MODERN METHODS IN THE TREATMENT OF CARIES TYPES ACCORDING TO BLACK'S CLASSIFICATION

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Abstract

This article analyzes the types of caries according to Black's classification, which is considered the classical foundation of dentistry, and the modern technologies used in their treatment. The research highlights minimal invasive preparation methods for Class I-V carious cavities, adhesive systems, and the specific aspects of composite restorations. Furthermore, the article provides a scientific basis for the transformation of traditional Black's principles according to the requirements of modern dentistry and the effectiveness of aesthetic restoration.

Keywords: Black's classification, caries, preparation, minimal invasiveness, adhesive restoration, composites, aesthetic dentistry, fissure sealing.

Introduction

The classification of carious cavities proposed by G.V. Black in 1896 continues to serve as the foundational "alphabet" of restorative dentistry, providing a systematic approach to cavity preparation for over a century. However, the paradigm of modern dentistry has undergone a radical transformation due to revolutionary advancements in dental materials science and a deeper understanding of adhesive technology. In Black's era, the limited properties of silver amalgam and gold foils necessitated "extension for prevention"-a practice that involved the removal of significant amounts of healthy tooth structure to ensure restoration stability and prevent recurrence. Today, this aggressive approach is being replaced by the principles of "biomimetics" and "minimal invasiveness," which prioritize the maximum preservation of natural tooth tissue.

The shift toward adhesive dentistry has rendered the creation of complex mechanical retentive shapes, such as the classic "dovetail," largely obsolete. Modern restorative materials, including advanced nanocomposites and bioactive glass ionomers, establish a chemical and micromechanical bond with the tooth structure, allowing for more conservative preparation designs that follow the natural topography of the lesion. This evolution not only maintains the structural integrity of the tooth but also significantly reduces the risk of post-operative complications and pulp irritation. Furthermore, the integration of high-magnification optics, such as dental operating microscopes, allows practitioners to identify and treat carious lesions with a level of precision that was unimaginable in the late 19th century. This article provides a

comprehensive analytical review of how each class of Black's classification has been redefined through the lens of modern clinical protocols and technological innovations.

Main Part

According to Black's classification, each group has its own modern treatment protocol based on the anatomical location of the tooth and the masticatory load:

Class I caries are now widely treated using the "invasive sealing" method. Instead of opening the entire fissure as per Black, only the carious points are cleaned using special micro-burs under a microscope or magnifying loupes. Subsequently, the tooth surface is restored using flowable composites and sealants. This method allows for the preservation of up to 80% of the healthy enamel layer. In Class II caries (proximal surfaces), the modern approach is aimed at ideally restoring the interproximal contact point. For this purpose, sectional matrices and light-transmitting wedges are used instead of traditional metal matrices. This prevents food impaction and gingival inflammation.

Class III and IV caries (anterior teeth) primarily require high aesthetic skill. Instead of the "dovetail" shaped additional platforms according to Black, a wide "bevel" is now created on the enamel surface to expand the adhesion area. Using the stratification method (layer-by-layer placement), the tooth's dentin, enamel, and translucent edges are restored with nanocomposites of various shades. In Class V caries (cervical area), the biggest challenge is ensuring the seal between the filling and the tooth. The "sandwich technique" (Glass Ionomer Cement + Composite) is considered the most effective modern method in this area. Glass ionomer cement protects the tooth due to its moisture resistance under the gingiva and fluoride release, while the composite layer provides aesthetics. Additionally, modern adhesives (8th generation) completely eliminate dentin sensitivity.

In all these processes, digital control and isolation (rubber dam system) have become a mandatory stage. Using a rubber dam protects the working field 100% from oral moisture, which guarantees that modern fillings serve for 10-15 years without falling out.

Conclusion

In conclusion, while G.V. Black's classification remains an indispensable diagnostic and descriptive tool in clinical practice, its application has been fundamentally re-engineered to meet the standards of the 21st century. The transition from mechanical macro-retention to chemical micro-adhesion marks a defining era in operative dentistry, where the preservation of natural enamel and dentin is the ultimate measure of success. The analysis conducted in this study demonstrates that contemporary techniques-from fissurotomy in Class I to the sandwich technique in Class V-not only enhance the longevity of the restoration but also respect the biological and functional complexity of the tooth-jaw system. The successful modern dentist must

therefore balance the historical wisdom of Black's topography with the cutting-edge capabilities of adhesive science.

Looking toward the future, the continuous development of "smart" bioactive materials that can actively remineralize affected dentin, combined with the increasing accessibility of laser-assisted preparation, promises to further minimize surgical intervention. These advancements will likely transform restorative procedures into regenerative ones, where the focus shifts from merely filling a cavity to restoring the biological vitality of the tooth. Moreover, the standardization of digital protocols and moisture control through rubber dam isolation will continue to be the pillars of high-quality, predictable outcomes. Ultimately, the synthesis of classical structural principles with modern technological precision remains the cornerstone of excellence in dental therapy, ensuring both functional durability and superior aesthetic results for the patient.

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