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THE IMPORTANCE OF PALATAL RELIEF OF UPPER COMPLETE DENTURE

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The purpose of the study was a meticulous visual assessment of the reflection of palatal relief on the outer surface of the prosthesis base. Within the scope of the research objectives, 204 patients (102 men and 102 women) aged 45–90 years old, applying for secondary complete edentulism had not received orthopedic treatment in the last 2 years based on their dental status. During the orthopedic treatment with upper complete dentures for secondary complete edentulism, the improved method was used, and improvements were made in the 2nd and 4th technical stages. The results were comprehensive, with the majority of patients (196 patients, 96.1 %) experiencing the preservation of their sense of taste, satisfactory retention results in 186 patients (91.2 %), and only 7 (3.43 %) reporting minor issues with pronunciation. This thorough research process underscores the reliability and trustworthiness of the findings, and the effectiveness of the improved methods in the treatment of secondary complete edentulism.

Key words: secondary complete adentia, complete removable plate prosthesis, orthopedic treatment, prosthetic bed.

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ЗНАЧЕННЯ РЕЛЬЄФУ ПІДНЕБІННЯ ДЛЯ ВЕРХНЬОГО ПОВНОГО ПРОТЕЗУ

Метою дослідження була візуальна оцінка відображення рельєфу піднебіння на зовнішній поверхні базису протеза. В рамках завдань дослідження було обстежено 204 пацієнти (102 чоловіки та 102 жінки) віком 45–90 років, які звернулися з приводу вторинної повної адентії, які не отримували ортопедичне лікування протягом останніх 2 років через стоматологічний статус. При ортопедичному лікуванні повними знімними протезами верхньої щелепи щодо вторинної повної адентії використано удосконалений метод, а також проведено доопрацювання на 2-му та 4-му технічних етапах. Більшістю хворих (196 хворих, 96,1 %) внаслідок застосування вдосконаленого методу відзначено збереження почуття смаку, задовільні результати збереження отримано у 186 хворих (91,2 %) і лише в 7 (3,43 %), були проблеми з вимовою. Таким чином, удосконалені способи ефективні для лікування повної вторинної адентії.

Ключові слова: вторинна повна адентія, повний знімний пластинчастий протез, ортопедичне лікування, протезне ложе.

At a certain period in a person's life, teeth are lost in the oral cavity, leading to the development of secondary complete edentulous. Secondary complete edentulous mainly occurs due to untreated dental caries and its complications, as well as failure of dental treatment [6, 8]. With secondary complete edentulism, aesthetic and functional changes occur in the stomatognathic system, muscles lose tone and decrease in strength. As a consequence of the functional changes that have occurred, a process of resorption takes place in the hard (bone) tissues of the upper jaw. Atrophy occurs in the soft tissues (mucosa, muscles) covering the hard tissues. In the upper jaw, bone loss occurs due to resorption. Soft tissues become thinner as a result of atrophy, especially due to a decrease in the height of the alveolar process, leading to the formation of a mobile part [4].

The methods of conventional complete denture fabrication have remained unchanged for the past 70 years since the introduction of polymethylmethacrylate in 1936 [6].

During the preparation of upper complete dentures for secondary complete edentulism, one of the primary goals is biological. The biological purpose aims to preserve the integrity and continuity of the tissues. Therefore, complete dentures within physiological norms should not only replace missing teeth but also compensate for the atrophied tissues in the prosthetic area. Complete dentures prepared for the upper jaw should restore lost functional and aesthetic changes and the artificial teeth should mimic the natural dental arch. The relief of the acrylic base should mirror the relief of the prosthetic area [7].

However, in the conventional method mentioned above, the relief of the prosthetic area in the upper complete denture remains on the inner surface of the prosthesis base. The outer surface of the prosthesis base is polished and smooth.

After the complete denture prosthesis is delivered to the patient for use, complaints related to the prosthesis are voiced over time. The most common complaint is the decrease in taste sensation while using the denture. Complaints mentioned in various literature sources are often associated with the patient's physiological aging and acquired systemic illnesses [9, 13].

A review of literature data reveals that, despite advancements in materials and techniques, achieving an optimal individual clinical position of the prosthesis base and artificial dental arch in the orthopedic treatment of secondary complete edentulism with complete dentures remains a pressing issue. The objective of the study was to visually evaluate the relief of the palatal region in fully removable plate prostheses manufactured using our improved method.

The purpose of the study was to perform a visual assessment of the reflection of palatal relief on the outer surface of the prosthesis base.

Material and methods. The study was performed in the Dental Clinic of Azerbaijan Medical University. Within the scope of the research objectives, 204 patients (102 men and 102 women) aged between 45 and 90, applying for secondary complete edentulism had not received orthopedic treatment in the last 2 years based on their dental status.

The primary orthopedic treatment for secondary complete edentulism consisted of preparing complete dentures. Complete dentures comprise an acrylic prosthesis base covering the prosthetic area and artificial teeth arranged on the base. The preparation of complete dentures using the conventional method during secondary complete edentulism involves a sequence of clinical and laboratory stages. Each clinical stage is followed by a technical stage. If mistakes occur during either the clinical or technical stages and are not rectified on time, the process continues through subsequent clinical and technical stages. Thus, the sequential process of preparing complete dentures using the conventional method during secondary complete edentulism is as follows:

Clinical stage: 1. Anamnesis. Examination of the oral cavity. Removing an anatomical impression with a standard metal spoon and any impression mass but with careful design of the edges of the impression.

Technical stage: 1. casting of the model according to the anatomical impression; delineation of borders on the model and making of acrylic individual spoon on the model.

Clinical stage: 2. Introduction of the individual spoon into the oral cavity, removal of a functionally suction cast. The cast, together with the spoon, is passed on to the technique.

Technical stage: 2. Casting a model according to a functionally suction cast, making a primus roller to determine central occlusion.

Clinical stage: 3. Determination of central occlusion:

– final determination of the central ratio of the jaws with simultaneous fixation of the central occlusion,

– selection of the appropriate color and form of the artificial teeth.

Technical stage: 3. Casting the model into the articulator, setting artificial teeth.

Clinical stage: 4. Checking the design of a complete removable prosthesis on the model and in the oral cavity:

Technical stage: 4. Replacing the wax composition of complete removable dentures with plastic.

Clinical stage: 5. Delivery of the prosthesis [4].

The results of applying the improved method were assessed in patients compared to the conventional method.

Results of the study and their discussion. The results of the sequential process of preparing complete dentures using the conventional method during secondary complete edentulism are presented in Fig. 1.

Taking into account the classic order of the staging prosess we use the some new approaches. During the orthopedic treatment with upper complete dentures for secondary complete edentulism, the sequence noted in clinical and laboratory (technical) stages was implemented to reflect the palatal relief on the outer surface of the upper prosthetic base, and improvements were made in the 2nd and 4th technical stages**.** So, the order was as following:

Clinical stage: 1. Without changes.

Technical stage: 1. Without changes

Clinical stage: 2. Without changes

Technical stage: 2. Casting a model according to a functionally suction cast, making a primus roller to determine central occlusion.

At this stage of our work incision is made to the hard palate of the acrylic bases.

Clinical stage: 3. Without changes

Technical stage: 3. Without changes

Clinical stage: 4. Without changes

Technical stage: 4. Replacing the wax with plastic in the composition of complete removable dentures.

At this stage:

– trial denture of a maxillary complete removable plate prosthesis,

– removal of a part of the hard palate of the acrylic bases in the trial denture of a maxillary complete removable plate prosthesis,

– part of the hard palate of the acrylic base used as a stamp in the trial denture of a maxillary complete removable plate prosthesis,

– adding base plate wax to a part of the hard palate taken from the acrylic base in the trial denture of a maxillary complete removable plate prosthesis, stamped with the figure in case of its softening,

– a reflection of the relief of a part of the hard palate in the base plate wax added to the trial denture of a maxillary complete removable platen prosthesis.

Clinical stage: 5. Delivery of the prosthesis.

– reflection of the relief of a part of the hard palate in the denture wax added to the trial denture of a maxillary complete removable platen prosthesis (Fig. 2).

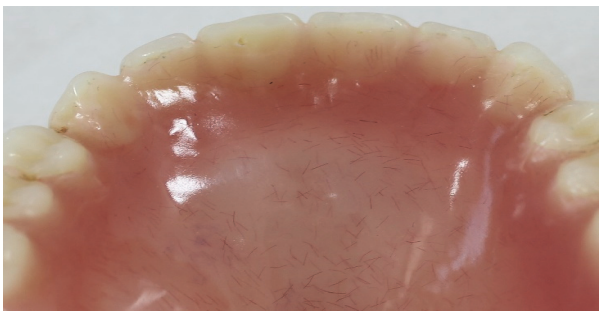

Fig. 1. Removable complete dentures prepared using conventional method

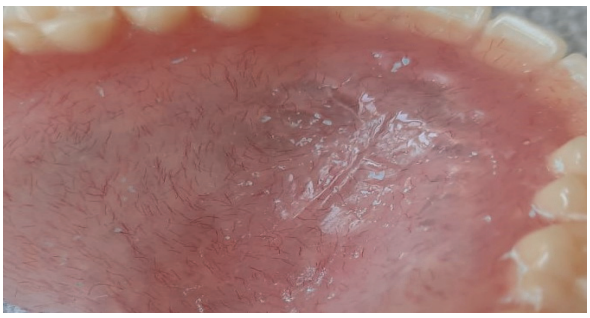

Fig. 2. Removable complete dentures using improved method

Restoring lost teeth to meet functional demands is a major goal for dentists. For what it has a beneficial impact on the aesthetic, mastication as well as the occlusion [1, 2].

Successful outcomes of complete denture patients may depend on prognostic factors, such as age of patient, patient demographic, psychological factors and personal traits, previous denture experience, expectation and attitudes, residual ridge form and anatomy, method of construction, quality [6, 9, 10].

Some of authors reiterated the continuous and unpredictable loss of residual bone after extraction and while using complete denture. It was suggested to not extract all remaining dentition but to preserve several teeth to fabricate overdentures to provide denture stability and retention [6]. But in our cases the patients lost all the teeth of upper jaw, thus we had to fabricate complete denture.

Additionally, success of treatment with complete dentures is often assessed differently by dentists and patients. Sghaireen and Al-Omiri found that 10 % of the subjects were not satisfied with their technically successful removable dentures [11].

Accordingly, clinical success of denture treatment can be assessed in terms of patient satisfaction. Satisfaction outcomes are easy to measure and allow direct quantification of patients' opinions and feelings towards different aspects of prosthodontic treatment. Satisfaction measures were found to be positively associated with oral health related quality of life [3, 8].

The tongue, as a muscular organ, touches the palatal surface of the upper jaw and adapts to its relief. However, when preparing complete dentures using the conventional method, the negative impression of the prosthetic area remains on the inner surface of the prosthesis base. Its outer surface, especially the palatine, is smooth, almost without individual relief. This is precisely what creates the main problem. Because when any function is performed, the tongue is directed to that area. However, by our improved method, the relief of the palatal area is mirrored on the outer palatal surface of the prosthesis as well, making it visually apparent. The folds located on the anterior palatal area clean the taste buds on the surface of the tongue and lead to irritation. This, in turn, prevents the atrophy of the taste buds on the tongue's surface, thereby preserving the sense of taste. In majority of our patients (196 patients; 96.1 %) we noted the preserving of sense of taste.

The orthopedic treatment with complete dentures for secondary complete edentulism is indeed one of the most crucial procedures in dentistry. It is carried out following protocol guidelines to meet the set objectives. This is because when a patient lacks teeth in their oral cavity, the dentist-orthopedist assesses the specific orthopedic treatment required based on the pathological changes in the stomatognathic system, as well as the anatomical, physiological, and hygienic conditions of the patient's oral cavity. According to results, only 6 of our patients (2.9 %) had complaints related to aging problems (athrophy of stomatognathic system, inconvenience etc.).

The preparation of upper complete dentures for secondary complete edentulism is one of the main biological objectives. The biological objective aims to prepare complete dentures within physiological norms to preserve the integrity and continuity of the tissues [5]. The prepared complete denture should not only replace missing teeth but also serve as an apparatus to compensate for the atrophied tissues in the prosthetic area, restoring lost functional and aesthetic changes. The artificial teeth on the complete denture should mimic the natural dental arch. Additionally, the relief of the acrylic base in the palatal region should reflect the relief of the prosthetic area.

One of the key factors determining the success of complete dentures is their retention, which refers to the ability of dentures to stay securely in place during normal oral function. Adequate retention is

essential for proper speech, mastication and overall comfort of the denture wearer. Shawi H, et al in their study aimed to improve the retention of complete dentures through three different approaches: spacer, posterior palatal seal area, and undercut area. Three dentures were fabricated using the same steps, with variations in certain steps based on the retention technique being employed. The authors showed that all three dentures had improved retention compared to standard complete dentures. It is worth noting that the patient did not find the denture with the undercut technique satisfactorily [12]. In our work we also obtained satisfactory results of retention (in 186 of patients; 91.2 %).

The palatal relief region and teeth are considered articulatory organs in the mechanism of sound formation during speech. Due to tooth loss, anatomical and functional changes occur in the stomatognathic system. The relief of the palatal area prepared using the traditional method is smooth. Elimination of this change with a full-removable prosthesis leads to a sudden change in the ratio of active and passive organs of the speech system. In most cases, because of this, sounds are not formed normally, words are pronounced incorrectly and, therefore, speech is not understood.

In the upper complete denture prepared using our improved method, the palatal relief is not smooth. Instead, it is designed to oppose the relief of the palatal region. This prevents changes in the articulatory contacts between the active and passive organs of the speech system. Consequently, this allows for the normal formation of sounds during the speech, proper pronunciation of words, and thus, clear speech comprehension. Among our patients only 7 (3.43 %) had some problems with pronunciation and this is due to variuos nasal defect and long time of abcence of teeth.

When the prosthetic structure supports the function of the stomatognathic system effectively and doesn't hinder it, it allows for the preservation of normal sensory experiences like taste. This, along with improved speech intelligibility and correct pronunciation, contributes to the patient's overall confidence and psychological well-being.

Conclusion

This study enables the visual evaluation of the reflection of the palatal relief region on the outer surface of the prosthesis base during orthopedic treatment of secondary complete edentulism with an upper complete denture made in both conventional and improved methods. It eliminates the negative effects caused by the palatal relief area during the use of the prosthesis in the upper jaw. In the majority of patients (196 patients; 96.1 %) the preserving of a sense of taste was noted as a result of using the improved method, satisfactory results of retention were obtained in 186 patients (91.2 %) and only 7 (3.43 %) had some problems with pronunciation. So, the improved methods are effective for the treatment of secondary complete edentulism.

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