Defects in the maxilla associated with oro-antral and oronasal communications generally affect patient’s function and esthetics leading to emotional imbalance. Reconstructive surgery is an option, but sometimes presents unsatisfactory results. Rehabilitation using obturator prostheses in edentulous patients often contributes to inadequate stability. The literature demonstrates that intra-oral endosseous implants help in retaining the obturator prosthesis with satisfactory results. The present article is a report of 2 clinical cases in which patients were rehabilitated with obturator prostheses over conventional and zygomatic implants, with a follow-up of 2 years.

**KEY WORDS:** zygomatic implants, complex cases, obturator prostheses

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INTRODUCTION
The difficulty in rehabilitating edentulous patients with maxillary defects is a recurrent theme in the literature mainly due to the limitations generated for these patients. Partial resections of the maxilla for removal of tumors generally affect speech, mastication, deglutition (swallowing) and facial esthetics and leads to emotional imbalance. Obturation of the oroantral communication in the maxilla through plastic surgery with the use of myocutaneous or osteomyocutaneous graft surgery is a feasible treatment option but depends on the size of the post resection defect and frequently presents unsatisfactory results in some situations. In some cases obturator prostheses in patients with oroantronal defects represent the only chance for fistula occlusion with the possibility of improving their general conditions. However, the absence of teeth often contributes to inadequate stability of an obturator prosthesis thus jeopardizing its function and esthetics. Some authors demonstrated that the use of endosseous implants can improve retention of obturators in the maxilla. Weischer et al demonstrated that intra-oral endosseous implants placed in a ressected region close or anchored to the zygomatic bone help in retaining the obturator prosthesis with satisfactory results.

Zygomatic implants were initially proposed by Brånemark with the objective of rehabilitating patients with defects and severe maxillary atrophies. Zygomatic implants are currently an important option for rehabilitation of atrophic ridges. The classic technique proposes the use and placement of standard implants in the anterior region of the maxilla with 2 zygomatic implants installed, one on each side anchored to the zygoma and remaining maxillary osseous crest. In more critical conditions the utilization of 4 zygomatic implants has been referred in the literature as a viable alternative and with high success rates. The bone density presented by the zygomatic bone favors good initial anchorage of the implant, thus enabling rehabilitation with prostheses over implants submitted to immediate load. Some authors believe that the use of zygomatic implants enables better stabilization of obturator prostheses in the post ressected maxilla promoting better quality of life to the patient.

This article consists of a presentation of clinical cases in which patients presented with oroantral communications and were rehabilitated with obturator prostheses over conventional and zygomatic implants. Follow up period was approximately 2 years.

CASE 1
In April 2005, patient A.H.J, male, 76 years old, complained about the presence of an oroantral communication which was affecting the stabilization of a standard total prosthesis. He said he had been submitted to an unsuccessful reconstructive surgery with onlay graft from the iliac crest for closure of the oroantral communication. During the physical exam an oroantral fistula was found with exposure of the fixed bone blocks that presented loosening with signs of necrosis. According to the patient, he had been submitted to reconstructive surgery with extra-oral graft from the iliac crest at which point the bone blocks were installed for closure of the fistula (Figure 1).

After clinical evaluation, a treatment plan was proposed together with imaging studies - panoramic X-Ray and CT. A steriolithographic model was also used in the treatment plan which was generated based on a three-dimensional (3D) edition of computed tomography (CT) data (Figure 2).
Treatment plan
Surgery for the installation of zygomatic implants was proposed because of the patient’s critical condition and was performed in April 2006. A supra-crestal midline incision was made with the patient under general anesthesia, broad detachment for exposure of the zygomatic bones bilaterally and the remaining bilateral region of the maxilla. The titanium micro-screws were removed and two implants Sistema Conic (Conexão Sistema de Prótese – São Paulo – Brazil) of 3.5 mm diameter and 10 mm length were installed in the pterygopalatine region bilaterally. Four zygomatic implants with inner hexagon Sistema Zigomax (Conexão Sistema de Prótese – São Paulo – Brazil) of 4.0 mm diameter and 30 mm length were also installed – 2 on each side. Due to the extension of the oroantral communication, we noticed an absence of remnant maxillary bone. Thus, given the magnitude of the defects, the zygomatic implants only acquired anchorage in the body of the zygoma, as opposed to the traditional technique. So as to increase the amount of tissue and mucosal scar retraction near the zygomatic implants, a pediculated flap with bilateral buccal fat pad was made. All standard and zygomatic implants were anchored with a 45 N.cm torque.

During surgery, micro-unit type abutment prosthetic components at 30 degree angles in zygomatic implants and straight abutments in standard implants were installed. Then, transfers were placed for molding and registers with a multifunctional acrylic guide were done after suturing the flap. From this register a cast model and gold metallic superstructures were manufactured. Initially, two milled metallic structures in gold screwed separately over the zygomatic implant abutments were installed, one on each side. Another telescopic supra-structure was also made and screwed onto the abutments of the standard implants bilaterally and placed on the milled supra-structures previously fixed onto the zygomatic implants. This telescopic structure was manufactured in gold with a metallic counter–bar and two precision attachments from the MK 1 System (MK 1 Dental-Attachment GmbH – Zetel – Germany) installed bilaterally. An “overdenture” acrylic prosthesis was made and

Figure 1: Clinical view of iliac bone blocks with signs of necrosis in Case 1.

Figure 2: Stereolithographic model for Case 1.
installed fifteen days after surgery (Figures 3-8).

The patient had a monthly follow up and the superstructure was removed after 6 months. Osseointegration of the implants was tested through a reverse torque test (10 Ncm) which is an indicator of clinical stability and percussion over the abutment. No implants presented loosening, except for a standard implant in the pterygopalatine region on the left side which presented loosening and was removed. Even with the loss of one implant, the supra-structure and the prosthesis were maintained. The patient was followed up for 2 years without presenting problems in the implants (Figures 9-12).

**CASE 2**

In July 2006, patient D.H, 45 years old, female, reported having been submitted for hemimaxillectomy for resection of a benign maxillary tumor performed about 30 years ago. She

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**Figure 3:** Cast model with two milled gold superstructures.

**Figure 4:** Telescopic gold structure.

**Figure 5:** Intra-oral view of two milled gold superstructures in Case 1.

**Figure 6:** Intra-oral view of telescopic structure in Case 1.
was using an obturator prosthesis, complained about prosthesis instability and phonatory difficulties. The physical exam showed an oro-antral communication and the presence of remaining bone on the left side only (Figures 13, 14).

A treatment plan was proposed after the clinical evaluation together with imaging tests – panoramic X-Ray and CT. A stereolithographic model that was generated based on three-dimensional (3D) CT images was also included in the plan (Figure 15).

**Treatment plan**

Under general anesthesia, an incision in the remaining zygomatic region on the right side was performed with a vertical medial incision, detachment of the flap and installation of two long implants of 4.0 mm diameter and 21 mm length of inner hexagon. On the left side a supracrestal incision was made, detachment and installation of two zygomatic implants of 4.0 mm diameter and 30 mm length of outer hexagon. The implants
installed were of Sistema Conexão (Conexão Sistemas de Prótese – São Paulo – Brazil) were placed, two on each side. An important piece of information to bear in mind is that the implants were anchored with a 45 Ncm torque (Figure 16).

Micro-unit type abutment prosthetic components were inserted in the zygomatic implants. Later on, transfers were fixed for impression and registers were performed with a multifunctional acrylic guide that had been made previously by reproducing the patient’s former prosthesis. A working model and a metallic superstructure in nickel-chrome were produced. The structure was screwed onto the implant abutments so as to make an overdenture with the bar and clip system installed five days after surgery. The patient was monitored every month and the superstructure was removed after 6 months.19 Osseointe-
The metallic superstructure after a period of 2 years in Case 2.

The esthetic condition of Case 2 after a period of 2 years.

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Figure 17a: The metallic superstructure after a period of 2 years in Case 2.

Figure 17b: The esthetic condition of Case 2 after a period of 2 years.

migration of implants was tested utilizing a reverse torque test (10 Ncm) which is an indicator of clinical stability and percussion over the abutment. No implant presented loosening and the patient was followed up for 20 months without presenting complications with the implants (Figures 17a, 17b).

DISCUSSION

Prosthetic rehabilitation of patients with extensive oroantral communications is a big challenge because of the critical conditions caused by this type of defect. Although onlay grafts and myocutaneous and osteomyocutaneous grafts are referred to as treatment options, they imply more invasive surgery and the need for surgical access to other donor sites with unpredictable results.

Standard obturator prostheses have been used but are unsatisfactory because they limit the
patient’s esthetic and functional conditions and may lead to emotional problems. Other authors consider that the results presented in the literature for rehabilitation with 2 and 4 zygomatic implants are encouraging. Landes et al. demonstrated that rehabilitation with obturator prostheses made over zygomatic implants presented satisfactory stability, thus improving patients’ quality of life. This paper proves this point with the presentation of 2 cases in which patients with oroantral communications and standard obturator prostheses were not satisfied with the conditions of the prostheses. The proposed treatment presented in this paper with the use of osseointegrated implants for stabilizing obturator prostheses corroborates other authors’ statements. The two modalities of “overdentures” utilized with two types of attachment systems presented satisfactory results from an esthetic and a functional point of view. The use of 4 zygomatic implants associated, or not, to standard implants proved that it is a viable and predictable option compatible with the results found in the literature. It is important to emphasize that the zygomatic bone presents good bone density and favors an initial anchorage of 45 Ncm, which enables immediate load as was shown in this paper, thus proving statements in the literature regarding this proposal. On the other hand, complex obturator prostheses over zygomatic implants installed in an atypical way generates unfavorable biomechanical conditions for the implants. More conclusive scientific studies are necessary to prove this statement.

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Disclosure
The author reports no conflicts of interest with anything mentioned in this article.

References