

**Case Report**

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Transnasal Implant Protocol - The Vanderlim Technique as an Alternative to Double Zygoma in Severely Atrophic Maxillae

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The rehabilitation of edentulous patients, aiming to restore comfort, function, and esthetics in cases of tooth loss and maxillary sinus pneumatization with implant-supported prostheses in severely atrophic maxillae, remains a major challenge in implant dentistry [1-3]. The "All-on-4" concept for treating the edentulous maxilla has been widely validated, with more than 15 years of satisfactory clinical outcomes. Hybrid approaches have also been developed, such as the Hybrid All-on-4, which combines four anterior conventional implants with two posterior zygomatic implants to compensate for the lack of bone in the premolar and molar regions, and the All-on-4 Zygoma, performed exclusively with zygomatic implants when bone availability is limited across the entire maxilla [4,5]. When the double zygoma protocol [6] is limited by insufficient zygomatic bone width for placement of a superior implant, the infraorbital foramen may lie too close to the implant trajectory. This can result in excessively externalized implants with multiple exposed threads, due to the concavity of the anterior maxillary wall, potentially leading to soft tissue complications and implant exposure. Recent research has therefore focused increasingly on graftless rehabilitation protocols with immediate loading in such challenging cases [7].

Keywords: Rehabilitation; maxillary sinus; tooth loss; concavity; transnasal implants; general anesthesia; quad zygoma**Introduction**

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satisfactory clinical outcomes. Hybrid approaches have also been developed, such as the Hybrid All-on-4, which combines four anterior conventional implants with two posterior zygomatic implants to compensate for the lack of bone in the premolar and molar regions, and the All-on-4 Zygoma, performed exclusively with zygomatic implants when bone availability is limited across the entire maxilla [4,5].

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Transnasal Implants and the Vanderlim Technique

Transnasal implants are extra-long fixtures anchored in the basal bone of the maxilla, traversing the nasal cavity tangentially to its lateral wall and apically engaging the frontal process of the maxilla to achieve high primary stability (Bedrossian & Brånemark). The aim of this study is to demonstrate the feasibility of using these anatomical pillars in severely atrophic maxillae with extra-long transnasal implants for immediate full-arch rehabilitation. This is achieved by applying the Vanderlim Technique, in combination with a zygomatic implant, as a graftless and immediate-loading alternative.

Case Report, Planning, and Execution of the Vanderlim Technique

C.A.L.F., a 72-year-old male, edentulous in the maxilla and rehabilitated with a mandibular acrylic full-arch fixed prosthesis, presented with the desire for maxillary implant-supported fixed rehabilitation. He reported multiple extractions in early adulthood, except for teeth 16, 17, and 27. Laboratory and cone-beam computed tomography (CBCT) exams were requested, including DICOM data for digital planning. Clinical examination revealed an atrophic ridge with a medium smile line, requiring bone reduction to conceal the transition zone of the future prosthesis. Imaging confirmed severe maxillary atrophy and sinus pneumatization. Based on 3D software planning to optimize anteroposterior implant distribution, the decision was made to rehabilitate the patient with two extra-long transnasal implants (Vanderlim Technique, as described in Aparicio's Advanced Zygomatic Implants, 2023), positioned in Zone 1 according to the NASA classification (Nasa 2), and two extramaxillary zygomatic implants placed in Zone 2 according to Aparicio's ZAGA classification (Zaga 4).

Following treatment plan approval, reverse prosthetic planning and a multifunctional surgical guide were fabricated. Surgery was performed in a hospital setting under general anesthesia. The surgical approach followed the Vanderlim protocol: midcrestal incision, elevation of vestibular and palatal flaps, and careful detachment of nasal mucosa to visualize the inferior nasal concha. The mesiodistal angulation of the transnasal implant was guided by the lateral wall of the nasal cavity, ensuring the implant remained tangential. The NASA classification (Nasal Anatomic Systematic Approach; Vanderlim, Grossi & Meurer, 2022) was applied to aid trajectory control.

Sequential drilling was carried out from a palatal approach, preserving the vestibular plate. Two long implants (SIN Epikut

3.8 × 24 mm) were placed transnasally in Zone 1 with torque of 40 Ncm. Subsequently, two extramaxillary zygomatic implants (SIN Zygomatic Plus 4.0 × 40 mm) were installed in Zone 2 with torque of 60 Ncm. This enabled immediate loading with a full-arch prosthesis. Multi-unit abutments were connected (30° × 2 mm on transnasal implants, 45° × 2 mm on zygomatic implants), followed by suturing. The surgery fulfilled all requirements for prosthetic space, primary stability, favorable anteroposterior distribution, and composite torque. The patient was rehabilitated with a definitive acrylic PF3 prosthesis three days postoperatively.

Discussion

The "All-on-4 Zygoma" technique is a well-established alternative for rehabilitating edentulous, atrophic maxillae [8]. Despite high reported success rates, the use of four zygomatic implants restricts the technique to highly experienced clinicians and requires sufficient zygomatic bone, which often complicates or prevents the placement of all four fixtures [9]. Using anterior osseous pillars for transnasal implant anchorage [10,11] increases available bone in the anterior maxilla, permitting placement of a long implant in combination with a posterior zygomatic implant. A minimum of 4 mm of residual bone height between the alveolar crest and the nasal cavity is required to achieve immediate loading. Additionally, at least 3 mm of apical anchorage in the frontonasal process is necessary. Thus, transnasal implants enable anchorage in dense basal bone, even with minimal alveolar ridge height, and support immediate loading. The Vanderlim (transnasal) technique offers a graftless solution that avoids bilateral sinus lifts, block grafts, and bilateral QuadZygoma.

Conclusion

The Vanderlim (transnasal) technique provides a viable alternative to bilateral placement of a second zygomatic implant in severely atrophic maxillae. It satisfies both surgical and prosthetic requirements while potentially reducing risks of bone and peri-implant soft tissue complications. Further long-term studies are necessary to assess treatment predictability and longevity.

Acknowledgement

None.

Conflict of Interest

No conflict of interest.

Reference

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