



Immediate loading of all-on-4 concept: 12 months follow-up

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ABSTRACT

This study aims to show 12 months follow-up of the treatment of an edentulous patient with concerns about using removable dentures with immediately loaded fixed prosthesis with All on four treatment concept. Our patient, a 55-year-old female patient without any systemic disease was referred to İstanbul University, Faculty of Dentistry, Oral and Maxillofacial Surgery Clinic. The intraoral examination and radiographic evaluation had been done. All on four treatment concept had been applied. The All-on-4 concept is a highly effective treatment option for complete edentulism that yields excellent results and does not require major surgeries. Due to the low number of implants, it is a cost-effective alternative. Given these advantages, it is often a preferred treatment modality. In summary, the All-on-4 treatment requires careful planning and consideration of patient expectations, offering a reliable and cost-effective solution for complete edentulism without the need for extensive surgical procedures.

Keywords: All-on-four, immediate loading, implant

INTRODUCTION

The "All-on-Four" concept is based on placing of four implants in a single jaw, with the posterior implants angled for optimal support. This principle was first introduced by Dr. Paulo Malo in 1993, and he and his colleagues formally described this technique in 2003.¹

The "All-on-Four" treatment concept refers to the application of two vertical implants in the anterior region and two distally angled implants in the posterior region, with a fixed restoration placed on these implants.^{2,3} After concepts that involve a higher number of implants for a single jaw, the "All-on-Four" application, which requires only four implants, is frequently implemented in clinical practice.

This system has been developed to maximise the utilisation of limited bone volume in atrophic jaws, allowing for rapid functionality post-surgery and preventing complications inherent in major surgical procedures that increase treatment costs and patient morbidity.⁴ According to Capelli et al.⁵, the bone loss resulting from stresses in the cortical bone of the implant neck region is similar between straight and angled implants. Short implants could be used for the atrophic mandible and maxilla, but even for use, a minimum of 7 mm vertical bone height is needed.^{6,7}

The crucial aspect of this treatment concept is the angled placement of posterior implants. This allows for the use of longer implants and increases the implant-bone interface, thereby positively influencing osseointegration. Additionally, it enhances anchorage obtained from the bone, eliminating the need for grafting.⁸⁻¹⁰ In the All-on-Four system, the long-term survival rate of implants in the mouth ranges between 92.2% and 100%.¹¹⁻¹³

This study aims to show 12 months follow-up of the treatment of an edentulous patient with concerns about using removable dentures with immediately loaded fixed prosthesis with All on four treatment concept.

CASE

Our patient, a 55-year-old female patient without any systemic disease was referred to İstanbul University, Faculty of Dentistry, Oral and Maxillofacial Surgery Clinic. The patient came to the clinic to have oral rehabilitation treatment. An informed consent form was obtained.

The intraoral examination and radiographic evaluation had been done (**Figure 1**). It had seen that there was some bone loss. Impressions for the model cast and photographs had taken. After understanding the patient's needs, All on four treatment concept had been decided to be performed.

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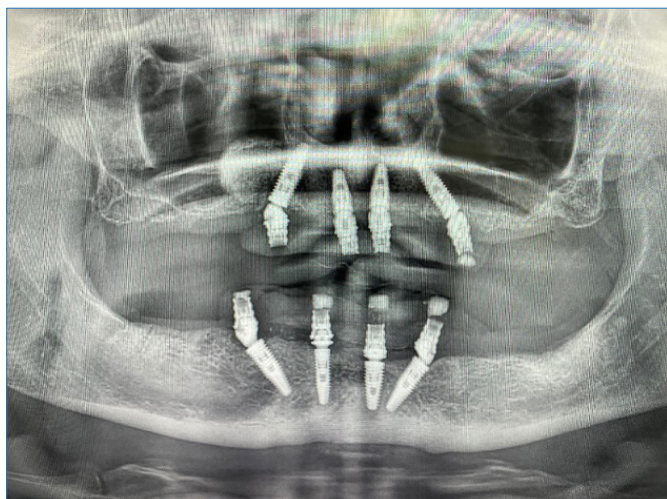


Figure 1. First orthopantomographic image of the patient

An overview of the surgical and prosthetic procedures in the described case is as follows:

Preoperative Preparation

Before the surgical operation, the patient used chlorhexidine oral rinse, and its continued use was recommended during the healing process.

Initial Surgical Phase

Flap elevation and extraction of existing teeth.

Re-evaluation of implant positions.

Anterior implants were placed as vertically and parallel to anatomical structures as possible, while posterior implants were placed with a distal inclination (Figure 2).



Figure 2. Orthopantomographic image of the patient after implant application with All-on-4 concept

Postoperative Care and Temporary Prosthesis

Three months after the surgical operation, the temporary prosthesis was removed.

Impressions were taken for the fabrication of a metal framework.

Fit and passive seating of the metal framework on abutments were verified.

Occlusal alignment and closure were checked.

Porcelain was applied to the metal framework for both aesthetic and functional purposes.

The restoration was secured by screwing it onto the abutments with a torque of 30 Ncm.

The screw access holes were filled with composite matching the colour of porcelain.

Patient Education and Follow-up

The patient received instruction on proper oral hygiene practices. Follow-up appointments were scheduled at intervals of 1 week, 1 month, and 1 year (Table).

During all follow-up appointments, the patient expressed satisfaction with both aesthetics and functionality.

Evaluation after 1 year revealed excellent outcomes in terms of function, aesthetics, and osseointegration.

Table. Follow-up evaluation			
Duration	1 week	1 month	1 year
Evaluation	Oedema on peri-implant soft tissue	No inflammation or swelling on peri-implant soft tissue	No inflammation or swelling on peri-implant soft tissue

RESULTS

With ageing, molecular and morphological changes in bone structure can lead to observed bone loss.¹⁴ In our case, our patient is 55 years old and exhibits bone loss in both the maxilla and mandible.

In the All-on-Four concept, four implants are placed to support a fixed prosthesis without the need for a removable prosthesis. Two of these implants are positioned in the anterior region vertically and parallel, while the posterior implants are placed at a distal angle.^{2,3} In this technique, the distal angulation of the implants in the posterior is primarily done to ensure proper load distribution. This way, the distance between the anterior and posterior increases, balancing the load distribution from the prosthesis and allowing the placement of 12 teeth with a relatively short cantilever length.¹⁵⁻¹⁷ We were able to provide fixed prosthodontic treatment for our patient by implementing the All-on-Four treatment, as her priority was not to use a removable prosthesis.

The prostheses that had placed on the All-on-Four system can be made of metal substructures with porcelain, zirconium, or titanium materials, and they can be either fixed, removable, or hybrid prostheses. Long implants placed at an angle in the posterior region allow for immediate loading due to increased primary stability.¹⁸

We aimed to increase the primary stability by placing the implants in the posterior region at a long and approximately 45-degree angle for our patient. Taking advantage of this approach, we were able to perform immediate loading.

The All-on-Four concept is a highly effective treatment option for complete edentulism that yields excellent results and does not require major surgeries. Due to the use of a minimal number of implants, it is a cost-effective alternative. Given these advantages, it is often a preferred treatment modality.

DISCUSSION

The All-on-Four concept is a highly effective treatment option for complete edentulism that yields excellent results and does not require major surgeries. Due to the use of a minimal number of implants, it is a cost-effective alternative. Given these advantages, it is often a preferred treatment modality.

One of the primary concerns among clinicians in All-on-four treatment is the potential loss of prosthetic support even with the loss of a single implant. However, implant loss is extremely rare in this treatment method, and if it occurs, it can be addressed by placing another implant in a nearby area of the same jaw. This underscores the importance of meticulous treatment planning.

Since All-on-Four treatment is typically employed in cases with limited bone support, the patient's aesthetic expectations should be clearly defined before the treatment begins. If the patient has expectations such as increasing vertical dimension or significantly enhancing lip support, alternative options like removable prostheses should be discussed with the patient.

CONCLUSION

The All-on-Four treatment requires careful planning and consideration of patient expectations, offering a reliable and cost-effective solution for complete edentulism without the need for extensive surgical procedures.

ETHICAL DECLARATIONS

Informed Consent

The patient signed the free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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