

Mandibular Prosthetic Rehabilitation of All-on-Six Implant-Supported Prosthesis: A Case Report

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ABSTRACT

This clinical study examines the efficacy of dental implants in restoring fully edentulous mandible dental arches, focusing specifically on the all-on-six treatment method. It suggests that implant-supported fixed restorations, utilizing six implants, represent a reliable and cost-efficient solution for promptly rehabilitating edentulous patients, circumventing the necessity for bone grafting. The report details a case where a patient's completely edentulous arches were successfully rehabilitated using the all-on-six approach, emphasizing the meticulous planning and precise execution involved. It concludes that accurate diagnostic assessment and implant planning, coupled with comprehensive attention to detail, are essential for achieving successful implant-supported fixed prostheses. The all-on-six concept is highlighted as offering enhanced clinical and radiological outcomes for maxillae affected by bone atrophy.

Keywords: Dentals Implants; Bone atrophy; Bone

INTRODUCTION

In complete edentulous patient, complete dentures are widely recommended to preserve normal speech, aesthetic appearance, and facilitate effective chewing of food. Various methods have been devised to restore both upper and lower edentulous jaws^[1].

Primary stability denotes the initial mechanical attachment of the implant to the bone, influenced by factors like bone density, implant design, surgical method, and insertion torque. Secondary stability, also known as biological stability, develops over the first two weeks as bone remodels around the implant surface, either through new bone formation or the remodeling of existing bone within the implant's thread chambers, contingent on the degree of contact between the implant body and bone tissue^[2].

The purpose of this study is to report a case of full-arch rehabilitation on six endosseous implants loaded following the standard procedure.

CASE PRESENTATION

A 51-year-old male patient presented to the prosthodontics department with complete edentulism in the mandibular arch. He showed no systemic pathology and was not a smoker. He already wore a complete denture for the mandible but was dissatisfied with its retention and desired a fixed prosthesis. Following a comprehensive examination of the bone, classified as D2 type (characterized by porous cortical and coarse trabecular bone according to Misch classification), a treatment plan was formulated to place six implants in both the maxilla and mandible. Implant placement was planned after conducting cone beam computed tomography (CBCT) scans.

Based on the available bone quantity, six implants were placed in the mandible at positions 31, 33, 37, 43, 46, and 47, ranging in size from 3.5x10 mm to 5.0x10 mm. Osstem Implants were used (**Figure 1**). The definitive prosthesis was provided three months after implant placement for standard protocol.

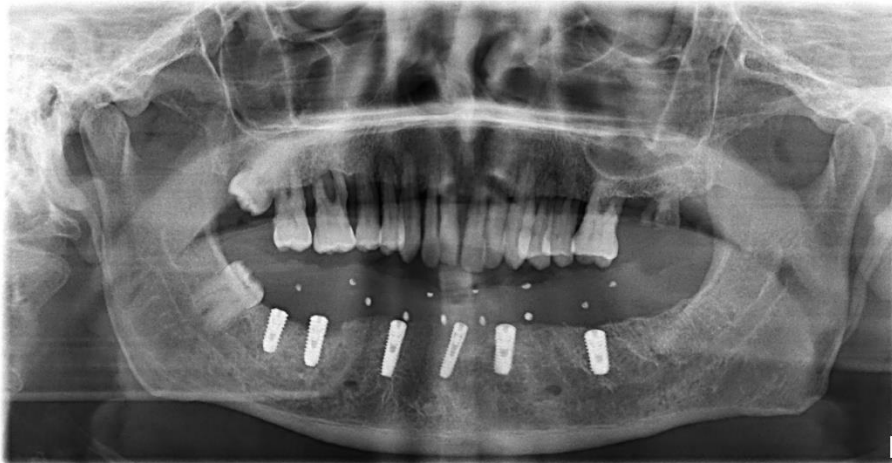


Figure 1: Six osstem implant inserted into mandible according to bone available.

Three months post-implantation, straight multiunit abutments were attached to the implants (**Figure 2**). In the mouth, open tray impression copings were connected to the implants after removing the healing caps (**Figure 3**). An open tray impression was then taken using elastomeric impression material, and the impression copings were unscrewed once the material had set.



Figure 2: Multiunit abutment



Figure 3: Open tray impression coping placed

After the impression was taken, a multiunit laboratory analog was placed onto the impression coping, and a gingival mask was applied before pouring the cast (**Figure 4 and 5**).



Figure 4: Open tray impression taken



Figure 5: Gingival mask and cast poured

Intraoral jig verification was conducted using pattern resin based on the diagnostic cast. Adjustments were made as necessary to ensure proper fit. Dental floss connected to the impression coping aided in positioning the pattern resin correctly. After adjustments, another open tray impression was taken and used to pour the cast (**Figure 6 and 7**).

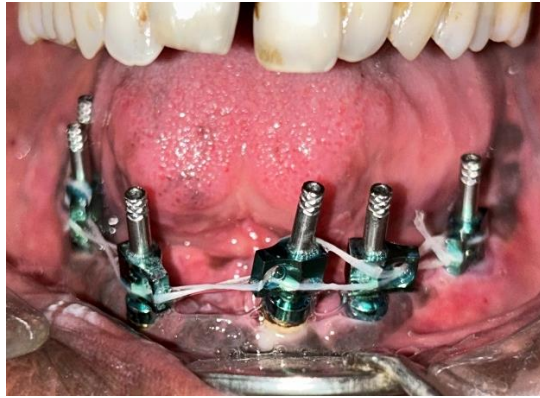


Figure 6: Impression coping splinted intraorally to provide greater rigidity

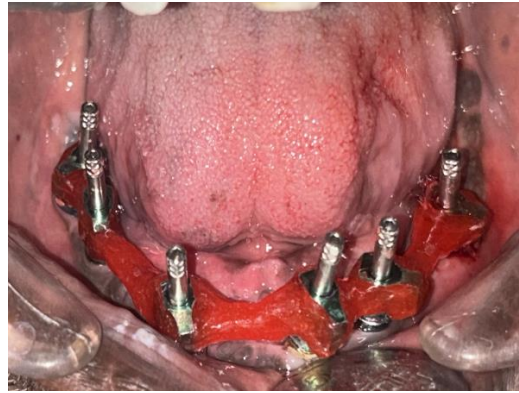


Figure 7: Intraoral jig fabricated

The jaw relationship and face bow transfer were recorded using a record base and occlusal rims (figure 8). The complete setup was articulated in semi adjustable articulator, and the interridge distance was evaluated (**Figure 9 and 10**). The planning for the implant-supported fixed prosthesis was carried out based on these measurements and evaluations.



Figure 8: Jaw Relation done



Figure 9: Teeth setting done in



Figure 10: Trial denture done in mandible

A 3D-printed wax pattern was created and tried intraorally to confirm the fit (**Figure 11**). Subsequently, a metal trial was inserted in the patient's mouth (**Figure 12**).



Figure 11: 3D printed wax pattern fabricated



Figure 12: Metal Try in done in mandible

The fixed prosthesis was fabricated spanning from the second molar to the second molar in the mandibular arch. It was secured with screws torqued to 25Ncm. Occlusal adjustments were carried out, and the patient was scheduled for regular follow-up appointments (**Figure 13**).



Figure 13: Completed all on six prosthesis

DISCUSSION

The all-on-four treatment offers a solution for fully edentulous jaws with minimal bone volume, providing cost-effectiveness, shorter treatment times, improved quality of life, and reduced patient discomfort(3). It involves the use of four implants to support fixed dentures. While the all-on-four technique boasts an implant success rate of up to 99%, there are concerns regarding prosthetic longevity. Issues such as porcelain crown failure, prosthetic fractures, screw and abutment loosening, and the challenge of managing distal cantilevers contribute to mechanical complications. These drawbacks can potentially be addressed by adopting the all-on-six approach, which is considered less taxing than all-on-four. By utilizing six implants, the all-on-six concept enhances prosthesis stability and ensures more effective distribution of stress across a larger area^[4].

The all-on-six treatment method was developed to maximize the utilization of existing jawbone, enabling rapid functionality without the need for costly regeneration procedures. By eliminating cantilevers in all-on-six cases, the risk of biomechanical issues like prosthetic screw loosening and implant overload is minimized. Hassan and colleagues determined through a one-year study that the all-on-six implant concept outperformed the all-on-four approach in atrophied maxillae, showing improved clinical and radiological outcomes^[5].

Park et al. found that implants can be effectively placed in elderly individuals, with favorable long-term outcomes. They concluded that the success of implants is not solely determined by age^[6].

CONCLUSION

Due to reduced stresses compared to the all-on-four design and minimized cantilever, the all-on-six approach is considered advantageous. Therefore, it represents a superior treatment option for edentulous patients seeking fixed prostheses. This treatment is particularly beneficial for individuals with extensive tooth loss, significantly improving dental function, comfort, and aesthetic appearance, thereby enhancing overall quality of life. The all-on-six implant system can create a customized and natural-looking smile that harmonizes with the patient's facial features, boosting self-confidence and life satisfaction. Consequently, this treatment option is poised to be a future standard in denture prosthetics.

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