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Technique for eliminating traumatic occlusion in patients using Implant-supported bridges.

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Abstract: In the article, the authors reveal the significance of traumatic occlusion in patients using fixed bridges fixed on dental implants. In the study, the authors use the method of occlusionography to reveal traumatic occlusion in the area of bridges fixed on dental implants. Selective grinding is carried out in the position of central occlusion from the occlusal surface of bridges and antagonist teeth. Radiographically, the authors assessed the degree of bone resorption in the area of implants at various times of the study. The examined patients were divided into 3 groups, of which group I consisted of 8 patients using bridges with implant support, group II - 10 patients with single artificial crowns on implants, group III - 13 patients using metal-ceramic bridges with based on devitalized teeth and implants. The appropriate distribution of patient groups was aimed to obtain comparative results of selective grinding in different clinical cases. The results of the study revealed a significant improvement in the processes of osseointegration in the area of implants using the method of selective grinding. Radiographically confirmed the normalization of the processes of osseointegration and the formation of mature bone tissue in the elimination of traumatic occlusion in the area of bridges fixed on dental implants.

Keywords: traumatic occlusion, dental implants, bone resorption, elimination, dental prosthetics.

1. Introduction

To date, a large clinical experience has been accumulated in the use of dental implants for dental prosthetics of various defects in the dentition. The success of dental implantation depends on a number of factors, both surgical and orthopedic. One of the orthopedic factors affecting the outcome of such treatment is the state of the occlusal relationship [6].

In this regard, the alignment of the occlusal relationship of teeth during prosthetics based on implants with adjacent teeth and antagonist teeth is of particular importance in order to avoid an increased oriented functional load on the implant, leading to a violation of the stability of the implant junction zone and the surrounding bone tissue. A necessary condition for the dynamic restructuring of cortical and cancellous bone tissue is the correct and uniform distribution of the mechanical load during chewing, taking into account its magnitude and direction. However, the problem of engraftment of implants and long-term preservation of a stable zone of connection between the implant and the surrounding bone tissue, capable of withstanding significant chewing loads, remains urgent, especially in patients with various occlusive disorders leading to the formation of traumatic nodes [5,7].

Objective.

To study the value of correction of occlusal disorders by the method of selective grinding on the processes of osseointegration of peri-implant tissues.

2. Methods

At various stages of prosthetics with the use of dental implants, we carried out clinical and X-ray studies in 3 groups of patients. Of these, group I consisted of 8 patients using bridges with implant support, group II - 10 patients with single artificial crowns on implants, group III - 13 patients using metal-ceramic bridges supported on devitalized teeth and implants. Patients of the third group did not undergo selective grinding of the occlusal surfaces of dentures.

We carried out the method of selective grinding in 12 stages (M.G. Bushan, Kh.A. Kalamkarov, 1983):

1) in distal occlusion (static phase);
2) with the reverse movement of the lower jaw to the position of the central occlusion (static phase);
3) in the position of central occlusion (static phase);
4) in the anterior occlusion (static phase);
5) when moving the lower jaw from the position of the central occlusion to the anterior occlusion (dynamic phase);
6) in lateral occlusion (right and left) on the balancing side;
7) when the lower jaw moves from the central occlusion to the transversal occlusion;
8) in lateral occlusion on the working side;
9) when the lower jaw moves from the central occlusion to the transversal occlusion on the working side;
10) elimination of canine supracontacts in lateral occlusion (static phase);
11) elimination of supracontacts in other parts of the dentition;
12) smoothing and polishing of all ground surfaces of teeth;

In the process of selective grinding, traumatic bumps were identified using articular paper. Correction of premature contacts was carried out in limited areas of the enamel, on the slopes of the tubercles to minimize trauma to the surface layers of the tooth enamel. After each manipulation, the teeth were covered with fluoride varnish from Belak-F. All patients during the period of selective grinding were recommended to brush their teeth 2 times a day with toothpastes, which prevent increased enamel sensitivity. After the completion of selective grinding, the enamel of the teeth was polished using fluorine-containing pastes, thereby achieving an absolutely smooth surface. This manipulation was carried out to prevent the formation of increased plaque deposits. Control over the process of osseointegration of peri-implant bone tissues was carried out by us using targeted radiography [7, 8].

3. Results and Discussion

Clinical examination of patients revealed signs of occlusive disorders, namely, traumatic occlusion, manifested by more pronounced exposure of the necks and roots of individual teeth, pronounced mobility of teeth of I-II degrees in the zone of occlusive trauma. There was an uneven deepening of the implant-gingival pockets in 7 patients, as well as the implant-gingival sulcus in 4 patients, determined by probing from the vestibular, oral, medial and distal sides of the tooth.

The examinations were carried out before the start of selective grinding, at the end of all stages of grinding, and also 1 month after grinding. Selective grinding was carried out in stages, every 2-3 days, which allowed the patient to gradually adapt to changes in occlusion.

The effectiveness of selective grinding of pronounced tubercles of the preserved teeth, as well as the occlusal surfaces of dentures based on dental implants, was monitored by us for 1, 2, 3 months using an X-ray study, in which we paid attention to the degree of bone tissue atrophy in the area of dental implants, the degree of X-ray optical density of inert tissues in the area of implants.

According to the data of the X-ray examination of the I-II groups of patients after the selective grinding of the occlusal surfaces of the teeth, it was found that after 1 month. after the implant is installed, the growth of the newly formed bone is observed, following the contour of the implant turns. There were no signs of inflammation. Selective resurfacing was carried out according to the mentioned method continuously during the 1st week of wearing dentures. In the images obtained after 3 months, the bone tissue had sufficient density and enveloped the threaded part of the implant. After 6 months, it was found that bone tissue was formed around the implants, covering the implant from all sides. Clinical studies of dental implantation with immediate and early functional loading have confirmed the effectiveness of this method.

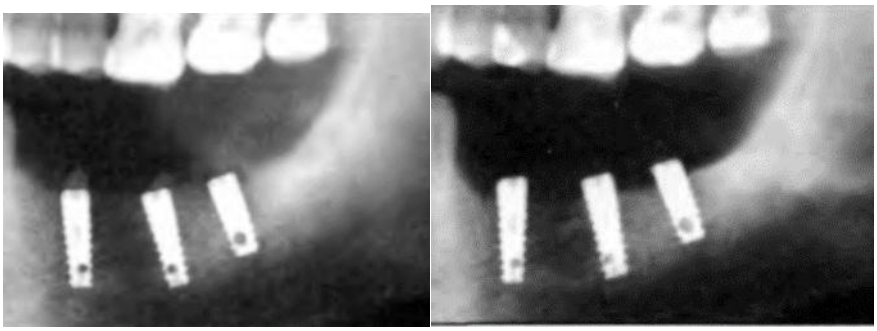

Figure: No. 1 X-ray of patient M., 45 years old. in the area of implants in the absence of functional load

A - a fragment of the control orthopantomogram 2 months after the first stage of implantation. Intraosseous elements are surrounded by bone tissue without signs of resorption;

B - a fragment of the control orthopantomogram of the same patient 2 years after the first stage of implantation. In the area of implants, the height of the bone shadow of the cortical plate of the lower jaw is uniformly reduced, and the X-ray optical density in the area of implants is also reduced. The patient did not show up for the second stage of the operation at the appointed time. Repeated X-ray examination 2 years after the installation of intraosseous elements clearly showed that the lack of functional load on the implants and the surrounding bone tissue led to bone atrophy and partial disorganization of the primary organization of the biotechnical system "implant-bone".

According to the data of orthopantomography in patients of group 1 with X-ray control within the period from 1 to 3 months there was a gradual neoplasm of bone tissue on the implant surface, and within the period from 6 to 12 months the process of bone tissue restoration around and on the surface of the implant continued, but less intensively than in the first 3 months. This is due to the fact that the neoplasm of mature bone trabeculae was completed by 6 months.

In patients of group 2, there were no differences in the state of the bone tissue around the implants during dynamic X-ray observation at all periods.

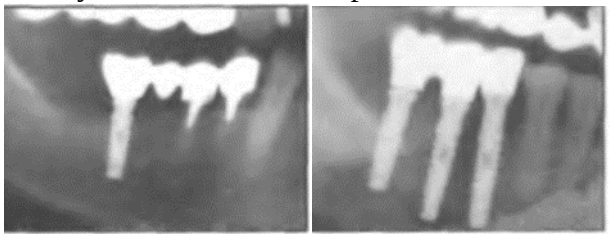

Fig. 2. X-ray of the patient T. 46 L. in the area of implants loaded with bridges after selective resurfacing.

In patients of group 3, with dynamic X-ray observation in the early stages and after 1 month, there was a decrease in the height of the bone shadow of the cortical plate of the lower jaw, as well as a decrease in the X-ray optical density in the area of the implants. Clinically, this

was expressed by swelling and edema of the implant-gingival groove, its deepening and bleeding. A more detailed X-ray examination of patients in this group revealed persistent and progressive loss of alveolar bone in the peri-implantitis area of the initial stage. In patients of the 3rd group, radiographically for 3 months of observation, we noted a lag in the processes of osseointegration in the implant-bone zone, namely, the formation of clearly edged fibrous tissue around the implants.

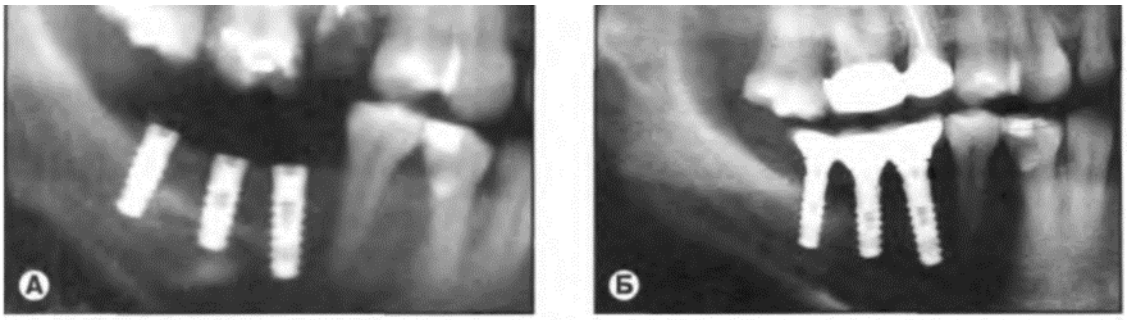

Figure # 3. X-ray of patient S., 35 l. implant area due to inadequate functional load.

A - a fragment of an orthopantomogram made 3 months after the installation of the intraosseous elements of two-stage screw implants. Intraosseous elements are surrounded by bone tissue without radiologically reliable signs of resorption;
B - a fragment of the orthopantomogram of the same patient 1.5 years after prosthetics. In the area of implants, bone resorption is observed with the formation of bone pockets with a depth of 1-2 mm, a decrease in the X-ray optical density in the area of implants.
Our comparative assessment of the radiological parameters of the peri-implant zone in group 3 patients revealed the need and justification for functional unloading of the implant-prosthesis system by selective grinding of the occlusal surfaces of dentures, as well as antagonist teeth.
In addition, the radiologically reliable lag in the processes of osteintegration of dental implants observed by us confirms the well-known opinion of a number of researchers about the close relationship between the processes of engraftment of dental implants and the standing of the occlusal relationship of the dentition. Due to the functional overload of the implant-prosthetic-bone zone, disorganization and resorption of the structural units of bone tissue, primarily trabeculae, begins, with the formation of cavities that are filled with fibrous connective tissue [8]. Due to the subsequent resorption of bone tissue, as well as its degeneration to the level of an osteoid devoid of a mineral component, microfractures of trabeculae and osteons are possible [9].

4. Conclusions

Thus, timely and targeted selective grinding helps prevent the development of metabolic, functional and structural changes in the alveolar bone in the perimplant area, which significantly improves the prognosis of orthopedic treatment of patients with the use of dental implants.

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