

IMPROVING THE EFFECTIVENESS OF TREATMENT OF CATARRHAL GINGIVITIS IN ADOLESCENTS WITH DIABETES MELLITUS

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Introduction Catarrhal gingivitis is a frequent inflammatory periodontal condition among adolescents, characterized by gingival redness, swelling, bleeding, and discomfort. The prevalence of this disease significantly increases in adolescents with diabetes mellitus, as chronic hyperglycemia alters immune responses, reduces salivary flow, increases bacterial growth, and promotes oxidative stress, thereby exacerbating periodontal inflammation. Poor glycemic control leads to increased susceptibility to oral infections and worsens periodontal outcomes. Effective management of catarrhal gingivitis in diabetic adolescents is essential to prevent further periodontal complications and to improve overall oral and systemic health. Conventional treatment strategies often include mechanical plaque removal, oral hygiene education, and antiseptic mouth rinses, yet these measures may not be sufficient in diabetic patients due to delayed tissue healing and altered host response. Therefore, optimizing treatment protocols tailored for diabetic adolescents plays a crucial role in reducing disease severity, enhancing clinical outcomes, and improving quality of life for young patients.

Objective The objective of this study was to evaluate and improve the effectiveness of therapeutic measures for treating catarrhal gingivitis in adolescents with diabetes mellitus by assessing clinical outcomes, reducing inflammatory symptoms, and enhancing gingival healing through a modified comprehensive treatment protocol. This research aimed to develop an optimized clinical management strategy for adolescents with diabetes mellitus suffering from catarrhal gingivitis by implementing a multidisciplinary treatment concept. The primary goal was to not only eliminate gingival inflammation but also enhance the biological response of periodontal tissues in a glucose-compromised environment. Special focus was placed on evaluating the synergistic impact of antioxidant support, metabolic control guidance, and reinforced oral hygiene education adapted to diabetic youth. Additionally, the study sought to monitor improvements in gingival vascular response, tissue resilience, patient-perceived comfort, and plaque-control skills over time, highlighting the importance of metabolic correction as part of periodontal therapy.

Materials and Methods A total of 60 adolescents aged 12–17 years diagnosed with diabetes mellitus and clinical signs of catarrhal gingivitis were included in the study. Patients were divided into two groups of 30 each. Group I received standard periodontal therapy, including professional dental cleaning, scaling, oral hygiene instructions, and antiseptic rinses containing chlorhexidine. Group II received an enhanced treatment protocol combining standard therapy with antioxidant gel application, vitamin supplementation, and individualized oral hygiene training focused on glycemic control awareness. Clinical indicators such as gingival index, papillary bleeding index, plaque index, and patient subjective discomfort levels were recorded at baseline, after 7 days, and after 14 days. Glycemic status (HbA1c) and oral hygiene habits were monitored to assess their influence on gingival healing.

Results Both groups demonstrated clinical improvement during the treatment period; however, Group II showed significantly greater reductions in gingival inflammation, bleeding, and plaque levels. After 14 days, the mean gingival index decreased by 65% in Group II compared to 42% in Group I. The papillary bleeding index reduction was 72% in the enhanced therapy group versus 48% in the standard therapy group. Patients in Group II reported faster pain relief and improved chewing comfort. Healing rate and visual gingival appearance improved more rapidly in Group II, demonstrating stronger inflammatory control and tissue recovery. Additionally, improved compliance with oral hygiene instructions was observed among patients receiving individualized diabetic-specific advice. The enhanced treatment method demonstrated superior therapeutic effects compared to conventional dental management. Adolescents receiving the comprehensive protocol exhibited pronounced improvement in soft-tissue tone, reduced gingival hyperemia, and faster epithelial recovery. Objective indices showed notable progress: plaque accumulation significantly decreased by the second week, bleeding on probing markedly diminished, and gingival tissue firmness increased. Patients reported improved self-confidence, less halitosis, and better oral comfort during daily activities such as eating and toothbrushing. Moreover, adherence to oral hygiene instructions improved after diabetes-focused education, resulting in sustained plaque control. Importantly, subjects with stable glycemic indicators experienced the fastest tissue recovery, emphasizing the essential role of metabolic stability in oral healing.

Discussion The findings highlight that traditional treatment alone is insufficient for managing gingival inflammation in adolescents with diabetes due to metabolic disturbances and slower tissue regeneration. Enhanced therapy incorporating antioxidants, micronutrients, and targeted oral hygiene education proved more effective in reducing periodontal inflammation and accelerating gingival healing. This improvement may be attributed to reduced oxidative stress, better microbial control, and strengthened host immune function. Emphasizing diabetic awareness in oral hygiene education also contributed to higher treatment compliance and improved home-care performance. These results suggest that periodontal therapy for diabetic adolescents should integrate systemic and metabolic considerations to achieve optimal outcomes.

The findings confirm that healing processes in young diabetic individuals require tailored strategies that account for metabolic vulnerabilities. Hyperglycemia alters salivary function, weakens immune cell performance, and increases oxidative stress, consequently delaying periodontal recovery if traditional treatment is used alone. Integrating antioxidant therapy and micronutrient supplementation strengthened epithelial regeneration and improved microcirculation in gingival tissues. Simultaneously, teaching patients the correlation between glucose control and gum health enhanced motivation, reflecting a behavioral-based improvement in oral hygiene consistency. These outcomes highlight the necessity of pairing mechanical dental therapies with metabolic-supportive and educational components. Such a holistic methodology demonstrates promising potential for broader clinical application in diabetic dental care protocols and could reduce long-term periodontal complications in this vulnerable age group.

Conclusion The study demonstrates that improving the effectiveness of treatment for catarrhal gingivitis in adolescents with diabetes mellitus requires a comprehensive therapeutic approach that includes professional dental cleaning, antiseptic therapy, antioxidant support,

vitamin supplementation, and individualized oral hygiene education. Enhanced treatment protocols significantly reduce inflammation, bleeding, and discomfort, while promoting faster gingival healing and improving oral health behavior. Considering the strong relationship between diabetes and periodontal disease, personalized periodontal therapy should be incorporated into routine care for diabetic adolescents to support both oral and systemic health. A structured, biologically orientated periodontal treatment protocol substantially elevates therapeutic outcomes in diabetic adolescents with catarrhal gingivitis. Combining professional gum therapy with antioxidant formulations, vitamin support, and personalized diabetes-focused oral hygiene instruction significantly accelerates tissue regeneration, reduces inflammatory manifestations, and improves clinical indices. The enhanced approach strengthens gingival resistance to microbial aggression, promotes sustained plaque control behaviors, and supports better patient well-being and self-management skills. Considering the long-term periodontal risks associated with diabetes, dental practitioners should incorporate metabolic awareness, nutritional assistance, and targeted oral health guidance when treating young diabetic patients. This integrative framework serves as a highly effective strategy and is recommended as a standard clinical model in pediatric diabetic dentistry.

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