

IMPROVING THE PRESERVATION OF THE ALVEOLAR BARRIER VOLUME USING THE EXTRACTED TOOTH FRAGMENT

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Abstract. *In order to achieve an aesthetic result when installing dental implants, it is an urgent goal of surgical dentistry to maintain the characteristics of the alveolar barrier after tooth extraction, taking into account the quality of the bone tissue around the defect and the availability of soft and hard tissues. . [Drobyshev, A. Yu. - 2008, Tabrizi, R.-2019].*

In clinical practice, preservation of the initial ideal volume of bone around the extracted tooth is rare. Therefore, methods of augmentation of the tooth cage, which are performed after tooth extraction, have been developed.

Keywords: *ultrasonic osteometry method, X-ray method of research (CBCT, radiovisiograph), Densitometry method, Resonance frequency analysis (RTA).*

The hard and soft tissue preservation method reduces or eliminates the use of the relatively more expensive and traumatic alveolar bone augmentation method in the preparation of patients with missing dentition. [Aghaloo TL-2007, Nida A. - 2019].

In the literature, in order to maintain the bone alveolar growth and aesthetic aspects after tooth extraction, using osteoplastic materials, collagen membranes, methods that enhance bone regeneration and perform the matrix function of eliminating defects are written. The use of osteoplastic materials depends on the presence of minerals with different properties, as well as different types of collagen proteins [Grigoryan AS - 2003, Veronika J. Lai. - 2020].

The purpose of the study

Basing and improving the method of closing the volume of the tooth cage with the extracted tooth piece to prevent bone absorption (resorption) processes.

Research objectives

1. Comparison of pre-extraction bone volume and post-extraction changes in different groups of teeth using the alveolar bone volume preservation technique using pieces of extracted teeth to close the dental cage, according to KLKT . comparison with sockets of teeth healing "under thrombus" for delayed dental implantation.

2 . To determine the stability parameters of implants after implantation using this technique, using resonance frequency analysis (RTA), compared to the control group.

3 . Determine the density of bone tissue and changes in the vertical level of the bone around the implants after prosthetics using X-ray studies.

4. Development of practical recommendations for the implementation of the current methodology.

Learning object

The dissertation is carried out in accordance with the principles and rules of evidence-based medicine. The object of the study is 41 primary patients aged 25-45 who applied to the department of oral cavity surgery and dental implantology and department of maxillofacial surgery of Samarkand State Medical University, divided into 2 groups. Experimental group 1

using the technique of preserving alveolar bone volume with extracted tooth fragments and osteoplastic material, group 2 different groups of teeth with "blood clot".

Research methods:

- 1) Ultrasonic osteometry method.
- 2) X-ray method of research (CBCT, radiovisiograph).
- 3) Densitometry method
- 4) Resonance frequency analysis (RTA)

Scientific news

According to the results of clinical and X-ray research, osteoplastic materials and a tooth fragment are used to ensure the attachment of the tooth cage. According to the results of transgingival probing of both groups, the method of closing with a tooth root piece is used to maintain the effectiveness of the use of osteoplastic material and the thickness of the tooth walls.

Expected results.

For the purpose of using a dental implant and completely removable dental prostheses, the method of closing the tooth cage using the osteoplastic material Bioplast-Dent and the extracted tooth fragment is used directly in practical medicine in outpatient clinics. related to Its use allows to improve the results of treatment, speed up the time of bone recovery, and shorten the duration and quality of prosthetics in the future.

Research materials and methods

During the years 2020-2022, scientific research aimed at maintaining the volume of alveolar bone tissue was conducted in the "Oral Surgery and Dental Implantology" departments of Samarkand State Medical University.

41 patients participated in the study . 16 women and 6 men participated in the 1st group, 14 men and 5 women participated in the 2nd group (Table 1).

Table. 1

Indicators		Search group		Control group		p
		Number	%	Number	%	
Sex	Male	16	73%	14	74%	0.94
	A woman	6	27%	5	26%	

Pearson's - ch2 criterion according to $p \leq 0.05$ to the indicator have if __ statistics important have

Research order

I in the group in patients tooth get traditional __ way was held _ and tooth box blood clot under was restored .

To research added __ II group to patients , teeth from received after received tooth from the piece using tooth box to close works take went _ Transgingival probing was performed prior to tooth extraction to determine the thickness of hardened gingiva.

Control work was carried out as follows:

1. After 1 week
2. After 2 weeks
3. After 1 month
4. After 3 months

After tooth extraction, the following clinical studies were conducted:

1. Take a picture of the toothbrush;
2. Measurement of the length and width of the tooth cage obtained using a 3D x-ray;

3 months after tooth extraction, the tooth cells of the research group were re-examined. Repeated transgingival probing and 3D X-ray were performed.

2.2 Methods of clinical examination of the patient

At the initial screening stage and before the implantation operation, all patients underwent clinical and laboratory examinations: the general state of health was assessed, the following blood tests were taken: clinical, biochemical, coagulogram, hepatitis B, C, VICH.

Dental examinations were carried out in the usual way and consisted of aspects such as identifying complaints, identifying past and accompanying diseases, collecting anamnesis, examining the oral cavity, and controlling the hygienic condition of the oral cavity.

The main purpose of collecting the anamnesis was focused on clarifying the patient's complaints related to the dental-jaw system. The reasons for the loss of teeth in the case of insufficient tooth rows in the patient, the characteristics of tooth cells after tooth and root removal, and the duration of adentia were studied.

When patients were examined, the condition of the teeth and tooth rows, the level of alveolar tumor atrophy, the presence or absence of tooth and alveolar deformations, the ratio of jaws in central occlusion, and functional and aesthetic changes in the dental-jaw system were evaluated. The condition of the teeth, the oral mucosa and periodontal tissues, the level of oral hygiene, the quality of existing fillings and prostheses were evaluated.

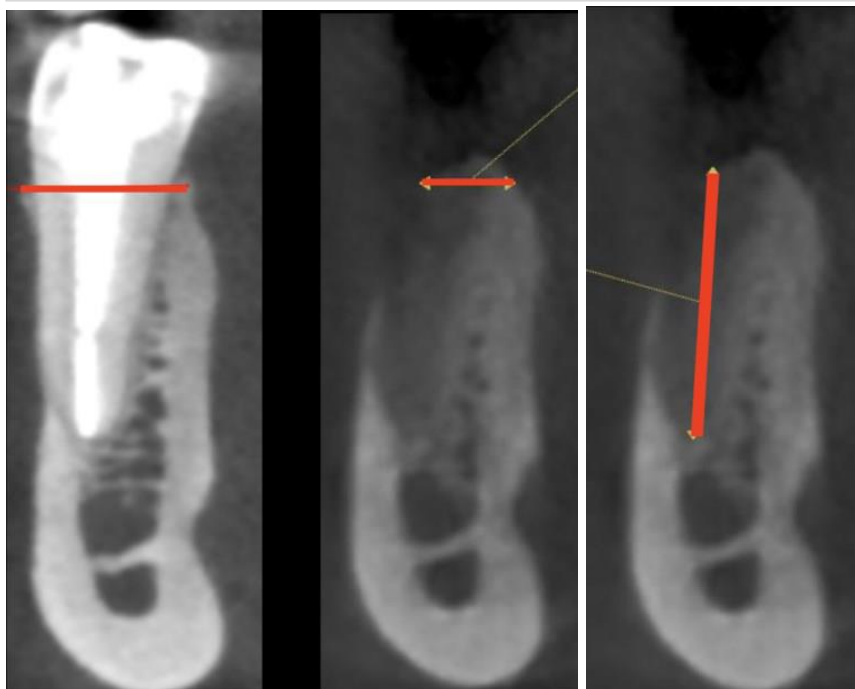
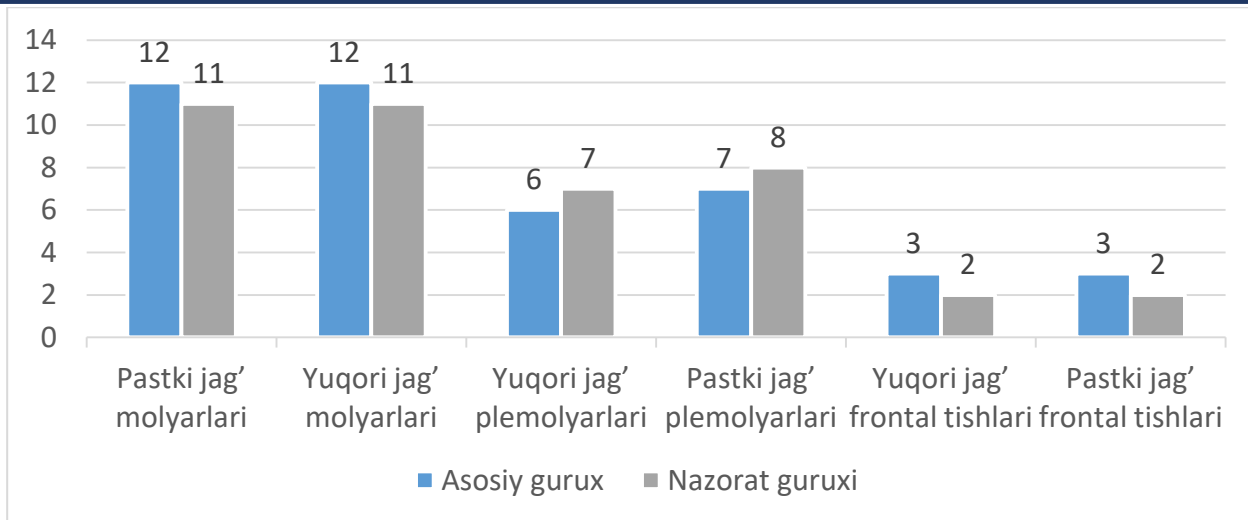
X-ray examination methods

In order to evaluate the structure and density of jaw bone tissue, patients underwent X-ray examination using orthopantomography, computer tomography and radioviziography methods. Digital orthopantomography was performed on the "MORITA Veraviewepocs 3D R100" equipment (MORITA Veraviewepocs 3D R100, Japan) at the stage of preoperative examinations (before tooth extraction) and to determine the alveolar bone condition. Anatomical structures and condition of the tooth row, condition of interdental barriers and periapical tissues, presence and degree of pathological processes were evaluated. The structure of the jaws, the ratio of cortical and porous bone, and the degree of alveolar edge atrophy were analyzed. In the preparation process, specific disorders of interactions between certain groups of teeth and tooth rows were identified.

In order to measure bone atrophy, the teeth of the members of both groups were divided into molars, premolars, frontal teeth of the upper and lower jaw (Diagram 1).

Diagram 1

After the extraction of the tooth (Fig. 1), the size of the tooth cage was determined using a ruler available in the X-ray program, which allows measurements to be made with an accuracy of 0.1 mm.



Computed tomography (CT) and radiography of patients were performed before tooth extraction and in the study group after extraction to evaluate, register, and close the cavity using a tooth piece; 3 months after tooth extraction; after 1 year in order to evaluate the principles of prosthetic or implant placement.

A total of 141 computer tomograms were taken and studied during radiological examinations.

Preoperative and postoperative CT data were compared to each other to determine differential features. Adaptation was determined according to the principle of matching of surface properties in the range of roentgenological density of bone tissue. For this, the nearest neighbor search method was used. The essence of the nearest neighbor search task is expressed in finding elements with a certain functional affinity among many elements in a multidimensional metric space. In this case, the location of many points and bony structures and the angle of certain radiographic sections were shown to depend on a large number of points on the alternate angle of the postoperative repeat CT radiographic sections as a function of proximity.

A method of maintaining alveolar bone volume using an extracted tooth fragment.

Local infiltration anesthesia was used to separate the tooth's circular ligament, and then the tooth was removed with a luxator and surgical forceps. After extraction of the tooth, a cross-segmental cut was performed using the correct technique and a separation disk. The coronal part of the first tooth is cut, and the next cut is made 2 mm more apical than the rotator cuff. The channel of the obtained slice was mechanically processed, then washed with 0.05% chlorhexidine solution

The dental canal was sealed with composite material Charisma (Germany). The obtained root fragment is placed on the surface of the hole for its complete closure, and the upcoming Vicryl 5-0 suture material is used, and the suture threads and the bone fragment can be combined with the help of a filler.

Post-operative follow-up

Follow-up was performed after tooth extraction according to standard dental procedures. For 48 hours, the patient was forbidden to brush his teeth on the surgical side. It was recommended to rinse the oral cavity with Loroben (chlorhexidine gluconate 0.240 g (0.12%), benzydamine hydrochloride 0.300 g (0.15%)) after every meal for 1 week. Anti-inflammatory drugs were prescribed.

After 7-10 days, during the oral examination, the condition of the mucous membrane of the surgical area, the stability of the root piece, and the presence of inflammatory processes were evaluated. The oral cavity was washed with an antiseptic and sutures were removed, the implanted tooth was intact and there was no movement.

Implant placement and evaluation of implantation efficiency

Dental implant surgery was performed 4 months after tooth extraction, using a one-stage technique to install gingival formers. Implay ("Implay dental implant system", Israel), "Osstem" ("Osstem Implant" Korea) implants were used.

Superkain Forte 4%-2.0 ml ("MERRIMED" Uzbekistan) infiltration anesthesia was used for anesthesia. After trephines are used to extract bone tissue, the site for the implant is prepared.

After implant surgery in the main study group, a gum former was placed on the implant in order to eliminate the possibility of direct impact on the implant. Due to the lack of possibility to bring the edges of the wound closer to each other, sutures were not applied (Fig. 10).

In the control group, after trephine biopsy, dental implantation was performed according to a standard protocol, a plug was placed, and the wounds were firmly sutured (Figure 11).

Figure 2.

In the main study group, the implant surgery was performed in a single-stage procedure and the wounds were not sutured.



Figure 3.

In the control group, the surgical site was sutured with knotted sutures.



Resonance-frequency analysis of implant stability

The stability of implants was evaluated by resonance-frequency analysis immediately after implantation and 6 months after placement of temporary crowns.

OsstellISQ (OsstellAB, Sweden) apparatus was used for Resonance Frequency Analysis (RFA) (Fig. 12).

With the help of resonance-frequency analysis equipment, it is possible to check the state of stress and deformation of the "bone-implant" system. The transducers of the OsstellISQ device allow to measure the resonance frequency, and its indicators depend on the stability of the dental implant, the height of the bone superstructure of the implant, and the stiffness or inclination of the connection of the "implant-bone" pair.

Figure 4.

OsstellISQ" (OsstellAB, Sweden) apparatus designed for resonance-frequency analysis.



The index of mutual connection between the implant and the bone surrounding it is the main factor determining the stability of the implant. A sensor connected to the instrument transmits the resonance frequency value through a signal, and its result is displayed on the screen. The so-called Implant Stability Quotient (ISQ) has a value from 1 to 100.

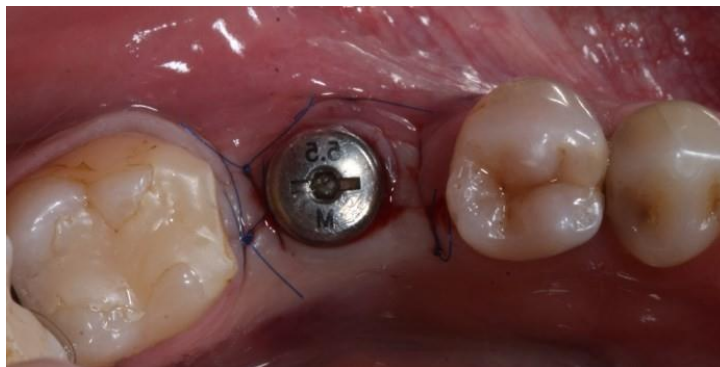
The second stage of rehabilitation

4-6 months after dental implantation, the second stage of implantation was performed in patients of the control group who had successful osseointegration and no complications.

In the main study group, gum formers were placed during dental implantation. Implants placed in the control group were opened and gingival formers were placed according to a standard protocol (Figure 13).

13.

In the control group, after 4-6 months, the placement of the gum shaper.



Thus, covering the removed tooth cage with a root fragment is more advantageous than the root grafting of the tooth cage under the blood clot, it allows to preserve the alveolar bone parameters in the area where the tooth was removed, reduces the likelihood of the development of inflammatory processes during rehabilitation, increases bone density, intraosseous it can be concluded that the installation of the type of dental implants corresponding to the size of the removed tooth group, as a result of which it will be possible to perform additional augmentation and plasticity of the alveolar ridge.

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