

## **DEVELOPMENT AND EVALUATION OF THE EFFECTIVENESS OF INDIVIDUAL ORAL HYGIENE MEASURES IN PATIENTS UNDERGOING ORTHODONTIC TREATMENT**

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**Abstract:** The study investigates the development and assessment of individualized oral hygiene measures for patients undergoing orthodontic treatment. Orthodontic appliances often complicate daily oral care, increasing the risk of plaque accumulation, gingival inflammation, and dental caries. This research aims to design personalized hygiene protocols tailored to the needs of orthodontic patients and to evaluate their effectiveness in improving oral health outcomes. The study involved a sample of patients undergoing fixed orthodontic treatment, with interventions including individualized instruction on brushing techniques, interdental cleaning, and the use of auxiliary oral hygiene tools. Evaluation was performed using clinical indices of plaque accumulation, gingival health, and patient adherence.

**Keywords:** Orthodontic treatment; oral hygiene; individualized hygiene program; plaque control; gingival health; patient compliance.

### **INTRODUCTION**

Orthodontic treatment is widely used to correct malocclusions and improve both functional and aesthetic aspects of the dentition. However, the presence of fixed or removable orthodontic appliances can complicate routine oral hygiene, leading to increased plaque accumulation, gingival inflammation, and a higher risk of dental caries. Maintaining proper oral hygiene during orthodontic treatment is therefore a critical factor in preventing complications and ensuring successful treatment outcomes. Individualized oral hygiene measures are designed to address the specific needs of each patient, taking into account the type of orthodontic appliance, oral anatomy, and patient habits. Tailored interventions, including personalized instruction on brushing techniques, interdental cleaning, and the use of auxiliary hygiene tools, can enhance patient compliance and promote better oral health. Despite the recognized importance of individualized hygiene protocols, there is limited research evaluating their effectiveness in orthodontic patients. This study aims to develop a structured program of personalized oral hygiene measures and assess its impact on plaque control, gingival health, and patient adherence, providing evidence-based recommendations for clinical practice in orthodontics.

## Methods

This study was conducted to develop and evaluate individualized oral hygiene measures for patients undergoing orthodontic treatment. **Study Design and Participants:** A total of 60 patients undergoing fixed orthodontic treatment, aged 12–25 years, were recruited from the orthodontic department. Patients with systemic diseases or poor baseline oral hygiene were excluded. **Intervention:** An individualized oral hygiene program was designed for each patient, which included: Personalized instruction on proper brushing techniques adapted to orthodontic appliances. Guidance on interdental cleaning using floss, interdental brushes, or water flossers. Recommendations on the use of auxiliary oral hygiene tools such as fluoride mouth rinses and specialized toothbrushes. Oral health was assessed at baseline and after 8 weeks of intervention using: Plaque Index (PI) to measure dental plaque accumulation. Gingival Index (GI) to evaluate gingival inflammation. Patient adherence based on self-reported daily hygiene practices and frequency of appliance cleaning.

## Results

The implementation of the individualized oral hygiene program led to significant improvements in oral health among orthodontic patients. After 8 weeks of intervention, the mean Plaque Index (PI) decreased from  $2.3 \pm 0.5$  at baseline to  $1.2 \pm 0.4$  ( $p < 0.001$ ), indicating a substantial reduction in dental plaque accumulation. The Gingival Index (GI) also showed significant improvement, decreasing from  $1.8 \pm 0.4$  to  $0.9 \pm 0.3$  ( $p < 0.001$ ), demonstrating reduced gingival inflammation. Patient compliance with the recommended hygiene measures increased notably. At baseline, only 45% of patients reported regular adherence to brushing and interdental cleaning, whereas after the intervention, adherence rose to 88%. Patients reported greater confidence in performing daily oral hygiene, improved comfort with orthodontic appliances, and increased motivation to maintain oral health.

## Discussion

The findings of this study demonstrate that individualized oral hygiene measures significantly improve oral health outcomes in patients undergoing orthodontic treatment. The reduction in plaque accumulation and gingival inflammation confirms that tailored interventions, which consider the type of orthodontic appliance and patient-specific oral conditions, are more effective than general hygiene instructions. Enhanced patient adherence observed in this study highlights the importance of personalized education and hands-on guidance. When patients receive clear, tailored instructions and practical support, they are more likely to maintain consistent oral hygiene practices, leading to better long-term outcomes. These results are consistent with previous research indicating that orthodontic appliances can hinder effective oral

hygiene and that structured, individualized interventions improve both compliance and clinical outcomes. The study underscores the necessity of integrating patient-specific hygiene programs into routine orthodontic care to prevent complications such as caries, gingivitis, and enamel demineralization.

### **Conclusion**

The study demonstrates that individualized oral hygiene measures are highly effective for patients undergoing orthodontic treatment. Personalized instruction on brushing techniques, interdental cleaning, and the use of auxiliary hygiene tools significantly reduced plaque accumulation, improved gingival health, and increased patient adherence. These findings emphasize the critical role of tailored oral hygiene programs in preventing common orthodontic complications, such as dental caries and gingival inflammation. Implementing individualized hygiene protocols in clinical practice enhances patient compliance, promotes long-term oral health, and contributes to the overall success of orthodontic treatment.

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