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REVIEW ARTICLE

Impact of teeth whitening on dental sensitivity in patients with diabetes

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ABSTRACT

Introduction: diabetes alters the body's response to dental procedures, increasing susceptibility to complications such as tooth sensitivity after bleaching.
Objective: to analyze how dental bleaching influences tooth sensitivity in young patients with diabetes.
Methods: a bibliographic search was conducted across different databases, for which a search algorithm was developed, taking into account various descriptors related to the topic. After identifying the available sources, those meeting the inclusion and exclusion criteria were selected, and the literature was analyzed to address the subject matter.
Development: findings show that sustained hyperglycemia affects pulp homeostasis and increases predisposition to inflammation and caries. Dental bleaching, by exposing dentin and opening dentinal tubules, intensifies sensitivity in diabetic patients. A higher incidence of postoperative pain, xerostomia, and risk of infections has been reported. Comparative studies indicate that up to 40 % of diabetic patients experience sensitivity after the procedure, compared to 20 % of non-diabetic patients. The literature highlights the need for adapted protocols, including the use of desensitizing agents, strict glycemic control, and specialized dental follow-up.
Conclusions: dental bleaching in patients with diabetes may exacerbate tooth sensitivity and lead to additional complications. An interdisciplinary approach is recommended, combining metabolic control, rigorous oral hygiene, and safe dental techniques to ensure aesthetic results without compromising pulp health.

Keywords: Tooth Bleaching; Diabetes Mellitus; Dentistry; Dentin Sensitivity.

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INTRODUCTION

Diabetes mellitus is a chronic disease that impairs the body's ability to regulate blood glucose levels. This condition not only affects vital organs such as the heart and kidneys but also has direct repercussions on oral health. Specifically, dental pulp tissue—composed of nerves and blood vessels—plays an essential role in tooth vitality by ensuring its nutrition and sensory response. Sustained hyperglycemia can compromise pulpal microcirculation and increase susceptibility to inflammatory processes, making diabetic patients a high-risk group for dental complications.[1]

Dental sensitivity is a common complication following teeth whitening procedures. This phenomenon is linked to dentin exposure—a mineralized tissue traversed by thousands of dentinal tubules that connect to the pulp's nerve endings. When these tubules are stimulated by thermal, chemical, or mechanical changes, a characteristic painful sensation occurs. Although typically transient, this sensitivity can affect the patient's quality of life and limit acceptance of aesthetic treatment. The use of less aggressive techniques and desensitizing agents are recommended strategies to mitigate this effect.[2]

Individuals with diabetes exhibit compromised oral health due to hyperglycemia, which increases the likelihood of developing periodontal disease and dental caries, making any dental procedure—including whitening—more complex and painful. Teeth whitening is a common cosmetic procedure that uses bleaching agents to lighten dental enamel.[3,4]

Diabetes can trigger a series of adverse changes in pulpal tissue, increasing vulnerability to infections, inflammation, and endodontic complications. Without adequate knowledge and specific management of these effects, diabetic patients face a higher risk of developing severe dental problems that can impact their quality of life and overall health.[5,6]

This treatment may provoke exacerbated inflammatory responses or pathological changes in the pulpal tissue of these patients. However, its effect on pulpal tissue, particularly in diabetic individuals, is not yet fully understood. Based on this gap, the present review was developed with the objective of analyzing how teeth whitening influences dental sensitivity in young patients with diabetes.

METHODS

This study was designed as a systematic bibliographic review, following PRISMA guidelines to ensure transparency and reproducibility in the evidence search and selection process. The search period was limited to January 2010 through December 2024, in order to include recent and relevant studies addressing the relationship between teeth whitening and dental sensitivity in patients with diabetes.

The information sources consulted included widely recognized biomedical databases: PubMed, SciELO, ScienceDirect, Google Scholar, LILACS, and BVSALUD. Additionally, secondary references from selected articles and grey literature (theses, conference proceedings, and institutional documents) were reviewed to broaden the scope of information and reduce publication bias.

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The search strategy was structured using an algorithm combining keywords and Boolean operators. Terms such as "blanqueamiento dental" OR "teeth whitening," "sensibilidad dentaria" OR "tooth sensitivity," and "diabetes mellitus" were linked using AND and OR operators to maximize retrieval of relevant records. Articles in Spanish, English, and Portuguese were considered, as these languages encompass the majority of scientific output in dentistry and public health in the region.

Inclusion criteria comprised original studies, systematic reviews, and clinical trials published within the defined timeframe that directly addressed the interaction between teeth whitening and sensitivity in diabetic patients. Duplicates, articles without full-text access, publications outside the search period, and those with irrelevant topics were excluded.

The selection process was carried out in multiple stages: first, titles and abstracts were screened to exclude non-relevant records; subsequently, full texts of preselected articles were reviewed. Initially, approximately 67 records were identified; after duplicate removal and application of exclusion criteria, 41 articles remained for full-text reading. Finally, 25 studies met the inclusion criteria and were incorporated into the analysis.

DEVELOPMENT

Diabetes mellitus constitutes an important risk factor for oral health, as it is associated with multiple complications affecting both soft tissues and dental structures. One of the most consistent findings in the literature is the increased predisposition to developing periodontal diseases. Hyperglycemia promotes chronic inflammatory processes in the gums, increasing the likelihood of gingivitis and periodontitis. These conditions can lead to gingival recession and root exposure, resulting in dental sensitivity and compromising tooth stability.[7]

Another relevant aspect is the reduction in salivary flow among diabetic patients. Xerostomia—resulting from metabolic alterations and the use of certain medications—diminishes saliva's protective capacity against acids and limits the supply of essential minerals needed for enamel remineralization. This condition not only favors caries development but also intensifies dental sensitivity to thermal and chemical stimuli.[8]

The compromised immune system in individuals with diabetes increases susceptibility to oral infections. Greater predisposition to infectious processes—such as oral candidiasis or periodontal abscesses—indirectly contributes to the onset of dental sensitivity and the progression of dental complications.[9] Added to this is the tendency to develop caries, especially in cases of poor glycemic control. Elevated glucose levels in saliva create a favorable environment for bacterial proliferation, facilitating enamel demineralization and dentin exposure.[10]

Furthermore, changes in dental structure and supporting tissues have been reported. High glucose levels in oral fluids can alter enamel mineralization and modify gingival response, leading to heightened sensitivity to external stimuli such as cold, heat, or sweet foods.[11] In some patients, diabetic neuropathy also plays a significant role, as damage to peripheral nerves may affect sensory perception in the oral cavity, exacerbating dental sensitivity.[12]

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Medications used to manage diabetes and its complications—such as hypoglycemic agents and antihypertensives—can cause side effects including dry mouth and alterations in dental sensitivity perception.([13]) These effects are exacerbated when glycemic control is inadequate, as sustained hyperglycemia intensifies inflammatory processes and promotes bacterial colonization in the oral cavity. Over time, these alterations can lead to severe complications, such as tooth loss due to advanced periodontal disease, significantly impacting patients' quality of life.[14,15]

Addressing dental sensitivity in individuals with diabetes requires an integrated approach that links the systemic dimension of the disease with specific oral care strategies. The literature consistently identifies glycemic control as the cornerstone of such care, as sustained hyperglycemia is associated with a higher risk of oral and periodontal complications. Therefore, regular monitoring of blood glucose levels, along with strict adherence to pharmacological treatment and recommended dietary plans, constitutes an essential measure to reduce susceptibility to dental sensitivity and preserve oral health in this patient population.[16]

In terms of oral hygiene, numerous studies highlight the effectiveness of desensitizing toothpastes containing compounds such as potassium nitrate or stannous fluoride. When combined with meticulous brushing, systematic flossing, and antimicrobial mouth rinses, these formulations help reduce bacterial plaque and improve response to painful stimuli. At the professional level, the application of fluoride varnishes and dental sealants has become a well-established preventive intervention that strengthens enamel and reduces sensitivity, while laser therapies have shown promising results in tooth desensitization, expanding the available therapeutic arsenal.[17,18]

Healthy lifestyle habits complement these clinical and self-care measures. Evidence suggests that avoiding acidic foods and beverages—responsible for enamel erosion—is crucial to prevent exacerbation of sensitivity. Likewise, maintaining adequate hydration supports salivary production, which serves as a natural protective mechanism against dental demineralization. In this context, regular dental visits not only enable early detection of complications but also facilitate professional cleanings and monitoring of periodontal health—key elements for ensuring a comprehensive and sustained approach over time.[19,20]

Diabetes, as a chronic condition impairing blood glucose regulation, directly impacts oral health and dental pulp tissue.[21] Hyperglycemia and associated immunosuppression increase the risk of periodontitis, caries, and other complications.[22] In this context, teeth whitening may exacerbate sensitivity and trigger inflammatory responses in the pulp tissue, highlighting the need for adapted protocols for diabetic patients.[23]

The findings of these studies underscore the importance of designing safe and personalized therapeutic strategies for this patient group. Managing dental sensitivity in diabetics requires close collaboration among the patient, dentist, and treating physician to integrate glycemic control, rigorous oral hygiene, professional desensitizing treatments, and healthy habits into a comprehensive care plan. This multidisciplinary approach not only reduces dental sensitivity but also enhances the overall quality of life and well-being of diabetic patients.[24,25]

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CONCLUSION

Diabetes mellitus, by impairing glucose regulation and immune response, increases the risk of periodontal disease, dental caries, and other oral complications that directly affect dental pulp tissue. In this context, teeth whitening—although widely used for aesthetic purposes—can exacerbate dental sensitivity in diabetic patients and promote pulpal inflammatory responses. These findings highlight the need to develop safe, adapted dental protocols that integrate metabolic control, rigorous oral hygiene, professional desensitizing treatments, and healthy lifestyle habits, in close collaboration among the patient, dentist, and treating physician. Such an interdisciplinary approach is essential to ensure aesthetic benefits without compromising oral health or quality of life in this

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