PROSTHETIC REHABILITATION OF THE PATIENT AFTER PARTIAL RESECTION OF THE MAXILLA USING BASAL DENTAL INPLANTS. A CASE REPORT

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Abstract

Introduction. The use of basal implantation permitted to perform prosthetic rehabilitation of patients with defects of the upper jaw, where traditional dental implantation could not be used. Materials and methods. We present the clinical case of a patient with a subtotal defect of the right half of the maxilla after removal of a benign tumor, for prosthetic rehabilitation through basal dental implantation.Results and discussion. According to the significant post-resection deficit of the bone, it was decided to create a fixed prosthetic construction with support on 3 dental implants located in "strategic" areas – floor of the nose, tubero-pterygoid area and zygomatic body. The treatment was uneventful. No complications were detected during 9 years of follow-up observation.Conclusions. This clinical case successfully demonstrates the possibility of rehabilitation of patients with post-resection defects of the upper jaw trough basal dental implants with fixed prosthetic bridge-like constructions.

Keywords: *upper jaw, post-resection defects, basal dental implants, prosthetic rehabilitation*.

1. INTRODUCTION

Prosthetic rehabilitation of patients with post-resection defects of the upper jaw resulting from surgical treatment of tumors of the maxillofacial area is an urgent problem of modern dentistry, as such defects significantly suppress the functions of the stomatognathic system and reduce the quality of life [1,2]. The traditional way of rehabilitation of such defects is the use of removable dental prostheses, designed to provide maximum possible restoration of lost aesthetics and function, in particular closure of the oroantral communication (if present). The stability and completeness of the application of the mentioned prosthetic construction depends on the size of the postoperative defect, number of patient's own remaining teeth, volume and condition of the bone tissue of the alveolar processes of the upper jaw, and patient's ability to adapt to the prosthesis. In most cases, in the absence of a significant number of teeth or an insufficient volume of the remaining bone, the use of such constructions is impossible [3,4]. The development of dental implantation partially resolved the issue, however the direct dependence of a possible implant placement on the available bone supply for a long time limits the full potential of the technique [5]. In order to find alternative places to expand the possibilities of traditional dental implantation, areas of the zygomatic bones and maxillary buttresses were considered as potential implant sites. Results of previous studies [6,7] and our own experience convincingly testify to the expediency and effectiveness of using dental implants in the aforementioned anatomical areas. In this article, we present the case of a successful treatment and a long-term dynamic follow-up of a patient after partial resection of the upper jaw, who was rehabilitated using a special fixed prosthetic construction supported on 3 implants located in the nasal floor, the body of zygoma and the tubero-pterygoid area.

2. MATERIALS AND METHODS

The clinical case of patient L., 47 years old (at the time of the first hospitalization) was examplified. In 2013, it was performed a partial resection of the right upper jaw for osteoblastoclastoma (the

diagnosis was confirmed pathomorphologically). As a result of resection, a subtotal bone defect of the alveolar process of the upper jaw on the right from the level of 13 teeth to the tuber of the upper jaw on the right was formed (Fig. 1).

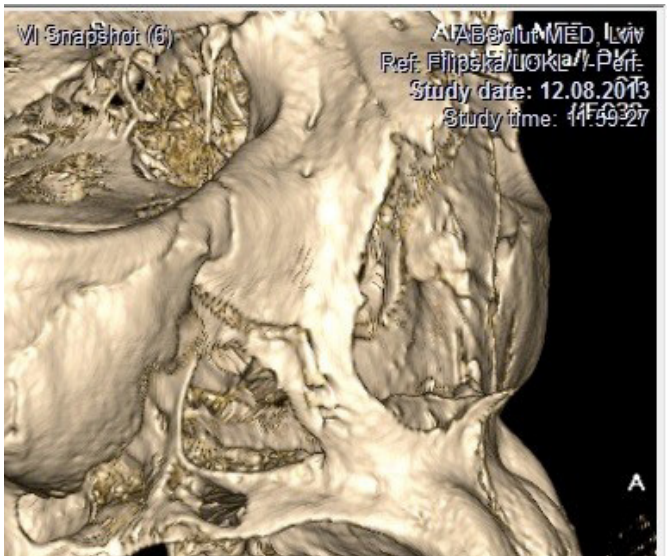


Fig. 1. 3-D model of patient's facial skeleton after resection

After the successful postoperative wound healing and recovery period, the patient decided to replace the existing defect of the dentition with a partial removable prosthesis. However, after some time, the patient noted the difficulty of using the prosthesis, especially when talking or singing (the patient is a music teacher). In addition, during smiling, there was a visible difference in height between the teeth on the prosthesis and patient's own teeth (Fig. 2). The patient came to the clinic again, to find a solution to replace the existing defect of the dentition of the upper jaw on the right side. After a careful analysis of the situation, it was found that routine methods, such as sinus lift or augmentation using bone blocks or titanium meshes, etc., cannot be applied due to the almost complete absence of the alveolar process after resection, changes in Schneider's membrane, and lack of places for attaching bone blocks or titanium meshes. After that, the patient was offered the use of a fixed prosthetic construction on 3 basal dental implants TPG® (Ihde Dental AG, Switzerland) according to the Strategic Implant® technology [8].

A

B

Fig 2. A – height difference between patient's teeth and the removable prosthesis. B – state of the available prosthetic "bed".

3. RESULTS AND DISCUSSION

After a preoperative routine examination (according to the treatment protocols), discussion of possible risks, early and late complications and possible consequences for patient's health and signing of the informative consent form, the patient underwent surgery - dental implantation on the right upper jaw with the installation of 3 TPG® (Ihde Dental AG, Switzerland) implants in 3 "strategic" areas: floor of the nose, body of zygoma and tubero-pterygoid area. Considering

the unparallel insertion of the implants, screwing fixation of the prosthetic device was chosen. The operation was performed under local anesthesia, with sedation. After reflection of the trapezoid full-thickness mucoperiosteal flap and bonr assessment, the presence of low bone supply was confirmed, which would make the use of traditional screw dental implants practically impossible (Fig. 3). According to the plan, implants were placed in: the area of the tooth 12, engaging floor of the nose, the body of the zygomatic bone and the pterygoid process of the sphenoid bone (Fig. 4).

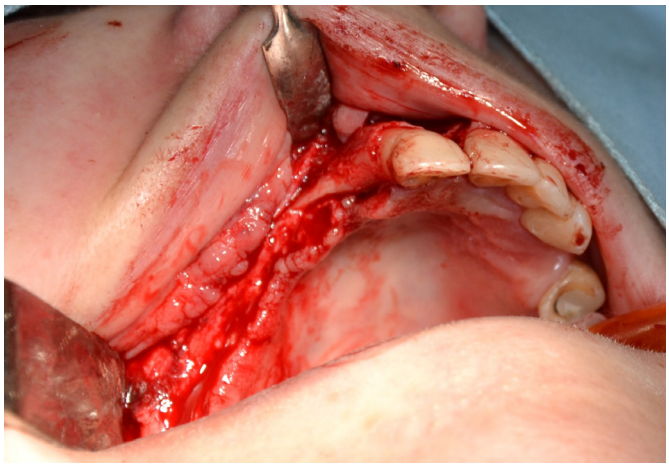


Fig. 3. State of available bone after reflection of full-thickness mucoperiosteal flap

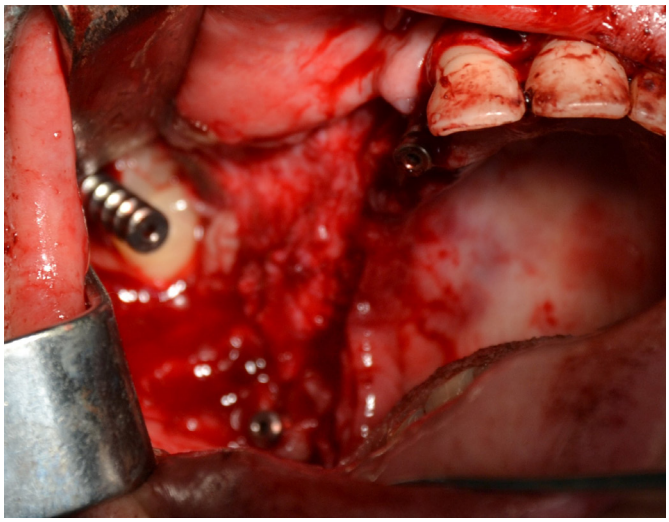


Fig. 4. Intraoperative view of the implants inserted in 3 "strategic" areas: nasal floor, zygomatic body, tubero-pterygoid area

After wound suturing (Seralon 4.0, Wiessner-Serag, Germany), the impression was taken immediately in the dental chair by the open-tray impression technique. In the postoperative period, the patient was administered antibiotics (Dalacin C 300 mg 3 times per day – 5 days, per os), corticosteroids (Dexamethasone 8 mg 1 time per day – 3 days, i/v) and NSAIDs (Dexalgin 50 mg – i/v), as well as oral rinsing with a chlorhexidine solution. In total, the patient spent 5 days in the hospital (1 day – before the operation, the day of the operation and 3 days after).

On the 5th day after surgery, the metal framework try-in was performed and on the 8th day the removal of stitches and fixation of long-term provisional metal-acrylic prosthetic construction were carried out (Fig. 5). After surgery, the patient remained under dynamic observation. During the entire postoperative period, several clinical and radiological check-ups were performed (Fig. 6-8). No changes were detected in the bone or in the soft tissues around the implants. At the time of the last follow-up (5 years after surgery), the prosthetic construction was changed from metal-acrylic to metal-ceramic (Fig. 8b).

A

B

Fig. 5. A – view of the finished metal-acrylic prosthetic construction with screwing fixation. B – the prosthetic construction is fixed in patient's oral cavity

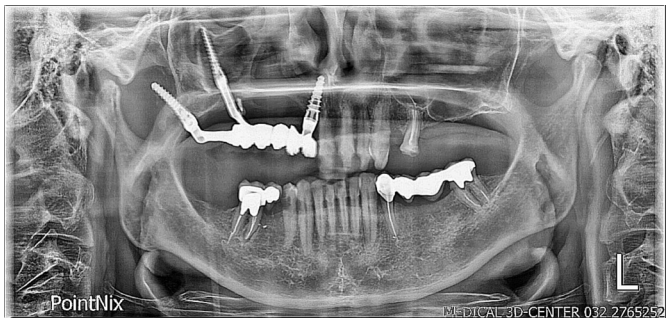
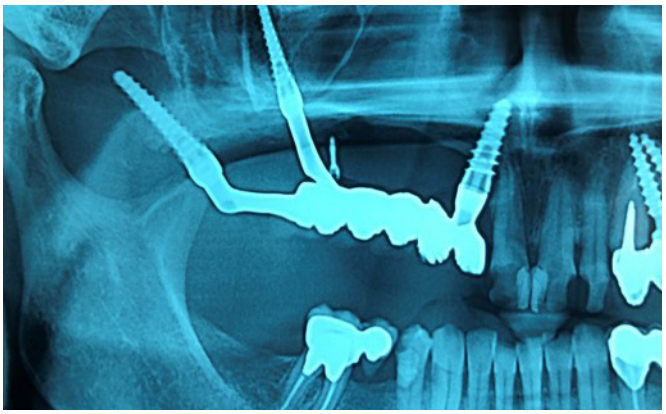


Fig. 6. OPG of the patient 10 days after surgery

Fig. 7. OPG of the patient 3 years after surgery



A

B

Fig. 8. OPG of the patient 5 years after surgery. B – fixation of permanent metal-ceramic bridgework on 3 implants

For the reconstruction of post-resection defects of the upper jaw, in particular the alveolar process, during all stages of the development of surgical dentistry and maxillofacial surgery, various technologies available at one point or another were used. The choice of method/ technology also depended on the location, size, shape of the defect, number and quality of patients teeth, condition of the bone tissue, presence or absence of communication between the oral cavity and the maxillary sinus, type of tumor, etc. In accordance with the above considerations, postoperative defects of soft tissues can be eliminated with the help of various types of plastics, both with local tissues and with the use of transplantation or of obturators [2,9-11]. Restoring the integrity of dentition is more complicated. The use of various partial or complete removable dental prostheses (which can also be used as an obturator) is limited by the above-mentioned factors [4,12]. Equally, traditional screw-type dental implants have limited fixation in such areas, because they depend on bone supply. Under these conditions, it became logical to search for alternative implant sites that avoid resection or are preserved in a sufficient volume after surgery - the tubero-pterygoid area and the zygomatic bone. An additional advantage of using these areas is avoiding the need for augmentation, the possibility of installing implants without additional preparation, which reduces patient's traumatization, the number of surgical procedures and the level of complications of the donor bed and, in particular, the augmentation-related infection [13]. However, along with a number of significant advantages, the use of the tuber of the upper jaw and zygomatic bone for implantation is associated with the risk of soft tissue injury, orbital penetration, fistula formation, and nerve damage. To minimize these risks, high-resolution computed tomography should be used to plan such interventions [14].

4. CONCLUSIONS

This clinical case successfully demonstrates the possibility of rehabilitation of patients with post-resection defects of the upper jaw by the use

of basal dental implants with fixed prosthetic bridge-like constructions. The above observation convincingly proves that the use of the tuber of the upper jaw and zygomatic bone as areas with sufficient bone supply for the insertion of basal dental implants is effective and appropriate. In turn, the combination of basal tubero-pterygoid and zygomatic dental implants in one prosthetic construction assures a greater stability and contributes to its successful use for a long time since its placement. It should also be emphasized that, considering the anatomical complexity of the area of the maxillary tuber and zygomatic bone, the experience and skill of the surgeon, as well as the use of modern diagnostic technologies, play a decisive role in the success of the planned surgical intervention.

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