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**CLINICAL AND FUNCTIONAL JUSTIFICATION OF USING
INDIVIDUAL ADAPTIVE SPLINTS AND THEIR IMPACT ON
DENTURE RETENTION IN COMPLETELY EDENTULOUS PATIENTS**

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ABSTRACT

This article analyzes the main clinical and functional factors influencing denture retention in completely edentulous patients. Particular attention is paid to the morphofunctional condition of the oral mucosa, its adaptive capacity to prosthetic load, and their relationship with denture stability. The use of individual adaptive splints is substantiated as an effective stage of preliminary mucosal preparation. Clinical observations demonstrate that adaptive splints reduce pain symptoms, shorten the adaptation period, and significantly improve the retention and stability of removable dentures.

Keywords: *complete edentulism, individual adaptive splints, oral mucosa, removable dentures, denture retention, clinical effectiveness*

1. INTRODUCTION

Complete edentia is one of the most challenging conditions in orthopedic dentistry, associated with significant functional, morphological, and psychoemotional impairments. Absence of teeth leads to a sharp reduction in chewing efficiency, impaired speech and aesthetics, and significant changes in the tissues of the denture bed. In complete edentia, the oral mucosa is subject to constant mechanical stress from removable dentures, which often leads to trauma and inflammatory changes. It is known that the success of orthopedic treatment in complete edentia is largely determined by the condition of the denture bed mucosa and its ability to adapt to prosthetic pressure. Alveolar atrophy, epithelial thinning, impaired microcirculation, and decreased tissue trophism significantly limit the adaptive capacity of the mucosa. As a result, patients experience pain, hyperemia and erosion, which negatively affects the fixation of the prostheses and reduces the quality of life [1.2.4].



2. MATERIALS AND METHODS

Table 1

The main morphofunctional changes in the oral mucosa in complete edentia

Indicator	Nature of changes	Clinical significance
Epithelial thickness	Reduced	Increased trauma
Microcirculation	Violated	Slow regeneration
Collagen fibers	Degeneration	Loss of elasticity
Pressure resistance	Reduced	Pain syndrome

Custom-made adaptive mouth guards are orthopedic devices manufactured to suit the anatomical features of a specific patient's prosthetic bed and designed for the

gradual preparation of the mucous membrane for subsequent prosthetic replacement. Their primary principle of operation is to evenly distribute mechanical load and reduce the intensity of traumatic impact on the tissues of the prosthetic bed [6.7].

The use of adaptive mouth guards allows for a gentle functional load on the mucous membrane, which helps restore microcirculation, reduce inflammation, and improve tissue resistance to prosthetic pressure. Gradual adaptation of the mucous membrane reduces the likelihood of acute traumatic injuries and promotes the formation of a more stable prosthetic bed.

3. RESULTS

From a clinical perspective, the use of custom-made adaptive mouth guards can shorten the period of patient adaptation to removable dentures, reduce pain, and increase subjective satisfaction with the results of orthopedic treatment. Furthermore, preliminary mucosal rehabilitation helps improve the fixation and stabilization of complete dentures, especially in patients with severe alveolar ridge atrophy.



Table 2

Clinical and functional effects of using individual adaptive mouth guards

Direction of impact	Effect	Clinical outcome
Protection of the mucous membrane	Reducing trauma	Reducing inflammation
Tissue adaptation	Gradual loading	Reducing the adaptation period
Microcirculation	Improvement	Increased regeneration
Fixation of prostheses	Stabilization	Increased treatment effectiveness

Clinical evaluation of the effectiveness of custom-fitted adaptive mouth guards in patients with complete edentulism is based on an analysis of the condition of the denture bed mucosa, the fixation of removable dentures, and the subjective tolerance of the orthopedic structures. Of particular importance is a comparison of clinical parameters before and after the preliminary rehabilitation of the mucosa using mouth guards [9].

Observations show that in patients who have not undergone the adaptation phase, the retention of complete removable dentures is often unstable, accompanied by displacement of the dentures under chewing load and requiring multiple adjustments. The presence of pain and mucosal inflammation limits the patients' functional activity and reduces the effectiveness of orthopedic treatment.

4. DISCUSSION

The use of custom-fitted adaptive mouthguards helps create a more favorable prosthetic bed by reducing mucosal trauma and improving its functional properties. This creates the conditions for increased prosthetic stability, reduced frequency of adjustments, and a faster adaptation period.

The results of the present study highlight the clinical significance of individualized adaptive splints in improving denture retention and stability in completely edentulous patients. Achieving adequate retention and functional stability of complete dentures remains one of the primary challenges in prosthodontic treatment, particularly in patients with severe alveolar ridge resorption or unfavorable anatomical conditions. Conventional denture fabrication techniques often fail to fully compensate for these anatomical variations, which can lead to reduced prosthesis retention, impaired mastication, and decreased patient satisfaction. The use of individual adaptive splints offers a

promising approach to address these limitations by enhancing the functional adaptation of the prosthetic base to the oral tissues.

The findings demonstrate that individualized splints contribute to a more precise distribution of masticatory forces across the supporting tissues. By improving the adaptation between the denture base and the mucosal surface, these splints help reduce localized pressure points that may otherwise lead to mucosal irritation, soreness, or instability of the prosthesis. As a result, patients experience improved comfort during mastication and speech, as well as greater confidence in daily activities. These observations are consistent with previous prosthodontic research emphasizing the importance of personalized treatment approaches in edentulous rehabilitation.

Another important aspect highlighted by the study is the functional role of adaptive splints in stabilizing the denture during dynamic oral movements. During chewing, speaking, and swallowing, dentures are exposed to multidirectional forces that can compromise their retention. Individual adaptive splints help maintain optimal denture positioning by enhancing contact with the supporting tissues and minimizing dislodging movements. This functional improvement is particularly beneficial for patients with reduced ridge height, thin mucosal tissues, or altered neuromuscular coordination.

The clinical application of individualized adaptive splints also contributes to better long-term outcomes in prosthetic treatment. Improved denture stability reduces the risk of traumatic mucosal lesions and enhances the overall functional efficiency of the prosthesis. Moreover, better retention promotes more effective mastication, which can positively influence nutritional status and overall quality of life in edentulous patients. From a prosthodontic perspective, these improvements underline the importance of incorporating individualized biomechanical considerations into the design and fabrication of removable dentures.

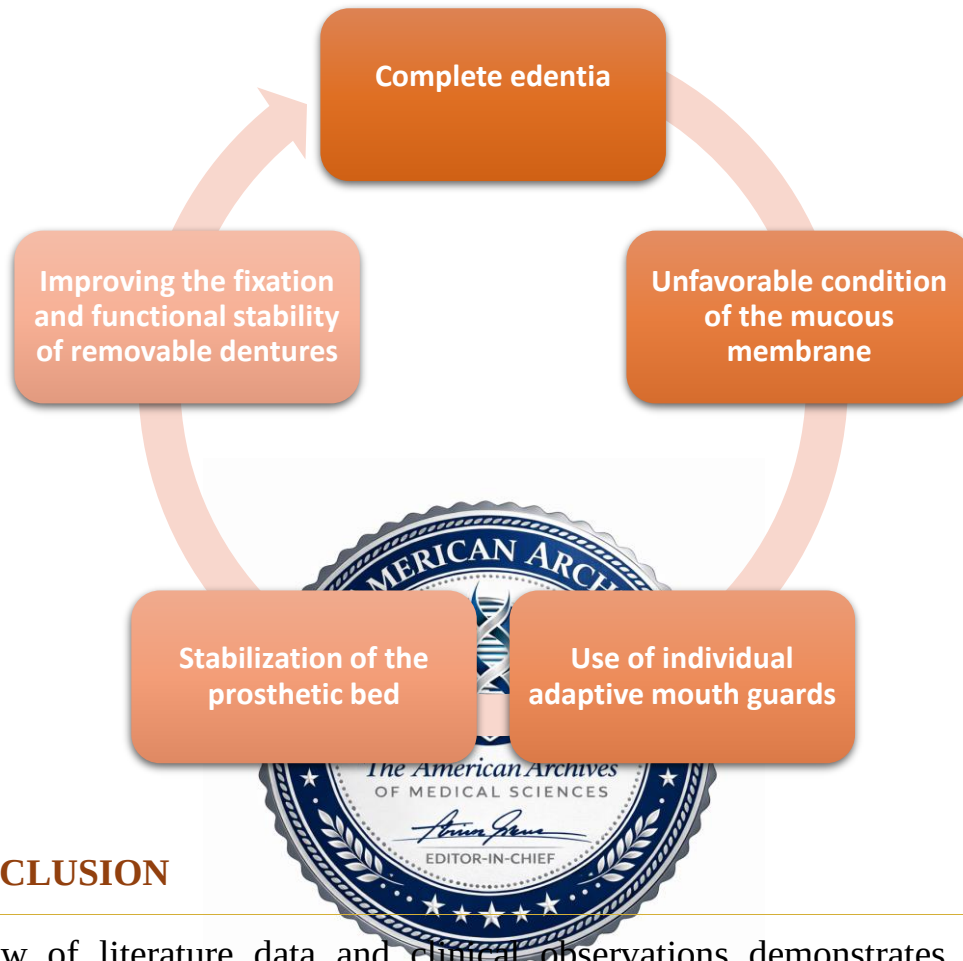
Despite the positive outcomes observed, certain limitations should be considered. The effectiveness of adaptive splints may vary depending on the degree of alveolar ridge resorption, mucosal condition, and patient-specific functional characteristics. Additionally, long-term clinical studies are required to further evaluate the durability of these devices and their impact on prosthetic

maintenance over extended periods. Future research should also explore the integration of digital technologies and advanced materials in the fabrication of individualized splints to further enhance precision and treatment outcomes.

Overall, the present study supports the clinical and functional advantages of individualized adaptive splints as an adjunctive method for improving denture retention in completely edentulous patients. Their use allows for better adaptation of prosthetic structures to oral tissues, enhanced functional stability, and improved patient comfort. These findings emphasize the importance of personalized prosthodontic approaches in achieving optimal rehabilitation outcomes for edentulous individuals.

Table 3
The influence of individual adaptive mouth guards on clinical indicators of removable denture fixation

Indicator	Without mouth guards	Using mouth guards
Primary fixation	Unstable	Stable
Displacement during chewing	Frequent	Rare
The need for corrections	Multiple	Minimum
Overall clinical efficacy	Average	High



5. CONCLUSION

A review of literature data and clinical observations demonstrates that the condition of the denture bed mucosa is a key factor determining the effectiveness of complete denture retention in edentulous patients. Morphofunctional abnormalities of the mucosa, typical for this patient population, significantly limit tissue adaptability and reduce the stability of prosthetic structures.

The use of custom-made adaptive mouth guards as a preliminary stage of mucosal rehabilitation helps create optimal conditions for subsequent prosthetic restoration. Gradual tissue adaptation to functional loads helps reduce trauma, alleviate pain, and improve the clinical performance of removable dentures.

Thus, the use of custom-fitted adaptive mouth guards in completely edentulous patients is a clinically and functionally proven method that improves the effectiveness of orthopedic treatment and improves patients' quality of life. Including this step in orthopedic rehabilitation can be recommended for widespread implementation in clinical practice.

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