Combined Application of Osteoplastic Material in the Bone Defects Treatment

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ABSTRACT

The aim of the article is to stimulate the healing of bone defects in the jaws, applying a combined osteoplastic preparation. 72 patients with retained teeth were treated by using combined osteoplastic material. The result of the study is a significant reduction in the number of local complications after bone grafting applying combined osteoplastic drugs.

Keywords: Bone Defect Of The Jaws; Osteoplastic Preparations.

Introduction. Diagnosis and treatment of patients with untreated permanent teeth in a timely manner in recent years is one of the most pressing problems in dentistry. Violations of the teething timing and their abnormal location in the dental arch leads to morphological, functional, and aesthetic disorders of the maxillofacial region, which, in turn, directly affects the activity of other human organs and systems[7].

In this case, the leading causes of violation of the permanent teeth eruption terms and their abnormal location are incorrect laying or delay in the replacement period of temporary teeth, premature extraction of baby teeth, the presence of supernumerary teeth, congenital pathology of the maxillofacial region, inflammatory processes, as well as traumatic injuries to the jaws. As a rule, the individual teeth retention is painless and asymptomatic and accidentally diagnosed as a result of dental examination of the patient with other interventions [8]. Defects that occur after a complex surgical intervention for osteomyelitis of the jaw and inflammatory complications in the postoperative period, certainly, create various problems with the bone wounds healing, according to some sources, defects of this kind of nature range from 14 to 45 % [5].

To eliminate bone defects in the oral cavity, after the retained teeth extraction, most frequently use auto-bone or another osteoplastic materials of various origins. However, such operations do not always lead to favorable results, which is often leads to various complications[9,10]. According to the analysis results of performed surgical interventions, it is necessary to look for more new and perfect ways to prevent and eliminate jawbone defects, so the solution of this acute problem remains not fully understood [1; 3].

In this case, the greatest interest, within the framework of modern physiology of regenerative processes, is represented by methods that stimulate directed biophysiological action both in the area of bone defects and in the entire human body, which have general strengthening, regenerative, analgesic, and desensitizing effects [2; 4].

Surgery or any other injury is known to be accompanied by a violation of regional blood circulation, which subsequently leads to a

violation of tissue regeneration. During this time, a progressive lack of oxygen and energy supply contributes to morphological and functional changes in the formed blood elements, which has a detrimental effect on metabolic processes in the human body, including the processes of osteoregeneration [1].

Despite significant advances in modern dentistry, traumatology, and tissue engineering, the problem of directed osteogenesis stimulation is currently considered to be completely unresolved.

The aim of the study: to stimulate patients treatment effectiveness of the jawbone defects by replacement in combination with osteoplastic materials.

Materials and methods. To examine an effectiveness of the studied osteoplastic preparation, surgeries were performed to remove retained teeth in 72 patients aged 20 to 55 years without severe somatic pathology, of which 32 (43.75%) men and 40 (56.25%) women (Table 1).

Table 1. Patients distribution by gender and age

Age	Total treated patients			
	Men		Women	
	Abs.	%	Abs.	%
20-24	12	18,75	18	26,56
25-30	10	14,0	10	15,62
31-35	5	6,25	7	7,81
36-45	3	3,12	4	4,68
46-55	2	1,56	1	1,56
In total	**32**	**43.75**	**40**	**56.25**

According to the study plan and depending on the used preparations to fill the bone defect after the jaws retained teeth extraction, patients were divided into 2 groups (Table 2). In the main group of patients, the bone defect was filled with an osteoinductive preparation-osteum+collapan gel (combined osteopreparations).

Table 2. Patients distribution depending on the bone defect plastic surgery method after retained teeth extraction

Used osteoplastic material	Total treated patients			
	Men		Women	
	Abs.	%	Abs.	%
Ostium+ Hydroxyapatite "Kollapan"	22	31.25	28	40,62
Control group (blood clot)	10	12.5	12	15.62
In total	**32**	**43.75**	**40**	**56.25**

In the 1st main group (50, or 71,8 %) patients the bone defect after tooth extraction filled with osteoplastic material "ostium"+ Hydroxyapatite " Kollapan" gel, control group – 22 (28,2 %) patients whose postoperative bone defect was filled with blood clot, and then the flap brought back in place and the wound sutured tightly.

Examination was conducted according to a standard, generally accepted scheme, including clarification of complaints, anamnesis, present disease development, the presence and absence of concomitant pathology. To obtain comparable data, patients of all groups underwent X-ray observation before surgery 1, 3, 6 and 12 months after surgery. OPG (Orthopantomography) The digital image was obtained using the VERAVIEW IC5 panoramic X-ray machine manufactured by J. MORITA MFG CORP (Japan). With the help of this device, the location of the retained teeth were identified and measurements were made of the area where part of the bone element should be removed – compactoosteotomy. Retained teeth surgery was performed as follows: a trapezoid incision was made under Solution Articaini DS Forte 4 % – 4 ml conducting and infiltration anesthesia. The muco-periosteal flap was created, a bone autograft (oval in shape, 12x10 mm in size) was formed using a fissure and spherical bur, then with the help of bur the coronal part of the retained tooth was splitted and atraumatically extracted. Then the root part was removed with the help of an excavator, and the wound was irrigated with antiseptics. Bone wound was

filled with an osteo-inductive preparation "Ostium" + Kollapan gel, autograft was applied on top, muco-periosteal flap was covered, and the wound was sutured tightly.

After the surgery, an ice pack was immediately applied to the area of the extracted tooth for half an hour. In the future, the postoperative wound is irrigated with an antiseptic solution. The general condition of the patient and the condition of the postoperative wound were evaluated during repeated examinations on the 3rd, 5th, and 8th days after surgery. Patient complaints on edema in the area of the postoperative wound, as well as temperature rise on the first day after the surgery.

Results. The general condition of all patients in the postoperative period was quite well, recovery process proceeded smoothly, without any complications, the wounds were healed by primary tension and sutures were removed on the 8th day after the surgery. To compare treatment results, control examination was performed 30 days after the surgery, X-rays were taken and analyzed in all groups of patients. A slight reduction in the bone defect was detected due to bone neoplasms along the edges of the defect of the main group patients, and the first signs of osteogenesis appeared. X-ray examination data indicated restoration of the bone defect in patients who used osteoplastic materials in combination to close the defect. In the control group of patients, according to the radiograph, the bone defect remains at the same level, with no changes.

Control radiograph after 90 days depicted that in the main group of patients there was an optimization of reparative processes in damaged tissues, more than half of the defect is replaced by newly formed bone tissue. In the control group of patients, the reduction of the bone defect only began due to bone neoplasms along the edges of the defect, in 4 (11.1 %) patients were marked with suppuration of the bone defect with the formation of purulent bone abscess, they underwent additional treatment: autopsy of the abscess followed by antibiotic therapy.

After 6 months, patients in the main group showed complete bone regeneration, defect was filled with bone trabeculae, similar in location to the pattern of healthy bone, but in 10 (13 %) cases there was no clear trabecular pattern. Visual and palpatory examination of the operated tissues did not reveal any changes in architectonics in all patients of the main group. In the control group, bone defect was filled in more than half.

After 12 months in the main group of patients, boundaries of the bone defect merged with their own intact bone tissue in 100 % of cases. In the control group, 40% of the patients had their bone cavities unfilled.

Conclusion. Thus, based on the results of the study, the clinical implementation of the combined biocomposite material application in surgical dental interventions, it can be noted that the combined material does not cause inflammatory processes during postoperative period, well tolerated by patients, and helps accelerate the regeneration of bone tissue in the area of formed defects after surgical interventions. In a retrospective assessment of the postoperative course, we noted a significant reduction in the number of local complications after bone grafting with the use of combined osteopreparations compared to the results obtained during these surgeries without these components application. As a result, the conducted observation and the obtained results allow us to recommend to use of combined osteopreparations in complex measures for the prevention of post-extraction complications.

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