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GUIDED ALL-ON-FOUR *PALATINE APPROACH* WITH PREDICTABILITY FOR IMMEDIATE LOADING: CASE REPORT

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ABSTRACT

Implant-supported rehabilitation of atrophic maxillae has advanced with new techniques, reducing the need for multiple interventions and increasing predictability in immediate loading. In this case, a patient who is aesthetically and functionally dissatisfied with her smile is observed, uses a maxillary total denture with masticatory instability and atrophy in the anterior region of the maxilla. Although the conventional plan included bone reconstruction before implants, the All-on-Four technique with a palatal approach was chosen, taking into account their clinical conditions and main complaints. This technique avoids multiple surgical stages, taking advantage of the maxilla's anatomy with the presence of keratinized palatine tissue to cover the exposed turns of the implants. A surgical guide was prepared and the mini abutments were scanned, allowing the digitization of the preoperative condition, digital design of the prosthesis and milling in PMMA, being delivered eight hours after surgery. DISCUSSION: The All-on-four technique has transformed the rehabilitation of total edentulous patients, offering less complex alternatives to bone grafts. Using four strategically placed implants, the technique allows for a reduced cantilever of long-term prosthetic complications and treatment time, avoiding multiple surgical steps. It allows immediate loading with approaches such as the palate, zygomatic, and pterygoid approaches. Guided surgery increases the precision in implant placement, reducing complications and surgical time, in addition to assisting in diagnosis and planning. FINAL CONSIDERATIONS: The All-on-four technique in palatine with guided surgery is crucial to rehabilitate complex cases, the patient has reestablished aesthetics and masticatory function, demonstrating the success of the treatment and the efficacy of the chosen approach.

Keywords: Dental Implant. Atrophic Maxilla. Palatine Approach.

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INTRODUCTION

Edentulism is a condition that affects all social classes globally. With the increase in life expectancy and longevity, tooth loss and bone resorption have become increasingly common. In response to this challenge, dental specialties are continually looking for new alternatives to oral rehabilitation.[8]

The most recent epidemiological survey of the oral health conditions of the Brazilian population indicated that, among the elderly, 23.9% needed a total prosthesis in at least one arch, and 15.4% needed a total prosthesis in both arches, that is, in the maxilla and mandible.[4] Although it is a problem frequently observed in the elderly, it is not restricted to this age group only. The total loss of teeth causes functional and aesthetic problems in patients, due to the imbalance of the stomatognathic system.[10]

Oral rehabilitation provided a significant improvement in the quality of life for partially or fully edentulous patients, mainly by restoring aesthetics and occlusal function through osseointegrated dental implants and removable prostheses. Removable dentures are the most common oral rehabilitation option due to their reduced cost. Although they offer aesthetic and functional advantages, these prostheses can promote bone resorption over time, resulting in instability and hindering future rehabilitation.[8]

In edentulous patients in the upper arch who develop maxillary atrophy, bone resorption occurs continuously and progressively, leading to an irreversible reduction in bone mass and volume in the region. This atrophy is more pronounced in cases of prolonged edentulism or in patients who use old or poorly adapted prostheses. In situations of severely atrophic maxilla, bone reduction prevents the use of other rehabilitation techniques, such as conventional prostheses or osseointegrated implants. In these cases, reconstruction techniques with bone grafts or anchoring protocols, such as the All-on-Four technique, are necessary.[5] Among the surgical techniques available, the placement of implants in specific anatomical regions, such as the zygomatic apophysis, the canine pillar, the pterygoid apophysis, in addition to the palatine approach, stand out.[2]

The "All-on-Four" technique seeks to optimize the available bone, avoiding bone graft procedures, reducing patient stress and reducing waiting time. This technique involves the placement of four longer implants, providing high stability without the need for a graft in the maxillary sinus, when performed in the maxilla. Among the advantages of this approach are the reduction of treatment costs, the ease of hygiene due to the lower number of implants, and the reduction of surgical steps. In addition, it makes it possible to place an immediate prosthesis after the surgical procedure.[10]

The conventional All-on-Four technique involves an incision in the gingival tissue and its detachment, resulting in edema and pain, prolonging the postoperative period. In contrast, the technique that uses guided surgery is less invasive. With the introduction of specialized software, it is possible to perform implant-prosthetic rehabilitations in complex scenarios, allowing the preview of the result. This improves communication between the dentist, prosthetist and patient, resulting in significantly higher quality of design and output.[2] The process begins with the creation of a prosthesis to serve as a guide and, without the need for a gingival incision, uses a guided flint. This allows for a significant reduction in treatment time and minimizes postoperative discomfort. In addition, the precision of guided surgery improves implant placement, increasing the success rate and patient satisfaction.[7]

In this study, we present a case report that focuses on the All-on-Four technique in a palatine approach for the rehabilitation of edentulous patients, using guided surgery. The objective is to demonstrate the efficacy and benefits of this approach, highlighting how guided surgery can improve clinical outcomes and reduce postoperative discomfort for the patient.

METHODOLOGY

A literature review was carried out through bibliographic research in the following databases: Virtual Health Library (VHL), LILACS, MEDLINE, PubMed, Scielo and Google Scholar. The search strategies used the descriptors: Dental implant; Atrophic maxilla; Approach palatine. Updated case report articles, clinical studies, and systematic reviews on this topic of the all-on-four guided all-on-four approach surgery protocol with predictability for immediate loading were included, and articles that do not fit the theme addressed in this study whose reading did not provide important information were excluded. The consultation covered studies available in Portuguese, English and Spanish. From a total of 25 articles identified, 13 were selected based on the established criteria, updated in the year 2020 to 2024.

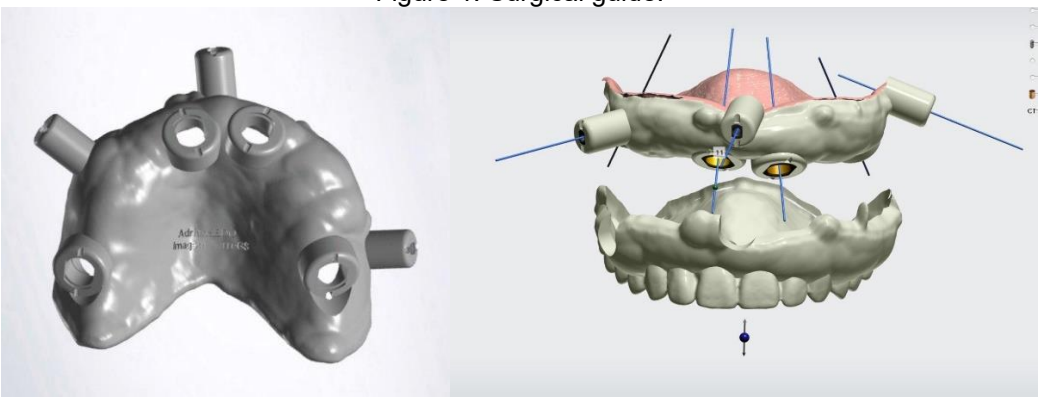
CASE REPORT

A 50-year-old female patient, systemically healthy, aesthetically and functionally dissatisfied with her smile, presented masticatory instability. She sought care from the Oral and Maxillofacial Surgery and Traumatology service for oral rehabilitation. He denied pathologies, use of continuous medication and drug allergies.

A panoramic X-ray and a CT scan were requested. After clinical and imaging examination, an edentulous maxillary alveolar ridge with severe bone resorption was observed.

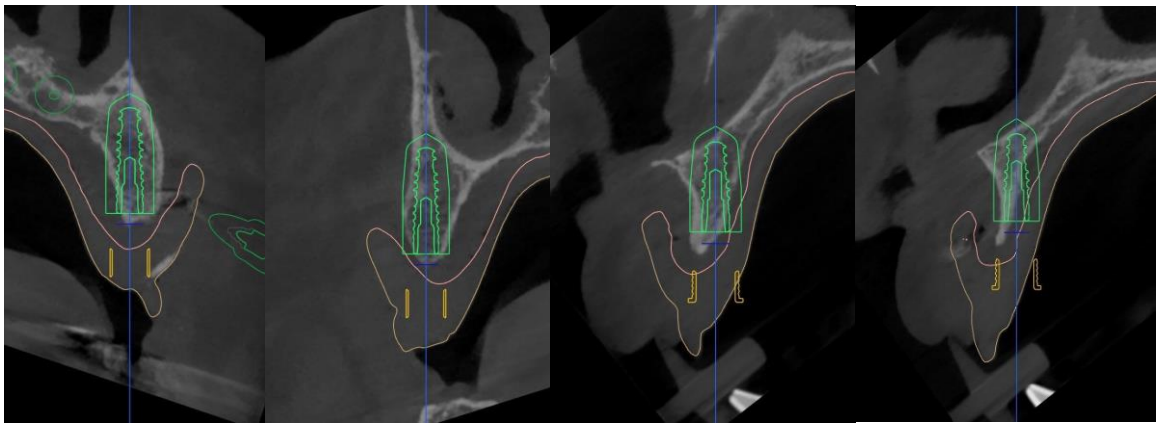
For a more precise surgery with less surgical time, the procedure was 100% guided. The double tomography flow was performed using 3Shape's 3Shape Implant Studio, resulting in an implant positioning project based on final rehabilitation, allowing the preparation of a personalized surgical guide. (Figure 1)

Figure 1. Surgical guide.



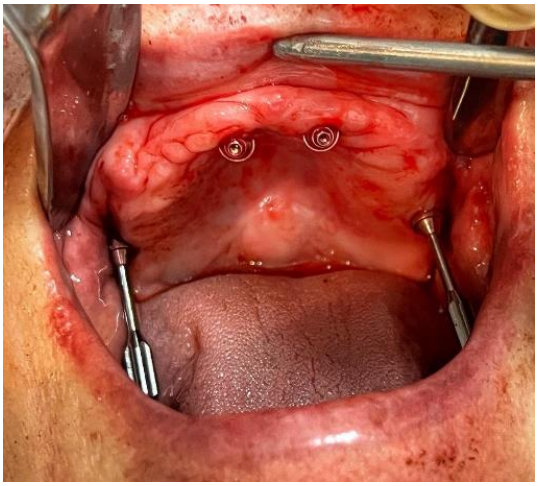
With a thorough anamnesis and careful planning, a conventional treatment was initially thought of, which would be bone reconstruction prior to the installation of implants, but it was possible to identify ideal areas for the installation of dental implants using the All-on-four technique with a palatal approach, which would avoid multiple surgical stages and enhance the effect of immediate loading (Figure 2). The All-on-four protocol was planned, with two implants in the distal region and two implants positioned in the anterior region of the maxilla, thus ensuring an optimized distribution for prosthetic support.

Figure 2. Virtual positioning of the implants in initial CT scans, parasagittal sections of the anterior region of the maxilla.



The surgery was performed in a clinical environment, under local anesthesia, without the need for detachment of mucoperiosteal flaps. The surgical guide was fixed in the region using support pins, and the perforation on the palatal surface was performed with sequential drills according to the manufacturer's specifications. Initially, it was planned to install two 3.5x11.5mm implants in the region of teeth 11 and 21, a 3.8x20mm implant in region 16 and a 3.8x18mm implant in region 26. However, the implants were performed in the region of teeth 21 (3.5x11.5mm), 11 (3.8x15mm), 16 (3.8x20mm) and 26 (3.8x18mm). Then, the prosthetic components were installed. (Figure 3)

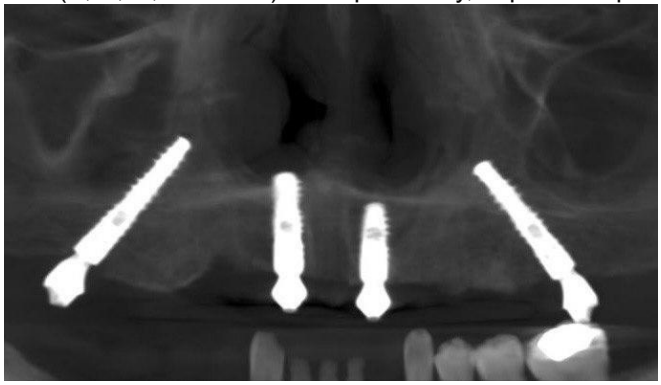
Figure 3. Immediate postoperative rehabilitation of the 4 implants using surgical guide and prosthetic abutments installed.



Finally, new imaging studies were performed to verify the position of the implants (Figure 4). The prosthesis was scanned and milled in PMMA, and delivered 8 hours after surgery (Figure 5). The patient received detailed guidance on postoperative care and was scheduled to return for continuous follow-up by the surgical and prosthetic team. The surgery was successfully performed without complications. The patient demonstrated excellent recovery and adapted well to the prosthesis (Figure 6).

Figure 4. (A, B, C, D and E) Postoperatively, implants in position.

A



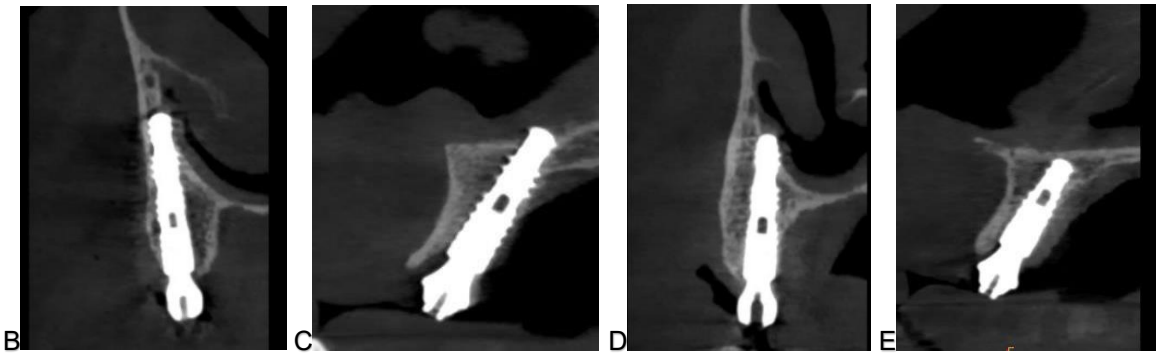


Figure 4. Total prosthetic device Pmma.

Figure 5. Final photo after prosthetic rehabilitation.

DISCUSSION

One of the main challenges of implantology is to develop protocols with advanced techniques that are simple and ensure the well-being of patients10. The rehabilitation of atrophic maxillae represents a significant challenge in dentistry, often requiring extensive surgical reconstruction with bone grafts for the placement of conventional implants or the application of advanced surgical techniques that eliminate the need for grafts13.

In the case reported above, the advanced All-on-Four technique with a palatal approach was chosen, using a surgical guide to ensure precision and efficacy in the procedure. The group opted for this technique because it is less invasive and to reduce multiple surgical stages. The All-on-Four technique allows total fixed rehabilitation with

implants, using four implants arranged in a supporting polygon, reducing the need for bone grafting. Combined with the palatine approach technique, it is an effective alternative for cases of severe bone resorption, using the palatal mucosa to protect the implant and ensure contact with the vestibular bone[6]. This approach offers greater long-term stability due to insertion into the keratinized mucosa, reducing the chances of peri-implantitis and implant failure2.

This case demonstrates the predictability of the All-on-Four technique, applied in conjunction with a surgical guide in maxillas, a successful treatment for cases of severe bone loss. Guided surgery offers several advantages, including accurate planning and exact implant placement, allowing for detailed assessment of bone thickness and minimizing potential procedural failures. As a disadvantage, there is an additional cost associated with the use of the surgical guide and the need for a qualified professional to perform the procedure8.

Santos et al. (2024) concluded that the All-on-Four technique, combined with guided surgery, is particularly effective in complex cases, requiring fewer implants and providing success, precision, safety, reduced surgical time, and greater postoperative comfort. Studies such as that of Cattoni et al. (2021) have demonstrated the efficacy and precision of computer-assisted implant surgery, reinforcing the feasibility and benefits of the All-on-Four technique with a palatine approach in complex oral rehabilitation situations.

According to Voss de Oliveira (2023), the All-on-Four technique can also be applied to HIV-positive patients who have a stable immune system. According to Paes et al. (2023), the All-on-Four technique has some limitations, including the risk of odontogenic bone infection at the implant sites, peri-implantitis, and adjacent periodontal disease, which can result in the loss of the implants. In addition, there is an increased risk of prosthetic complications such as screw fracture, cantilever fracture, and screw looseness, often caused by mismatches that generate constant stress on components and often associated with failures in the osseointegration of implants.

The review by Andrade et al. (2024), based on articles from the PubMed and Scielo databases (2011–2024), observed that the All-on-Four technique for oral rehabilitation has a success rate of over 95% in long-term follow-up. This technique reduces both the number of implants needed and the need for bone grafts. In addition, it has proven effective for immediate loading, with a failure rate of less than 1.25%. Moreira et al. (2023) also highlighted that this protocol is quick to execute, with positive results in aesthetics and function.

A complex clinical case described by Serag et al. (2020) involved an elderly patient with Class III skeletal malocclusion. This study is notable for its detailed approach and the challenges faced in correcting severe malocclusion and implementing an effective rehabilitative solution.

These observations highlight the need to follow strict planning and protocols and employ high-quality materials to ensure effective and long-lasting results in oral rehabilitation.

CONCLUSION

It is concluded that the All-on-Four technique combined with guided surgery is an excellent option for rehabilitation of complex cases. The rehabilitation of edentulous patients with atrophic maxilla presents significant challenges for dental professionals, requiring careful analysis and accurate execution of the procedure. This process can involve both anchoring techniques and bone reconstruction by grafting. Among the options for total rehabilitation of the edentulous maxilla, the All-on-Four technique stands out for providing positive results, low cost, high implant survival rate, and a short post-surgical recovery period.

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