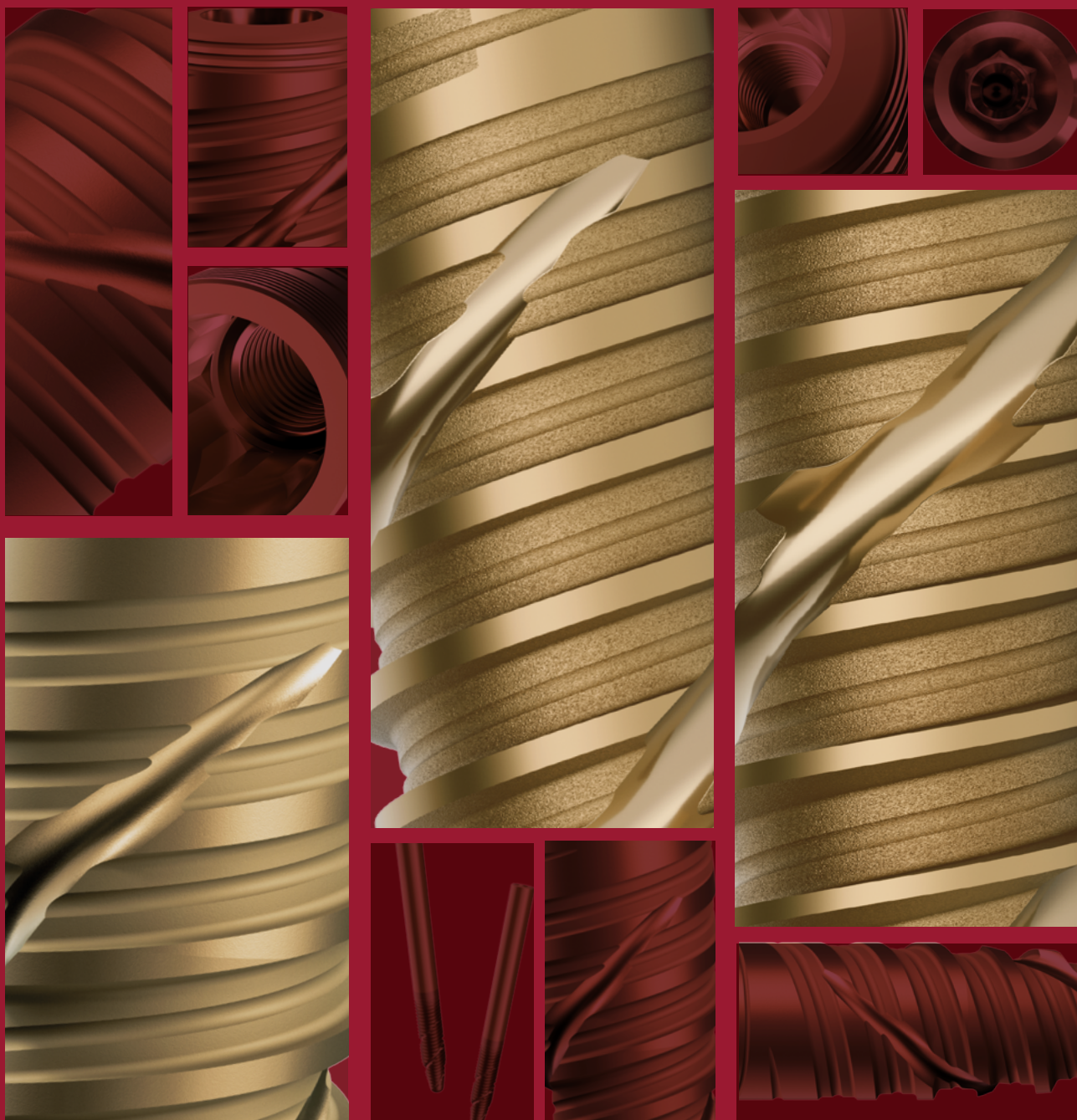


SCIENTIFIC
JOURNAL

BEYOND Full Arch



BEYOND Full Arch SCIENTIFIC JOURNAL

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EDITORIAL

DR. UMBERTO DEMONER RAMOS

PhD in Periodontics and Scientific Consultant at S.I.N.

Imagine an 80-year-old woman, Aláide, who has been using a complete upper denture for 35 years, walking into your clinic seeking fixed teeth. This woman, understandably, presents with extensive bone resorption, which makes even a typical protocol with four implants the minimum number of implants for the maximum number of teeth unfeasible. You examine the CT scan and conclude that she would need a sinus lift, and possibly extensive bone grafting to achieve horizontal bone gain. You present the treatment plan: at least 12 months before the actual rehabilitation can begin. She will be at least 81 years old by the time the treatment is completed five years older than the average life expectancy of a Brazilian born today. You would agree that, for this lady, 9 to 12 months is a long time, and the ideal would be for her to have functional and aesthetic “new teeth” as soon as possible. It’s a matter of fixing the teeth and time.

For this reason, we, oral health professionals, in our mission to create new smiles and rehabilitate people who, for whatever reason, have suffered oral mutilation, must offer treatment options that can recover this lost time. And for that, we must go beyond we cannot limit ourselves to just one option. Even if you are “team regeneration,” you would agree that Mrs. Aláide is in a hurry.

To solve both problems fixed teeth and time we need to seek techniques that go beyond the obvious, beyond the limited maxillary bone that many patients, like Mrs. Aláide, present with. We need what is called remote anchorage: implants anchored in high-quality bone, extra-maxillary, such as the nasal, zygomatic, and pterygoid bones. For that, we also need implants that go beyond the usual beyond what we use in single cases and even full-arch protocols in younger patients with more available bone. We need special implants, long implants designed with primary stability in mind.

Upon graduation, we took the famous Hippocratic Oath, in which we committed to offering treatments that prioritize the health and well-being of our patients, as well as to practicing our profession according to best practices. One way to honor these two lines of our oath is to offer treatment options that are grounded in high-quality science. This magazine presents clinical solutions for evidence-based practice, so that patients like Mrs. Aláide, my grandmother, can be rehabilitated with safety, predictability, and, ultimately, quality.

HISTORY & DEVELOPMENT

Thinking beyond the basics, S.I.N. strives to innovate its products to support full-arch immediate loading rehabilitations, always grounded in science. To achieve this, before any launch, a whole team of engineers, dentists, and opinion leaders work together with the goal of designing and producing solutions that will significantly change the clinical daily routine of implantologists, periodontists, and prosthodontists. To this end, an entire line of remote anchorage systems, aimed at “full arch” rehabilitations, has been developed.

Obviously, the entire development process involves not only gathering opinions and seeking convergence in rehabilitation philosophy but also rigorous scientific work. This includes preclinical animal studies, when necessary, following ARRIVE and CONCEA guidelines, as well as computational finite element analyses to anticipate potential issues in various clinical implant situations. This is complemented by strict internal and external mechanical tests to assess the mechanical strength of the implant-component assembly and, of course, clinical validations that ensure the conceived design truly meets the needs and premises for which it was created.

Basically, if something does not withstand enough stress, it will not be brought to market. If something is not good enough for clinical use, it will not reach the market. After all, at the end of the day, we rehabilitate people, not just mouths, and patient safety comes first.

The Beyond Full Arch line aims to go beyond the obvious and was designed for dentists seeking high insertion torque with predictability to achieve immediate loading in their rehabilitations, without altering their prosthetic connection and without the need to stock multiple components.

With implants ranging from regular sizes, such as the Epikut S, to long implants like the Epikut S Long, and even special implants like the Zygomatic Plus, each is developed for specific uses, tested and approved by our development dentists and ambassadors, combining market needs with scientific foundation.

Regardless of the philosophy for or against zygomatic implants, or for or against implants anchored in the nasal bone or even pterygoid implants, the Beyond Full Arch line provides the clinician with something important when offering rehabilitation to their patient: choice.



SCIENTIFIC ARTICLES

THE IMPACT OF BIOACTIVE SURFACES IN THE INITIAL STAGES OF OSSEOINTEGRATION: A COMPARATIVE IN VITRO STUDY EVALUATING THE HYDROPHILIC SURFACES HANANO® AND SLACTIVE®

BIOMED RESEARCH INTERNATIONAL

Rodrigo A. da Silva^{1,2,3}, Geórgia da Silva Feltran¹, Marcel Rodrigues Ferreira¹, Patrícia Fretes Wood¹, Fabio Bezerra¹ and Willian F. Zambuzzi;

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² School of Dentistry, University of Taubaté, 12020-340, Taubaté, São Paulo, Brazil;

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There is a growing effort to develop active and innovative surfaces aimed at accelerating osseointegration, such as the nanosized crystalline hydroxyapatite coating (HANano®). To better understand the biological behavior of osteoblasts cultured on the HANano® surface, the data were compared with SLActive®, a titanium surface treated with sandblasting. Methodologically, osteoblasts were cultured on both surfaces for up to 72 hours to assess cell adhesion, viability, and the set of genes encoding proteins related to adhesion, proliferation, and differentiation. Our data show that HANano® provides an interesting substrate to support cell adhesion with cells exhibiting typically spread morphology, whereas cells adhered to SLActive® display a spindle-shaped morphology. Our data indicate that the cell adhesion mechanism was accompanied by the upstream expression of integrin $\alpha 1$, Fak, and Src,

favoring the assembly of focal adhesion platforms and coupling with cell cycle progression (upregulation of the genes Cdk2, Cdk4, and Cdk6) in response to HANano®. Additionally, both bioactive surfaces promoted osteoblastic differentiation stimulation through activation of the genes Runx2, Osterix, and Alp. Although both surfaces promoted the expression of the Rankl genes, the expression of the Opg genes was higher in SLActive®, and this difference was reflected in the Rankl/Opg ratio. Finally, the Caspase-1 gene was significantly upregulated in response to HANano®, suggesting involvement of the inflammasome complex. This study, as a whole, provides sufficient evidence to confirm that the nanosized hydroxyapatite-coated surface provides the necessary microenvironment to enhance osteoblast performance in dental implants and predicts that these osteogenesis phases occur during the initial stages of osseointegration.



FULL ARTICLE

NEW CONCEPT OF IMPLANTS FOR HIGH PRIMARY STABILITY IN LOW-DENSITY BONE AND POST-EXTRACTION SOCKETS

IMPLANTNEWS – ORAL REHABILITATION FROM A TO Z

Nelson R. F. A. Silva¹, Felipe Moura Araújo², Roberto Sales e Pessoa³, Mônica Diuana Calasans-Maia⁴, Bruna Ghiraldini⁵, Fábio J. B. Bezerra⁶;

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⁴Especialista e mestra em CTBMF – UFRJ; Doutora em Patologia e professora titular do Depto. de Cirurgia Oral Menor – Universidade Federal Fluminense. Orcid: 0000-0001-5759-7926;

⁵Doutora em Implantodontia – Unip; Coordenadora do Depto. de Pesquisa e Desenvolvimento – S.I.N. Implant System. Orcid: 0000-0002-3693-3035;

⁶Doutor em Biotecnologia – Instituto de Biociências/Unesp; Diretor do Depto. de Pesquisa e Desenvolvimento – S.I.N. Implant System. Orcid: 0000-0003-0330-2701.

Objective: This article presents a new implant proposal with specific characteristics for challenging clinical situations.

Materials and Methods: TAll implants were placed by professionals with a minimum of ten years of prior experience, following the manufacturer’s recommendations,

a form containing information about the patients’ sex and age, the type of implant installed, the type of socket (fresh or healed), the use or not of simultaneous bone grafting, trans- and post-operative complications, clinical or radiographic changes, and osseointegration success was used for data collection. Two representative cases were photographed and presented..

Results: In total, 161 implants (109 CM and 52 HE; diameters: 3.5 mm to 4.5 mm, lengths: 10 to 13 mm) were installed in 91 patients (68% men, 32% women, with an average age of 50 years). Of these, 65% of the implants were placed in post-extraction sockets, and 53% were associated with intra-alveolar grafts. The average insertion torque was 45 N.cm, enabling immediate loading when clinically indicated. The overall survival rate was 99.37%.

Conclusion: Within the limitations of this study, the cases presented suggest the effectiveness of the new implant design for situations involving low bone density or when immediate loading is indicated.

THE INFLUENCE OF THE NANOSTRUCTURED HYDROXYAPATITE SURFACE ON THE INITIAL STAGES OF OSSEOINTEGRATION: A MULTIPARAMETRIC STUDY IN LOW-DENSITY BONE IN ANIMALS

INTERNATIONAL JOURNAL OF NANOMEDICINE

Suelen Cristina Sartoretto^{1,2}, Jose de Albuquerque Calasans-Maia³, Rodrigo Figueiredo de Brito Resende⁴, Eduardo Câmara², Bruna Ghiraldini⁵, Fabio José Barbosa Bezerra⁶, Jose Mauro Granjeiro^{7,8}, Monica Diuana Calasans-Maia⁴;

¹Oral Surgery Department, Universidade Veiga de Almeida, Rio de Janeiro, RJ, Brazil; Oral Surgery Department, Universidade Iguacu, Nova Iguacu, RJ, Brazil;

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³Orthodontics Department, Dentistry School, Universidade Federal Fluminense, Niteroi, RJ, Brazil;

⁴Oral Surgery Department, Universidade Federal Fluminense, Niteroi, RJ, Brazil;

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Dental implants in partially or fully edentulous patients are a predictable treatment with high long-term success rates¹. However, early osseointegration is still considered a challenge in areas with more trabecular bone (type IV bone)², along with thinner and less dense cortical bone, which is generally regarded as less suitable for supporting dental implants.

In recent years, new implant surface technologies with micro- to nanotopography, new chemical compositions, new loading protocols, and new surgical techniques have been introduced to improve osseointegration and reduce treatment time, allowing for immediate or early functional loading in patients with reduced bone density.³⁻⁵

Various approaches to improve dental implant surfaces have been studied, including mechanical, chemical, and physical techniques⁶. Calcium phosphate has been widely used as a bone substitute^{7,8}; dental implant coating⁹; and carrier of proteins¹⁰, growth factors¹, and

antimicrobials¹²⁻¹⁴ due to its similarity to the mineral fraction mineral of bone tissue and its adequate capacity for cell adhesion. Among calcium phosphates, hydroxyapatite, in particular, has been favored due to its biocompatibility, safety, predictability, unlimited availability, lower patient morbidity, and cost-effectiveness, offering significant advantages and making it a good choice for dental implant surface coatings.¹⁵

The use of nanostructured hydroxyapatite to coat titanium implant surfaces increases the strength of the bond between titanium and bone, enhances the rate of osseointegration, and reduces the duration of the treatment period, especially in patients with poor bone quality.⁹

There is a continuous increase in research focused on developing new bioactive surfaces to reduce the osseointegration period in low-density bone. This study aimed to compare the bone response of the surface coated with HAnano® (S.I.N., São Paulo, Brazil) with well-known hydrophilic surfaces such as SLActive® (Straumann, Basel, Switzerland) and TiUnite® (Nobel Biocare, Gothenburg, Sweden) through histomorphometric analysis of bone-implant contact (BIC) and bone area fraction occupancy (BAFO) in a low-density ovine iliac crest model.



FULL ARTICLE

CLINICAL CASES

EPIKUT LONG IN THE TREATMENT OF SEVERELY ATROPHIC MAXILLA

11



BY DR. MAIOLINO THOMAZ FONSECA OLIVEIRA

Doctor in CTBMF and Implant Dentistry from the Federal University of Uberlândia

Oral and Maxillofacial Surgeon at the University Hospital of the Federal University of Uberlândia

CASE INTRODUCTION

A 63-year-old female patient with severe maxillary atrophy, wearing a complete upper denture, sought treatment for oral rehabilitation using an implant-supported prosthesis.

TREATMENT EXPLANATION

The therapeutic approach includes the use of Epikut Long implants in the distal regions (implants measuring 3.8 x 22 mm) and implants measuring 3.8 x 11.5 mm in the anterior maxillary region. After flap elevation and maxillary exposure, the implants were distributed following the All On Four technique and installed via palatal access. The distal implants were placed tilted, tangential to the anterior wall of the maxillary sinus, aiming for anchorage in the canine pillar.

PATIENT RECORD

Patient: 63 years old, female.

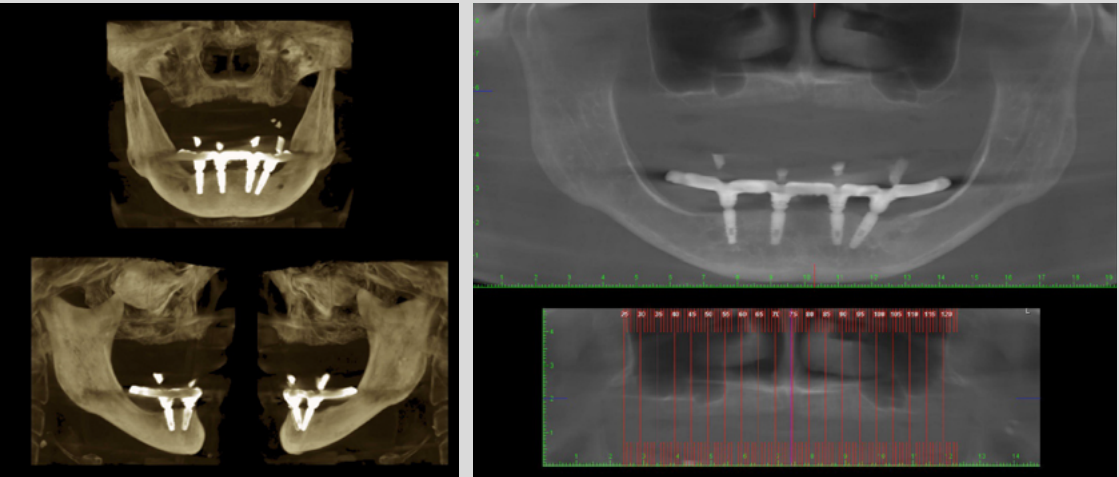
Chief complaint: The patient reported instability of the complete denture, requiring implant rehabilitation for improved masticatory performance.

Medical history: Hypertensive patient using antihypertensive medication.

Treatment plan: The treatment plan includes implant distribution following the All On Four technique, using Epikut Long implants in the distal regions and conventional-sized implants in the anterior maxillary region.

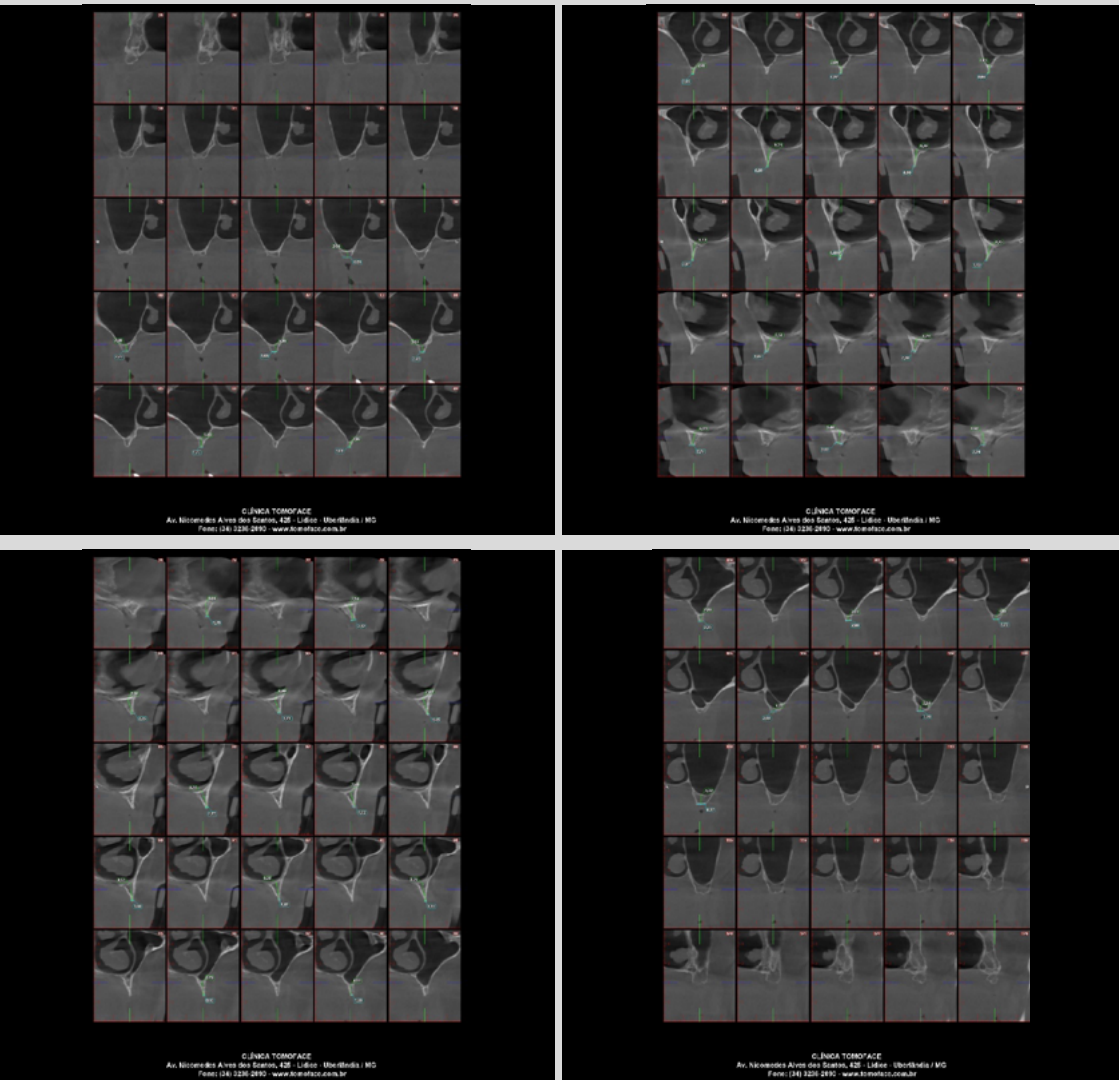
X-RAY/CT SCAN

Tomographic reconstruction and coronal section showing significant pneumatization of the maxillary sinus.



X-RAY/CT SCAN

Sagittal sections revealing severe maxillary atresia.



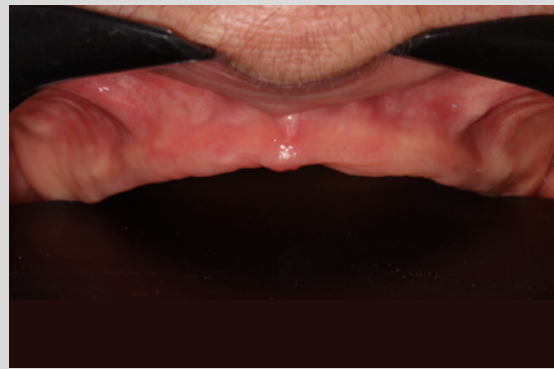
BEFORE

Intraoral view showing a protocol-type lower prosthesis and a removable upper prosthesis.



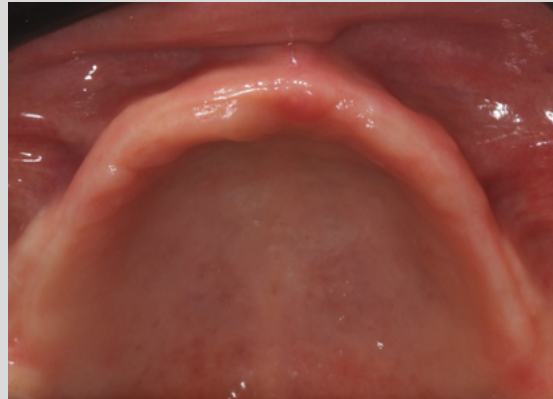
BEFORE

Intraoral view of the maxilla without the removable prosthesis.



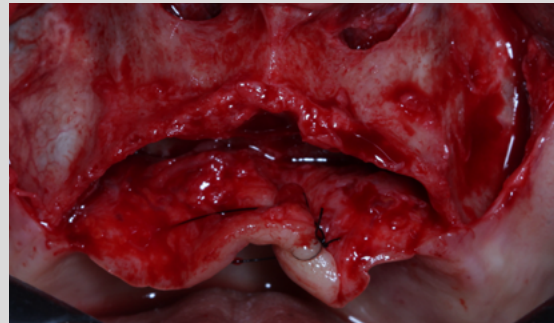
BEFORE

Occlusal view.



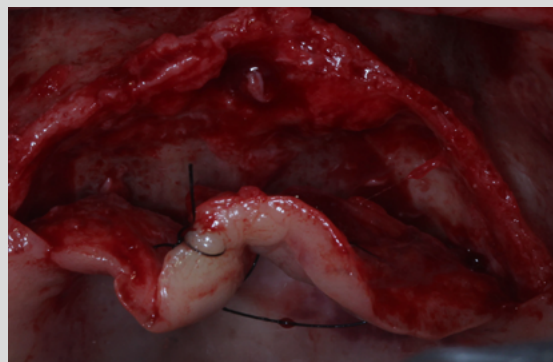
STEP-BY-STEP OF THE PROCEDURE

Wide access to the maxilla, exposing the palatal plate, maxillary sinus, and piriform aperture. Mucosal detachment of the nasal mucosa was performed to achieve bicortical anchorage of the Epikut Long implants.



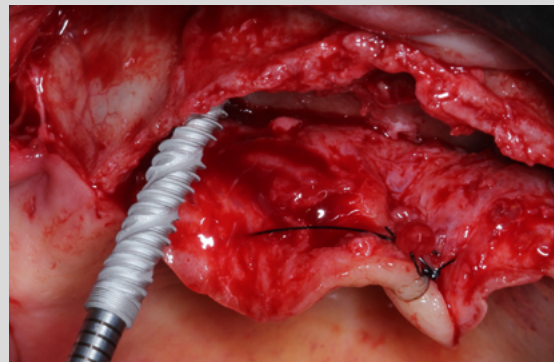
STEP-BY-STEP OF THE PROCEDURE

Palatal flap elevation aimed at facilitating the palatal approach.



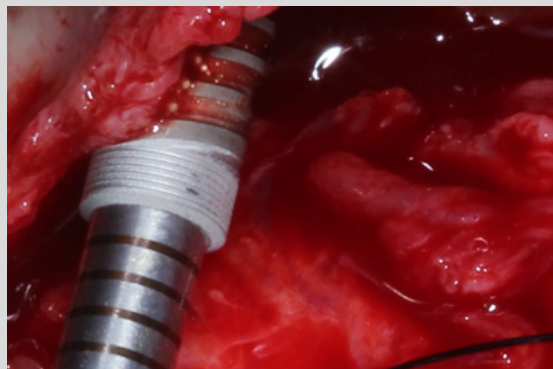
INTRAOPERATIVE

Placement of the distal Epikut Long implants measuring 3.8 x 22 mm.



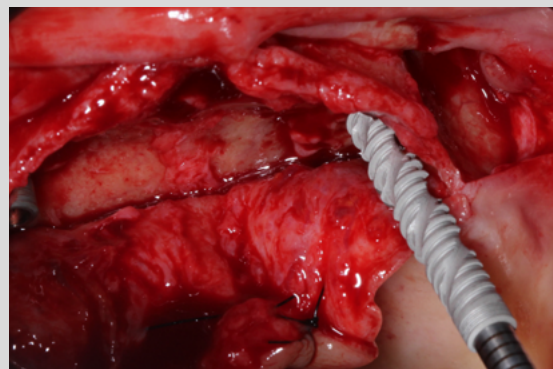
INTRAOPERATIVE

Relation of the implant cervical region with the residual alveolar process plate.



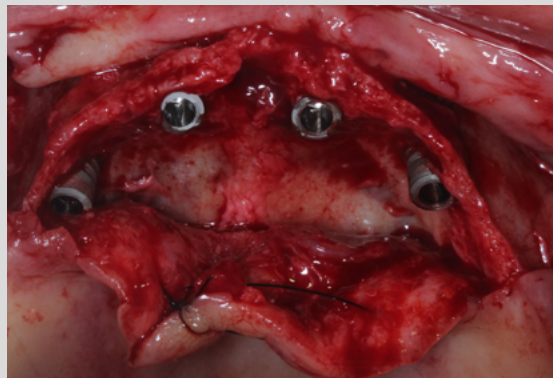
INTRAOPERATIVE

Placement of the distal Epikut Long implants measuring 3.8 x 22 mm.



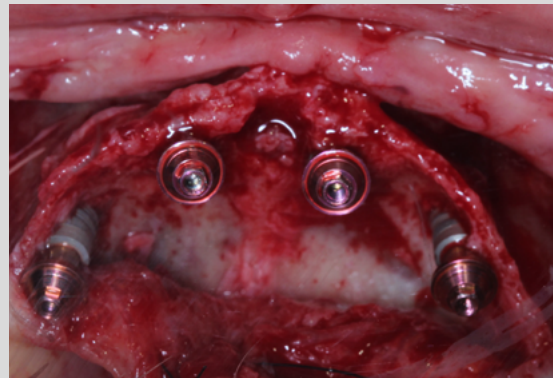
INTRAOPERATIVE

Distribution of the Epikut Long implants following the All On Four protocol.



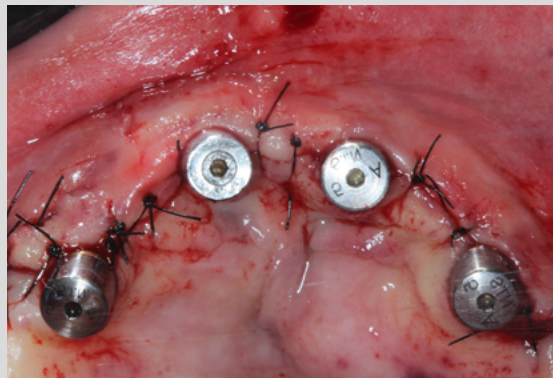
INTRAOPERATIVE

Placement of mini abutments with 3.5 mm transmucosal height.



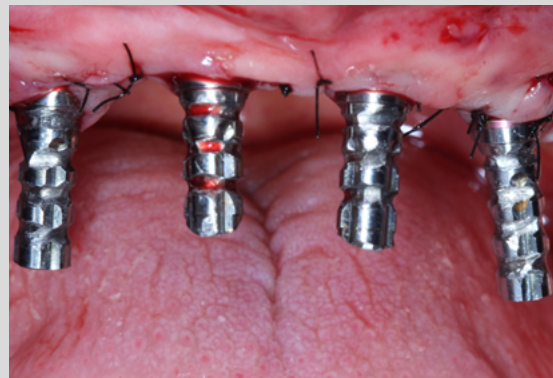
STEP-BY-STEP OF THE PROCEDURE

Suturing of the surgical wound with placement of mini abutment protectors.



STEP-BY-STEP OF THE PROCEDURE

Placement of the provisional titanium cylinders.



PROVISIONALIZATION

Impression of the removable prosthesis and fabrication of the provisional protocol prosthesis.



PROVISIONALIZATION

Occlusal view of the implant emergence.



PROVISIONALIZATION

Intraoral appearance after impression of the removable prosthesis.



PROSTHETIC PHASE



PROSTHETIC PHASE

Após período de osseointegração foi realizada a moldagem e sequência para construção da prótese definitiva.



PROSTHETIC PHASE

Checação da infraestrutura metálica.



PROSTHETIC PHASE

Aspects of the definitive prosthesis.



PROSTHETIC PHASE

Implant emergence in relation to the prosthesis.



FINAL RESULT

Final intraoral appearance.



ZYGOMATIC PLUS



TEAM OF THE CENTER FOR TEACHING AND RESEARCH IN IMPLANTODONTICS AT UFF/RJ

Prof. Dr. Priscila Casado, Prof. Dr. Aldir Machado, Prof. Dr. Gustavo Oliveira, Prof. Bruno Rangel, Prof. Dr. Alexandre Montenegro, Doctoral Candidates: Prof. Thainara Salgueiro, Student: Fernando Azevedo, Guest: Prof. Marcus Vinicius Siqueira, and Advisor: Prof. Fernando Giovanela

CASE INTRODUCTION

Clinical case of zygomatic implants combined with conventional implants in the anterior region, with immediate provisionalization and a resin-printed prosthesis featuring extrinsic staining.

TREATMENT EXPLANATION

Placement of two Zygomatic Plus implants combined with two conventional implants placed in the region of teeth 11 and 21, preceded by extraction of teeth 21, 22, and 23, and bone smoothing. The procedure included scanning, digital design and 3D printing of the prosthesis, followed by immediate installation.

PATIENT RECORD

Patient: 81 years old, male.
Chief complaint: The patient reported difficulty chewing (“SIC”).
Medical history: Hypertensive, has gastritis, former smoker, uses simvastatin, losartan, and omeprazole.
Treatment plan: Due to insufficient posterior bone remnant for conventional implant placement, a combination of two implants in the anterior region with two Zygomatic Plus implants was chosen.

BEFORE

Initial clinical appearance.



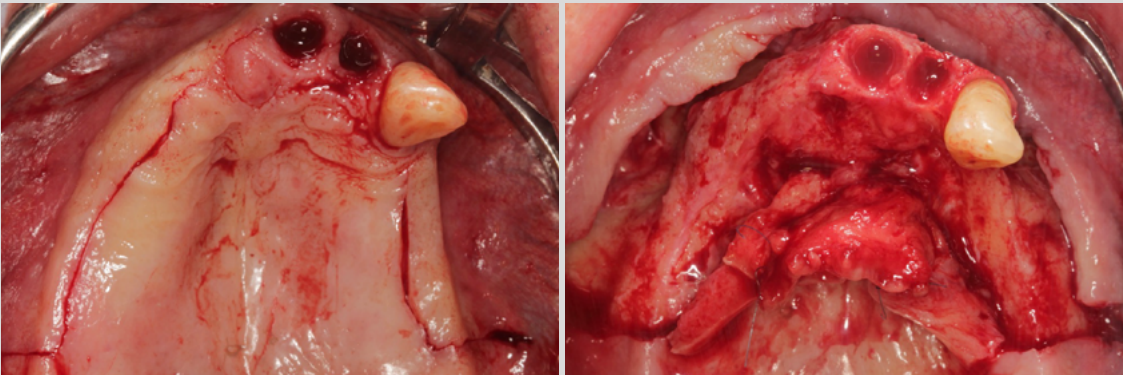
X-RAY/CT SCAN

Initial panoramic X-ray and panoramic tomographic slice.



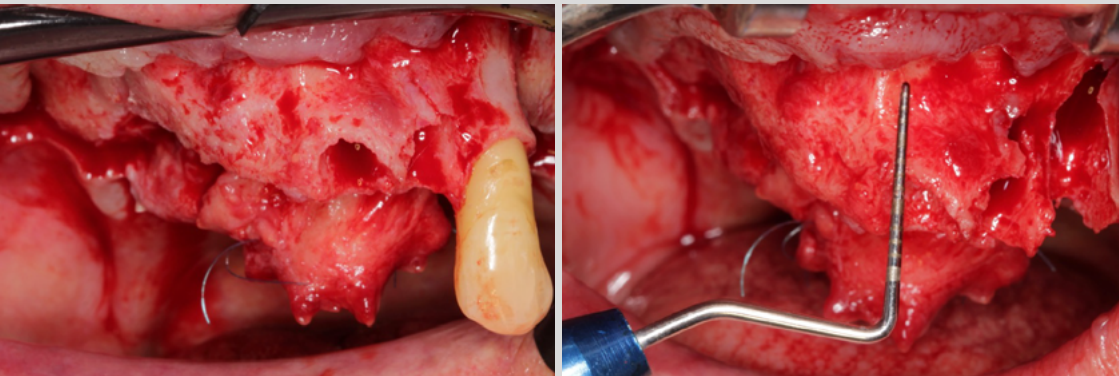
STEP-BY-STEP OF THE PROCEDURE

Palatinized incision relative to the alveolar ridge with distal releasing incisions at the level of the zygomatic pillar and full flap elevation.



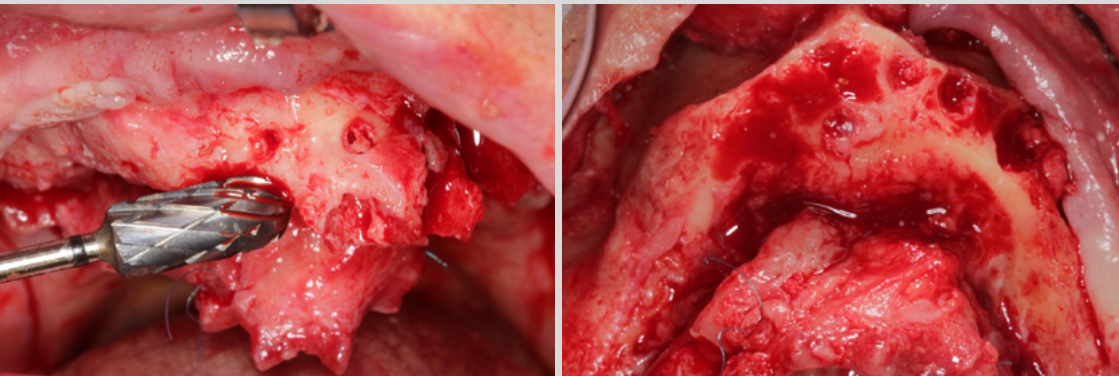
STEP-BY-STEP OF THE PROCEDURE

Measurement of the required smoothing of the remaining alveolar process, guided by tomography, following extraction of teeth 21, 22, and 23.



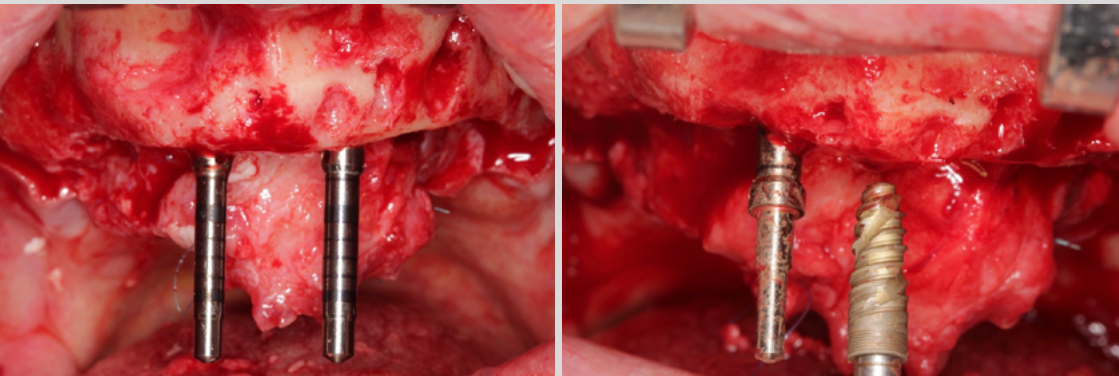
STEP-BY-STEP OF THE PROCEDURE

Bone smoothing with a tungsten bur and occlusal view of the prepared ridge.



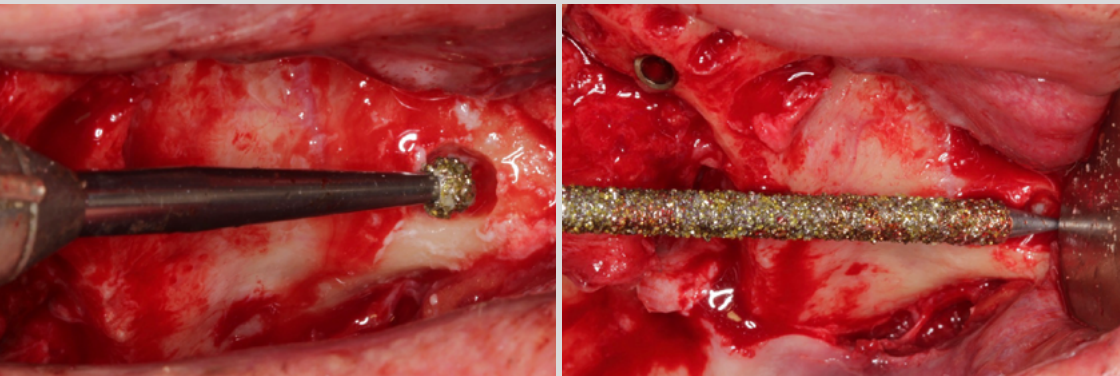
INTRAOPERATIVE

Parallel pins for implants in regions 11 and 21, and Epikut implants measuring 3.5 x 10 mm.



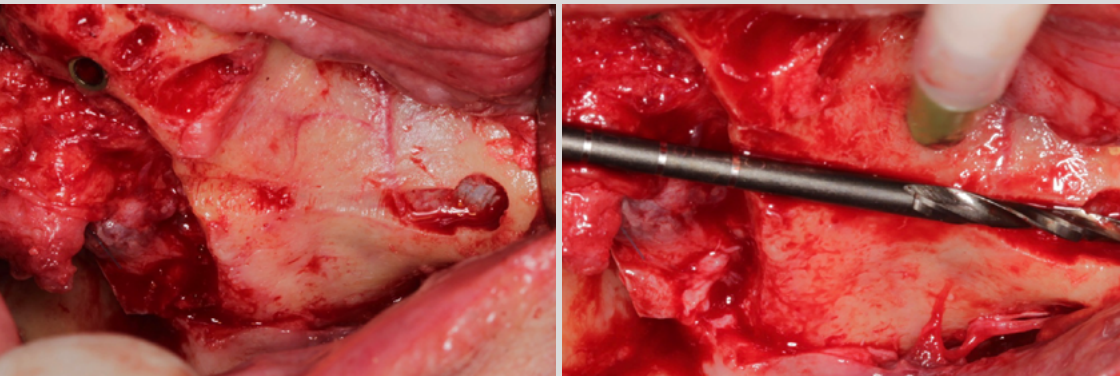
INTRAOPERATIVE

Initial marking with a diamond round bur on the zygomatic arch and preparation of the osteotomy site with a 4.0 mm diamond bur.



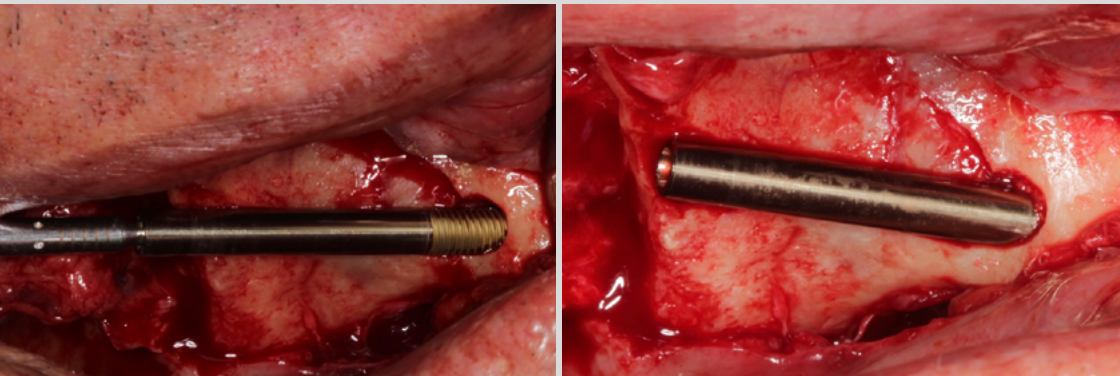
INTRAOPERATIVE

Surgical site initiated, and drilling performed with lance-shaped burs of 1.8 mm and 2.35 mm.



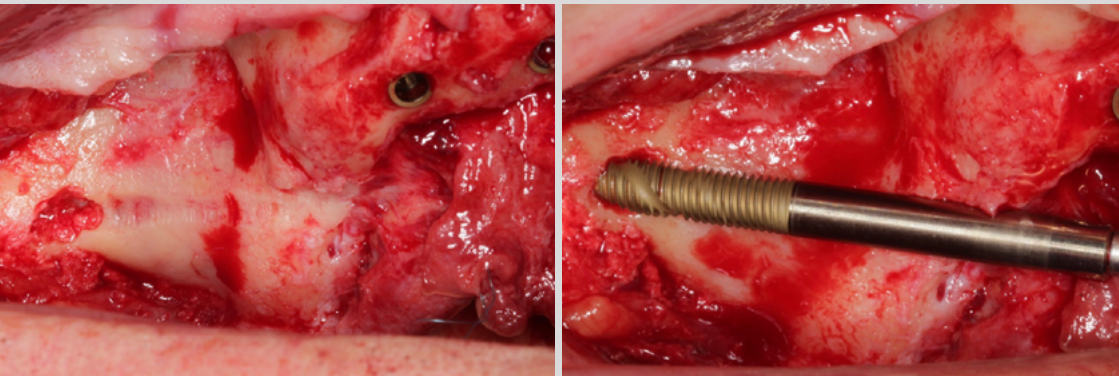
IMPLANT USED

Left Zygomatic Plus implant (ILMZ 4057N) placed with 60 N.cm torque.



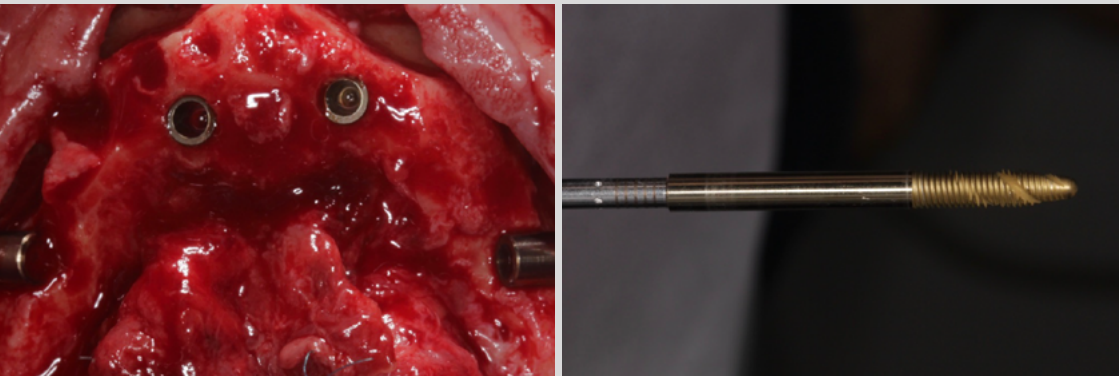
IMPLANT USED

Surgical site and right-side Zygomatic Plus (ILMZ 4052N) implant placed with 60 N.cm torque.



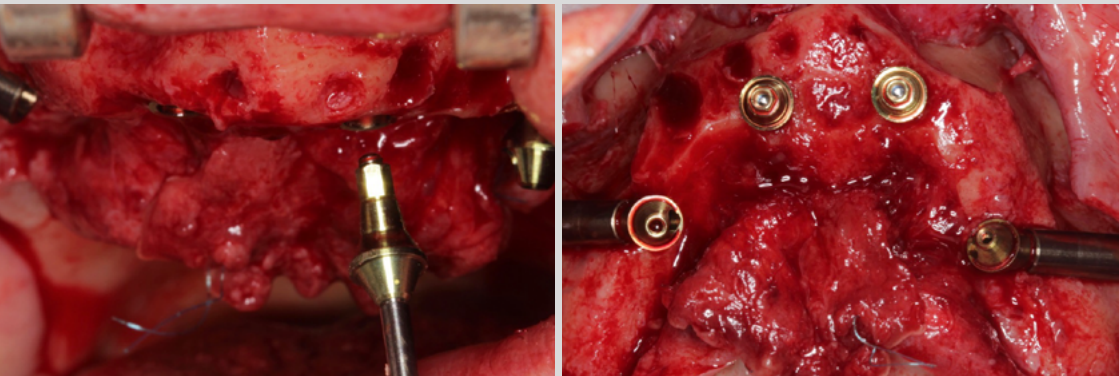
IMPLANT USED

Implants finalized in position.



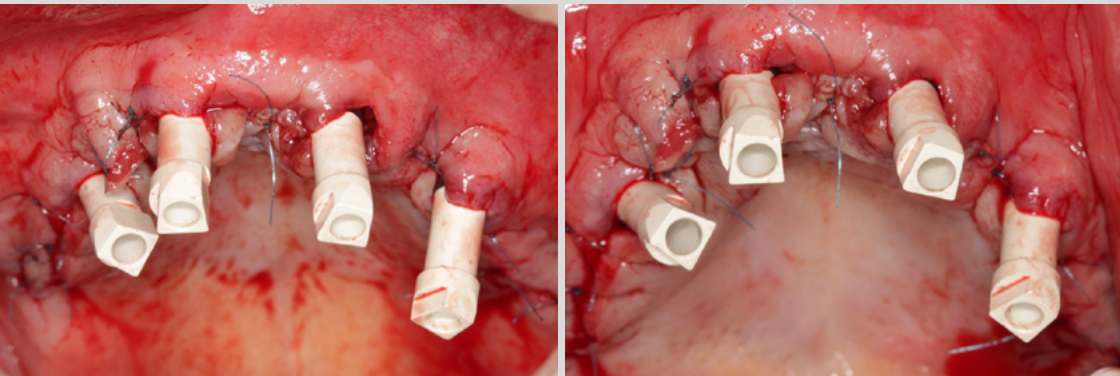
INTRAOPERATIVE

Placement of 45° angled mini abutments, torqued to 20 N.cm.



PROSTHETIC PHASE

Scan jigs in position, suturing, and scanning.



PROSTHETIC PHASE

Prostheses prototyped before and after extrinsic staining.



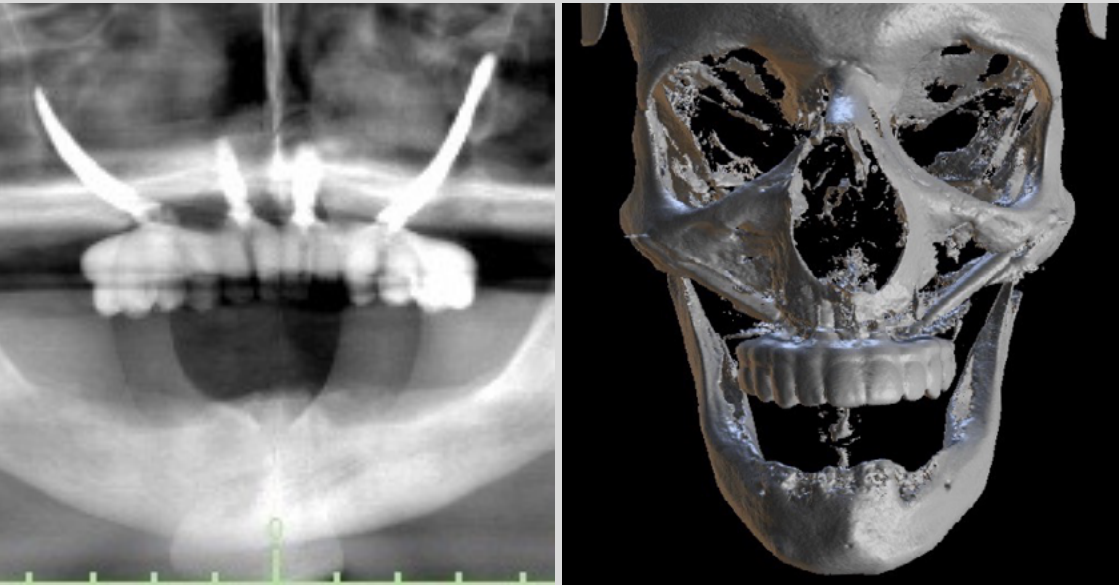
PROSTHETIC PHASE

Prostheses installed 24 hours after surgery.



FINAL CT SCAN

Post-surgical CT scan images.



FINAL RESULT

Prosthesis after 1 week.



OUR GLOBAL PRESENCE



POINT YOUR PHONE’S CAMERA AT THE
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