

## Evaluation of Chewing Efficiency of Prosthetics in the Complete Absence of Teeth With Removable Prosthesis Based on Dental Implants

*Teshaboev M. G<sup>1</sup>, Yuldoshev A. A. S,<sup>2</sup> Umarkhojaeva M. I<sup>3</sup>*

**Resume:** Old age determines the features of orthopedic treatment with removable dentures, which can cause difficulties due to a decrease in the activity of the body's adaptation mechanisms. An important step in improving the prosthetics of edentulous patients was the use of the method of dental implantation. In the course of the work, a comprehensive dental and laboratory examination was carried out in 20 patients aged 50 to 70 years with complete secondary adentia on the basis of the Department of Maxillofacial Surgery and Dental Implantology A.G.M.I. implants with different fixation options. As a result of a comparative analysis of the chewing efficiency of patients, it turned out that implant-supported removable dentures have greater functional indicators than traditional complete dentures.

**Keywords:** secondary adentia, removable prosthesis, dental implant, spherical attachment, locators, beam fixation, Gelman chewing test.

**Relevance.** Complete secondary edentulism occurs in people aged 70 and older, but even at the age of 50, 15% of people also need prosthetics. WHO in 1999 published the following data: 20-26% of patients after the manufacture of complete removable dentures for them for various reasons do not use them, but most refer to poor fixation of dentures, mainly in the lower jaw. 44% of persons with complete removable dentures in the lower jaw note their low chewing efficiency (38.89% according to Gelman's chewing test). The main reason for the low quality of prosthetics in this group of patients is the anatomical and functional features of the lower jaw, with significant atrophic processes of which reliable retention of removable dentures only by the biophysical method becomes impossible. An important step in improving the prosthetics of edentulous patients was the introduction of the method of dental implantation into practice. However, one of the acute problems of elderly patients is the loss of bone tissue of the alveolar processes of the edentulous jaws.

A number of clinical situations limit the possibility of prosthetics on implants: lack of bone tissue volume due to resorption of the alveolar processes of the jaws after tooth loss, which does not allow the installation of intraosseous implants of optimal parameters; the presence of chronic infectious-inflammatory destructive processes in the periodontium.

The phenomenon of atrophy of the alveolar process due to tooth extraction leads to bone loss in 40-60% of cases. Already a month after tooth extraction, resorption of up to 1/3 of the buccal plate is observed, which progresses at a rate of 0.25–0.5% per year.

In such a clinical situation, the use of dental implantation requires additional surgical procedures: sinus lift, bone grafting, and so on. Experience and literature data show that in the elderly, the methods of reconstructive plastic surgery are practically not used due to the fact that the somatic status of persons of older age groups is aggravated by diseases that are contraindications for surgical preparation of the oral cavity for prosthetics.

An alternative way to improve fixation and stabilization is the use of simplified artificial supports - mini-implants.

**The purpose of the study.** Improving the efficiency of prosthetics in patients with complete secondary adentia with removable dentures based on dental implants.

<sup>1, 2, 3</sup> Andijan State Medical Institute



To optimize the stages of orthopedic treatment of patients of the older age group with a complete absence of teeth in the manufacture of covering structures based on implants. To give a comparative assessment of the chewing ability of patients of the older age group with a complete absence of teeth when using various designs of covering removable dentures based on implants. To develop an algorithm for prosthetics of patients with removable dentures in the absence of teeth.

**Material and methods.** A group of 20 patients was divided into 3 subgroups according to the type of prosthesis attachment:

Subgroup III - 7 patients with spherical fixation;

Subgroup L - 6 patients with fixation by the Locator system ;

Subgroup B - 7 patients with a beam fixation system.

Were applied such research methods as: the method of questionnaire survey; clinical research methods; calculation of the area of the prosthetic bed; assessment of chewing efficiency ; assessment of the fit of the prosthesis to the prosthetic bed; statistical methods for processing research results.

When using the system of spherical fixation in subgroup III , the prosthesis is fixed on spherical attachments and a plastic matrix. Patients are characterized by a longer addiction and impaired diction than when using other fixation systems. It is known that the initial retention force in the group of prostheses with a spherical fixation system is  $24.4 \pm 7.7$  N. Upon further study (3 months of clinical use), the retention force is  $15.0 \pm 3.9$  N. After 2520 cycles, equivalent At 1 year and 9 months of using the prosthesis, the force was  $5.5 \pm 1.9$  N. The gradual decrease in the retention force during prosthetics with use confirms the need for careful monitoring of the state of the fixing elements and stability of the prosthesis.

In subgroup L, patients were fitted with complete removable dentures using the Locator fixation system . In the oral cavity, when determining the degree of fixation of structures and during phonetic tests, the prostheses do not move from the prosthetic bed, they have a sufficient degree of stabilization. The retention of Locator attachments decreases more over time than the retention of ball-shaped attachments . But the replacement of nylon inserts allows us to consider this system as an alternative to spherical attachment .

The beam fixation system of the prosthesis was used in patients in subgroup B , the functionality of this fixation method is to redistribute the masticatory load on the implants and the bone tissue located between them. Fixation and stabilization of a complete removable prosthesis is close to a fixed structure. When using the beam fixation system and the Locator system , it is possible to reduce the boundaries of the prosthesis. Retention properties when using beam fixation are maintained throughout the life of the prosthesis. The initial retention averages  $21.4 \pm 1$  N. In the study of the retention of the spherical and bar fixation systems, the retention force index in the groups does not differ significantly (  $p = 0.702$ ) and averages 23.1 N. After 3 months of clinical use, the retention value in prostheses with a bar fixation system, on average,  $18.1 \pm 2.4$  N. After 1 year and 9 months of using the prosthesis, the retention force was  $7.6 \pm 2.1$  N in prostheses with a bar fixation system.

**Results and its discussion.** Analysis of variance revealed the presence of statistically significant differences between subgroups ( $H=23.1$ ,  $p = 0.034$ ). It was found that the lowest retention force is typical for spherical fixation of the prosthesis (by 14.2%,  $p = 0.042$ , compared with the beam fixation system and by 12.5%,  $p = 0.049$  compared with the Locator system ). The beam fixation system provides maximum fixation in the central and posterior parts of the prosthesis (by 17.3%,  $p = 0.034$ , and 43%,  $p = 0.001$ , respectively, compared with spherical fixation); with the Locator fixation system in the central and posterior parts of the prosthesis, it is slightly lower (by 11.9% and 7.4%, respectively,  $p > 0.05$ ), but it increases in the lateral areas (by 18.3%,  $p = 0.039$ ).

Evaluation of masticatory efficiency using the Gelman test showed that in subgroup III on the day of prosthesis application, this indicator was  $19.5 \pm 0.8\%$  ( $5.57 \pm 0.089$  mm). After 3 months of using the prosthesis, chewing efficiency increased by 2 times (  $p = 0.002$ ) and amounted to  $36.9 \pm 1.7\%$ . After 6



months, chewing efficiency increased by another 20% ( $p=0.035$ ) and amounted to  $44.07\pm 1.1\%$ . After one year of using a complete removable denture, the chewing efficiency reached its maximum values ( $51.7\pm 1.2\%$ ).

In subgroup L, without changing the area of the prosthetic bed, chewing efficiency on the day the prosthesis was placed was  $19.8\pm 0.95\%$  ( $4.75\pm 0.49$  mm). After 3 months of using the prosthesis, this indicator increased by 1.89 times ( $p = 0.0019$ ) and amounted to  $37.5\pm 1.5\%$ . After 6 months, chewing efficiency increased by another 22% ( $p=0.027$ ) and amounted to  $45.7\pm 1.3\%$ . Efficiency of chewing reached the maximum values -  $52.9\pm 1.4\%$  - as well as in other subgroups one year after orthopedic treatment. With a decrease in the area of the prosthetic bed, chewing efficiency did not change statistically significantly.

Chewing efficiency in subgroup B without changing the area of the prosthetic bed on the day of prosthesis was  $20.4\pm 1.9\%$  ( $4.37\pm 0.041$  mm). 3 months after orthopedic treatment, chewing efficiency increased by 1.9 times ( $p = 0.0018$ ) and amounted to  $38.8\pm 2.1\%$ . After 6 months, chewing efficiency increased by another 19% ( $p=0.041$ ) and amounted to  $46.2\pm 1.2\%$ . The maximum values ( $53.6\pm 2.0\%$ ) of chewing efficiency were observed after one year. With a decrease in the area of the prosthetic bed, chewing efficiency did not change statistically significantly.

**Conclusions.** Thus, the clinical use of overdentures with a locking system of fixation in the prosthetics of elderly patients with significant atrophy of the lower jaw in the complete absence of teeth implanted in the anterior part of the lower jaw showed the advantages of such prostheses: reliable fixation of the prosthesis; selection of the required interalveolar height and parameters of the basis of the prosthesis, the possibility of transferring the masticatory load through the implants to periodontal and reduction of atrophy processes, the possibility of achieving results with high aesthetic efficiency, good oral care due to the removable denture.

It has been established that after orthopedic treatment with implant-supported removable dentures, based on a comprehensive analysis of the masticatory function of patients with complete secondary adentia, the results of the main chewing parameters improve, and also has a significant impact on the growth of quality of life indicators of patients of the older age group with a complete absence of teeth.

#### **Bibliography:**

1. Abolmasov , N.G. Orthopedic dentistry / N.G. Abolmasov - M.: Medicine, 2003.
2. Bersanov , R.U. The influence of modern prosthesis designs on dynamics of indicators of the quality of life of patients / R.U. Bersanov [i dr.] // Russian Dental Journal. - 2015. - No. 6. - S. 43-44.
3. Borisova, E.N. The set of factors contributing to the complete loss of teeth to the elderly and senile age // Russian dental journal. - 2000. - No. 3. - P. 23-25.
4. Voronov A.P. Orthopedic treatment of patients with complete absence teeth / I.Yu. Lebedenko, I.A. Voronov. - M., 2006. - 320 p.
5. Dobrovolskaya, O.V. Comparative characteristics of efficiency of patients with complete edentulous mandible using various design options based on implants / O.V. Dobrovolskaya, A.V. Dobrovolsky, V.V. Rubanenko // Ukrainian Dental Almanac. - 2011. - No. 3. - pp. 17-18.
6. Zhibylev , E.A. Application of the LOKATOR system to improve fixation and stabilization of complete removable dentures / E.A. Zhibylev // Bulletin of medical Internet conferences. - 2014. - Volume 4, No. 12.- S. 1336.
7. Zrazhevsky , S.A. Changes in the quality of life of patients with complete adentia of the lower jaw when using complete removable prostheses and after the manufacture of prostheses based on dental implants / S.A. Zrazhevsky , M.V. Malik // Russian Bulletin dental implantology. - 2011. - No. 3. – P. 66–72.



8. Ivanov, A.S. Fundamentals of Dental Implantology: Study Guide / A.S. Ivanov. - St. Petersburg : SpecLit , 2011 - 63 p.
9. Kulakov, A.A. Dental implantation: basic principles, modern achievements / A.A. Kulakov, F.F. Losev, R.Sh. Gvetadze . – M.: Medical Information Agency, 2006. - 152 p.
10. Ozrokova , A. Comparative analysis of the degree of retention of complete removable overdentures of the lower jaw with a spherical fixation on various implant systems / A. Ozrokova [and etc.] // Medical alphabet. Dentistry. - 2016. - No. 9. - S. 51-53.

