Managing dental caries: From diagnosis to restoration.

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Introduction

Dental caries, commonly known as tooth decay, is a multifactorial disease resulting from the interplay of bacterial biofilm, dietary sugars, and host factors. Effective management of dental caries encompasses a continuum from diagnosis to restorative interventions. This comprehensive approach aims to halt the progression of decay, preserve tooth structure, and restore function and aesthetics [1].

Early and accurate diagnosis is critical in managing dental caries. Modern diagnostic tools include visual-tactile examination, radiographs, and emerging technologies like laser fluorescence and digital imaging. Visual-tactile examination remains fundamental, often using the International Caries Detection and Assessment System (ICDAS) to categorize lesions based on severity [2]. Radiographs, particularly bitewing, are instrumental in detecting interproximal caries and assessing lesion depth. Advanced technologies, such as DIAGNOdent, utilize laser fluorescence to detect early enamel demineralization, providing a non-invasive diagnostic adjunct [3].

Prevention is the cornerstone of caries management. Strategies include patient education on oral hygiene practices, dietary counseling to reduce sugar intake, and the use of fluoride. Topical fluorides, such as varnishes and gels, enhance enamel resistance to acid attacks additionally, pit and fissure sealants effectively prevent occlusal caries in children and adolescents [4].

In cases of early carious lesions, remineralization is a viable option. Remineralizing agents, such as casein phosphopeptide-amorphous calcium phosphate (CPP-ACP), help in the deposition of calcium and phosphate ions, thereby reversing early enamel demineralization. Regular monitoring and application of these agents can arrest the progression of non-cavitated lesions [5].

Non-restorative caries control methods focus on managing the cariogenic biofilm and modifying the oral environment. Silver diamine fluoride (SDF) has gained attention for its ability to arrest caries and prevent further decay. SDF application is particularly beneficial in pediatric and special needs patients where traditional restorative treatment may be challenging [6].

When cavitation occurs, restorative intervention becomes necessary. Minimally invasive techniques aim to preserve as much natural tooth structure as possible [7]. The atraumatic restorative treatment (ART) involves the use of hand instruments to remove decayed tissue, followed by the placement of a high-viscosity glass ionomer cement . This technique is advantageous in settings with limited access to dental care [8].

The selection of restorative materials is critical for the longevity and success of the restoration. Composite resins are widely used due to their aesthetic properties and ability to bond to tooth structure. Advances in composite technology have improved their wear resistance and marginal integrity. Glass ionomer cements, with their fluoride-releasing properties, are preferred in high-caries-risk patients and for interim restorations [9].

For extensive carious lesions involving significant tooth structure loss, indirect restorations such as inlays, onlays, or crowns may be indicated. These restorations, often fabricated from ceramic or metal alloys, provide durable solutions for compromised teeth [10].

Conclusion

Managing dental caries involves a comprehensive approach that begins with accurate diagnosis and spans preventive, non-restorative, and restorative interventions. By adopting minimally invasive techniques and leveraging advances in dental materials, clinicians can effectively treat caries while preserving natural tooth structure and maintaining oral health. Continuous education and adaptation to new technologies are essential for optimizing caries management strategies and improving patient outcomes.

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