry remains ensuring the durability of restorations in conditions of high occlusal pressure and aggressive oral environment. Despite the fact that fillings made of composite materials have a large number of advantages: they have mechanical strength, resistance to oral fluid and abrasion, good adhesion to tooth tissues, excellent aesthetic qualities, a wide range of indications for use, ergonomics in operation, durability, but also have a number of disadvantages: polymerization shrinkage, deformation with time. Due to the lack of biocompatibility with enamel, dentin and cement, fluorine is not released over time. One of the problems in using composite filling materials is their toxic effect on the tooth pulp. This is due not only to the composition of the material, but also to its photopolymerizability. As a result of the research, it was proved that after polymerization of the light composite, the electrical excitability of the tooth pulp decreased after a day, while the restoration of pulp excitability was noted only in 39.09% on the first day and by 23.25% on the fifth day in the molar group with deep caries. The photoinitiating factor plays a special role in caries, which subsequently is highly likely to lead to treatment outcomes such as pulpitis and periodontitis.

This problem has been relevant for many years and one of the solutions is the proposed "sandwich technique" - layered sealing (from English sandwich — sandwich). Sandwich technology was proposed as a hybrid solution combining the positive properties of glass ionomers (fluorination, chemical adhesion) and composites (strength, aesthetics).

Sandwich technology is divided into two main types, depending on the exposure of the lining material to the external environment.:

1. Closed technique: The CIC is completely covered by a composite. It is used in cases where the carious cavity does not reach the gingival margin, and the main purpose is to create a biological barrier and reduce the volume of the composite.

2. Open technique: The CIC extends to the surface of the tooth in the gingival region. It is used for deep defects of the II and V classes according to Black, where the dentine border is below the level of the enamel.

Advantages of sandwich technology.

The following combinations are used in sandwich technology: compomer-composite; glass ionomer cement – composite, liquid-flow photopolymer – composite.

A variant of the CIC - composite technique is indicated for: low hygiene; high CP index; high frequency of recurrent caries; filling cavities in the root of the tooth or in the neck area; with insufficient enamel thickness or in the absence of it; restoration of teeth with large defects in the

hard tissues of the tooth; in the event that the hard tissues of the tooth have pathological changes, such as in non-carious lesions and adhesive systems designed for the normal structure of tooth tissues, but do not ensure proper sealing and adhesion of the filling; if it is impossible to achieve complete drying of the surgical field. The glass ionomer layer acts as a shock absorber under the composite, increases the durability and strength of the seal, and improves the adhesion of the seal to dentin, as a chemical bond and strong micromechanical adhesion to the composite material are formed between the hard tissues of the tooth and cement. The glass ionomer also ensures tightness for a long time and prevents the occurrence of micro-flows at the filling - hard tooth tissue boundary. When fluoride is released, the risk of secondary caries decreases, as it has been found that caries-causing microorganisms such as streptococci multiply ten times slower on the surface of a glass ionomer seal than on the surface of a composite seal. And coating the glass ionomer with a composite layer on top eliminates such negative properties as low aesthetics and low abrasion resistance. The application of a glass ionomer gasket makes it possible to reduce both the amount of expensive composite material being applied and the polymerization shrinkage of the seal, as well as internal stress, and the possibility of deformation of the seal. The glass ionomer gasket enhances the aesthetics of the seal, as it mimics dentin due to its natural opacity.

Disadvantages and limitations. However, when using the CIC, it is necessary to take into account the disadvantages, such as:

1. The difference of physical and mechanical properties. The elastic modulus of the CIC is lower than that of the composite. With excessive chewing load, this can lead to microdeformations at the interface of materials and subsequent delamination of the restoration.

2. Aesthetic limitations (with an open technique). The CIC has a high opacity and lower color fastness. With an open technique, discoloration or loss of gloss of the material may occur over time in the area of the tooth neck.

3. Sensitivity to moisture. At the stage of maturation (the first 24 hours), the CIC is extremely sensitive to dehydration and excess moisture. An error in the insulation of the working field can lead to a loss of strength of the base layer.

4. Technical complexity. The method requires a two-stage application of materials, which increases the time of admission and requires the doctor to have an accurate knowledge of the protocol for combining specific grades of cement and composite.

The effectiveness of the method directly depends on consistency.:

1. Cavity preparation with the creation of an enamel bevel.

2. Isolation of the tooth with a cofferdam (preferably) or cotton pads

3. Dentine conditioning (weak acids to remove the lubricated layer). This will improve the communication of the CIC.

4. Introduction of CIC (up to the enamel-dentine border when the technique is closed or to the edge of the gum when open). The thickness should be about ~0.5–1 mm, and the adaptation is without bubbles.

5. Waiting for the primary curing phase of the CIC.

6. Acid etching of the enamel and the surface of the CIC.

7. Adhesive application and layer-by-layer composite restoration.

Conclusion.

Sandwich technology remains the "gold standard" in the treatment of deep caries and defects in the cervical region, where adhesion to dentin is a critical factor. Despite the appearance of modern self-etching adhesives, the biological advantages of CIC make this method indispensable in pediatric dentistry and in the treatment of patients with high activity of the carious process. However, the success of a clinical case requires strict timing and an understanding of the material science aspects of the interaction of polymers and cements.

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