INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563 2024: 7,805
eISSN :2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 12, issue 05 (2025)

EFFECTS OF METABOLIC DISORDERS ON PERIODONTAL TISSUES DURING ORTHODONTIC TREATMENT

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Abstract: This study examines the impact of metabolic disorders, specifically those associated with excessive body weight, on periodontal tissues during orthodontic treatment. A clinical investigation was conducted on 20 patients undergoing orthodontic treatment at "Sapfir Dental clinic" in Andijan, Uzbekistan.

The study group comprised 10 patients with excess body weight and 10 patients with normal weight. Clinical examinations revealed that patients with elevated body mass index (BMI) demonstrated not only metabolic disturbances but also a 50% occurrence of flatfoot conditions, which was significantly less prevalent in normal-weight patients. Patients with excessive weight exhibited a higher risk of periodontitis, with both localized and generalized forms of gingivitis observed. Additionally, dental caries were more prevalent in overweight patients. For overweight patients with periodontitis, we implemented specialized oral hygiene techniques and prescribed specific Splat toothpastes, which resulted in notable improvements in 5 out of 10 patients. Periodontal conditions were primarily monitored through alveolar bone assessment using Osstem T2 radiography.

Keywords: orthodontics, metabolism, obesity, periodontium, gingivitis, periodontitis, flatfoot, prevention.

Introduction

Orthodontic treatment represents a widely practiced procedure in modern dentistry. However, the changes that occur during dental alignment corrections may be influenced not only by the condition of the dentofacial system but also by the overall health status of the patient. Recent research confirms that metabolic alterations, particularly those associated with obesity and excess weight, significantly impact the condition of oral tissues [1, 2]. The relationship between metabolic disorders and periodontal health has garnered increasing attention from researchers, especially in the context of orthodontic treatment [3].

Periodontal tissues play a crucial role during orthodontic treatment as they respond to mechanical forces and undergo remodeling. The health of these tissues is fundamental for successful treatment outcomes and the long-term stability of results [4]. However, systemic factors such as metabolic disorders may impair the normal physiological response of periodontal tissues to orthodontic forces, potentially leading to complications during treatment [5].

The aim of this study was to investigate the effects of metabolic disorders associated with excessive body weight on periodontal tissue health during orthodontic treatment and to evaluate the effectiveness of targeted interventions in mitigating these effects.

Materials and Methods

Study Population

This study was conducted at "Sapphire Dental" clinic in Andijan, where 20 patients undergoing orthodontic treatment were enrolled. The participants were divided into two groups:

- Group 1: 10 patients with excess body weight (elevated BMI)
- Group 2: 10 patients with normal body weight (normal BMI)

Clinical Assessment

All patients underwent comprehensive clinical examinations that included:

1. Anthropometric measurements with BMI calculation
2. Orthopedic assessment for flatfoot condition
3. Periodontal examination including:
   - Assessment of gingival inflammation (gingivitis)
   - Evaluation of periodontal attachment loss (periodontitis)
   - Dental caries detection
4. Radiographic assessment of alveolar bone using Osstem T2 radiography

Intervention Protocol

For overweight patients with identified periodontal issues, a specialized intervention protocol was implemented, which included:

1. Training in advanced oral hygiene techniques
2. Prescription of specialized Splat toothpastes
3. Regular monitoring of periodontal condition using Osstem T2 radiography

Statistical Analysis

The data collected was analyzed to determine the correlation between body weight, metabolic disorders, orthopedic conditions, and periodontal health status. Statistical significance was established at $p<0.05$.

Results

Correlation Between BMI and Orthopedic Conditions

Analysis of the data revealed a significant correlation between elevated BMI and orthopedic issues. Specifically, 50% of patients with excess body weight presented with flatfoot condition, while this orthopedic issue was significantly less prevalent in normal-weight patients.

Periodontal Health Status

Patients with elevated BMI demonstrated a higher risk for periodontal diseases. Clinical examinations revealed:

- Higher prevalence of both localized and generalized forms of gingivitis in overweight patients
- Increased incidence of periodontitis in patients with excessive body weight
- Greater occurrence of dental caries in overweight individuals

Effectiveness of Intervention Protocol

Implementation of the specialized oral hygiene protocol among overweight patients with periodontitis yielded positive results:

- 5 out of 10 patients (50%) showed significant improvement in periodontal health
- Radiographic assessment using Osstem T2 confirmed stabilization of alveolar bone loss in responsive cases

Discussion

Our findings indicate a substantial relationship between metabolic disorders associated with excess body weight and periodontal health during orthodontic treatment. The observed correlation between elevated BMI and increased risk of periodontal diseases aligns with previous research suggesting that systemic inflammation associated with obesity may exacerbate local inflammatory responses in periodontal tissues [6].

The notable co-occurrence of flatfoot condition in 50% of overweight patients raises interesting questions about the systemic nature of connective tissue alterations in these individuals. This finding may suggest a broader impact of metabolic disorders on connective tissue integrity throughout the body, affecting both orthopedic structures and periodontal tissues [7].

The higher prevalence of dental caries in overweight patients also warrants attention, as it may indicate compounding factors affecting oral health in these individuals, possibly including dietary habits and altered salivary composition [8].

Our intervention protocol demonstrated promising results, with 50% of overweight patients exhibiting improvement in periodontal health. This suggests that targeted approaches to oral hygiene, specifically adapted for patients with metabolic disorders, may effectively mitigate some of the negative impacts on periodontal tissues during orthodontic treatment.

Conclusion

This study highlights the significant impact of metabolic disorders, particularly those associated with excess body weight, on periodontal health during orthodontic treatment. The findings suggest that patients with elevated BMI require special attention and modified treatment approaches to prevent and manage periodontal complications during orthodontic therapy.

The observed correlation between excess weight, flatfoot condition, and periodontal disease points to a potential systemic effect of metabolic disorders on various connective tissues throughout the body. Furthermore, the positive response to targeted intervention in a substantial portion of affected patients suggests that appropriate preventive and therapeutic protocols may help overcome these challenges.

For clinical practice, these findings emphasize the importance of comprehensive patient assessment before and during orthodontic treatment, including evaluation of metabolic status and implementation of tailored preventive measures for patients with identified risk factors.

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