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REABILITAÇÃO ORAL EM PRÓTESE IMPLANTOSSUPORTADA COM ANCORAGEM EM OSSO ZIGOMÁTICO~

ORAL REHABILITATION WITH IMPLANT-SUPPORTED PROSTHESIS ANCHORED IN THE ZYGOMATIC BONE

REHABILITACIÓN ORAL CON PRÓTESIS IMPLANTOSOPORTADA CON ANCLAJE EN HUESO CIGOMÁTICO

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Abstract
Introduction: The rehabilitation of severely atrophic maxillae represents a challenge in Implant Dentistry due to the limited bone volume available for the placement of conventional implants. In this context, zygomatic implants emerge as a therapeutic alternative, allowing anchorage in bone structures with higher density and avoiding

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extensive reconstructive procedures. Case report: A melanoderma patient, residing in the Zona da Mata region, underwent a surgical procedure performed under local anesthesia, following a sequential instrumentation protocol for preparation of the bone bed and placement of implants with insertion torque between 60 and 65 N·cm, indicating satisfactory primary stability. Subsequently, angled prosthetic abutments were installed to correct parallelism and enable implant-supported rehabilitation. Clinical and radiographic follow-up revealed adequate peri-implant tissue health, marginal bone stability, and functional restoration, with no signs of complications. Conclusion: Zygomatic implants can be considered a viable alternative for the rehabilitation of severely atrophic maxillae when conventional implants are unfeasible, providing structural support and functional rehabilitation.

Keywords: Dental Implants; Zygomatic Implants; Maxilla Atrophy; Oral Rehabilitation; Osseointegration; Periodontal Health; Quality of Life.

Resumo
Introdução: A reabilitação de maxilas severamente atróficas representa um desafio na Implantodontia devido à limitação de volume ósseo para instalação de implantes convencionais. Nesse contexto, os implantes zigomáticos surgem como alternativa terapêutica, permitindo ancoragem em estruturas ósseas de maior densidade e evitando procedimentos reconstrutivos extensos. Relato de caso: Paciente melanoderma, residente na região da Zona da Mata, foi submetido a procedimento cirúrgico sob anestesia local, seguindo protocolo de instrumentação sequencial para preparo do leito ósseo e instalação de implantes com torque de inserção entre 60 e 65 N·cm, indicando estabilidade primária adequada. Foram instalados intermediários protéticos angulados para correção do paralelismo e viabilização da reabilitação implantossuportada. O acompanhamento clínico e radiográfico evidenciou tecidos periimplantares saudáveis, manutenção da estabilidade marginal óssea e restauração funcional satisfatória, sem sinais de complicações. Conclusão: Implantes zigomáticos podem ser considerados alternativa viável para reabilitação de maxilas severamente atróficas, oferecendo suporte estrutural e reabilitação funcional quando implantes convencionais são inviáveis.

Palavras-chave: Implantes Dentários; Implantes Zigomáticos; Atrofia Maxilar; Reabilitação Oral; Osseointegração; Saúde Periodontal; Qualidade de Vida.

Resumen
Introducción: La rehabilitación de maxilares severamente atróficos representa un desafío en Implantología debido a la limitada disponibilidad de hueso para la colocación de implantes convencionales. En este contexto, los implantes cigomáticos surgen como alternativa terapéutica, permitiendo anclaje en estructuras óseas de mayor densidad y evitando procedimientos reconstructivos extensos. Reporte de caso: Paciente melanoderma, residente en la región de la Zona da Mata, fue sometido a procedimiento quirúrgico bajo anestesia local, siguiendo protocolo de instrumentación secuencial para preparación del lecho óseo e instalación de implantes con torque de inserción entre 60 y 65 N·cm, indicando estabilidad primaria adecuada. Se instalaron pilares protésicos angulados para corregir el paralelismo y viabilizar la rehabilitación implantosoportada. El seguimiento clínico y radiográfico mostró tejidos periimplantarios saludables, estabilidad ósea marginal mantenida y restauración funcional satisfactoria, sin evidencias de complicaciones.

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Conclusión: Los implantes cigomáticos pueden considerarse una alternativa viable para la rehabilitación de maxilares severamente atróficos, proporcionando soporte estructural y rehabilitación funcional cuando los implantes convencionales son inviables.

Palabras clave: Implantes Dentales; Implantes Cigomáticos; Atrofia Maxilar; Rehabilitación Oral; Osteointegración; Salud Periodontal; Calidad de Vida.

1. Introduction

Tooth loss initiates a multifactorial biological process culminating in progressive alveolar bone resorption, as alveolar maintenance directly depends on functional stimulation transmitted via the periodontal ligament. Absence of this stimulation favors remodeling imbalances, increasing osteoclastic activity and reducing residual ridge height and thickness. In the posterior maxilla, this process is exacerbated by maxillary sinus pneumatization, significantly decreasing bone availability for conventional implant placement and compromising load distribution and primary stability of dental implants (Polido et al., 2023).

Severe maxillary deficiency is associated not only with technical limitations but also with functional and aesthetic impairments. Clinically, patients often present reduced masticatory efficiency, difficulty consuming rigid foods, phonetic alterations, and overload of remaining teeth. Aesthetically, loss of labial support and collapse of the lower third of the face negatively impacts self-image and quality of life, highlighting the multidimensional impact of maxillary atrophy on oral and systemic health (ITI Consensus Report, 2023; Longo et al., 2023). Several strategies have been proposed for rehabilitation of severely atrophic maxillae, including autogenous or allogeneic bone grafting, sinus floor elevation, guided bone regeneration, and angled implant protocols such as All-on-4. While effective in selected cases, these approaches often require multiple surgical stages, longer treatment times, and increased costs associated with grafting and adjunctive procedures (ITI Consensus Report, 2023).

In the early 1990s, Brånemark and colleagues introduced the zygomatic implant technique, involving implant placement through the maxillary sinus for anchorage in

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the zygomatic bone, providing structural support without extensive bone grafting. Recent evidence suggests that zygomatic implants can achieve high long-term survival rates (≈96 %) while maintaining peri-implant stability and satisfactory masticatory function in clinical studies and systematic reviews (Brennand Roper et al., 2023; Rebelo et al., 2025). Despite these findings, methodological heterogeneity among studies and the lack of randomized controlled trials limit generalizability, emphasizing the need for cautious interpretation. Moreover, complications such as sinusitis, paresthesia, implant exposure, and peri-implant infection have been reported, indicating that clinical success depends not only on implant technique but also on meticulous three-dimensional planning, case selection, and long-term follow-up (Longo et al., 2023; Davó et al., 2020).

2. Case

A melanoderma patient from the Zona da Mata region presented with complaints of masticatory discomfort, persistent halitosis, gingival bleeding, and dental fragility associated with loss of periodontal support. Initial clinical examination revealed intense gingival bleeding, subgingival calculus, edema, and exudate in both arches. Periodontal probing depths ranged from 5 to 8 mm at multiple sites, with clinical attachment loss ≥ 8 mm, suggesting advanced chronic periodontitis. Tooth mobility, assessed using standard mirror pressure, was approximately 1 mm in the mesiodistal direction, classified as grade III for posterior elements. Radiographic panoramic and tomographic examinations revealed extensive alveolar bone resorption in both buccal and palatal walls of the maxilla, severe maxillary inclination, and sinus pneumatization, resulting in a concave residual ridge that precluded conventional implant placement with adequate primary stability (Figure 1).

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Figure 1: Initial image for intervention analysis.

After discussion of clinical and radiographic findings, an integrated treatment plan was proposed, starting with supra- and subgingival debridement using ultrasonic devices and Gracey curettes at sites with probing depth >3 mm, combined with subgingival irrigation with 1 % chlorhexidine gel. Following Feres (2018) protocol, antibiotic therapy with amoxicillin 500 mg every 8 h and metronidazole 400 mg every 8 h for 14 days was prescribed, along with 0.12 % chlorhexidine mouth rinses for 30 days. After this period, clinical reassessment and surgical planning were based on zygomatic body bone density and adjacent areas. Anesthesia was achieved using 4 % articaine with 1:200,000 epinephrine, covering infraorbital, middle and posterior superior alveolar, greater palatine, and nasopalatine nerve blocks, totaling eight cartridges.

Surgery followed strict biosafety criteria, including extraoral antisepsis with 2 % chlorhexidine digluconate and intraoral preparation with 0.12 % chlorhexidine. A linear incision along the crest, slightly palatally displaced, was performed with bilateral releasing incisions to allow wide exposure. Initial cortical perforation was

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carefully executed with sequential rotary instrumentation to minimize complications and preserve critical anatomical structures. Osteotomy was oriented along the planned implant axis, with careful sinus membrane elevation for implant placement anchored in the zygomatic body. Sequential instrumentation involved a 2.9 mm round bur at the palatal region corresponding to the maxillary second premolar, followed by helical and pilot drills up to a final diameter of 3.5 mm, with copious irrigation to control heat.

On the right side, a 3.5 × 42.5 mm Z-FORCE implant (Dentoflex, SP, Brazil) was placed with 60 N·cm torque, along with a 3.5 × 13 mm vomer implant. On the left, a 3.5 × 42.5 mm implant was installed with 65 N·cm torque. Both implants exhibited satisfactory primary stability (Figure 2).

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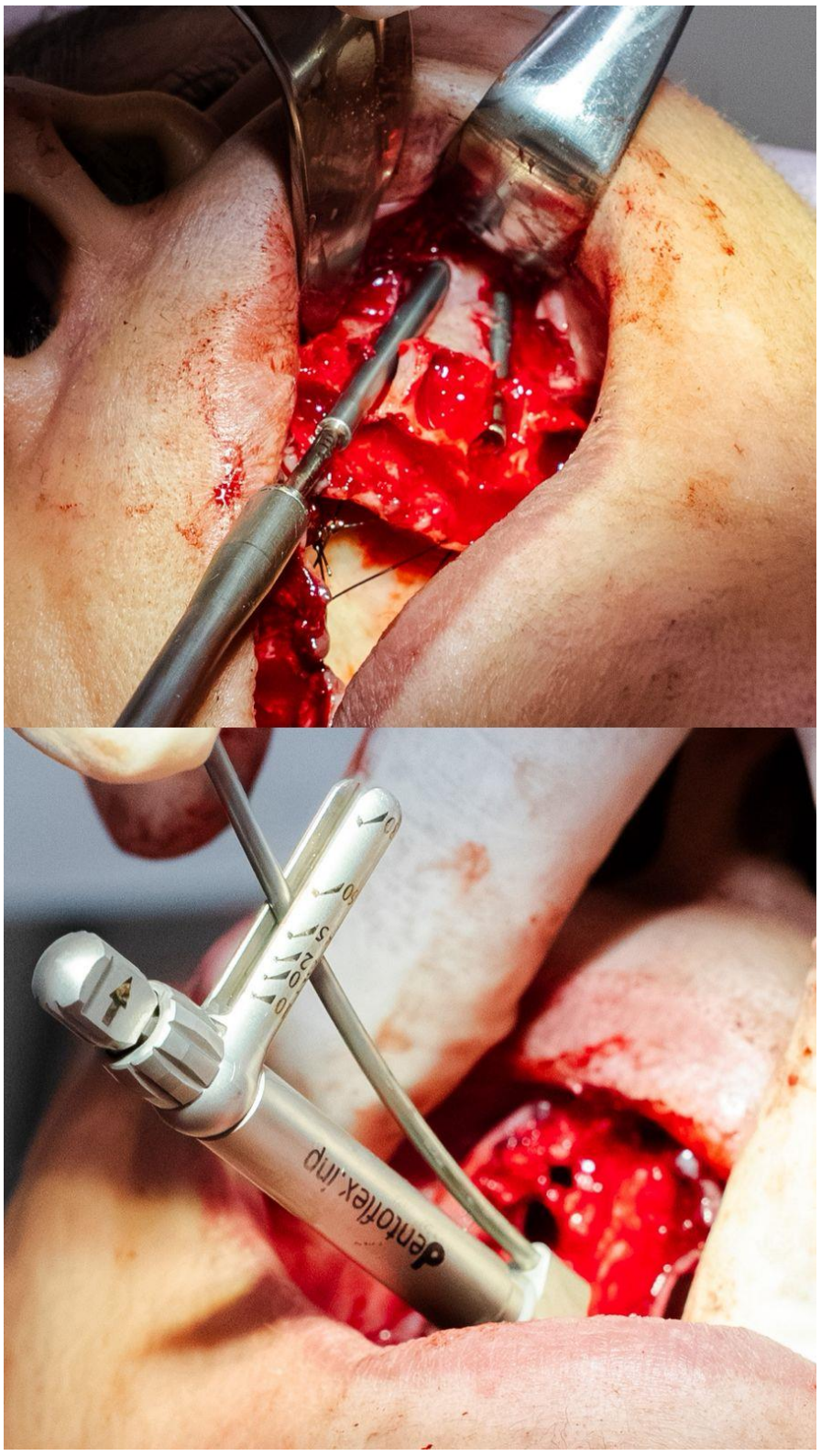


Figure 2: Placement of implants with anchorage in zygomatic bone.

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Immediately postoperatively, 30° angled prosthetic abutments were placed on posterior zygomatic implants to correct parallelism; 17° abutments were used on transnasal implants, and straight abutments on pterygoid implants to preserve passive fit. Postoperative medication included amoxicillin 500 mg for seven days, naproxen 550 mg for four days, and ibuprofen 600 mg for two days. At baseline, periodontal probing depths were 5–8 mm, clinical attachment loss ≥ 8 mm, bleeding on probing in over 80 % of sites, subgingival calculus, purulent exudate, grade III tooth mobility, and radiographic evidence of insufficient residual bone height for conventional implants(Figre 3).

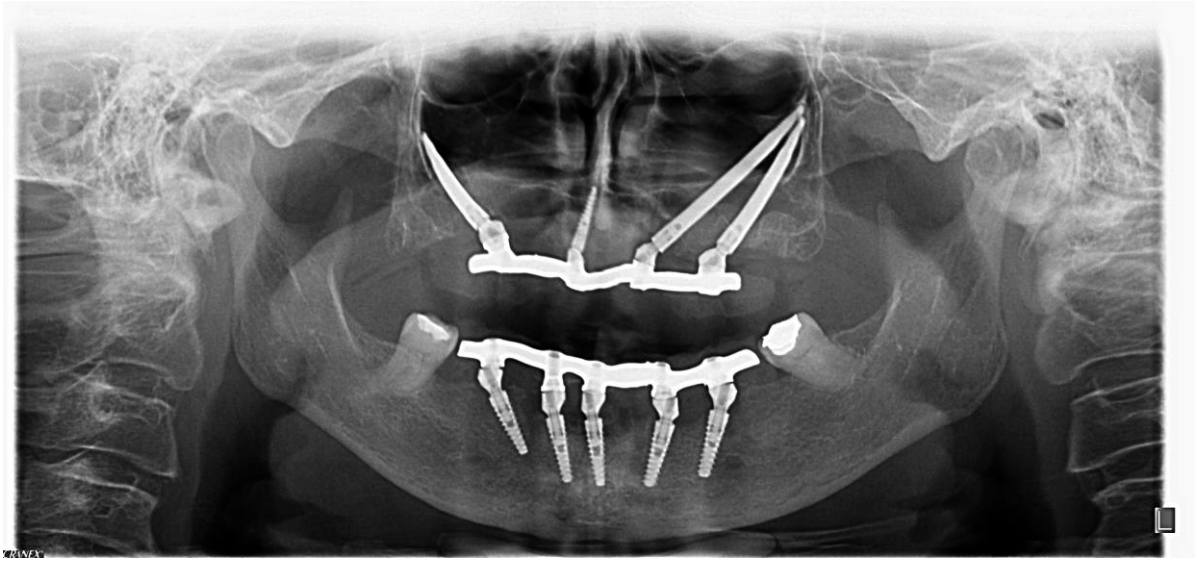


Figure 3: X-ray examination after surgical intervention.

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Six months after zygomatic implant rehabilitation, peri-implant probing depths stabilized at 2–3 mm, without bleeding on probing or exudate. Marginal bone stability was maintained on serial radiographs. Tooth mobility was eliminated with implant fixation, and adjacent tissues remained healthy. In addition to objective clinical parameters, the patient reported significant improvements in quality of life, including pain-free mastication, ability to eat foods of various consistencies, restoration of facial aesthetics due to labial support, and overall satisfaction with the treatment outcome (Figure 4).

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Figure 4: Prosthetic rehabilitation in function, case completed.

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3. **Discussion**

Management of severely atrophic maxillae remains a significant challenge in contemporary implant dentistry. Conventional bone grafting techniques can provide sufficient bone volume but often require multiple surgeries, extended treatment time, and increased morbidity and costs. In contrast, zygomatic implants offer an alternative approach by anchoring in denser bone, particularly the zygomatic body, reducing the need for extensive grafting. Recent clinical studies and systematic reviews demonstrate that zygomatic implants can achieve long-term survival rates exceeding 90 % over follow-up periods of more than five years (Brennand Roper et al., 2023; Rebelo et al., 2025; Longo et al., 2023). However, methodological heterogeneity and the lack of randomized controlled trials limit generalizability.

A key limitation of case reports is the absence of control groups, preventing direct comparison with other treatment modalities, such as bone grafting or hybrid All-on-4 and pterygoid implant protocols. Nevertheless, case reports remain valuable for detailing surgical techniques, prosthetic choices, and individual biological responses, providing hypotheses for further research. Complications associated with zygomatic implants include postoperative sinusitis, peri-implant infection, implant exposure, paresthesia, and oroantral fistula formation. While relatively uncommon, these events must be considered in preoperative planning and follow-up (Davó et al., 2020; Fiamoncini et al., 2020).

Comparative analysis suggests that conventional reconstruction may offer adequate bone volume but with greater morbidity and treatment demands, whereas zygomatic implants may reduce surgical stages and time to functional rehabilitation, provided clinical and radiographic criteria are rigorously assessed. In the present case, objective indicators such as stabilized probing depths, maintained marginal bone stability, and patient-reported functional improvements indicate favorable tissue response over the follow-up period, highlighting the clinical potential of the technique when carefully applied.

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4. Conclusion

This case report demonstrates that in patients with severely atrophic maxillae, zygomatic implants may provide satisfactory structural stability, maintain peri-implant bone integrity, and improve clinical and functional parameters, along with enhanced patient-reported quality of life. Despite these positive findings, results should be interpreted cautiously, as single-case design limits extrapolation to broader populations. Prospective controlled clinical studies with long-term follow-up are necessary to identify predictors of success and characterize complications compared to conventional rehabilitation techniques.

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