Reconstruction of the Premaxilla With Autogenous Iliac Bone in Combination With Osseointegrated Implants

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The simultaneous use of autogenous bone grafts and osseointegrated implants has opened up new possibilities in the reconstrution of large tissue defects in the oral-maxillofacial region. In this paper, the successful rehabilitation of a patient who lost the premaxilla following a segmental osteotomy is described. The resulting oronasal communication and bony defect were restored by placing a bone graft from the iliac crest that was stabilized with two osseointegrated implants. A fixed prosthesis was fabricated to replace the missing anterior teeth. Esthetic and functional criteria were fulfilled. (INT J ORAL MAXILLOFAC IMPLANTS 1993;8:61—67.)

Tilted implants as an alternative to maxillary sinus grafting: a clinical, radiologic, and periostest study.

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Author Information

Abstract

BACKGROUND: Owing to mechanical and anatomic difficulties, implant treatment in the atrophic maxilla remains a challenge. The maxillary sinus floor augmentation procedure is still not universally accepted because of its complexity and its unpredictability.

PURPOSE: In this study, a combination of tilted and axial implants was used in patients with severely resorbed posterior maxillae as an alternative to sinus grafting.

MATERIALS AND METHODS: Twenty-five patients were rehabilitated with 29 fixed partial prostheses supported by 101 Brånemark System implants. Fifty-nine implants were installed in an axial and 42 in a tilted direction. The average follow-up period was 37 months (range, 21-67 mo post loading).

RESULTS: After 5 years, the implant cumulative success rate was 95.2% (survival rate 100%) for the tilted implants and 91.3% (survival rate 96.5%) for the axial implants, and the prosthesis survival rate was 100%. At the fifth year, the average marginal bone loss was 1.21 mm for the tilted implants and 0.92 mm for the axial ones. The mean Periotest values (PTV) at loading time were -2.62 and -3.57, and after 5 years the PTVs were -4.73 and -5.00 for the tilted and the axial implants, respectively. During the follow-up, all prostheses but two were mechanically stable, retightening of 16 abutment screws and 5 gold screws in 13 prostheses was done, and fracture of two abutment screws and two occlusal surfaces was experienced.

CONCLUSIONS: Results indicate that the use of tilted implants is an effective and safe alternative to maxillary sinus floor augmentation procedures.

The long-term use of zygomatic implants: a 10-year clinical and radiographic report.


Abstract

BACKGROUND: The zygoma implant has been an effective option in the short-term management of the atrophic edentulous maxilla.

PURPOSE: To report on long-term outcomes in the rehabilitation of the atrophic maxilla using zygomatic (ZI) and regular implants (RI).

MATERIAL AND METHODS: 22 consecutive zygomatic patients in a maintenance program were included. Cumulative survival rate (CSR) of ZI, RI prostheses, and complications were recorded during, at least, 10 years of loading. Implant mobility was tested using Periotest®. Sinus health was radiographically and clinically assessed according to Lund-Mackay (L-M) score and Lanza and Kennedy survey, respectively. A satisfaction questionnaire and anatomical measurements were also performed.

RESULTS: Patients received 22 prostheses, anchored on 172 implants. Forty-one were ZI. Three RI failed (10 years CSR = 97.71%). Two ZI were partly removed due to peri-implant infection (10 years CSR = 95.12%). All patients maintained functional prostheses. One patient fractured framework twice. Loosening or fracturing screws happened in 11 patients. Seven patients fractured occlusal material. Four ZI abutments in two patients were disconnected because of uncomfortable prostheses. Alveolar height at the ZI head level on the right and left sides was 2.64 mm and 2.25 mm, respectively. Mean distance of ZI head center to ridge center, on the right and left sides was 4.54 mm and 5.07 mm, respectively. Mean Periotest values (PTv) of ZI were -4.375 PTv and -4.941 PTv before prostheses placement and after 10 years, respectively. Six patients experienced sinusitis 14-127 months postoperatively. 54.56% of the L-M scores did not present opacification (L-M = 0) in any sinus. Osteoconal obstruction happened in eight patients (two bilateral). Two (9.09%) were diagnosed with sinusitis. Eighty-four per cent reported satisfaction levels above 80%. 31.81% reported maximum satisfaction score (100%).

CONCLUSIONS: The long-term rehabilitation of the severely atrophic maxillae using ZI is a predictable procedure.

The use of zygomatic implants for prosthetic rehabilitation of the severely resorbed maxilla.

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The use of zygomatic implants for prosthetic rehabilitation of the severely resorbed maxilla

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In many patients conventional implant treatment cannot be performed in the edentulous maxilla because of extensive bone resorption and the presence of extensive maxillary sinuses, leading to inadequate amounts of bone tissue for anchorage of the implants. The treatment option for these patients has often been some type of bone-augmentation procedure in order to increase the volume of load-bearing bone. Traditionally, the atrophic maxilla has been treated with large bone grafts from the iliac crest, a procedure that requires general anesthesia. The bone grafts have been used as onlays, in combination with a Le Fort I osteotomy, or as maxillary sinus inlays. Implants have been inserted simultaneously or after an initial healing period. Long-term follow-up studies have shown varying degrees of implant survival in grafted bone. A recent literature review based on 23 publications revealed an overall survival rate of 82-84% after a follow-up time from 12 to 60 months (38). A 10% higher survival rate was seen for implants placed after initial healing of the bone graft than if the implants were placed simultaneously with the bone graft. It can be argued that bone-augmentation procedures are resource demanding, take a long time and may present risks for morbidity of the donor site of the bone graft. It is also obvious that failure rates are higher in grafted than in nongrafted maxillae (17).

Indications and pre-surgical evaluation

In general, zygomatic fixtures can be used in patients with a totally and partially edentulous maxillary who have insufficient bone volume for placement of regular implants posterior to the canines (Figs. 1 and 2). Together with conventional implants in the anterior region, the zygomatic fixture offers anchorage for a fixed bridge using less invasive surgery compared with bone-augmentation procedures. It is most suitable in patients presenting with severe resorption of the posterior maxilla (i.e. <4 mm bone height distal to the canines) but with sufficient amounts of bone in the anterior region, so at least three implants per quadrant can be placed. In patients with small bone volumes also in the anterior part of the maxilla, the zygomatic implant can be used in conjunction with a bone-augmentation procedure of the anterior segment. In this way, fewer bone grafts are needed for the augmentation procedure. Zygomatic implants are also indicated when contraindications exist for harvesting of the iliac crest bone graft. As discussed later, one advantage with the technique is that it can be performed as an outpatient procedure under local anesthesia and conscious sedation. However, for
Sinus reactions to immediately loaded zygoma implants: a clinical and radiological study.

**Abstract**

AIM: There are no published studies regarding sinus reactions to immediately loaded zygomatic implants. The aim of this study was to evaluate the maxillary sinus in a cohort of patients by means of clinical criteria and computerised tomography performed before surgery and after zygomatic implant placement (immediate function protocol).

MATERIALS AND METHODS: A total of 38 patients with 71 immediately loaded zygomatic implants were evaluated to find clinical criteria of maxillary sinus disturbance 13 to 42 months (average 21.3 months) after zygoma implant placement. A total of 44 implants had a machined surface and 27 had a porous titanium oxide surface. Twenty-six patients with 52 immediately loaded zygomatic implants were evaluated by means of a CT scan of the paranasal sinuses, 3 to 20 months (average 10.5 months) after zygomatic implant placement. All patients had no sinus symptoms before surgery and had a preoperative CT scan.

RESULTS: No clinical signs or symptoms of sinusitis were found. Radiological opacity of the antrostomy was found in two sinuses (out of 52), and minimal thickening of the Schneiderian membrane was found in 12 patients (out of 26). In eight of them, this was present in the preoperative CT scan.

CONCLUSIONS: Sinuses penetrated by zygomatic implants seem to maintain a normal physiology. However, in approximately 15 to 20% of patients, early radiological findings without clinical symptoms were observed.

A proposed classification for zygomatic implant patient based on the zygoma anatomy guided approach (ZAGA): a cross-sectional survey.

**Abstract**

PURPOSE: The aim of the present cross-sectional study was to propose a classification system based on a cross-sectional survey of zygomatic implant cases.

MATERIALS AND METHODS: Cone beam computed tomography (CBCT) postoperative images and clinical Intra-surgery photographs of 200 sites corresponding to 100 patients, treated with a total of 196 zygomatic implants in the maxilla according to an anatomy-driven prosthetic approach, were reviewed with regard to anatomy and pathway of the zygomatic implant body. The patients were consecutively selected independently of the type of surgery performed, with the unique requirement of a post-surgical CBCT performed at the moment of selection. Of special interest was the morphology of the lateral sinus wall, residual alveolar crest and the zygomatic buttress. An attempt was made to divide the patients into groups, describing typical anatomies and implant pathways.

RESULTS: Five basic skeletal forms of the zygomatic buttress-alveolar crest complex and subsequent implant pathways could be identified in a sample of 100 patients. Out of them, 62% were female and 38% male, with ages varying between 36 and 83 years (mean age 50.6; SD: 9.67). The five groups were classified as ZAGA 0 to 4 representing 16%, 49%, 20.5%, 9% and 6.5% of the studied sites, respectively. Intra-individual anatomical differences affecting the zygomatic buttress-alveolar crest complex was also found in 58% of the patients.

CONCLUSIONS: Five typical anatomical and implant pathway situations could be identified. A classification system comprising five groups named ZAGA 0 to 4 is proposed. Anatomical intra-individual differences were also found in the 58% of the studied population. It is believed that the proposed classification system is useful for categorising zygomatic implant cases for therapy planning and for scientific follow-up purposes.

Zygomatic implants: indications, techniques and outcomes, and the zygomatic success code.

**Abstract**

The zygoma implant has been an effective option in the management of the atrophic edentulous maxilla as well as for maxillectomy defects. Bränemark introduced the zygoma implant not only as a solution to obtain posterior maxillary anchorage but also to expedite the rehabilitation process. The zygoma implant is a therapeutic option that deserves consideration in the treatment-planning process. This paper reviews the indications for zygoma implants and the surgical and prosthetic techniques (including new developments) and also reports on the clinical outcome of the zygomatic anatomy-guided approach. An overview of conventional grafting procedures is also included. Finally, a Zygoma Success Code, describing specific criteria to score the success of rehabilitation anchored on zygomatic implants, is proposed.
Zygomatic implants placed using the zygomatic anatomy-guided approach versus the classical technique: a proposed system to report rhinosinusitis diagnosis.
Aparicio C1, Manresas C, Francisco K, Aparicio A, Nunes J, Claros P, Potau JM

Abstract
PURPOSE: The first aim of this study is to compare the outcomes in rehabilitating the atrophic maxilla using zygomatic implants (ZIs) and regular implants (RIs) using the classical zygomatic technique (CZT) versus the zygomatic anatomy-guided approach (ZAGA). The second goal of this paper is to propose a standardized system to report rhinosinusitis diagnosis.

MATERIALS AND METHODS: Twenty-two consecutive zygomatic patients operated on from 1999 to 2002 and 80 consecutive zygomatic patients operated on from 2004 to October 2009 were selected. All included patients were in a maintenance program. Survival rates (SRs) of ZI and RI were recorded. Implants were individually tested using Periotest® (Periotest value [PTv]; Siemens AG, Bensheim, Germany). Sinus health was radiographically and clinically assessed according to Lund-Mackay system and Lanza and Kennedy survey recommended by Task Force on Rhinosinusitis for research outcomes. A satisfaction questionnaire (Oral Health Impact Profile for assessing health-related quality of life in Edentulous adults) and different anatomical measurements were also performed.

RESULTS: No significant differences (p = 0.02) were observed with respect to SR between the two groups (95.12% vs 96.79%). Significant differences (p = 0.00) were found comparing measurements of ZI head distance to the alveolar crest (5.12 ± 2.38 mm vs 2.92 ± 2.30 mm). With the CZT, more parafacial emergence of ZI was observed. PTv gave significantly greater stability for the CZT compared with the ZAGA group in both measurements (-3.88 ± 1.75 vs -2.49 ± 1.51, p = 0.00), -4.94 ± 1.46 vs -3.11 ± 2.69, p = 0.00). Lund-Mackay score was significantly lower for the ZAGA group (2.38 ± 1.86 vs 0.56 ± 1.26, p = 0.04). Statistically significant difference (p = 0.04) regarding the percentage of patients with no signs or symptoms of rhinosinusitis (Lanza and Kennedy test negative and Lund-Mackay score zero) was observed between groups (54.55% vs 76.25%, p = 0.04).

CONCLUSIONS: Both procedures had similar clinical outcomes with respect to implant survival. The ZAGA concept is able to immediately rehabilitate the severely atrophic maxilla, minimizing the risk of maxillary sinus-associated pathology. Moreover, less bulky, more comfortable, and easy to clean prostheses are achieved.