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Editors
Oleksii Tymofieiev • Rui Fernandes
(Kyiv, Ukraine • Jacksonville, FL, USA)

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About the Journal: Aims and Scope

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Official Title

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J. Diagn. Treat. Oral Maxillofac. Pathol.

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Aims & Scope

This is a monthly peer-reviewed oral and maxillofacial surgery journal focused on: Microvascular and jaw reconstructive surgery, dental implants, salivary gland tumors/diseases, TMJ lesions, virtual surgical planning, implementation of ultrasonography into the practice of oral and maxillofacial surgeons.

Editorial Board (EB) Composition

- EB shows significant geographic diversity representing 26 opinion leaders from 13 countries: Brazil, Canada, Colombia, Greece, Hong Kong (SAR, China), India, Israel, Italy, Slovak Republic, Spain, Ukraine, United Arab Emirates, and United States.
- The majority of the EB Members have a discernible publication history in Scopus, Web of Science, and journals with a high impact factor.
- The publication records of all EB members are consistent with the stated scope and published content of the journal.
- The journal has a several full-time professional editors.

Frequency

12 print/online issues a year (from January 2020)

Publication History

2017: 4 issues a year
2018: 4 issues a year
2019: 10 issues a year
2020: 12 issues a year

Publishing Model

Journal combines a *hybrid* and *delayed open access* publishing models. The articles of all types, except Editorials, are immediately in open access. Editorials became an open access publication too after 3-month embargo period.

Article Processing Charge (APC)

During hard times of Covid-19 pandemic our journal trying to support authors by reducing the APC by 50%. And by the end of December 2020 the APC will be 100 USD and 50 USD (excluding taxes) depending on the article`s type. Details at website: dtjournal.org.

13 Types of Articles Currently Published by the Journal

Editorials/Guest Editorials/Post Scriptum Editorials, Images in Oral & Maxillofacial Surgery, Case Reports/Case Series, Original Articles, Review Articles, Discussions, Paper Scans (*synonyms*: Review of Articles, Literature Scan), Book Scans (*synonym*: Book Reviews), Letters to the Editor (*synonym*: Letters), and Viewpoints.

Registration: Ministry of Justice of Ukraine

Registration: July 28, 2016
Re-Registration: May 21, 2019 (Certificate: KB # 23999-13839ПР)

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2. Private Higher Educational Establishment "Kyiv Medical University."
3. OMF Publishing, Limited Liability Company.

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See page A5.

Editorial Board

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TANTUM VERDE®

INFORMATION LEAFLET
for the medicinal product

Composition:
active substance: **benzydamine hydrochloride**;
100 mL of solution contain benzydamine hydrochloride 0.15 g;
excipients: ethanol 96%, glycerol, methyl parahydroxybenzoate (E 218), flavor (menthol), saccharin, sodium hydrocarbonate, Polysorbate 20, Quinoline Yellow (E 104), Patent Blue V (E 131), purified water.

Dosage form. Oromucosal solution.
Basic physical and chemical properties: a clear green liquid with a typical mint flavor.

Pharmacotherapeutic group. Dental preparations. Other agents for local oral treatment.
ATC code: A01A D02.

Pharmacological properties.
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Benzydamine is a non-steroidal anti-inflammatory drug (NSAID) with analgesic and antiexudative properties.

Clinical studies have shown that benzydamine is effective in the relief of symptoms accompanying localized irritation conditions of the oral cavity and pharynx. Moreover, benzydamine has anti-inflammatory and local analgesic properties, and also exerts a local anesthetic effect on the oral mucosa.

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Absorption through the oral and pharyngeal mucosa has been proven by the presence of measurable quantities of benzydamine in human plasma. However, they are insufficient to produce any systemic pharmacological effect. The excretion occurs mainly in urine, mostly as inactive metabolites or conjugated compounds.

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Benzydamine is not recommended for use in patients hypersensitive to acetylsalicylic acid or other non-steroidal anti-inflammatory drugs (NSAIDs).

The product can trigger bronchospasm in patients suffering from or with a history of asthma. Such patients should be warned of this.

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No adequate data are currently available on the use of benzydamine in pregnant and breastfeeding women. Excretion of the product into breast milk has not been studied. The findings of animal studies are insufficient to make any conclusions about the effects of this product during pregnancy and lactation.

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TANTUM VERDE should not be used during pregnancy or breast-feeding.

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When used in recommended doses, the product does not produce any effect on the ability to drive and operate machinery.

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Pour 15 mL of TANTUM VERDE solution from the bottle into the measuring cup and gargle with undiluted or diluted product (15 mL of the measured solution can be diluted with 15 mL of water). Gargle 2 or 3 times daily. Do not exceed the recommended dose.

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Within each frequency group, the undesirable effects are presented in order of their decreasing seriousness.

Adverse reactions are classified according to their frequency: very common (≥ 1/10); common (≥ 1/100 to <1/10); uncommon (≥ 1/1,000 to <1/100); rare (≥ 1/10,000 to <1/1,000); very rare (<1/10,000); frequency unknown (cannot be estimated from the available data).

Gastrointestinal disorders: rare – burning mouth, dry mouth; *unknown* – oral hypesthesia, nausea, vomiting, tongue edema and discoloration, dysgeusia.

Immune system disorders: rare – hypersensitivity reaction, *unknown* - anaphylactic reaction.

Respiratory, thoracic and mediastinal disorders: very rare –laryngospasm; *unknown* – bronchospasm.

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Nervous system disorders: unknown – dizziness, headache.

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Shelf life. 4 years.

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Location of the manufacturer and its business address. Via Vecchia del Pinocchio, 22 – 60100 Ancona (AN), Italy.

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September 26, 2018.

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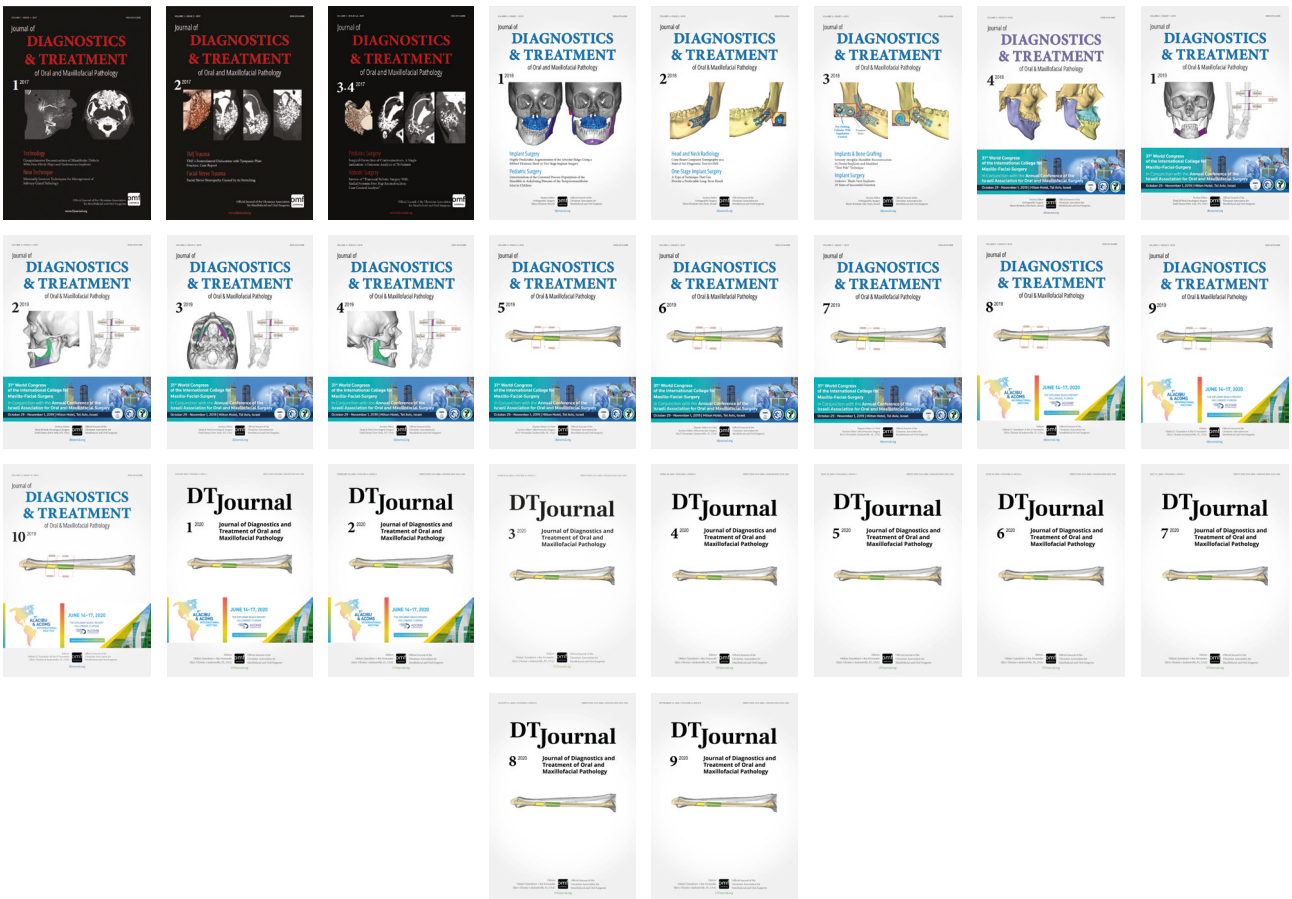

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1. At Ukrposhta post offices.
2. At the website www.presa.ua.
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With the care of our readers, the subscription fee in 2021 successfully decreased by 73.81 percent and is $1 for 1 printed Issue.

Issues	Fee in 2020	Fee in 2021
1 Issue	$4[12] (103[08] UAH)	$1 (27 UAH)
3 Issues	$12[36] (309[24] UAH)	$3 (81 UAH)
6 Issues	$24[73] (618[48] UAH)	$6 (162 UAH)
12 Issues	$49[46] (1,236[96] UAH)	$12 (324 UAH)

Content

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COURTESY

Journal`s cover image (virtual surgical planning for a segmental mandibular reconstruction with fibula transplant) is courtesy of Rui P. Fernandes, MD, DMD, FACS, FRCS.

Image was taken from the article: Fernandes RP, Quimby A, Salman S. Comprehensive reconstruction of mandibular defects with free fibula flaps and endosseous implants. *J Diagn Treat Oral Maxillofac Pathol* **2017**;1(1):6–10.

EDITORIAL

Introducing the Editorial Board Member from Philadelphia, Pennsylvania: Andrew Yampolsky, DDS, MD

Oleksii O. Tymofieiev[a], Ievgen I. Fesenko[b], & Anastasiya Quimby[c]

Nice to see OMS flourishing in my motherland.
—Dr. Yampolsky (personal communication, 2019)

Uniting the best microvascular surgeons in the Editorial Board became a new honorary tradition of our journal. We are enormously proud to receive the acceptance and wise support of Dr. Yampolsky (Fig 1).

Andrew Yampolsky, DDS, MD is a Director, Maxillofacial Surgical Oncology and Microvascular Reconstruction, Department of Oral and Maxillofacial Surgery in Thomas Jefferson University Hospital, Philadelphia, Pennsylvania.

Dr. Yampolsky`s numerous cutting-edge works continue to inspire our team to expand the portfolio of articles focused on jaw reconstructive techniques.[1–5] One of the masterpieces we are really enjoying is a "Fibula Condyle in a Day" technique.[5] Report perfectly describes experience in creating fibula free flap neo-condyle with soleus muscle used as an intermediate layer to fill in the defect between new condyle and the skull base.[5]

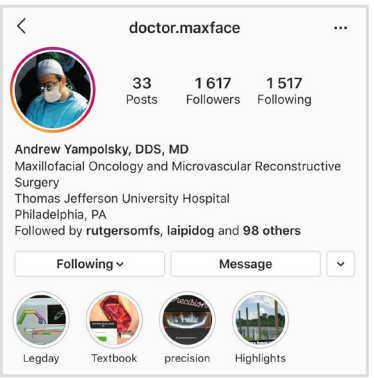

FIGURE 1. Instagram page of Dr. Yampolsky (@doctor.maxface).

So, dear Dr. Yampolsky, thank you for moving the surgery forward and thank you for joining the multinational team of the dtjournal.org!

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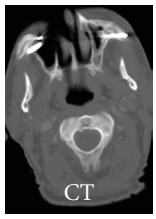

CASE

Zygomatic Implants for Restoration of Complex Nasal Defects – A Case Report and Outcome

John M. Le[a,*], Po-Hsu Chen[b], Julius C. Seidenfaden[c], Anthony B. Morlandt[d], & Michael T. Kase[e]

SUMMARY

Total rhinectomy defects pose a challenge for the reconstructive surgeon, but since the introduction of osseointegrated implants, maxillofacial implant–retained prosthetic rehabilitation has provided the patient with an alternative option that has an excellent cosmetic result. Traditionally, zygomatic implants are used for prosthodontic restoration in patients with severely atrophic maxilla or to retain an obturator after tumor ablative surgery. More recently, the nonconventional use of zygomatic implants for retention of a nasal prosthesis has been reported in cases involving rhinectomy defects where the length of conventional dental implants is a limiting factor. In this article, we describe the use and value of transversely-oriented zygomatic implants in combination with an acrylic keeper and maxillary denture to optimize retention of a complex, multi-unit prosthesis in an edentulous patient with a total rhinectomy and upper lip defect.

Birmingham, Alabama, United States

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Letters 'CT' at the upper right icon means that article contains post-operative computed tomography (CT) data.

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INTRODUCTION

Extensive nasal defects due to tumor ablative surgery pose a number of reconstructive challenges. In patients with malignant pathology, local disease control may be challenging and recurrent disease can compromise previous surgical reconstruction attempts, limiting reconstructive options. In cases that involve total rhinectomy with extensive circumferential hard and soft tissue deficits, the optimal cosmetic reconstructive option may be an osseointegrated implant-retained prosthesis.

The use and value of osseointegrated implants for extraoral prosthetic rehabilitation has been increasingly advocated in the literature for maxillofacial defects.[1–4] In cases of extensive atrophy or loss of the maxillary bone due to ablative surgery, the use of zygomatic implants alone or with conventional dental implants provide retention for an intraoral prosthesis.[5,6] In these instances, the zygomatic implants are typically oriented obliquely, to engage the zygomatic and palatal bone, with the fixture mount surface projecting into the oral cavity. Their use for retention of nasal prosthesis following rhinectomy, where the bony components of the piriform aperture are not present or insufficient for conventional implant placement, has also been reported.[7–9] To date however, combined facial/intraoral prostheses supported by horizontally-oriented zygomatic implants have not been reported in the literature.

Here, we present an edentulous patient with an extensive rhinectomy that was restored with a nasal prosthesis retained by magnetic retention by zygomatic implants and a denture using an acrylic keeper.

CASE

A 72-year-old man was referred for treatment of recurrent basal cell carcinoma (BCC) of the right nasolabial fold. He had previously undergone multiple wide local excisions with local flap reconstruction for a primary and recurrent BCC of the right nasal ala that ultimately resulted in a defect comprising the majority of the nasal complex, bilateral nasal cavity, and left medial canthus along with the lacrimal system. Due to the aggressive nature of the disease, the patient was discussed at the multidisciplinary tumor board where it was agreed that the best option for cure included total rhinectomy, infrastructure maxillectomy, and excision of the involved upper lip. Due the extent of the anticipated defect and the need for adjuvant radiotherapy, osseointegrated implant–retained maxillofacial prosthesis was felt to represent the best reconstructive option for the patient. To minimize the risk of osteoradionecrosis, implants were placed at the time of ablative surgery, 6-8 weeks prior to starting adjuvant radiation therapy.

Following tumor extirpation, there was a large facial defect that involved the nasal bones, right infraorbital rim and lacrimal bone, right cheek skin, upper lip, right maxilla sinus, inferior turbinate, and anterior maxilla. Two horizontally-oriented zygomatic implants (47.5-mm left and 37.5-mm right) were then placed into the remaining maxillae and zygomae bilaterally (Brånemark System; Nobel Biocare™, Zürich, Switzerland) (Fig 1).

The patient then underwent 60 Gy of adjuvant radiotherapy in 30 fractions without complication. At the initiation of the prosthetic phase of treatment, the defect site was well-healed, and the zygomatic implants were stable without evidence of mobility. The key component that optimized the retention of the nasal prosthesis was the fabrication of an acrylic keeper that was incorporated with two magnets to match the nasal prosthesis and upper denture (Figs 2 and 3).

Fifteen months after the completion of radiotherapy, the patient remained free of disease and the nasal prosthesis along with the dentures was in function, with an excellent cosmetic outcome and no evidence of implant or prosthetic failure (Figs 4–6).

DISCUSSION

Total rhinectomy with extensive adjacent hard and soft tissue involvement can be a challenge for the reconstructive surgeon. In cases with malignant pathology, there is a risk for recurrence, and additional adjuvant radiotherapy may be indicated. Because of these factors, a horizontally oriented, zygomatic implant–retained maxillofacial prosthesis can optimize treatment, provide a superior cosmetic outcome and patient satisfaction compared to local or free flap reconstruction.

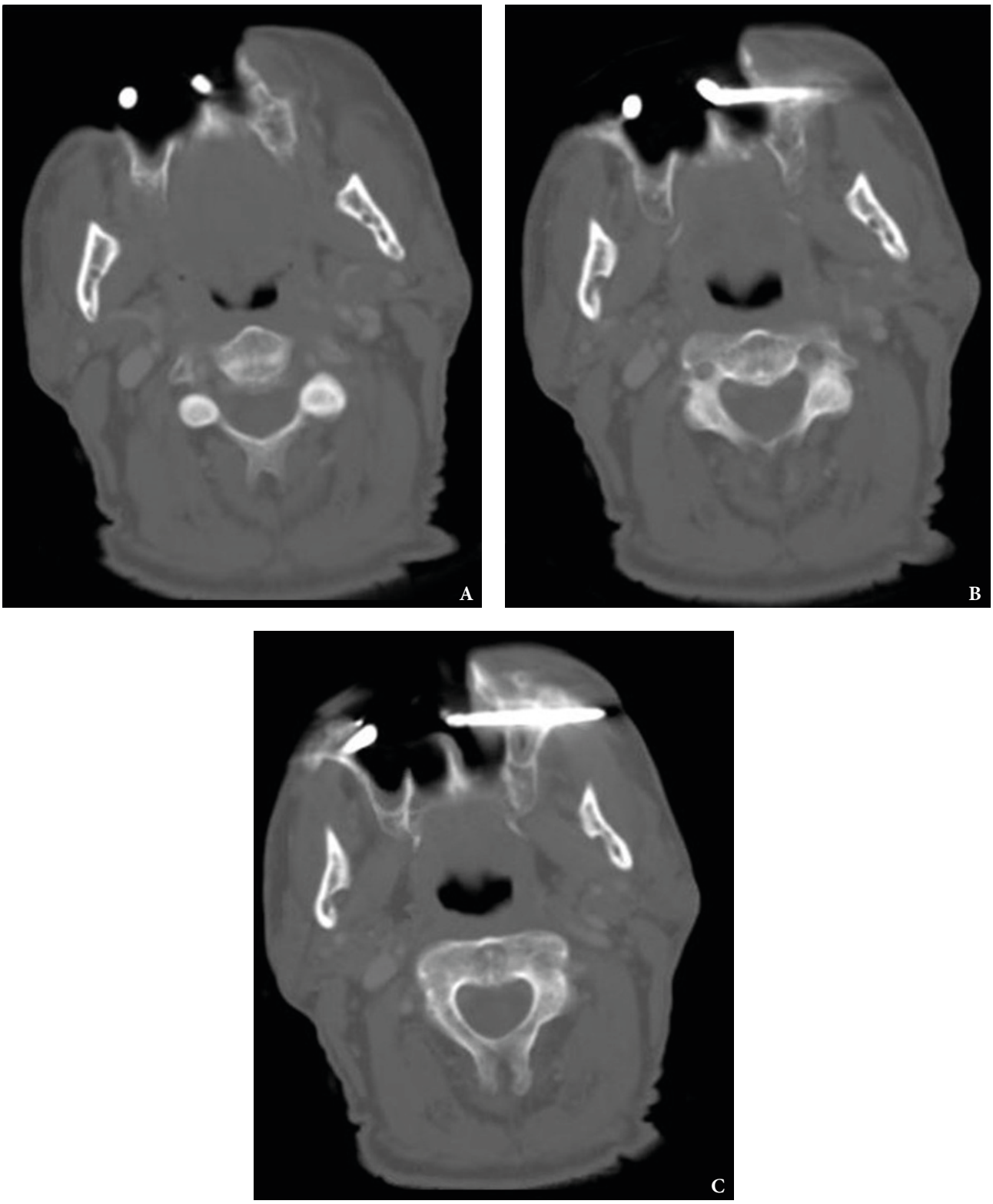

FIGURE 1. Serial computed tomography (CT) imaging (axial view) of zygomatic implants. Where **A** is the most caudal CT scan and **F** is the most cranial one.
(Fig 1 continued on next page.)

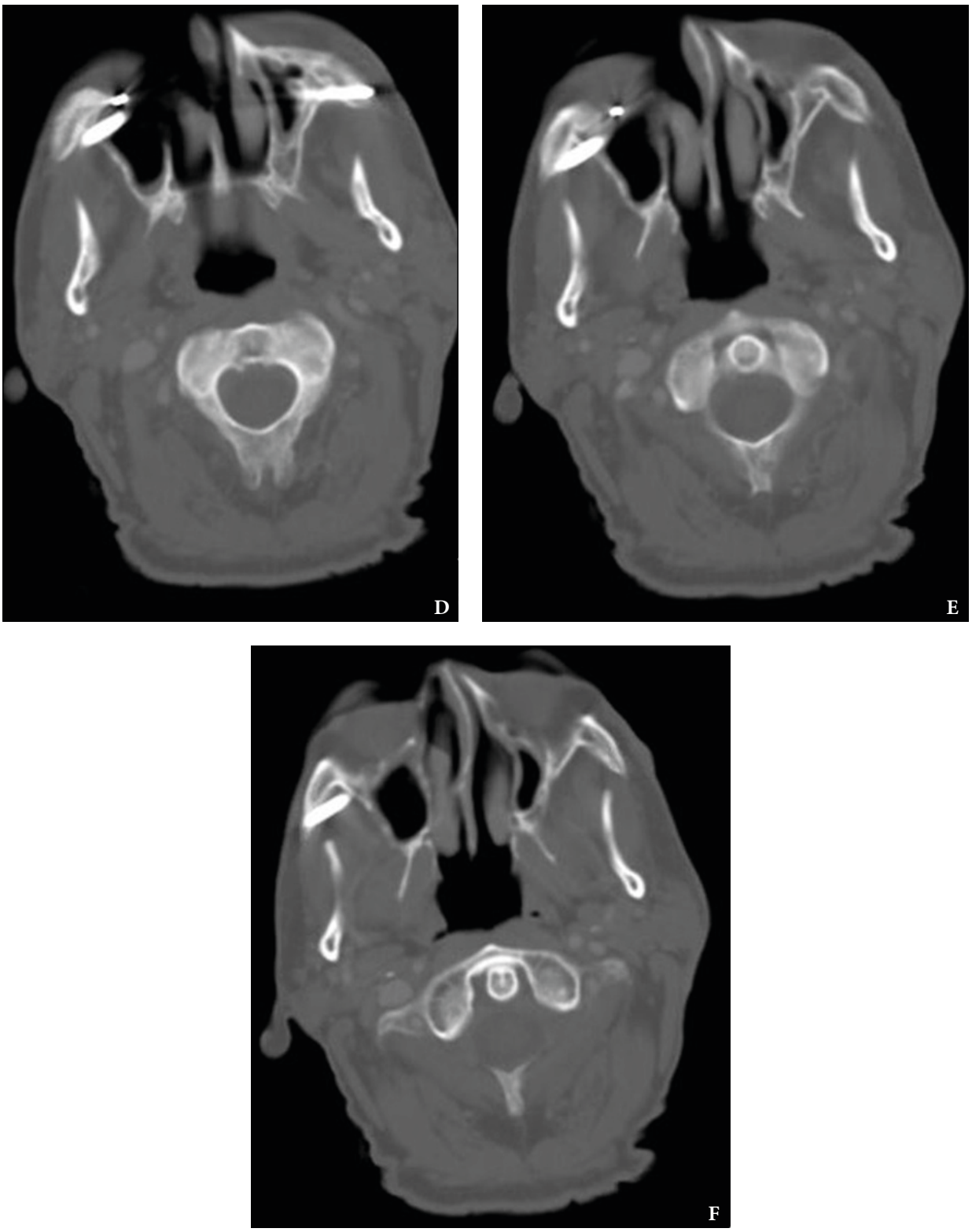

FIGURE 1 (cont'd). Serial computed tomography (CT) imaging (axial view) of zygomatic implants. Where **A** is the most caudal CT scan and **F** is the most cranial one.

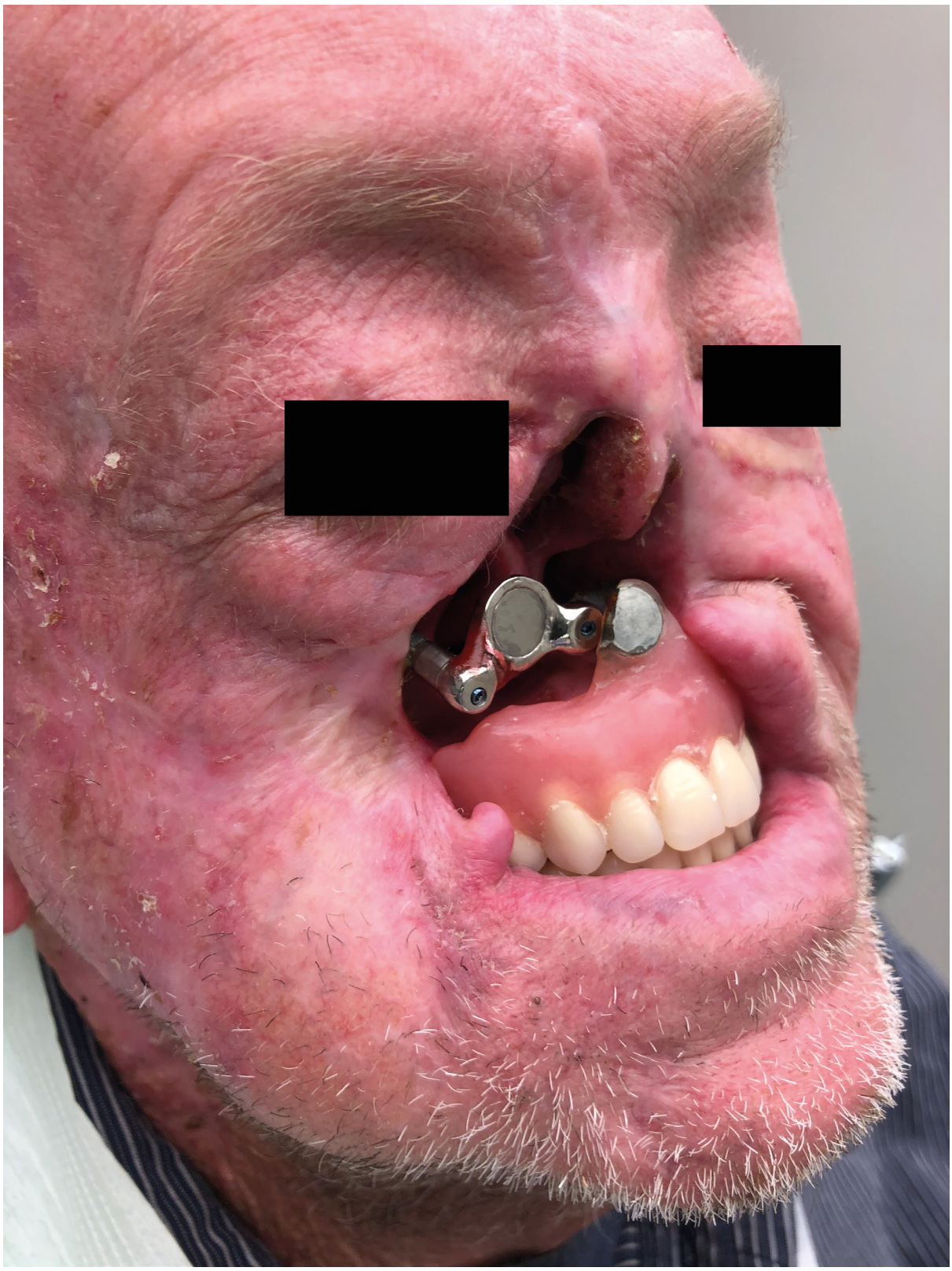

FIGURE 2. Three-quarter view with upper denture in place.

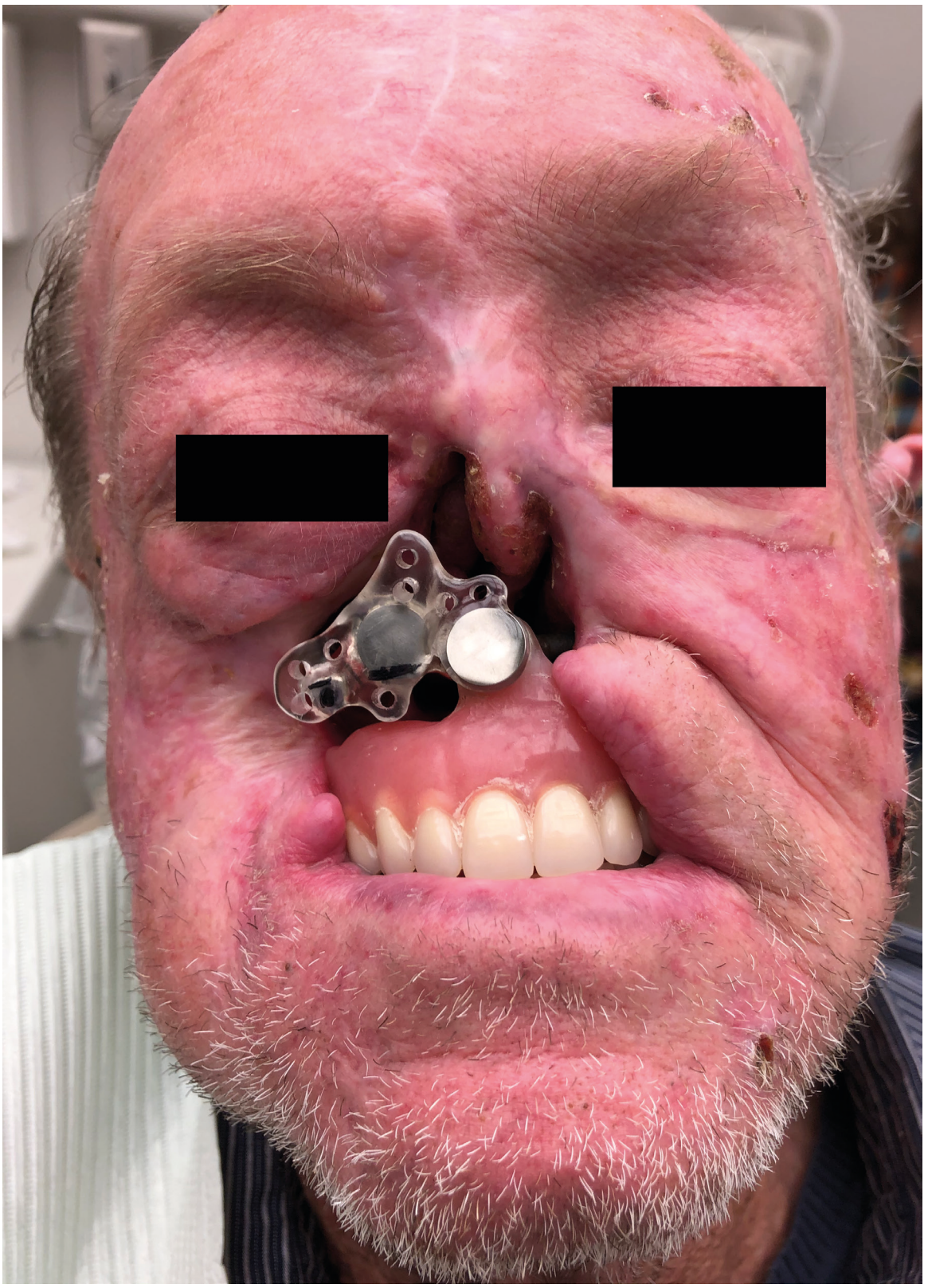

FIGURE 3. Frontal view with acrylic keeper connecting maxillary denture to zygomatic implant connector.

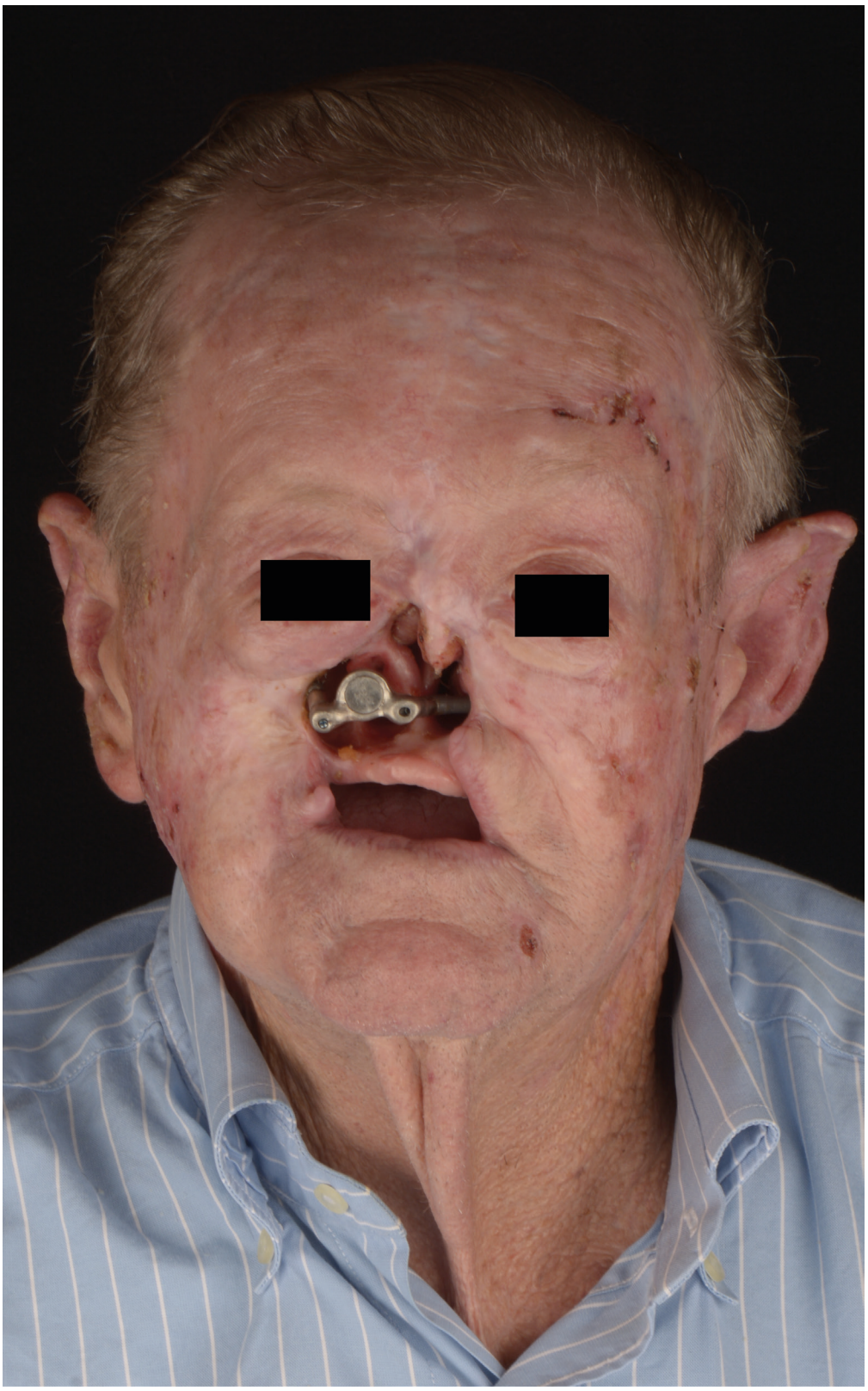

FIGURE 4. Postoperative frontal view with zygomatic implants attached to magnetic component for the nasal prosthesis.

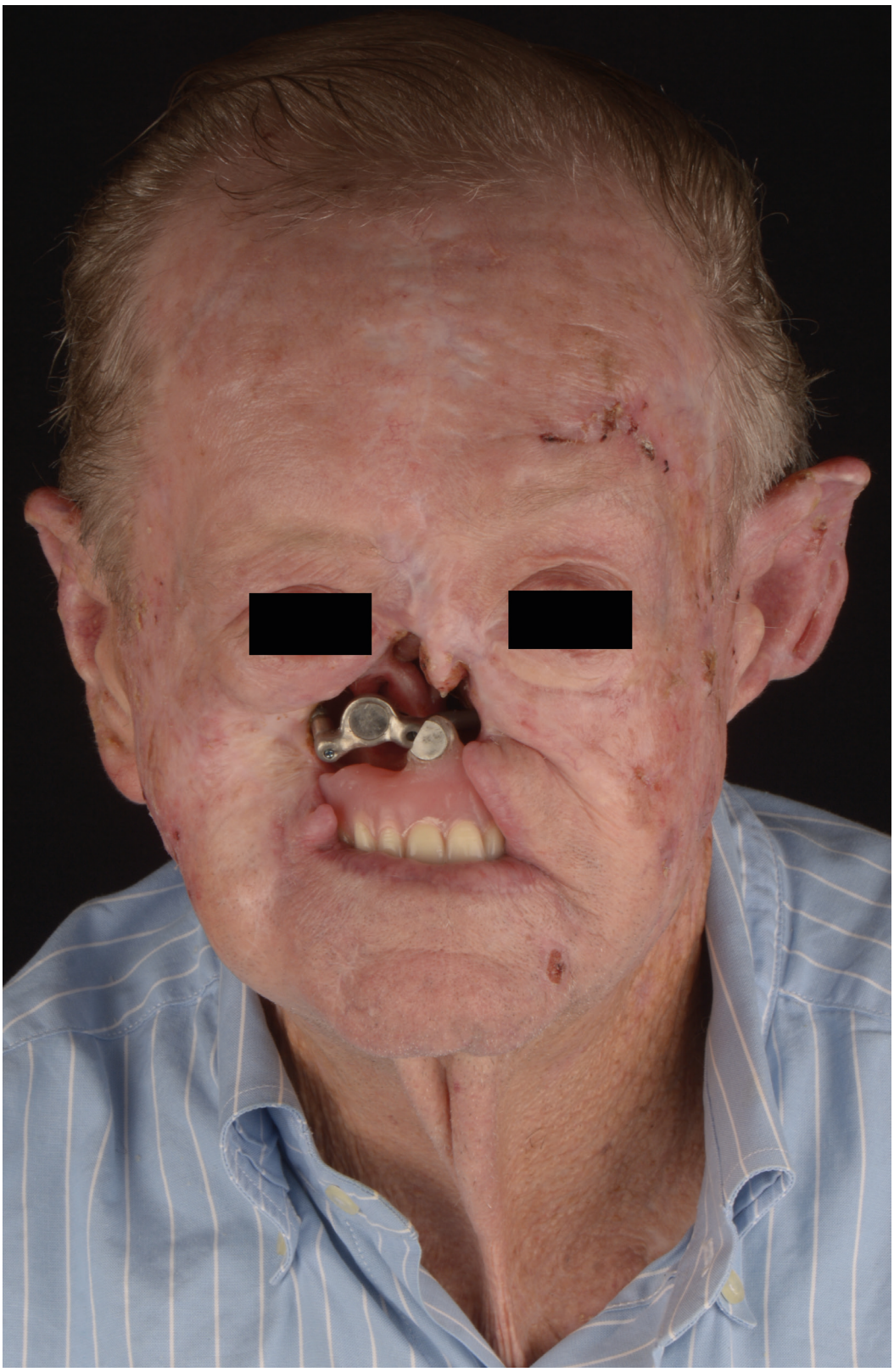

FIGURE 5. Postoperative frontal view with the upper complete denture in place with a magnet component attached to the anterior superior flange for the nasal prosthesis.

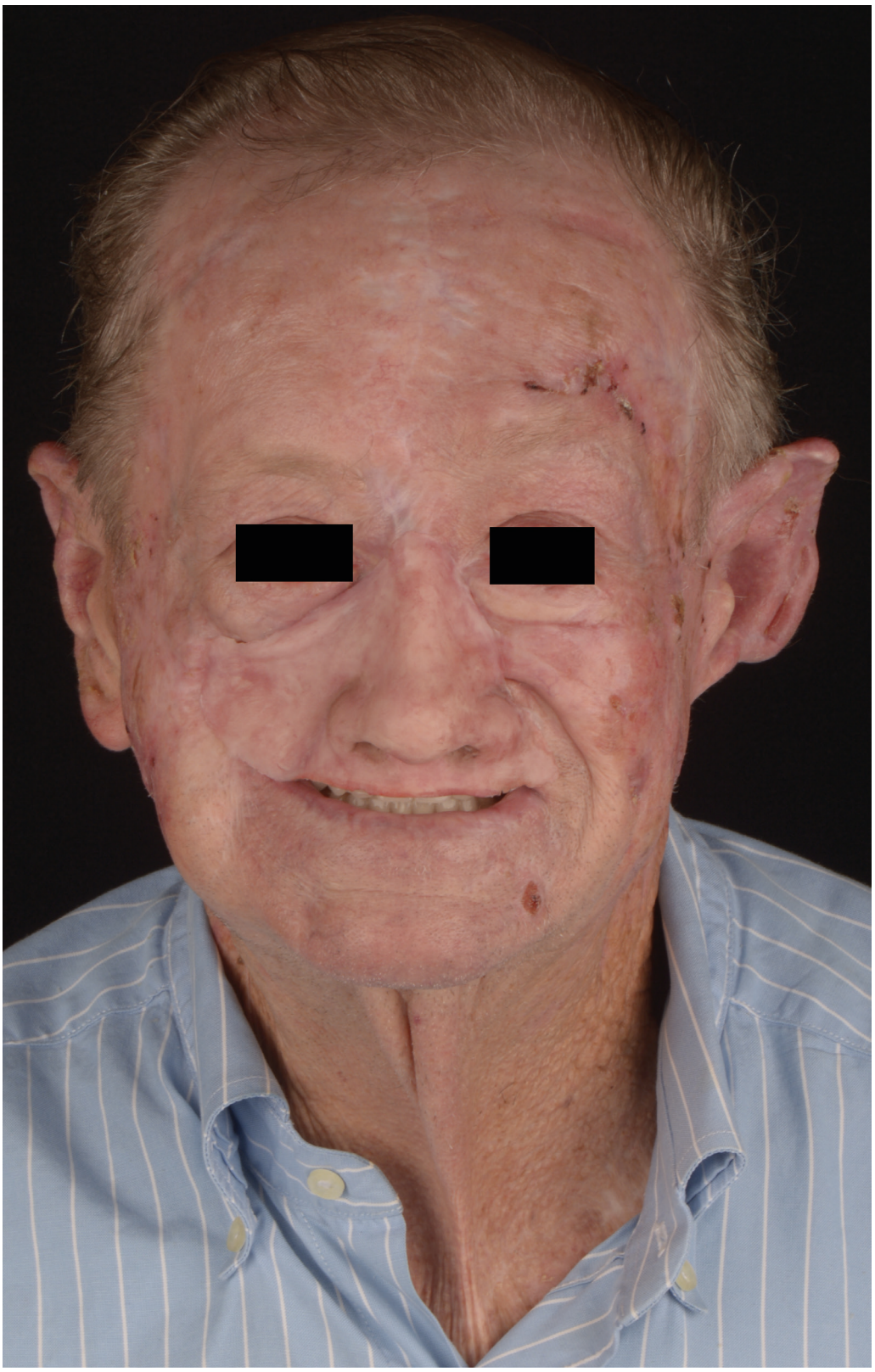

FIGURE 6. Frontal view with the final nasal prosthesis and complete dentures in place.

Although the risks for implant failure and infection exist, as well as the need for long-term prosthetic maintenance, the success rate of zygomatic implant-retained facial prosthesis remains high.[9–10] Furthermore, the area of the disease can be easily surveilled by the oncologic surgeon.

In our case, we demonstrate the successful outcome of a zygomatic implant–retained nasal prosthesis in an edentulous patient with an extensive nasal defect involving the maxilla, right cheek, and upper lip. While the proper retention of a conventional complete denture was not achievable in our patient due to the compromised anatomical structure at the anterior denture border, by applying an acrylic keeper to connect the magnetic components of the maxillary denture and nasal prosthesis together with the zygomatic implants, the retention of the maxillofacial prosthesis was optimized. The patient was free of disease at the 15-month mark and very pleased with the intra- and extraoral prostheses.

CONFLICT OF INTEREST

No conflict of interest.

FUNDING

This study did not receive any funding source.

ROLE OF CO-AUTHORS IN WRITING

All authors contributed equally to the concept and design of the study; writing, editing, and final review of the manuscript. The material collection and data processing was completed by the first author.

PATIENT CONSENT

Consent was obtained by the patient in writing and verbally for publication of photos.

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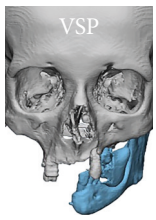

ORIGINAL

Clinical Efficacy of Patient-specific Implants Manufactured by Direct Metal Laser Sintering (DMLS) Technology in Patients with Mandibular Defects

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ABSTRACT

Purpose: The purpose of this study was to compare the clinical efficacy of patient-specific implants (PSIs) in patients with mandibular defects in the early and distant postoperative period.

Materials and Methods: The surgical results in 60 patients with postoperative and posttraumatic mandibular discontinuous defects were analyzed. The patients were treated at the Center of Maxillofacial Surgery and Dentistry, Kyiv Regional Clinical Hospital in the period from 2015 to 2020.

Results: Despite certain functional limitations and residual aesthetic deficiency, 34 patients (85%) of the main group and 9 (45 percent) of the control group noted an improvement in their quality of life and were satisfied with the results of the operation ($p < 0.05$).

Conclusions: The use of PSIs, compared to traditional methods of bone grafting, allow to achieve a more accurate restoration of the anatomical shape of the mandible in areas with complex geometry and probably better aesthetic results, and significantly reduces the frequency of secondary displacement of bone fragments due to plastic deformation and destruction of fixation elements ($p < 0.05$). At the same time, it probably does not affect the frequency of purulent-inflammatory complications, unsatisfactory clinical results and the effectiveness of the restoration of masticatory function in patients with mandibular defects.

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INTRODUCTION

Treatment of patients with posttraumatic and postoperative mandibular defects is an urgent medical and social problem. Large defects, accompanied by a significant breach of bone continuity, lead to cosmetic deficiency, impaired chewing, swallowing and speech, deterioration of somatic health of severe psycho-emotional disorders and reduced quality of life.[1] The main objectives of comprehensive treatment of such patients are to ensure adequate masticatory function and acceptable aesthetic outcome.[2]

To date, a significant number of surgical interventions have been proposed to replace mandibular defects, in particular with the use of bone grafts, endoprostheses, patient-specific implants, tissue engineering methods, and distraction osteogenesis.[3]

The gold standard for the treatment of large mandibular defects today is considered to be the use of vascularized and non-vascularized autologous bone transplants from the fibula, iliac crest, scapula, etc.[4,5] They allow not only to restore the continuity and shape of the mandible, but also to create conditions for future prosthetic rehabilitation with the use of dental implants.[6,7]

One of the important problems is the significant discrepancy between the donor bone and intact mandible in its geometric parameters, architecture, mechanical, and biological properties. For functionally stable fixation of bone grafts, preformed reconstructive plates are used, the adaptation of which to the relief of bone fragments of the jaw and graft is performed directly in the wound or on stereolithographic models (Fig 1).[8,9] Depending on the severity of the clinical case, the surgeon's skills and experience, these procedures can take a long time, and their accuracy and effectiveness will be affected by subjective factors.

FIGURE 1. Intraoperative adaptation of a preformed reconstructive plate on a stereolithographic model in a 42-year-old male patient with postresection mandibular defect in the area of left body, angle and ramus.

The existing shortcomings and limitations of traditional bone grafting methods using preformed standard plates have led to the emergence of a new concept – the creation of patient-specific implants (PSIs).[10,11] They are made on the basis of pre-created virtual design using computer-assisted design/computer-assisted (CAD/CAM) technology.[12,13] Such structures do not require intraoperative bending or shape adaptation and themselves act as a template that determines the correct position of the jaw fragments and bone grafts.[11]

The clinical effectiveness of this approach has been demonstrated in the numerous works.[5,7,9,14–16] When using different types of PSI, the authors have demonstrated certain advantages of their use.[17,18]

At the same time, the systematic review[19]

found no significant differences in the frequency of postoperative complications, length of hospital stay, graft rejection and flap necrosis, as well as the frequency of secondary surgery with PSI compared to traditional methods of reconstruction.[16] The long-term results of reconstructive surgeries are also insufficiently studied[9] and require additional research and accumulation of clinical material to determine objectively the advantages and disadvantages of this technique, the limits of its use, indications and contraindications for PSI usage, substantiated from the standpoint of evidence-based medicine.[12]

The purpose of this study was to compare the clinical efficacy of patient-specific implants in patients with mandibular defects in the early and distant postoperative period.

MATERIALS AND METHODS

The materials of this study included 60 patients with postoperative and posttraumatic mandibular discontinuous defects, who were treated at the Center of Maxillofacial Surgery and Dentistry, Kyiv Regional Clinical Hospital in the period from 2015 to 2020. The study ensured compliance with the principles of bioethics and patient rights in accordance with the Helsinki Declaration and the Fundamentals of Health Legislation of Ukraine (1992). Examination of the work materials was conducted by the commission on bioethics of Bogomolets National Medical University (protocol #107 dated December 29, 2017).

Criteria for inclusion in the study groups were: mandibular discontinuous defects (Fig 2), which required reconstruction in the presence of written informed consent of the patient to participate in the study. Exclusion criteria were – age up to 16 years, the presence of concomitant somatic pathology in a compensated or a decompensated state, mental illness, chronic alcoholism or drug addiction, active radio- or chemotherapy, non-compliance with medical recommendations and lack of interaction with the doctor, total mandibular defects, incomplete clinical and computed tomography documentation, follow-up period less than 6 months, and patient`s refusal to participate in the study.

Among the patients included in the study, men accounted for 40% and women – for 60 percent. The age of patients ranged from 16 to 82 years, and averaged 40.9 ± 14.6 years. All patients were divided into 2 groups, homogeneous in age, sex, severity and etiology of the defect. In the main group (40 patients) the PSI, made by the technology of selective laser sintering of titanium, was used for the replacement of defects. In the control group (20 patients), traditional methods of replacement of mandibular defects with autologous bone grafts were used in combination with preformed reconstructive plates.

Patients of both groups were examined according to a standard protocol, which included history taking, assessment of general and local status, computed tomography of the facial skeleton, followed by diagnosis and treatment plan. Virtual simulation of surgical interventions and design of PSI was performed by multi-slice computed tomography (MSCT) data on the basis of the Laboratory of Computer Modeling and Digital Dentistry, Bogomolets Dental Medical Center. The location, size and type of defect according to the recommendations were divided into anterior defect (from canine to canine), distal parts of the bodies (in the area of molars and premolars), and defects in areas of two rami.

The design and manufacture of PSI in both groups were based on a standard digital protocol, which provided the following: tomographic data presented as a series of Digital Imaging and Communications in Medicine (DICOM) files were imported into the D2P™ software environment (version 1.0.253, DICOM to PRINT, 3D Systems, Rock Hill, SC, USA). To create a three-dimensional virtual model of the bones of the facial skull, image segmentation was performed according to the radiological density of tissues, followed by the creation of virtual models of mandibular fragments.

In the main group, virtual models were exported to the software environment Geomagic Freeform Plus™ (3D Systems, Rock Hill, SC, USA) where virtual repositioning of fragments and replacement of defect with the subsequent creation of design of PSI according to a clinical task were carried out (Fig 3). The main types of constructions used were anatomical titanium endoprostheses, which restored the lost areas of the mandible without additional use of bone autografts (Fig 4), patient-specific fixators in the form of a trough (Fig 5), and combined structures from elements of endoprosthesis and the patient-specific fixator (Fig 6). Resection template made of polymeric bioinert sterilizable material used for accurate osteotomy presented at Figure 7 and the use of navigational surgical template for

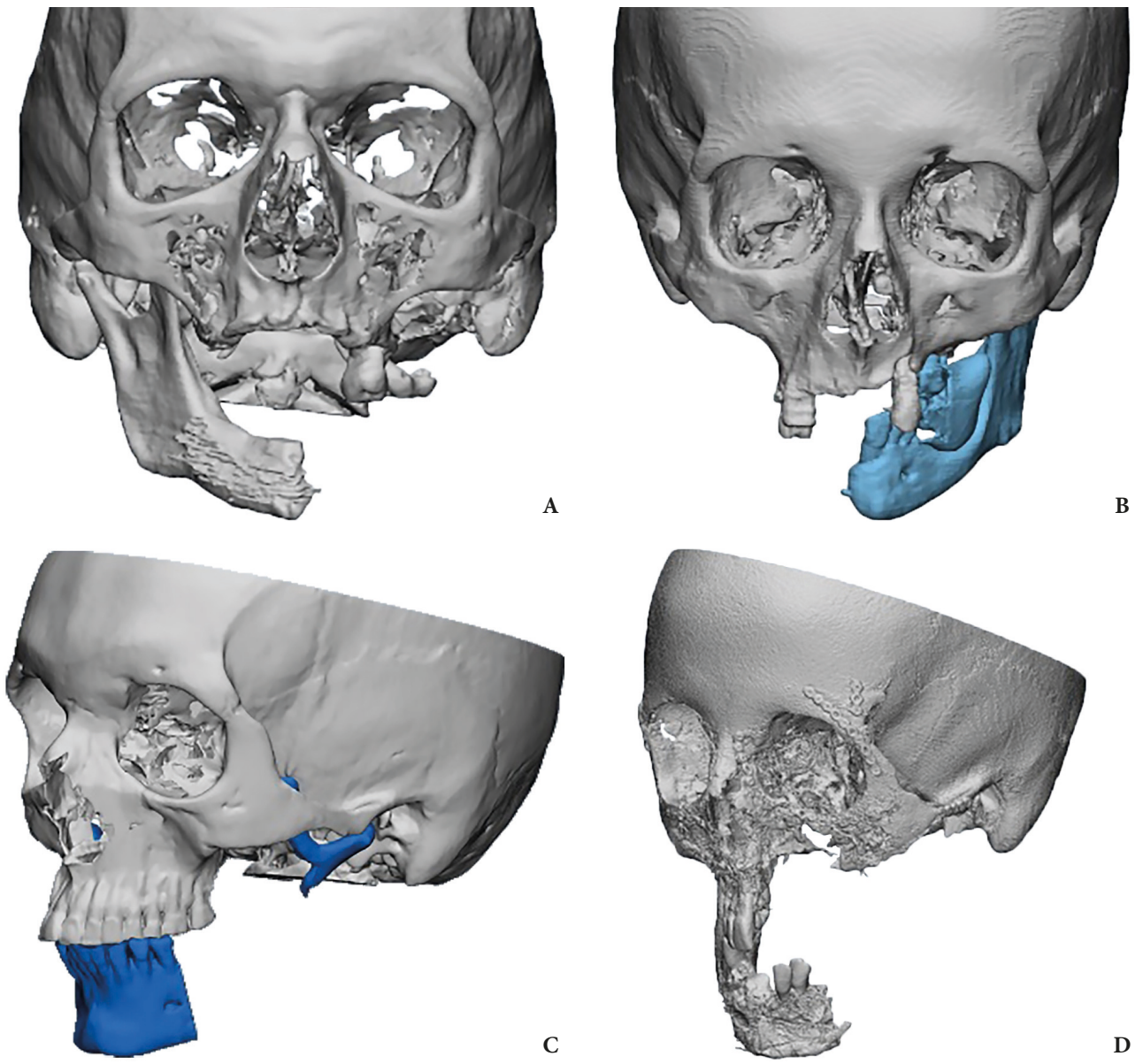

FIGURE 2. Different types of defects present in patients included to the experimental groups. **A**: Subtotal mandibular defect of the symphyseal area, left body, angle, and ramus (ie, Brown et al `s class II defect). **B**: Subtotal mandibular defect of the symphyseal area, right body, angle, and ramus (ie, class II according to Brown et al `s classification). **C**, **D**: Subtotal mandibular defects in the area of the left ramus, angle, and body (ie, Brown et al `s class I defect).

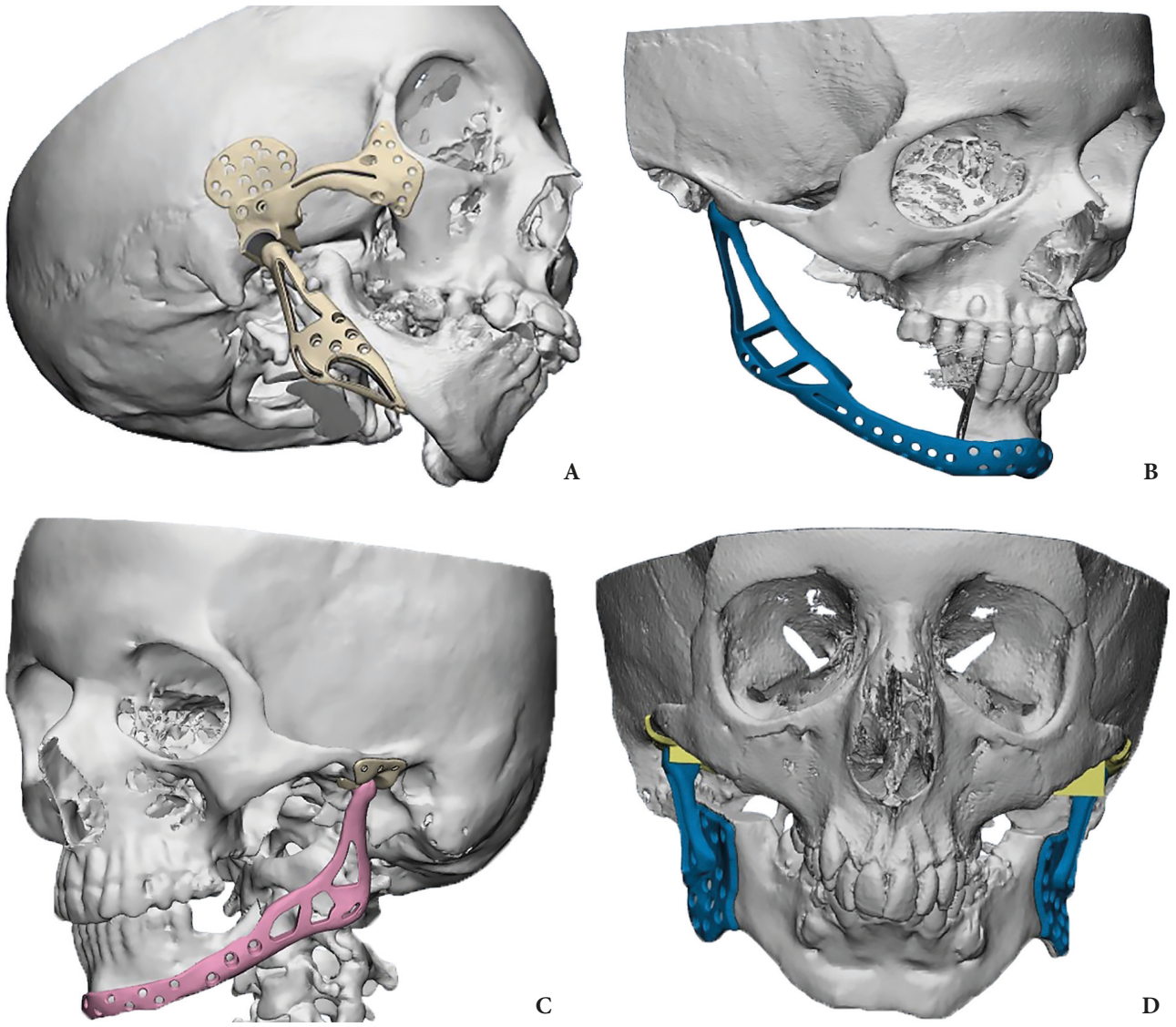

FIGURE 3. Different types of patient-specific implants at the stage of modeling in a software CAD environment. **A**: Individualized patient-specific endoprosthesis of the right temporomandibular joint (TMJ), mandibular ramus, and zygomatic arch. **B**: Endoprosthesis-fixator of the mandible, which replaces the defect of the right body, angle, and ramus. **C**: Mandibular endoprosthesis-fixator, which restores the defect of the left body, angle, and ramus. **D**: Two-component endoprostheses of the right and left TMJs.

intraoperative adaptation of a bone autograft from the iliac crest – at Figure 8. In the control group, after virtual repositioning of fragments and replacement of defects, plastic models of the mandible were made by stereolithography, which was used as a basis for bending of the reconstructive plates to give them the desired shape. Surgeries performed in accordance with the created virtual plan following the standards and protocols of reconstructive surgery of the jaws.[20]

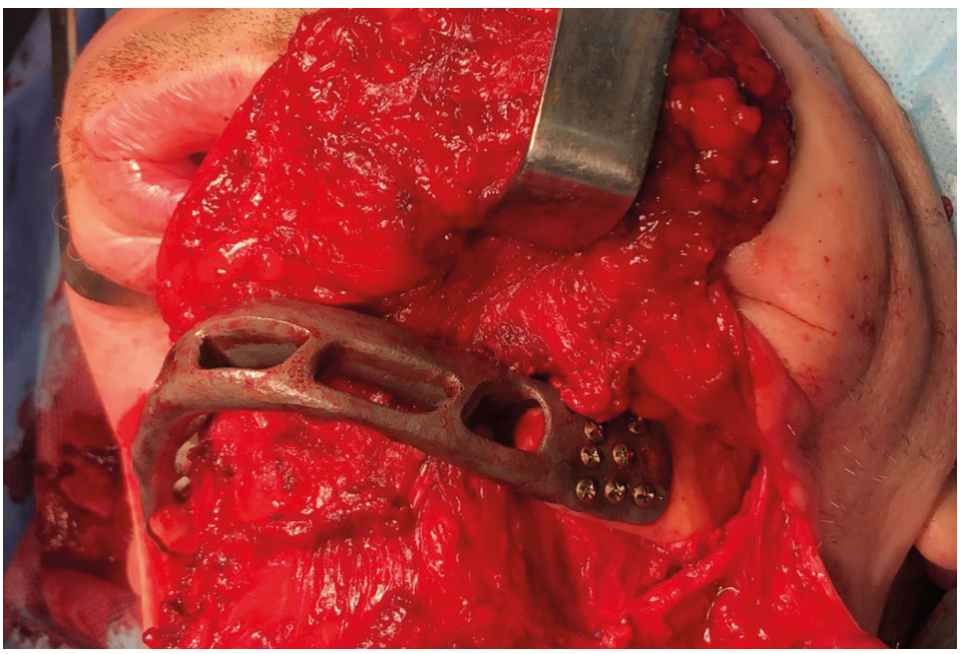

FIGURE 4. A 58-year-old male patient with osteoradionecrosis of the mandible: Anatomical titanium endoprosthesis replaced the postresection mandibular defect in the symphyseal area and bilateral body.

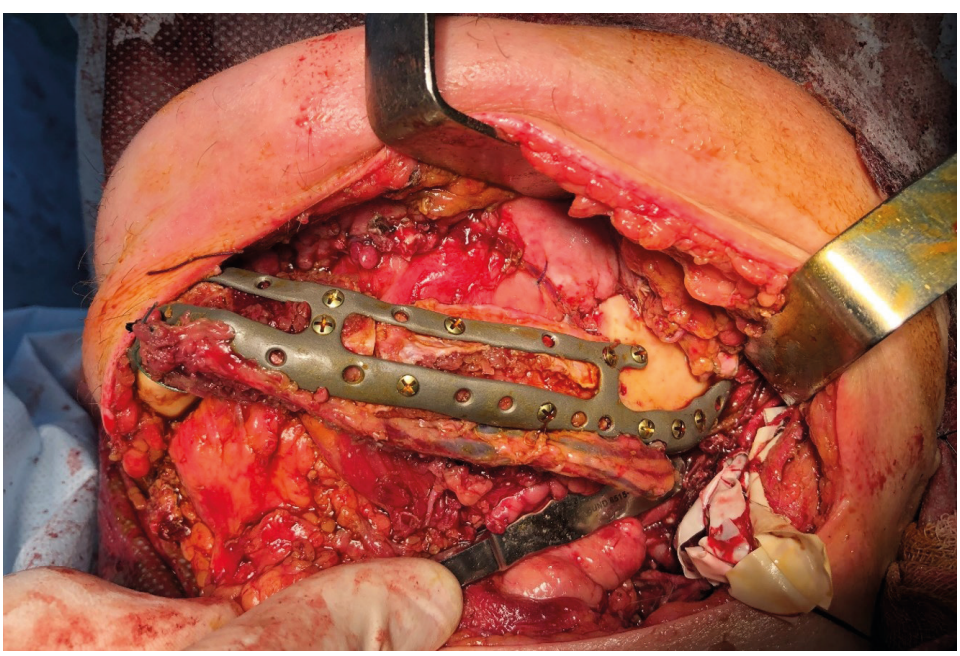

FIGURE 5. Simultaneous replacement of the postresection mandibular defect in a 47-year-old female patient by a patient-specific fixator in the form of a trough with a vascularized fibular bone transplant. Diagnosis: Mandibular ameloblastoma in the anterior and left body`s region.

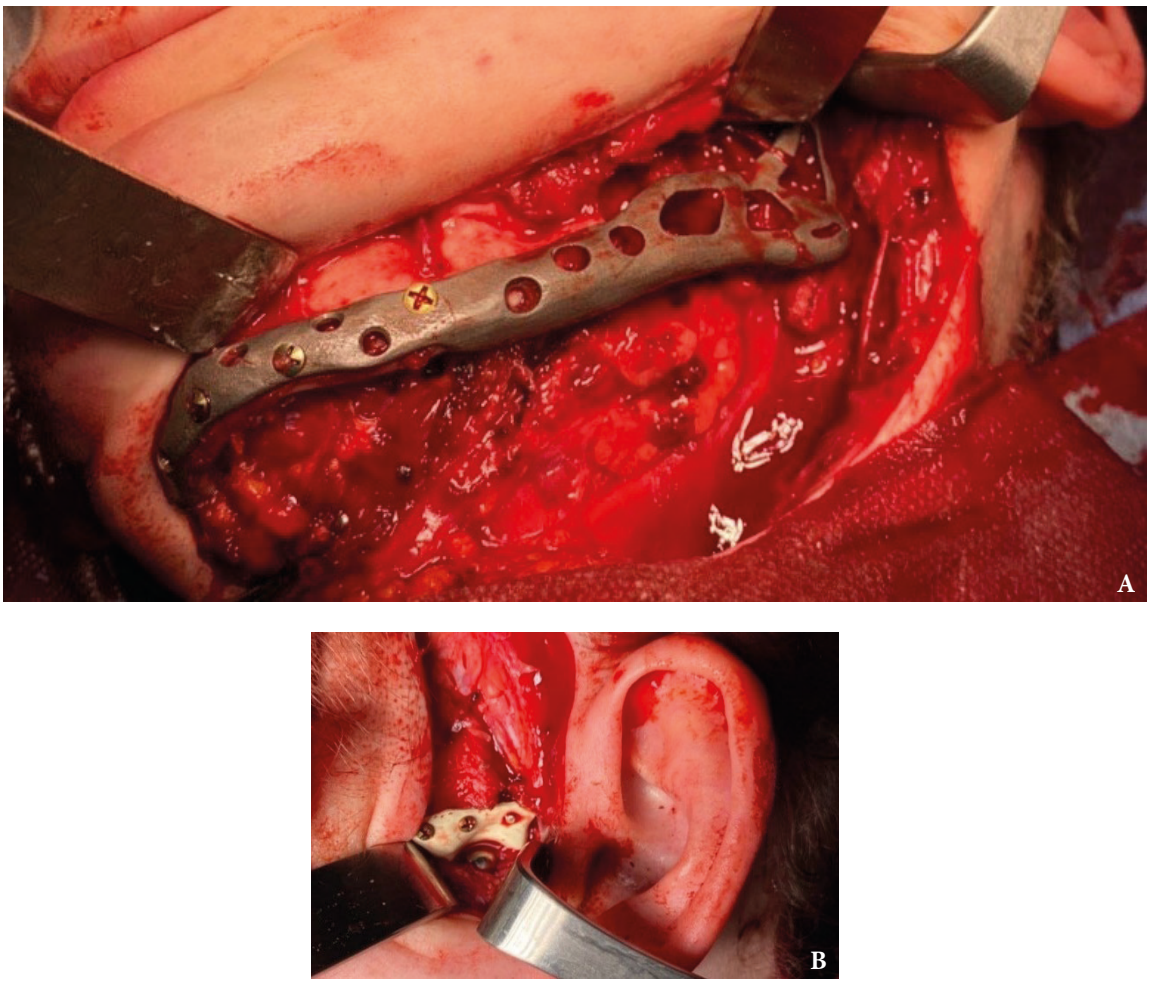

FIGURE 6. Mandibular endoprosthesis (**A**) with two-component TMJ (**B**) represented by titanium head and polyetheretherketone (PEEK) articular fossa in a 31-year-old female patient. Postresection mandibular defect due to ameloblastoma is partially replaced by an autogenous graft from the iliac crest.

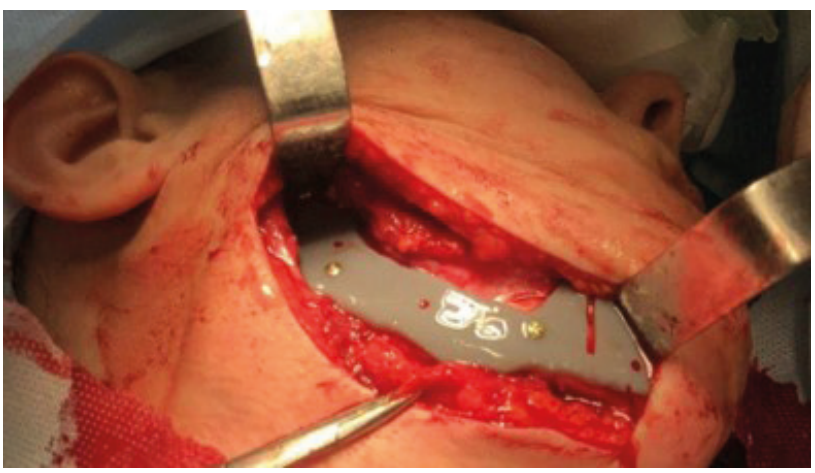

FIGURE 7. A 55-year-old male patient (from the main group) with a mandibular ameloblastoma of the right body and ramus. Resection template made of polymeric bioinert sterilizable material used for accurate osteotomy, according to the virtual surgical planning.

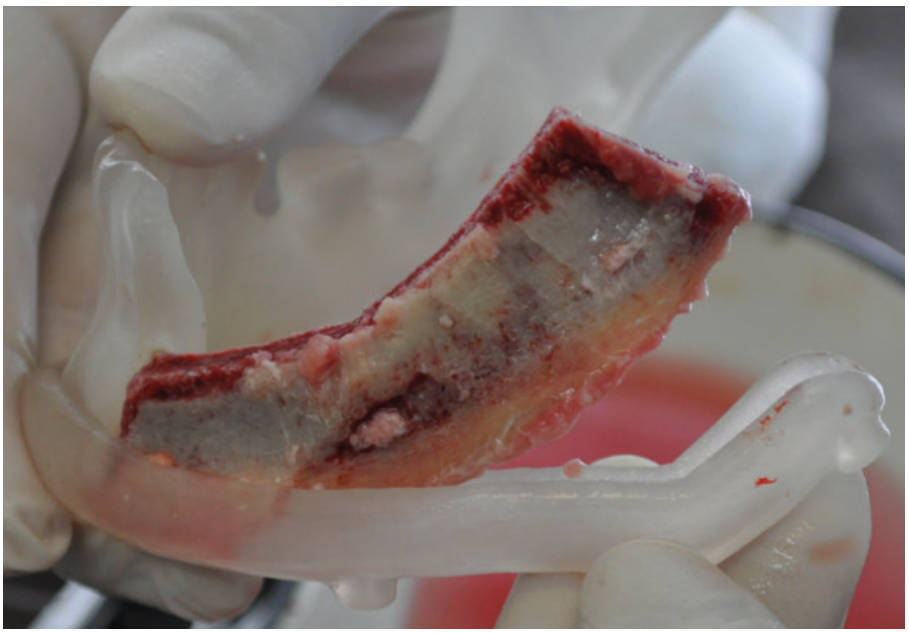

FIGURE 8. Use of a navigational surgical template for intraoperative adaptation of a bone autograft from the iliac crest. Graft will be fixed by a preformed reconstructive plate to replace the mandibular defect of the mandible in the left body and ramus.

The clinical efficacy of the implemented approaches was judged based on local status assessment and postoperative computed tomography in 1-week, 3-, 6-, 12- and 24-month follow-up period.

The aesthetic result of surgery was analyzed on expert assessments using the following score scale: 5 points – changes are not visually noticeable, 4 points – changes in appearance are barely noticeable and do not affect the patient's quality of life, 3 points – there is an aesthetic deficit that does not require surgical correction, 2 points – there are aesthetic defects that require minor surgical corrections in the postoperative period, 1 point – there are significant aesthetic defects that require serious (often multi-stage surgical correction), and 0 points – the presence of severe aesthetic defects that cannot be eliminated.

Statistical calculations were performed in the software environment SPSS Statistics (version 18.0, SPSS, Chicago, IL, USA). To determine the nature of the sample distribution, the Kolmogorov-Smirnov test for normality was used. Statistical analysis involved the calculation of mean values, standard deviation and mean error. The assessment of the reliability of discrepancies between the studied indicators was based on the use of nonparametric Mann-Whitney U test, parametric Student's *t*-test, and compliance criterion x^2 (for qualitative and semi-quantitative indicators). Statistical discrepancies were considered significant at a confidence level of 95 percent ($p < 0.05$).

RESULTS

Defects localized within one site were noted in 9 (22.5 percent) patients of the main group and in 4 (20%) in the control group, within 2 anatomical areas – in 24 patients (60 percent) of the main group against 13 persons (65%) in the control group, within 3 and more anatomical sites – in 7 (17.5 percent) against 3 (15 percent) respectively. Defects extended to the frontal part of the mandible in 11 patients (27.5 percent) of the main group and 6 patients (30%) in the control one, to the distal part of the body (on one or two sides) – in 29 patients (72.5 percent) of the main group and 19 patients (95%) of the control group, on the branch (on one or two sides) – in 32 patients (80%) of the main group and 14 patients (70%) of the control group.

The distribution of patients by the type of defect in clinical groups is shown in Table 1.

Surgical interventions for mandibular defects replacement performed in patients of 2 experimental groups were as follows: bone grafts were used in 17 patients of the main group (42.5 percent) and 13 of the control group (65%). Among them, iliac crest grafts

predominated (12 in the main [70.5 percent] [Fig 9] and 8 in control group [61.5 percent] [Fig 10]) of the fibula (4 in the main [22 percent] [Fig 11] and 3 in the control group [23 percent]). Other types of bone grafts were bone blocks from intact areas of the mandible and metatarsophalangeal joints. In 23 observations of the main group (57.5 percent), the defects were completely replaced by anatomical endoprostheses of the mandible without bone transplantation. In 7 patients (35 percent) of the control group, preformed reconstructive plates without bone grafting were used (this was considered mainly as a temporary solution before a full reconstruction, which was postponed for different reasons).

TABLE 1. Distribution of Patients of the Main and Control Groups by Defect Class According to Brown et al`s Classification (Fig 2).[21]

Defect Class	Main Group	Control Group
Class I, lateral defect without including canine	29 (72.5%)	11 (55%)
Class II, lateral defect include canine	4 (10%)	4 (20%)
Class III, anterior defect include two canines	3 (7.5%)	1 (5%)
Class IV, bilateral defect include two canines	4 (10%)	4 (20%)

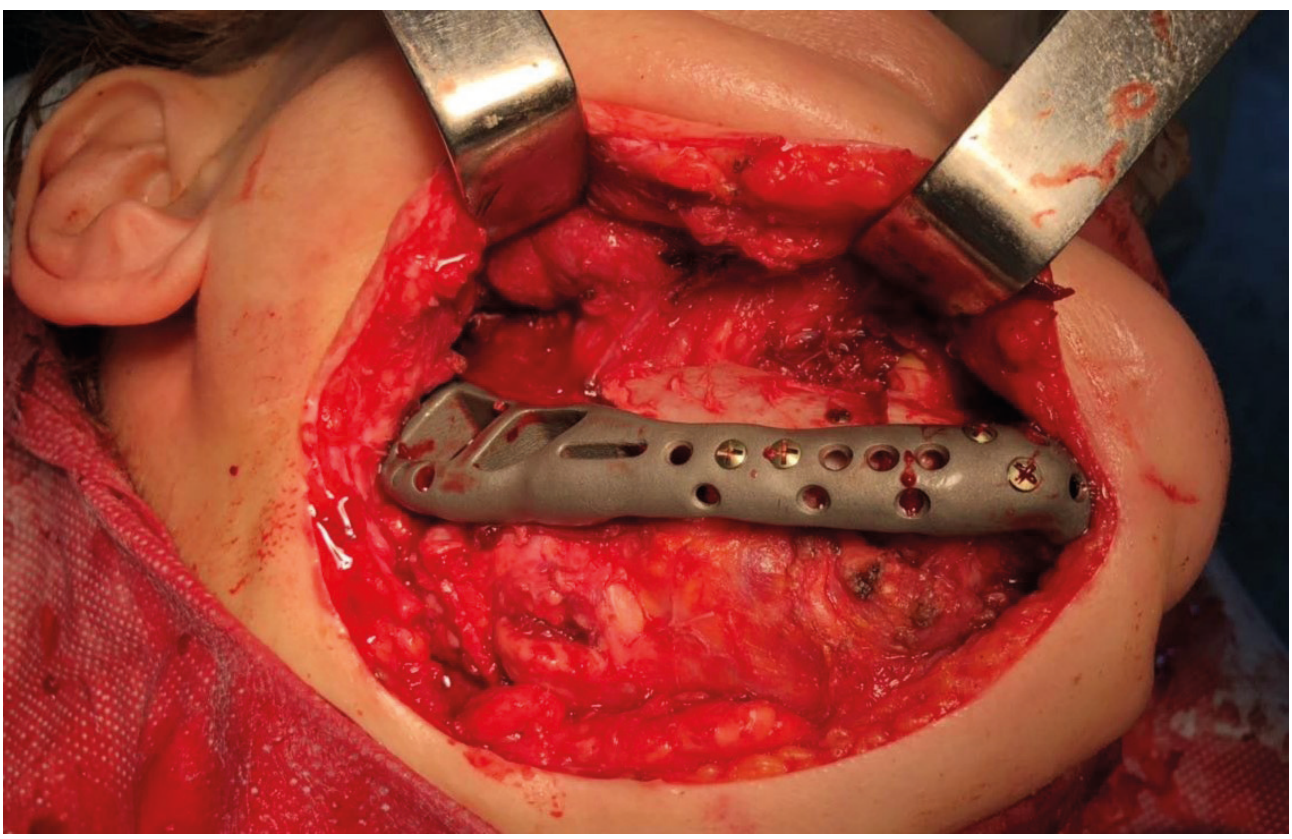

FIGURE 9. A 43-year-old female patient with ameloblastoma of the mandible. Patient-specific endoprosthesis–fixator with an iliac crest graft simultaneously replaces the postresection mandibular defect in the right ramus and body.

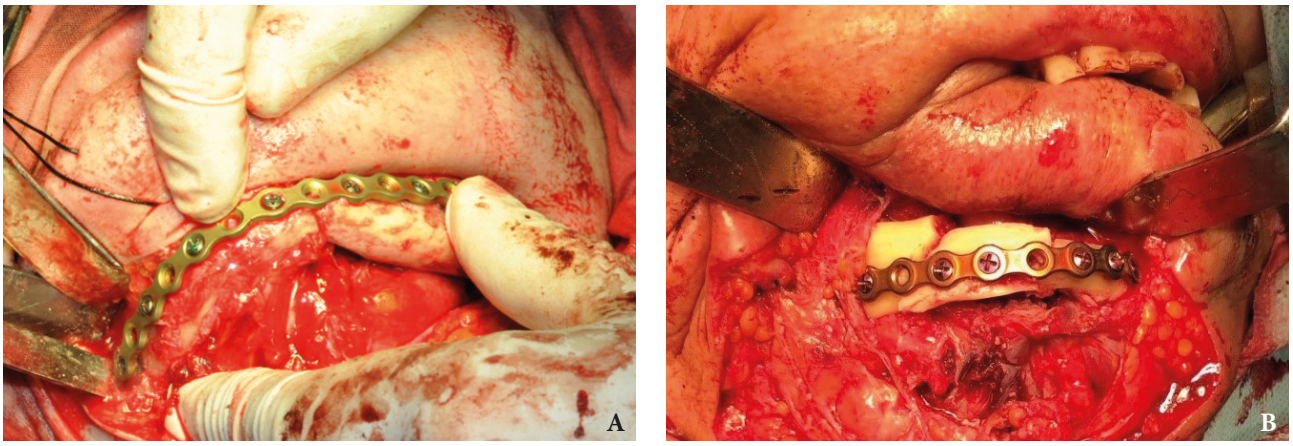

FIGURE 10. Replacement of the mandibular defect in anterior (**A**) and the right body (**B**) region by an iliac crest autologous graft, fixed by a preformed reconstructive plate, in a 62-year-old patient male patient, diagnosed with mandibular ameloblastoma.

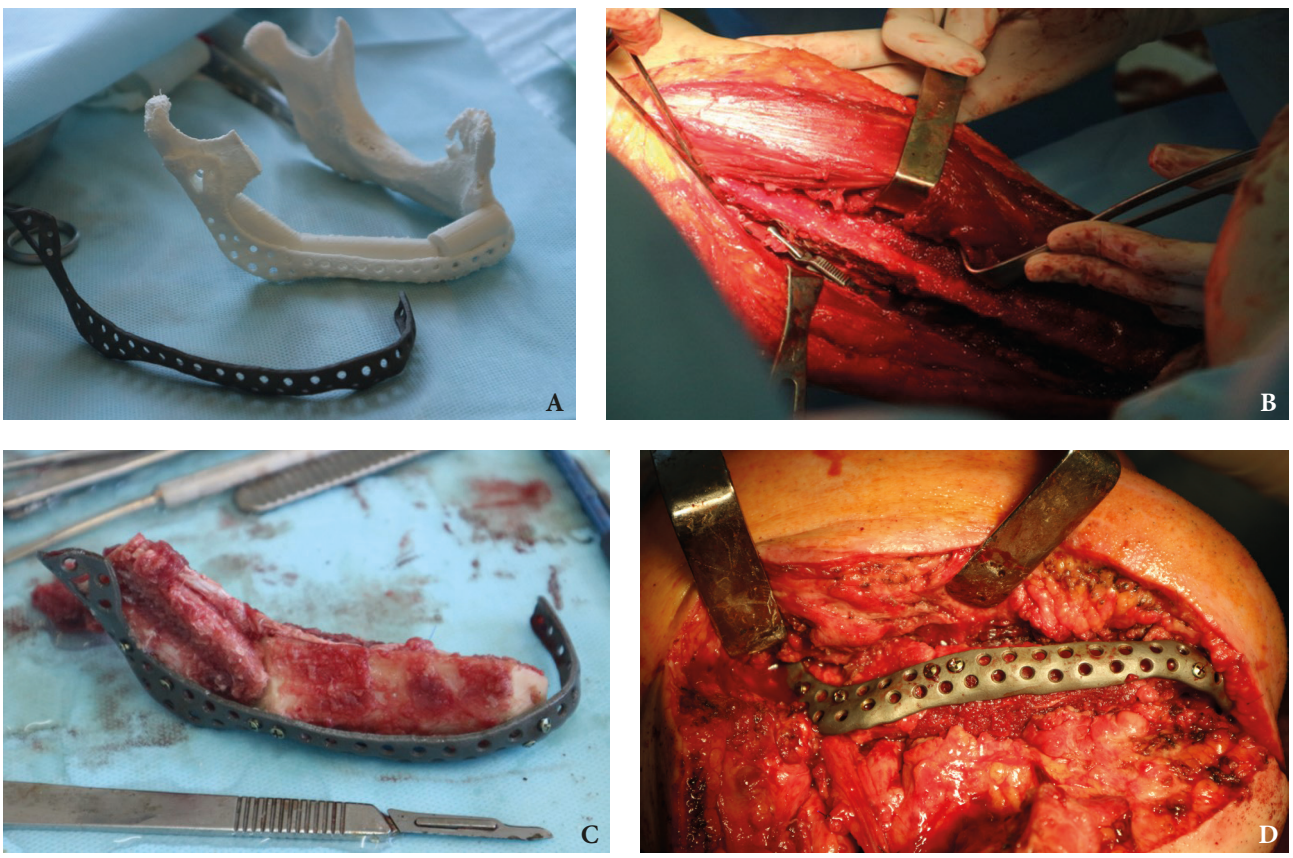

FIGURE 11. A 48-year-old male patient with ameloblastoma of the mandible in the right body and ramus. Stages of reconstruction with an individualized titanium implant and fibula transplant. **A**: Patient-specific fixator and planned prototypical model of the mandible. **B**: Harvesting of the fibula bone autograft on vascular anastomosis. **C**: Intraoperative adaptation of fibula bone autografts on the vascular anastomosis to the fixator. **D**: installation and fixation of a patient-specific fixator with a bone autograft to the preserved fragment of the mandible.

The duration of surgery in the comparison groups did not differ significantly and averaged 231 ± 121 min in the main group against 233 ± 106 min in the control ($p > 0.05$). After surgery, the anatomical shape of the mandible and its continuity were restored in all patients. At the same time, in the main group, the aesthetic results were better: satisfactory results without the need for additional corrective surgeries were achieved in 57 percent of patients versus 10 percent in the control ($p < 0.05$). The average score determined on the basis of expert assessment of the achieved aesthetic result in the main group was 2.88 + 1.5 against 1.75 + 1.2 in the control ($p < 0.05$).

The period of postoperative observation of patients ranged from 12 to 48 months and averaged 24 months in the main and 40 months in the control group. During this period, postoperative complications developed in 13 patients (32.5 percent) of the main group and 13 patients (65%) of the control group ($p < 0.05$) (Figs 12–15). The list and distribution of complications in the study groups are given in the Table 2.

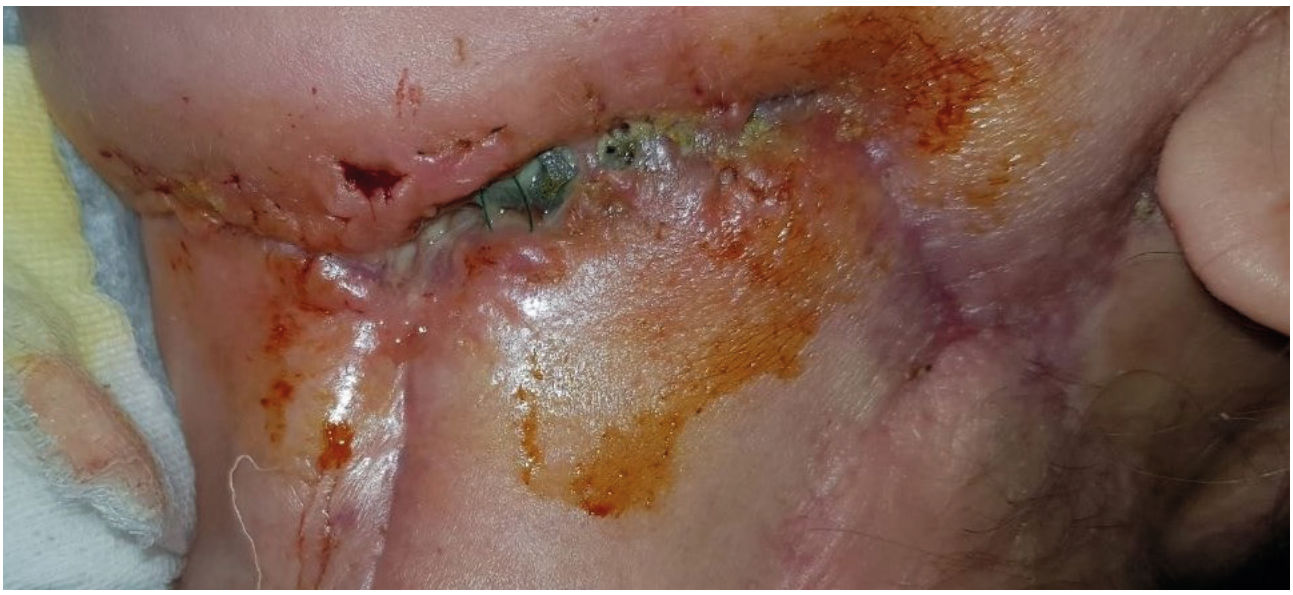

FIGURE 12. Suppuration of the surgical wound after mandibular reconstruction with exposure to an individualized patient-specific structure in a 47-year-old male patient diagnosed with osteoradionecrosis of the mandible in the left body and ramus.

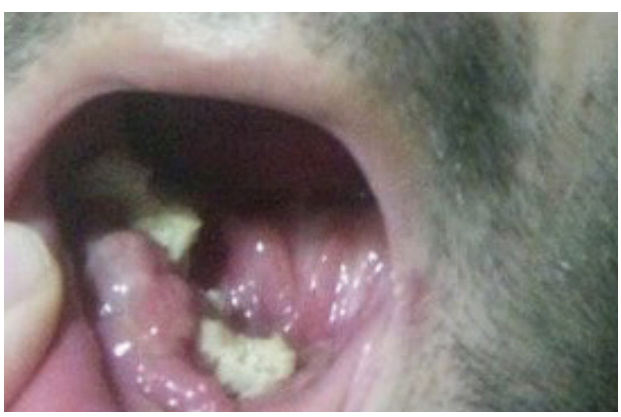

FIGURE 13. A 34-year-old male with a fibrous dysplasia of the anterior mandible and the right body. Notes the mucosal necrosis, the iliac transplant sequestration, and suppuration of the surgical wound.

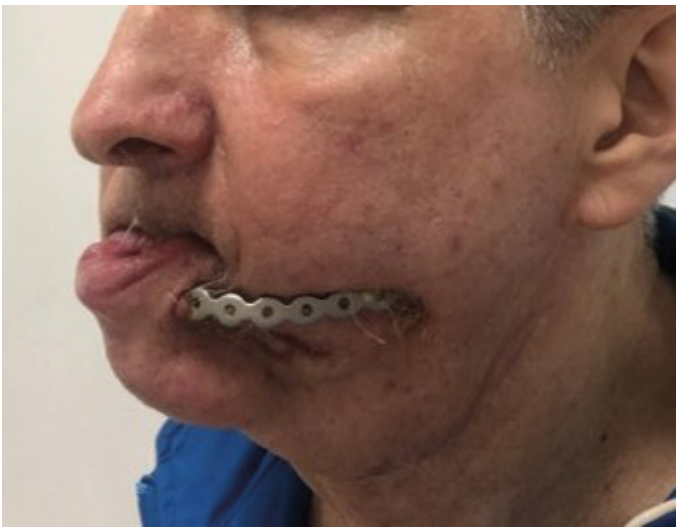

FIGURE 14. A 56-year-old male patient with mandibular ameloblastoma in the anterior part, left angle, and ramus region. Notes the reconstructive plate exposure after subtotal mandibular resection on the stage of residual histopathologic verification.

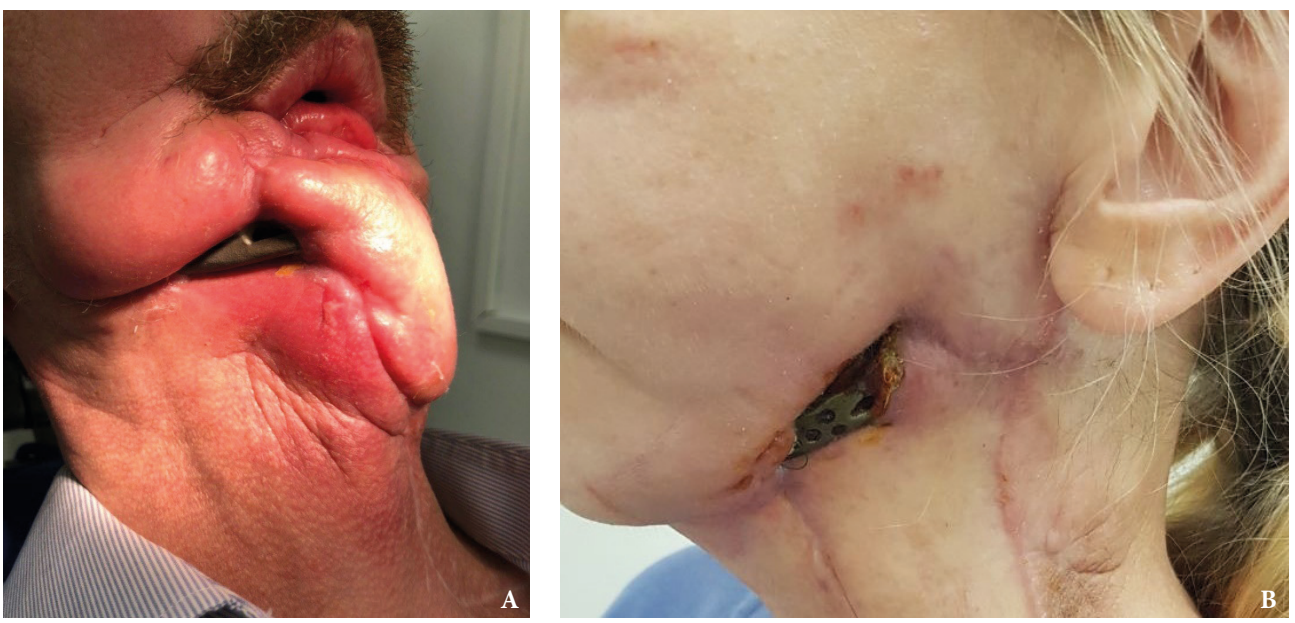

FIGURE 15. Exposure of the individualized patient-specific endoprostheses. **A**: Exposure of patient-specific mandibular endoprosthesis in the anterior area and bilateral body after inflammatory complication and deterioration of soft tissue hemodynamics in the area of microvascular soft tissue autoplasty. **B**: Exposure of a patient-specific mandibular endoprosthesis in the area of the anterior part, body and left ramus after an inflammatory complication and an attempt to close the soft tissue defect in the area of soft tissue autoplasty.

TABLE 2. Complications That Developed in Patients of the Main and Control Groups in the Postoperative Period.

	Main Group	Control Group
The total number of patients with developed complications	13 (32.5%)*	13 (65%)
Complications of infectious and inflammatory nature	9 (22.5%)	8 (40%)
Partial or complete loss of the graft due to infection and sequestration	6 (15%)	4 (20%)
Implant/plate exposure	8 (20%)	7 (35%)
Removal of implants/fixators, with secondary reconstruction	3 (7.5%)	2 (10%)
Removal of implants/fixators, due to the tumor recurrence and the need for radiation and chemotherapy	3 (7.5%)	2 (10%)
Loosening and falling of the screws or plates`	1 (2.5%)*	8 (40%)
Secondary displacement / deformation of the fixator	0*	6 (30%)

* – Differences with the control group are significant with $p < 0.05$.

Functional ability of the mandible in patients who underwent reconstructive surgery was restored during the year, after which the dynamics slowed down significantly and the functional state stabilized. During this observation period, prosthetic structures in the area of bone grafting were manufactured in 7 patients (17.5 percent) of the main group and 5 patients (25%) in the control group (among them – fixed structures based on dental implants in 3 and 3 patients [7.5% and 15%], respectively). Problems in occlusal relations that required orthopedic correction during this period persisted in 17.5 percent of patients in the main group and 25% of patients in the control group. Pain and discomfort in the area of surgery associated with the movements of the mandible and chewing food were observed in 2.5 percent of patients in the main group and 25 percent of patients in the control group ($p < 0.05$). Most patients noted some limitations in mouth opening and mandibular movements. Thus, in the main group, the maximum mouth opening was slightly limited (less than 1 cm) in 60% of patients, 1-2 cm in 37 percent, and more than 2 cm in 3%. In the control group, mouth opening was slightly limited (less than 1 cm) in 55% of patients, 1-2 cm in 40 percent, and more than 2 cm in 5 percent (discrepancies are insignificant, $p > 0.05$). Lateral mandibular movements were sharply limited in 30 percent of patients in the main group and 25 percent of patients in the control group ($p > 0.05$).

Paresthesias in the area of innervation of the third branch of the trigeminal nerve were observed in 19 patients (47.5 percent) of the main group and 19 patients (95%) of the control group. Their occurrence was due to the mechanism of defect formation and its localization, and recovery was partial and very slow, regardless of the type of surgery used.

Despite certain functional limitations and residual aesthetic deficiency, 34 patients (85%) of the main group and 9 (45 percent) of the control group noted an improvement in their quality of life and were satisfied with the results of the operation ($p < 0.05$).

DISCUSSION

Widespread introduction of computer simulation, modeling and CAD/CAM technologies in medicine, in particular in maxillofacial surgery, which has taken place over the past 2 decades, has qualitatively changed approaches to the treatment of head and neck diseases and opened a new direction of facial skull reconstruction – computer associated surgery (ie, computer aided surgery) of the face. It is based on algorithms that integrate modern capabilities of digital diagnostics, computer data processing, visualization, virtual simulation, three-dimensional design, intraoperative navigation, production of implants and medical devices.[22,23]

Digital surgery involves the use of techniques and protocols that differ from traditional conceptually: it is based on the use of accurate calculations, computer simulation results and individualized medical devices, while classical methods of reconstruction of complex anatomical objects rely mainly on intraoperative manual approximation based and experience, practical skills and preferences of the surgeon, and not least depend on his intuition, spatial representation and creativity.[24]

Our study contains a comparative analysis of the clinical effectiveness of PSI and traditional bone grafting techniques using preformed reconstructive plates in patients with mandibular defects. Short- and long-term results of surgical interventions confirmed the presence of a number of advantages inherent in PSI, the main of which was to increase the accuracy of individual anatomical shape and contour of the mandible, which probably affected the aesthetic outcome of surgery and patients` satisfaction level/quality of life. It is known that the anatomy, architectonics, embryogenesis and conditions of the functional load of the mandible are unique and significantly different from other skeletal bones. This determines a significant discrepancy between the geometry of the mandible and bone grafts, regardless of the selected donor site. Adaptation of the graft shape by performing osteotomies of mutual movement and additional mechanical processing of fragments does not allow effective restoring the features of the mandibular anatomy in areas with complex geometry (anterior part, angle, ramus, and condyle). In these areas, PSIs have a significant advantage over traditional methods involving the use of preformed plates and bone blocks. They allow you to accurately restore the mandibular contour in the mirror image of the healthy side, compensating for the existing mismatch in the shape of the grafts.

Instead, when using traditional methods of defect replacement, there is often a need for contouring, correction of the mandibular shape, reproduction of the curvature of its contour using individualized polymer and ceramic plates, bone grafts and more. This is fully confirmed by our data on the need for corrective surgery, which in the control group was twice as large. Aesthetic outcomes in the main group of patients, the satisfaction level and the assessment of changes in quality of life were probably better in patients with established PSI than in the control group.

Another advantage of PSIs identified in this work was the improvement of the biomechanical properties of the mandible-graft-fixator system and the probable reduction in the number of secondary displacements, loosening and prolapse of screws, fractures, etc. PSIs showed greater rigidity and strength compared to reconstructive plates, deformations or fractures of which occurred in 40 percent of cases. Thus, rigid reconstructive plates did not demonstrate the ability to withstand significant masticatory loads, especially in the presence of mandibular defects, loss of contact between bone fragments during their reconstruction and unfavorable cross-section of reparative regeneration. The incidence of pain syndrome upon masticatory loads in the main group was also probably lower than in the control one, which confirms the ability of the placed patient-specific structures to perceive and redistribute the load effectively. According to a study,[25] increasing the rigidity and strength of installed titanium structures during their long-term function can cause a stress shielding effect, which negatively affects the processes of bone remodeling. This issue requires in-depth study and observation in the more distant postoperative period.

Despite the established benefits of PSIs, differences in the frequency of purulent-inflammatory complications, unsatisfactory clinical results with bone graft rejection, exposure and loss of titanium constructions in the comparison groups were insignificant. The use of PSI did not show significant benefits in restoring the functional state of the masticatory apparatus and the volume of mandibular movements. This, in our opinion, is due to the fact that the integral result of the operation is determined by many factors (topographic-anatomical, biomechanical, and biological), the general condition of the patient and the specific features of the clinical case. One of the main limitations of this study was that the structure of clinical groups on these parameters was quite heterogeneous, and the number of observations was too small to obtain statistically reliable results on certain parameters. Thus, the current tendency to reduce the frequency of purulent-inflammatory complications with the use of PSIs (by 17.5 percent) in this number of observations was not significant.

Restoration of mandibular function, occlusal-articulatory relationships, TMJ function, and muscular function were also independent of the type of performed surgery. The existing limitations were related to the difficulty of fixing and integrating the masticatory muscles to the titanium implant/endoprosthesis (especially the lateral pterygoid muscles, which limited the lateral mandibular movements in a significant percentage of cases), the inability to reproduce full range of motion in the TMJ (in modern constructions, usually, only rotational movements are restored) and the

presence of significant soft tissues scarring in the area of defect.

With traditional approaches, this problem is even more pronounced, as fixation of muscles to bone grafts, ensuring their predictable restructuring and recovery of TMJ elements is extremely difficult to achieve today. At the same time, modern methods of replacement of mandibular defects (in the main and control groups) allowed to achieve an acceptable level of compensation for lost functions and to restore the ability to chew, swallow and speak in the vast majority of operated patients.

Thus, the use of PSI was associated with better aesthetic results and a lower frequency of complications compared to traditional methods of mandibular reconstruction. However, their effect on function recovery of the damaged jaw and the frequency of purulent-inflammatory complications, as well as possible ways to reduce the frequency of unsatisfactory clinical results need further study.

CONCLUSIONS

The use of patient-specific implants made by the method of selective laser titanium sintering in patients with segmental and subtotal mandibular defects allows achieving satisfactory aesthetic and functional results in 85% of operated patients.

Postoperative complications in the form of purulent-inflammatory processes, exposure and graft/PSI rejection were noted in 22.5 percent of patients operated with this technology (against 40 percent in the control group); in 7.5 percent of patients (against 10% in the control) the development of these complications led to the removal of the established structure and the need for secondary mandibular reconstructions.

The use of PSIs compared to traditional methods of bone grafting, allows to achieve a more accurate restoration of the anatomical shape of the mandible in areas with complex geometry and probably better aesthetic results, and significantly reduces the frequency of secondary displacement of bone fragments due to plastic deformation and destruction of fixation elements ($p < 0.05$). At the same time, it probably does not affect the frequency of purulent-inflammatory complications, unsatisfactory clinical results and the effectiveness of the restoration of masticatory function in patients with mandibular defects.

TERM OF CONSENT

Written consent from patients was obtained to publish the clinical photographs.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ROLE OF THE AUTHORS

Denis M. Chernogorskyi (concept of the article, material collection, and writing), Marharyta V. Voller (material collection and writing), Aleksandr S. Vasilyev (material collection and writing), Yurii V. Chepurnyi (material collection and editing), and Andrey V. Kopchak (concept of the article and editing). All authors read and approved the final manuscript.

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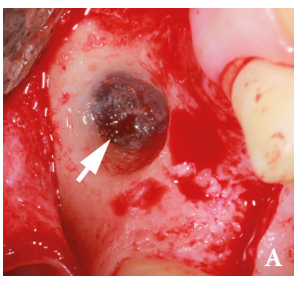
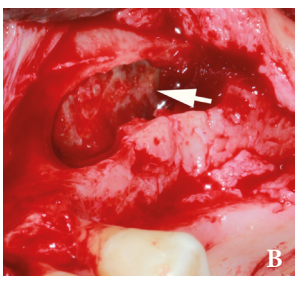
IMAGES
Camilo Mosquera, DDS, *Editor*

Lateral Sinus Lift

Ivan V. Nagorniak





Maxillary sinus grafting was proposed by Boyne in 1960s for the prosthetic purposes.[1] Later it became an open (synonyms: direct and lateral) technique for sinus membrane elevation developed in 1970s by Tatum.[1,2] This technique successfully evolved to the two-stage procedure (1980)[3] with blade-vent implant placement and to one-stage sinus lift with root implant placement (1986)[4]. In 1994, a new chapter in sinus grafting was written by Summers who modified Tatum`s osteotome-mediated transcrestal lift[1] (ie, a closed, indirect or crestal sinus lift) proposing the transalveolar osteotome set`s technique[5], which is considered to be more conservative (ie, less invasive) procedure than the lateral lift. In 2001, Vercellotti et al offered to the world the piezoelectric bony window osteotomy and the Schneiderian membrane elevation[6] without a risk of its perforations and leaving undamaged the posterior superior alveolar artery.[1] Panels A (a 27-year-old male) and B (a 51-year-old male) demonstrate a *complete osteotomy* design for the lateral sinus floor elevation approach. This technique is even more popular than *repositioned bony window trapdoor* and the *top-hinge trapdoor* technique. Non-reflected (Panel A) and lifted (Panel B) Schneiderian membrane is indicated by *arrows*. Its other names are 'maxillary sinus membrane,' 'mucoperiosteum[3]', and 'ciliated bi-laminar mucoperiosteal membrane[2]'. Nowadays, the sinus lift is ferociously expanding the horizons, even in a combination with Le Fort I osteotomy and zygomatic implants. ▪ DTJournal

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POSTSCRIPT

The Covid-19 Pandemic and the DTJournal.org

Evangelos G. Kilipiris

We run the marathon of the Covid-19 pandemic, a novel and severe coronavirus (SARS-CoV-2) infection, an unprecedented crisis in modern medical times. This crisis has profoundly stressed health care systems worldwide by testing the limits of their capabilities, and abruptly changed the way of delivering care to our patients. Every aspect of the medical field has been heavily affected, and Oral-Maxillofacial Surgery services are no exception during these difficult circumstances.[1] In addition, it posed a strict limit in the freedom of travel, and highly altered the global product supply chain, including personal protective equipment for the hospitals and health care workers. It gave rise to an economic crisis, very different from the previous experienced, with the economies trying to follow, modify and adapt their plans according to the virus spread, transmission and severity of regional clinical picture. Our social lives are altered with the introduction of distancing measures, and the wearing of face masks. All scientific meetings, globally and nationally, are cancelled, postponed or transformed to virtual events.[2] The rapid adoption of digital technology revolutionized the delivery of healthcare and education.[3]

A new path has been formed, by crafting the workflow, based on this new normal. Because of the healthcare crisis of this magnitude, the aim of the *Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology* (the website is dtjournal.org) is to publish important and accurate articles on the Covid-19 pandemic. This collection has been inaugurated by an article addressing the impact of the pandemic to the clinical and educational activities of our specialty. As the Covid-19 crisis is an evolving and dynamic event, and new health protocols are implemented and maturated, the collection of papers on Covid-19 at our journal will steadily expand with the addition of new content. For example, we anticipate articles, among others, on topics that highlight the global impact of Covid-19 on Oral and Maxillofacial Surgery, provide a picture of the challenges our specialty is facing, address preventive strategies, investigate the expanding role of telemedicine, creatively adjust new protocols, guidelines and workforce through the lens of Oral and Maxillofacial Surgery specialty, and share practical frameworks with the ultimate goal to continue the delivery of high quality care, in a new way, to the Oral and Maxillofacial Surgery population, but also to serve the broad medical community.

This disruptive challenge placed medical care in a new path within an uncharted territory. However, by running this long way with global collaboration, solidarity and adaptability, brilliant examples of innovation can emerge, the organization and preparedness of healthcare systems can improve, and the medical education with biomedical research will

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progress.

In this Covid-19 crisis, and on its rapidly evolving landscape, the *Journal of Diagnostics and Treatment of Oral and Maxillofacial Pathology* actively contributes by bringing free expanding literature, and extends to everyone in our international network the best wishes for health and safety.

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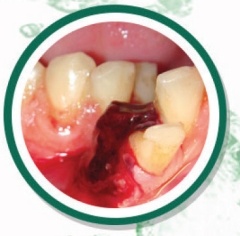

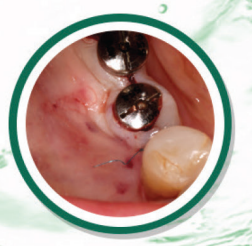

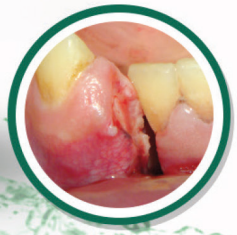

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SUMMARY OF PRODUCT CHARACTERISTICS

NAME OF THE MEDICINAL PRODUCT. Tantum Verde 0.15% mouthwash. QUALITATIVE AND QUANTITATIVE COMPOSITION. Each 100 ml contains: active ingredient: benzydamine hydrochloride 0.15 g (equivalent to 0.134 g of benzydamine). **Therapeutic indications.** Treatment of symptoms such as irritation/inflammation including those associated with pain in the oropharyngeal cavity (e.g. gingivitis, stomatitis and pharyngitis), including those resulting from conservative or extractive dental therapy. **Posology and method of administration.** Pour 15 ml of Tantum Verde mouthwash into the measuring cup, 2-3 times per day, using it either at full concentration or diluted. If diluted, add 15 ml of water to the graduated cup. Do not exceed the recommended dosage. **Contraindications.** Hypersensitivity to benzydamine or to any of the excipient. **PHARMACOLOGICAL PROPERTIES. Pharmacodynamic properties.** Pharmacotherapeutic group: Stomatologic drugs: other agents for local oral treatment, ATC code: A01AD02. Clinical studies demonstrate that benzydamine is effective in relieving suffering from localised irritation of the mouth and pharynx. In addition, benzydamine possesses a moderate local anaesthetic effect. **Pharmacokinetic properties.** Absorption. Absorption through the oropharyngeal mucosa is demonstrated by the presence of measurable quantities of benzydamine in human plasma. These levels are insufficient to produce systemic effects. Distribution. When applied locally, benzydamine has been shown to accumulate in inflamed tissues where it reaches effective concentrations because of its capacity to penetrate the epithelial lining.

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