

AESTHETIC CORRECTION OF ANTERIOR MAXILLARY BONE DEFECTS THROUGH IMPLANT SUPPORTED ZIRCONIA CERAMIC CROWNS. A CASE REPORT.

Mircea Suciu^{1*}, Radu Ionuț Grigoraș², Carmen Ioana Biriș¹, Claudiu Vasile Horga¹, Alina Ormenișan²

1 University of Medicine and Pharmacy – Tîrgu Mureș, Romania, Faculty of Dentistry, Department of Oral Rehabilitation and Oclusology

2 University of Medicine and Pharmacy – Tîrgu Mureș, Romania, Faculty of Dentistry, Department of Oral and Maxillo-Facial Surgery

*Corresponding author: Mircea Suciu, Professor, DMD, PhD
University of Medicine and Pharmacy – Tîrgu Mureș, Romania
e-mail: suciu.mircea@umftgm.ro

INTRODUCTION

The therapy of maxillary bone defects in the frontal area is amply disputed in the literature, due to the specific aesthetic requirements of the area, correlated with the needs of patients. Bone atrophy consecutive tooth extraction, infection, trauma or aplasia may lead to major bone defects [1]. Studies have shown that vertical bone resorption rate can vary between 11-22%, and the horizontal bone resorption can reach up to 63% at 6 months after tooth extraction [2]. The treatment solutions oscillate between bone defect augmentation or masking the bone defect by a prosthetic solution. Not always the anatomical and morphological conditions of the bone defect allow an efficient bone augmentation [3]. Maxillary anterior aesthetics depends on additional factors like gingival biotype, smiling line, the type of implant and the type of prosthetic restoration [4].

Metal-ceramic crowns that have dominated prosthetic dentistry more than half a century, have now been replaced with ceramic crowns on a support of zirconia, with higher biological, mechanical and

technological qualities and this material is able to provide superior aesthetics [5].

CASE REPORT

We present the case of a female, 27 years old, who requested functional and aesthetic rehabilitation of the maxillary dental arch. Medical history has identified that the majority of teeth were lost through tooth extraction as a consequence of dental caries complications. On clinical examination there was shown a major bone loss in the region of central and lateral incisors on right maxillary and absence of upper left canine, interspersed with edentulous of upper premolar areas. Gingival mucosa which covers the bone defect is thin and adherent to the periosteum. Smiles line is normal. Computed tomography examination highlighted the lack of a sufficient bone density to insert an implant in the left maxillary canine area. Also tomography confirmed a 6 mm vertical bone loss. All these data suggest that bone augmentation defect is difficult, and its prognosis is less favourable. In this situation it was decided that the defect must receive a concealment, through a prosthetic devices

(figure 1 A,B).

The first stage of treatment was the insertion of five screw-type implants in the bilateral area of premolars and upper incisor, followed by provisional prosthesis for a period of six months, which was required for osseointegration. Dental implants used have been standard platform sizes of 3.75 mm. An exception to this has made the dental implant placed in the upper right first premolar which has benefited from a wider platform due to anatomical conditions. Another exception was the frontal area, in the right lateral

incisor. The existence of the bone defect, which reduced the bone offer both on height and length dimension, it was necessary to use a dental implant with a smaller platform.

Radiographic evaluation after 6 months revealed a minor defect in osseointegration at the level of upper right central incisor. Assessment of dental implant secondary stability using electromechanical methods was within the normal limits. For this reason it was decided to use the dental implant in a prosthetic device to favor the aesthetic effect in frontal area (figure 1 C,D).

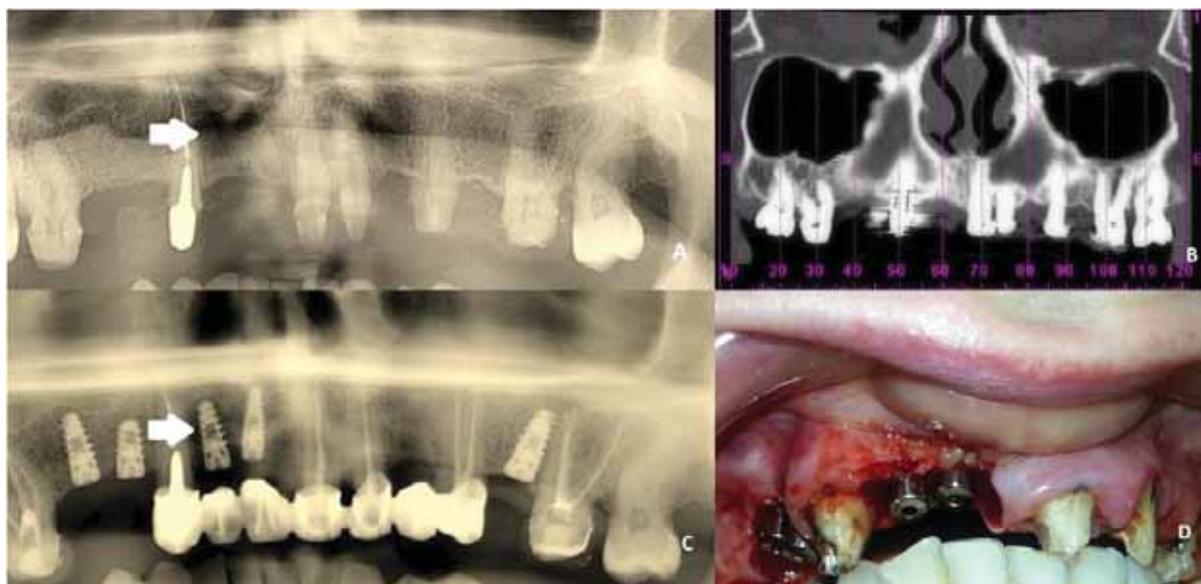


Figure 1. Radiological and clinical evaluation of bone defect: A – initial OPT; B – initial CT; C – minor bone defect after dental implant insertion; D – clinical aspects

The second phase of treatment consisted in accomplishment of the dental ceramic crowns with zirconia support, which must satisfy the aesthetic demands of the patient. The prosthetic treatment plan was based on the confluence of the three basic principles of partial edentulous treatment, namely mechanical, prophylactic and functional, with emphasis on aesthetics. To serve this ultimate goal has been decided to use ceramic single crowns supported on zirconia, the only exception being the left upper canine, where was made a dental bridge with three elements. At the level of the bone defect in the right

maxillary central and lateral incisors, a zirconium crown was modeled in such a way as to delineate the gingival area of the tooth crown, being made a threshold to allow placement of gingival mask to cover the existing bone defect.

At the end of prosthetic treatment the patient was instructed in order to maintain a good oral hygiene to avoid further complications.

RESULTS AND DISCUSSIONS

In the majority of clinical cases the bone defects are corrected by bone augmentation

with autogenous or heterogeneous bone blocks or granules and allow immediate insertion of dental implants [6,7,8]. As described, the clinical situation was not favourable for the bone addition and the results are not consistent with effort made both, the physician and patient. Gingival biotype has influenced the final therapeutic decision because mucosa was thin and adherent to the periosteum. The clinical findings have been confirmed by the measurements made on computed tomography, which allowed accurate assessment of the bone defect. Computed tomography examination has also allowed the assessment of bone offer in terms of dimensional and bone density. Thus, we were able to choose the optimal size of the dental implants and the decision of their immediate loading was excluded. Placement of the dental implants in place of each missing tooth, except upper left canine, have ensured the premises to achieve a correct prosthetic and aesthetic treatment. Consideration of ortopantomography may lead errors and artefacts due to the overlapping images of hard and soft tissues [9,10]. This has led to a suspicion of impossibility to use the dental implant in the upper right central incisor area, suspicion dismantled by electromechanical testing of the dental implant secondary stability [11]. Prosthetic treatment respects the three fundamental principles in therapy of fixed prostheses. Thus, in terms of mechanical principles was use zirconium as a support for the ceramic material, although mechanical strength of lithium disilicate is higher [12,13]. In this case was chosen the support zirconium due to the finite accuracy limit of the crown, requirements imposed by aesthetic aspect of the area [14]. Intimate adaptation of dental crown on both abutments, natural tooth and dental implant, ensured stability and balance for the prosthesis. The biological characteristics and

biocompatibility of zirconium fully satisfy the requirements of the prophylactic principle [15,16,17,18]. Added to this are the morphological modelling of dental crowns and pontics in relation to the edentulous ridge [19].

Establishing a correct occlusal vertical dimension and respecting by modelling the teeth morphology in relation to antagonists, in our case has ensured an effective mastication and phonation according with the functional principle requirements [20].

Regarding the aesthetics of prosthesis, placement of dental implants in place of each missing tooth has enabled individual dental crowns fabrication. The largest space in the body of the bridge has allowed a good individualization of teeth [21,22]. In those situations when the toothless gap's space was reduced, it is indicated the modelling artifices which gives a whole natural look to prosthetics [23]. In our case, the changes from premolar and anterior right areas have imposed such manoeuvres. The gingival mask placement to the bone defect level in anterior area has positively influenced the aesthetics, because it doesn't allowed making teeth with different vertical dimension [24,25].

To solve clinical and technical this case, the surgeon and the dental technician have brought their contribution under the supervision of specialist in dental prosthetic [26,27].

In the current situation, the clinical situation prognosis is favourable in condition to maintain a good oral hygiene to avoid the risk of a peri-implantitis which can compromise the treatment plan. The favourable prognosis is influenced by the time of onset of peri-implantitis.

CONCLUSIONS

1. In the presented clinical case, the possibility of inserting implants in every

missing tooth place and making individual dental crowns ensure the premises of success in terms of aesthetics.

2. Interdisciplinary approach in this case has allowed basic principles of fixed prosthetics such as mechanical, functional and prophylactic.

3. The imagistic paraclinical investigations may lead to confusions thus require any further examinations.

4. The absence of a proper oral hygiene increases the risk of a peri-implantitis which can compromise the treatment despite the use of biological and biocompatible materials.

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