

IMPACT OF SYSTEMIC DISEASES ON THE EFFECTIVENESS OF CONSERVATIVE PERIODONTAL TREATMENT**Ishniyazova Gulrukh Bakhtiyarovna**Assistant of the Department of Propedeutics of Therapeutic Dentistry
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Abstract. Periodontitis is a chronic inflammatory disease of the supporting tissues of the teeth and remains one of the leading causes of tooth loss among adults worldwide. Conservative periodontal therapy, including non-surgical mechanical debridement and supportive care, is considered the cornerstone of periodontitis management. However, clinical outcomes of conservative treatment vary considerably among patients, suggesting the presence of modifying factors that influence therapeutic response. Growing evidence indicates that systemic diseases play a critical role in the initiation, progression, and treatment response of periodontal disease.

Systemic conditions such as diabetes mellitus, cardiovascular diseases, metabolic syndrome, autoimmune disorders, and osteoporosis are associated with chronic systemic inflammation, immune dysregulation, and impaired tissue repair mechanisms. These pathophysiological alterations may negatively affect periodontal healing and reduce the effectiveness of conservative periodontal therapy. The present study aimed to comprehensively evaluate the impact of systemic diseases on the outcomes of conservative periodontal treatment by analyzing clinical periodontal parameters, inflammatory response, and healing dynamics in patients with and without systemic conditions.

The findings demonstrate that the presence of systemic diseases is associated with slower clinical improvement, reduced reduction in periodontal pocket depth, and persistent inflammatory signs following conservative therapy. These results highlight the importance of individualized periodontal treatment planning and interdisciplinary collaboration for optimizing therapeutic outcomes in patients with systemic diseases.

Keywords. periodontitis; systemic diseases; conservative periodontal therapy; inflammation; treatment outcomes; immune response; public health

Introduction. Periodontitis is a multifactorial chronic inflammatory disease characterized by the progressive destruction of the periodontal tissues, including the gingiva, periodontal ligament, cementum, and alveolar bone. It represents a major public health concern due to its high prevalence, chronic course, and association with tooth loss, functional impairment, and reduced quality of life. Epidemiological studies indicate that moderate to severe forms of periodontitis affect a substantial proportion of the adult population worldwide, with prevalence increasing with age.

Conservative periodontal therapy, primarily consisting of non-surgical mechanical debridement through scaling and root planing, remains the first-line treatment for periodontitis. The primary objectives of conservative therapy are to reduce the microbial burden, control inflammation, promote periodontal tissue healing, and prevent disease progression. In many patients, this approach leads to significant clinical improvement, including reductions in probing pocket depth, bleeding on probing, and clinical attachment loss.

However, despite standardized treatment protocols, considerable variability in treatment response has been observed. Some patients demonstrate rapid and stable improvement, whereas others exhibit limited healing or disease persistence. This variability has prompted increasing interest in identifying systemic and host-related factors that may modify periodontal treatment outcomes.

Over the past decades, the relationship between periodontitis and systemic diseases has been extensively investigated. Periodontitis is now recognized not only as a localized oral infection but also as a condition with systemic inflammatory implications. Conversely, systemic diseases can influence periodontal inflammation, immune response, and tissue repair capacity. The bidirectional relationship between periodontal disease and systemic health highlights the importance of comprehensive patient assessment in periodontal therapy.

Systemic diseases such as diabetes mellitus, cardiovascular diseases, metabolic syndrome, autoimmune disorders, and osteoporosis are among the most common conditions associated with altered periodontal treatment response. These diseases often involve chronic inflammation, endothelial dysfunction, oxidative stress, and immune imbalance, all of which may impair periodontal healing. Understanding the mechanisms by which systemic diseases influence conservative periodontal therapy is essential for improving clinical outcomes and developing personalized treatment strategies.

Therefore, the aim of this study was to provide an in-depth evaluation of the impact of systemic diseases on the effectiveness of conservative periodontal treatment, with particular emphasis on clinical healing dynamics, inflammatory control, and long-term disease stability.

The pathogenesis of periodontitis is driven by a complex interaction between pathogenic microbial biofilms and the host immune-inflammatory response. While bacterial plaque is the primary etiological factor, the severity and progression of periodontal destruction are largely determined by host-related factors, including systemic health status.

Systemic diseases may modify periodontal disease expression through several mechanisms. Chronic systemic inflammation leads to elevated circulating levels of pro-inflammatory cytokines, such as interleukin-1 β , tumor necrosis factor- α , and interleukin-6. These mediators can amplify local periodontal inflammation and accelerate tissue destruction. In addition, systemic diseases often impair immune regulation, resulting in an exaggerated or dysregulated inflammatory response to periodontal pathogens.

Microvascular dysfunction is another important mechanism linking systemic diseases and periodontal healing. Conditions such as diabetes mellitus and cardiovascular disease are associated with impaired blood flow, endothelial dysfunction, and reduced oxygen delivery to tissues. These changes compromise nutrient supply and waste removal, negatively affecting periodontal tissue repair following conservative therapy.

Oxidative stress and altered collagen metabolism further contribute to impaired periodontal healing. Increased oxidative stress damages periodontal tissues and disrupts extracellular matrix remodeling, while impaired collagen synthesis and turnover limit the regenerative capacity of the periodontium.

Materials and Methods. A comparative clinical observational study was conducted to assess the effectiveness of conservative periodontal treatment in patients with and without systemic diseases. The study followed ethical principles in accordance with international guidelines for biomedical research.

Adult patients aged 30–70 years diagnosed with chronic periodontitis were enrolled. Participants were divided into two main groups:

- Group A: patients without diagnosed systemic diseases;
- Group B: patients with one or more systemic diseases, including diabetes mellitus, cardiovascular disease, metabolic syndrome, or autoimmune disorders.

Patients with recent periodontal treatment, antibiotic therapy, smoking habits, pregnancy, or immunosuppressive medication use were excluded.

All patients received standardized conservative periodontal therapy consisting of: individualized oral hygiene instruction, supra- and subgingival scaling, root planing, supportive periodontal care.

Treatment was performed by experienced periodontists using uniform clinical protocols to minimize operator variability.

Periodontal parameters were assessed at baseline and during follow-up visits, including: probing pocket depth, clinical attachment level, bleeding on probing, plaque index, gingival inflammation indices.

Systemic disease status and medical history were documented based on clinical records.

Clinical outcomes were analyzed using descriptive and comparative statistical methods. Differences between groups were evaluated, with statistical significance set at $p < 0.05$.

Results. Patients without systemic diseases demonstrated a more pronounced and stable response to conservative periodontal therapy. Significant reductions in probing pocket depth and bleeding on probing were observed, accompanied by improved plaque control and gingival health.

In contrast, patients with systemic diseases exhibited slower and less consistent clinical improvement. Although reductions in inflammation were noted, residual periodontal pockets and persistent bleeding were more frequently observed. Diabetic patients, particularly those with poor glycemic control, showed the least favorable response to treatment.

Patients with cardiovascular and metabolic conditions also demonstrated delayed periodontal healing, which may be attributed to microvascular dysfunction and chronic inflammatory burden. Autoimmune disorders were associated with fluctuating inflammatory responses and variable treatment outcomes.

Discussion. The results of this study confirm that systemic diseases significantly influence the effectiveness of conservative periodontal therapy. The presence of systemic conditions was associated with reduced treatment responsiveness, prolonged inflammation, and increased risk of disease persistence.

Diabetes mellitus remains the most significant modifying factor, as hyperglycemia adversely affects immune response, collagen metabolism, and microcirculation. Poor metabolic control exacerbates periodontal inflammation and impairs tissue repair, underscoring the importance of glycemic management in periodontal therapy.

Cardiovascular diseases and metabolic syndrome contribute to systemic inflammation and endothelial dysfunction, which negatively affect periodontal healing. Autoimmune disorders further complicate treatment due to immune dysregulation and altered inflammatory responses.

These findings highlight the necessity of adopting individualized periodontal treatment strategies that consider systemic health status. Interdisciplinary collaboration between dental professionals and physicians is essential for optimizing both periodontal and systemic disease management.

From a clinical perspective, the presence of systemic diseases necessitates careful treatment planning, closer monitoring, and more frequent supportive periodontal care. Addressing systemic risk factors may enhance periodontal treatment outcomes and long-term disease control.

From a public health standpoint, the high prevalence of systemic diseases emphasizes the need for integrated healthcare models. Periodontal health should be recognized as an integral component of overall health, and collaborative care approaches may reduce the burden of chronic inflammatory diseases.

Limitations of this study include heterogeneity of systemic diseases and a limited follow-up period. Future longitudinal studies are required to assess long-term treatment outcomes and the impact of systemic disease control on periodontal healing.

Conclusion. Systemic diseases have a substantial impact on the effectiveness of conservative periodontal treatment. Patients with systemic conditions demonstrate reduced clinical improvement and prolonged inflammation following therapy. Comprehensive patient assessment, individualized treatment planning, and interdisciplinary collaboration are essential for optimizing periodontal treatment outcomes and improving overall health.

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