USE OF THE ALL-ON-FOUR TECHNIQUE FOR ORAL REHABILITATION IN A PATIENT WITH PERIODONTAL DISEASE

UTILIZAÇÃO DA TÉCNICA ALL-ON-FOUR PARA REABILITAÇÃO ORAL EM PACIENTE COM DOENÇA PERIODONTAL

JAMILLE DA PENHA **RODRIGUES**[1], LAURA JHANNE SERRÃO DE **FREITAS**[1], ARIMATÉIA ALBUQUERQUE **SALES**[1], MARIA EDUARDA FREITAS **WANZELER**[2], POLYANNA LIMA DA **SILVA**[2], ALANN THAFFARELL PORTILHO DE **SOUZA**[3*]

1. Undergraduate Student of Bachelor's in Dentistry at the Metropolitan University Center of the Amazon (UNIFAMAZ); **2.** Dental Surgeon specialized in Oral Rehabilitation and Dental Implants; Partner-Owner of the Stellare Personalized Dentistry Clinic; **3.** Professor, PhD in Oral and Maxillofacial Surgery, Professor at the Metropolitan University Center of the Amazon (UNIFAMAZ) and Postgraduate Dentistry Program, CEUMA University.

* Avenida Visconde de Souza Franco, 72, Belém, Pará, Brazil. Zip Code: 66053-000. alann.thaffarell@gmail.com
1.These authors contributed equally to this work

Received: 11/24/2025. **Accepted:** 12/14/2025

ABSTRACT

Contemporary dentistry has advanced significantly in oral rehabilitation techniques, particularly in implant dentistry. Periodontal disease, a chronic inflammatory condition of bacterial etiology, is one of the main causes of tooth loss in adults and older individuals, compromising aesthetics, masticatory function, and quality of life. In this context, the "All-on-Four" technique emerges as an effective and minimally invasive alternative for patients with severe bone loss, eliminating the need for grafts and reducing overall treatment time. This study presents a clinical case report of a 60-year-old patient with advanced periodontal disease and multiple tooth loss, rehabilitated using the "All-on-Four" technique in a hospital setting. Four implants were placed per arch (two anterior implants in an axial position and two posterior implants placed at an angle) allowing for the immediate installation of a provisional fixed prosthesis and, later, a definitive one. Postoperative follow-up showed satisfactory primary stability, absence of complications, and excellent functional and aesthetic outcomes. The technique proved to be a predictable, safe, and efficient alternative for rehabilitating patients with advanced periodontal involvement, restoring masticatory function, phonetics, aesthetics, and self-esteem in a reduced clinical timeframe.

KEYWORDS: Dental Implants; Mouth Rehabilitation; Immediate Dental Implant Loading; Prostheses and Implants.

INTRODUÇÃO

A odontologia contemporânea avançou significativamente nas técnicas de reabilitação oral, particularmente na implantodontia. A doença periodontal, uma condição inflamatória crônica de etiologia bacteriana, é uma das principais causas de perda dentária em adultos e idosos, comprometendo a estética, a função mastigatória e a qualidade de vida. Nesse contexto, a técnica "All-on-Four" surge como uma alternativa eficaz e minimamente invasiva para pacientes com severa perda óssea, eliminando a necessidade de enxertos e reduzindo o tempo total de tratamento. Este estudo apresenta um relato de caso clínico de um paciente de 60 anos com doença periodontal avançada e perda dentária múltipla, reabilitado com a técnica "All-on-Four" em ambiente hospitalar. Quatro implantes foram instalados por arco (dois implantes anteriores em posição axial e dois implantes posteriores angulados), permitindo a instalação imediata de uma prótese fixa provisória e, posteriormente, da definitiva. O acompanhamento pós-operatório demonstrou estabilidade primária satisfatória, ausência de complicações e excelentes resultados funcionais e estéticos. A técnica demonstrou ser uma alternativa previsível, segura e eficiente para a reabilitação de pacientes com comprometimento periodontal avançado, restaurando a função mastigatória, a fonética, a estética e a autoestima em um período clínico reduzido.

PALAVRAS-CHAVE: Implantes dentários; Reabilitação oral; Carga imediata em implantes dentários; Próteses e implantes.

1. INTRODUCTION

Modern dentistry has continually evolved in search of solutions that promote the functional and aesthetic restoration of edentulous patients, in response to the increasing life expectancy and the evolving demands of the population. Tooth loss due to periodontal diseases, in addition to compromising masticatory and phonetic functions, affects the self-esteem and quality of life of individuals, directly influencing nutritional, social, and psychological aspects[1,2]. Periodontal disease, a bacterial etiology and chronic inflammatory condition, is one of the most prevalent oral pathologies, compromising the dental support tissues and potentially resulting in severe tooth mobility and significant bone loss[3]. In the more advanced stages, conventional prosthetic rehabilitation becomes limited due to bone resorption and the difficulty of achieving prosthetic stability. In this context, implantology emerges as an effective alternative for oral rehabilitation of edentulous patients, restoring masticatory function, phonetics and aesthetics. Among the available techniques, the ″All-on-Four″ technique, described by Maló (2003)[4], stands out for using only four strategically positioned implants, two anterior in an axial position and two posterior ones

inclined up to 45 °, optimizing the use of the remaining bone and dispensing with bone grafts. This approach reduces treatment time, cost, and surgical morbidity, in addition to enabling the installation of prostheses with immediate loading [5,6]. In view of the high prevalence of periodontal disease and the need for functional and aesthetic rehabilitation in a shorter time, this study aims to report the clinical case of a patient with advanced periodontal disease, submitted to oral rehabilitation using the "All-on-Four" technique, analyzing the clinical, functional and aesthetic results obtained. The justification for this study is based on the importance of documenting and discussing the applicability of this technique in patients with severe periodontal involvement, highlighting its benefits, challenges, and clinical predictability.

2. CASE REPORT

A 60-year-old female patient presented with chief complaints of severe tooth mobility, difficulty chewing, and aesthetic concerns. Clinical and radiographic examinations revealed the absence of teeth 18, 27, 28, 34, 38, 45, 46, 47, and 48. The remaining teeth exhibited grade III mobility, accompanied by generalized horizontal and vertical bone loss, findings consistent with advanced periodontal disease (Figure 1A, B).

Figure 1A Initial smile photograph documenting facial and dental aesthetics prior to treatment. **1B.** Anterior intraoral view with lipretractor showing baseline dental and periodontal conditions.

The therapeutic planning consisted of the extraction of the remaining elements and the immediate installation of implants using the "All-on-Four" technique. Imaging studies (computed tomography and panoramic radiography) were used to plan the ideal positions of the implants, respecting anatomical and maxillary structures (Figure 2).

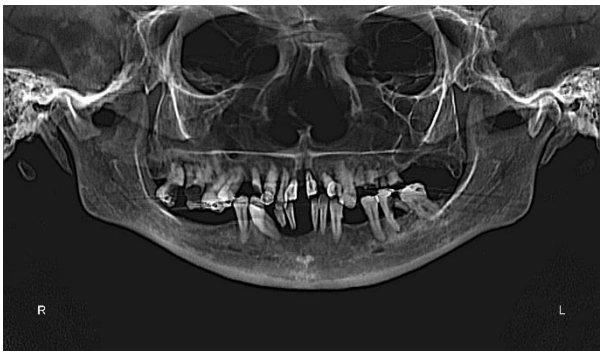

Figure 2. Panoramic radiograph showing multiple tooth losses and generalized periodontal bone loss.

The surgical procedure was performed in a hospital environment under an antisepsis and local anesthesia protocol. In the maxilla, two external hexagon *Titaniumfix* ® (São Paulo, SP, Brazil) implants (3.75 × 13 mm) were placed in the anterior region and two angled implants (3.75 × 13 mm) in the canine region, both with straight and angled mini abutments (17º) of the *Implanew*® (Pinhais, PR, Brazil) brand. In the mandible, the same protocol was used, with *Titaniumfix* (Brazil) implants (3.75 × 15 mm) in anterior and posterior positions, ensuring satisfactory primary stability (Figure 3A, B).

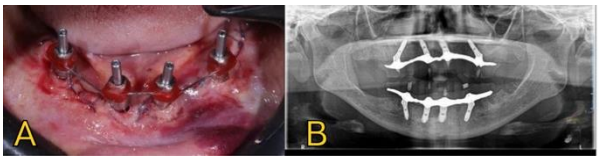

Figure 3A. Intraoral mandibular view showing impression copings in position for the All-on-Four protocol prosthesis. **3B** post-surgical panoramic radiograph showing maxillary and mandibular implants placed using the All-on-Four technique.

Immediately after surgery, a temporary fixed resin prosthesis was made for immediate loading (Figure 4A, B).

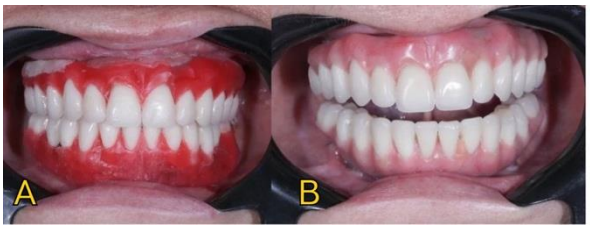

Figure 4A. Intraoral photograph of the wax try-in stage during the provisionalization process, **4B** Intraoral photograph of the temporary fixed resin prosthesis.

Two days after surgery, functional impressions were obtained using additional silicone material. Nine days later, a wax trial of the prosthetic setup was conducted to verify esthetics and occlusion. At 14 days postoperatively, the definitive fixed prostheses were delivered following acrylization, finishing, and occlusal adjustments. During clinical follow-up, no complications, pain, infection, or signs of implant mobility were detected. The patient reported progressive improvement in masticatory efficiency and a high level of esthetic satisfaction within the first weeks of rehabilitation (Figure 5A, B)

Figure 5A. Initial smile photograph demonstrating the patient's pre-treatment dental and esthetic condition. **5B** post-treatment smile photograph showing the final esthetic outcome after delivery of the definitive prosthesis.

3. DISCUSSION

The rehabilitation of patients with advanced periodontal disease poses significant challenges due to the progressive destruction of periodontal structures and the consequent reduction in available bone for implant

installation. Periodontitis is recognized as a chronic immunoinflammatory condition caused by a dysbiotic biofilm, capable of inducing irreversible tissue breakdown and ultimately leading to tooth loss when inadequately treated[7,8]. In these scenarios, conventional implant placement often becomes limited, especially in patients with generalized alveolar resorption and unfavorable anatomical conditions.

The "All-on-Four" protocol, introduced by Maló et al.[9], has gained recognition as a predictable and minimally invasive rehabilitation strategy for edentulous arches with reduced bone availability. By combining two axially positioned anterior implants with two posterior implants inclined up to 45°, this technique maximizes the use of existing bone and avoids the need for extensive grafting procedures. Such a configuration increases the anteroposterior spread and improves biomechanical load distribution, reducing cantilever forces and implant overload[10,11]. In the present case, the generalized horizontal and vertical bone loss justified the use of this protocol, as grafting would significantly increase surgical morbidity, cost, and treatment time.

Current evidence demonstrates high predictability for the "All-on-Four" concept. Long-term studies report implant survival rates ranging from 92% to 98% after 5 to 10 years of follow-up, even in atrophic maxillae[12,13]. Immediate loading, an essential component of this protocol, has also shown favorable outcomes provided adequate primary stability (generally $\geqslant$30 N/cm^2) is achieved during implant insertion[14]. In the present case, satisfactory primary stability allowed immediate provisionalization, which contributed to improved comfort, early restored function, and positive psychological impact for the patient.

Patients with a history of periodontal disease are known to present a higher risk for peri-implant complications due to their predisposition to dysbiotic inflammatory responses[15]. Nonetheless, when periodontal infection is properly controlled prior to surgery, clinical success rates remain comparable to those of patients without a history of periodontitis[16]. The absence of postoperative complications in this clinical case reinforces the importance of meticulous infection control, surgical precision, and adherence to maintenance protocols.

The prosthetic phase is another determinant in the success of full-arch implant-supported rehabilitation. Proper occlusal adjustment, balanced load distribution, and passive fit of the prosthesis are essential to minimize mechanical complications such as screw loosening, prosthetic fractures, and overloading of the implants[17]. The excellent functional and aesthetic outcomes obtained in this case reflect the importance of these technical variables. Moreover, literature indicates that "All on Four" oral rehabilitation results in significant improvements in mastication, esthetics, and overall oral health-related quality of life[18] which supports the positive outcomes experienced by the patient.

Despite the numerous advantages of the "All-on-Four" technique, it may present limitations in cases of extreme jaw atrophy, severe parafunctional habits, or insufficient primary stability. In such circumstances, alternative strategies, including zygomatic implants or staged bone augmentation, may be necessary[19]. Nevertheless, for patients with moderate to severe alveolar destruction and adequate basal bone, the "All-on-Four" protocol remains a highly effective and evidence-based treatment option.

In summary, the present case aligns with existing scientific evidence by confirming that the "All-on-Four" protocol is a predictable, safe, and efficient method for rehabilitating patients with advanced periodontal disease. Appropriate planning, infection control, and precision during the surgical and prosthetic phases are essential to achieving long-term success.

4. CONCLUSION

The "All-on-Four" technique proved to be a predictable, safe, and efficient treatment modality for the oral rehabilitation of patients with advanced periodontal disease. In the present case, the strategic placement of axial and tilted implants allowed for optimal use of the remaining bone, eliminating the need for grafting procedures and enabling immediate functional loading. The absence of postoperative complications, the achievement of satisfactory primary stability, and the patient's rapid recovery of masticatory function and esthetics highlight the clinical advantages of this approach.

Furthermore, the results reinforce that, when preceded by proper infection control and followed by meticulous prosthetic planning, the "All-on-Four" protocol offers high levels of patient satisfaction and long-term stability, even in individuals with a history of severe periodontal involvement. Thus, this technique represents a valuable therapeutic option for full-arch rehabilitation, providing significant functional, aesthetic, and psychosocial benefits within a reduced treatment timeframe.

5. REFERENCES

[1] Carvalho CC. All on four: literature review. São Paulo: [sn]; 2021.
[2] Mendez M, Gomes SC. Quality of life related to oral health: perspectives for periodontics. Periodontics. 2013; 38–44.
[3] Van Dyke TE, Sima C. Understanding resolution of inflammation in periodontal diseases: is chronic inflammatory periodontitis a failure to resolve? Periodontol 2000. 2020;82(1):205-13.
[4] Maló P, Rangert B, Nobre M. "All-on-Four" immediate-function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study. Clin Implant Dent Relat Res. 2003; 5:2-9.
[5] Soto-Peñaloza D, et al. The all-on-four treatment concept: systematic review. J Clin Exp Dent. 2017; 9(3): e474.
[6] Chochlidakis K, et al. Survival rates and prosthetic complications of implant fixed complete dental prostheses: an up to 5-year retrospective study. J Prosthet Dent. 2020; 124(5):539-46.
[7] Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. Nat Rev Dis Primers. 2017;

3:17038.
[8] Van Dyke TE, Sima C. Understanding resolution of inflammation in periodontal diseases. Periodontol 2000.
[9] Maló P, Rangert B, Nobre M. "All-on-Four" immediate-function concept with Brånemark System implants for completely edentulous mandibles. Clin Implant Dent Relat Res. 2003; 5:2-9.
[10] Rangert B, Jemt T, Jörneus L. Forces and moments on Brånemark implants. Int J Oral Maxillofac Implants. 2001; 4:241-7.
[11] Kämmerer PW, Fan S, Aparicio C, Bedrossian E, Davó R, Morton D, et al. Evaluation of surgical techniques in survival rate and complications of zygomatic implants for atrophic maxilla rehabilitation: a systematic review. Int J Implant Dent. 2023; 9(1):11.
[12] Francetti L, Agliardi E, Testori T, Romeo D, Taschieri S, Del Fabbro M. Immediate rehabilitation of the mandible with fixed full prosthesis supported by axial and tilted implants: interim results of a single cohort study. Clin Implant Dent Relat Res. 2008; 10(4):255-63.
[13] Maló P, de Araújo Nobre M, Lopes A, Ferro A, Nunes M. The All-on-4 concept for full-arch rehabilitation of the maxillae: a longitudinal study with 5–13 years of follow-up. Clin Implant Dent Relat Res. 2019; 21(4):538-49.
[14] Gallucci GO, Benic GI, Eckert SE, Papaspyridakos P, Schimmel M, Schrott A, et al. Consensus statements and clinical recommendations for implant loading protocols. Int J Oral Maxillofac Implants. 2014;29(Suppl):287-90.
[15] Darby I. Risk factors for periodontitis and peri-implantitis. Periodontol 2000. 2022; 90(1):9-12.
[16] Schwarz F, Derks J, Monje A, Wang HL. Peri-implantitis. J Clin Periodontol. 2018; 45(S20): S246-66.
[17] Sánchez-Torres A, Cercadillo-Ibarguren I, Figueiredo R, Gay-Escoda C, Valmaseda-Castellón E. Mechanical complications of implant-supported complete-arch restorations and impact on patient quality of life: retrospective cohort study. J Prosthet Dent. 2021; 125(2):279-86.
[18] Soto-Penaloza D, Zaragozí-Alonso R, Penarrocha-Diago M, Penarrocha-Diago M. The All-on-Four treatment concept: systematic review. J Clin Exp Dent. 2017; 9(3): e474-80.
[19] Aghaloo TL, Misch C, Lin GH, Iacono VJ, Wang HL. Bone augmentation of the edentulous maxilla for implant placement: systematic review. Int J Oral Maxillofac Implants. 2016; 31(Suppl): s19-30.