

Case Report

All-on-4 Lower Fixed Screw Retained Prosthesis with 2 Years Follow-Up: A Case Report

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ABSTRACT:

The “All-on-Four” concept is based on the placement of four implants in the anterior part of fully edentulous jaws to support a provisional, fixed, and immediately loaded full-arch prosthesis. Typically, full arch reconstruction of edentulous ridges requires five to 10 dental implants; however, some patients demanding fixed implant-supported prostheses are not able to medically or economically afford complex bone grafts and/or a greater number of implants. These situations could pivot the treatment plan toward the All-on-4 protocol. Combining tilted and straight implants for supporting fixed prostheses can be considered a viable treatment modality resulting in a simpler and less time consuming procedure, in significantly less morbidity, in decreased financial costs and a more comfortable postsurgical period for the patients. In this article, a case report with mandibular implant supported prosthesis with all-on-4 concept is discussed.

Key words: Mouth Rehabilitation; Edentulous Jaw; Implant-Supported Dental Prosthesis

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INTRODUCTION

The “All-on-4” technique has evolved from original work of Branemark and colleagues in 1977, whereby they utilized 4 to 6 vertical implants placed within the anterior segment of the edentulous maxilla and mandible, cantilevered to accommodate a full-arch fixed prosthesis (1,2). Paulo Malo et al in 2003 introduced the “All-on-4” treatment modality and recommended its development as a standardized concept and observed it to be a good strategy (3).

Current standards in implant dentistry are intended to provide prosthetic restorations with the finest esthetic and functional outcomes. Several parameters have been suggested to achieve gold standard results: adequate bone height, width and sagittal projection, adequate soft tissue quantity and quality, preservation of buccal sulcus and adequate papillae and gingival contour(4). Solutions to inadequate ridge height include the use of short implants, vertical ridge augmentation procedures, or cantilever prostheses (5).

Combining tilted and straight implants for supporting fixed prostheses can be considered a viable treatment modality resulting in a simpler and less time consuming procedure, in significantly less morbidity, in decreased financial costs and a more comfortable postsurgical period for the patients (6).

CASE REPORT

A 45 years old patient visited the department of prosthodontics with the chief complaint of inefficient mastication, completely missing lower teeth and partially missing upper teeth. On intraoral examination it was seen that upper 14,15,16 and 24 were missing. Carious lesions were detected on 11,12,13, 21 and 22. Mandibular arch was completely edentulous.

Patient showed an inclination for fixed prosthesis. She was then evaluated for fixed prosthesis from CBCT findings. Her past medical history was uneventful and past dental history too revealed no bleeding

abnormality and uneventful healing. Blood sugar level was found to be normal and then bleeding time and clotting time were also found to be normal from blood investigations. The “all-on-four” technique was scheduled to rehabilitate the lower jaw.

Patient was explained about the detailed treatment plan which was constructed as following:

1. Oral prophylaxis of remaining teeth.
2. Root canal treatment for all carious teeth followed with crown fabrication
3. Two implants placement for upper missing site
4. All on 4 implant with multiunit abutment for lower arch.

Sequence of treatment was then planned as mentioned below:

1. All on 4 implant placement in lower arch followed with complete rehabilitation of lower arch first
2. Upper implant placement irt 15, 16 and posterior fixed partial prosthesis irt 23, 24, 25 and 26.
3. Mutually protected occlusion

Step by step procedure:

1. Under local anaesthesia , 4 osstem implant both of dimensions 4*10 mm were placed in 32 and 42 region and two 4*11.5 mm were placed in premolars area in respective quadrants.
2. After one-week implant was placed for planned site for upper arch irt 14 and 15 (fig 1).



Fig. 1 upper implant placement

3. Patient was recalled after 3 months to evaluate for osseointegration (fig 2).



Fig. 2 Mandible all on 4 implant placement and multi-unit healing abutment

4. After evaluating satisfactory osseointegration, second stage surgery was planned.
5. Healing abutment was placed for two weeks.
6. After two weeks healing abutments were removed, impression post was screwed to implant, implants were splinted with dental burs and stabilized with pattern resin
7. Final impression was recorded with polyvinylsiloxane impression material using closed tray in lower arch. Resin jig was fabricated with the help of pattern resin with definitive abutments in place and verified both clinically and radiographically for marginal discrepancy (fig 3).



Fig. 3 fabrication of jig on impression coping

8. Jaw relation was done and freeway space was evaluated (fig 4).



Fig 4 Jaw relation



Fig 5 Try In

9. Cobalt chromium metal framework was fabricated and tried in patient's mouth and verified for midline, visibility, vertical dimension at rest and occlusion and freeway space (fig 6).
10. Interocclusal record was made in patient's mouth at the desired vertical dimension (fig 7).



Fig 6 Metal try in



Fig.7 Bite verification

11. After that according to the selected shade, ceramic build up was carried out .
12. Bisque trial was done one week later and occlusal correction were made. Final prosthesis was screwed to the patient after glazing. Mutually protected is an occlusal scheme which was planned and executed.
13. Upper implant space was rehabilitated with the crown at the place irt 13, 14 and 15.
14. Upper rehabilitation was done first for posterior with fixed prosthesis bridge irt 23,24,25,26 and then followed by anterior rehabilitation irt 11,12,13,21 and 22 (fig 8,9,10).



Fig. 8 Screw retained final prosthesis



Fig. 9 Mandibular final prosthesis



Fig. 10 Upper rehabilitation

15. Mutually protected occlusion was provided and all occlusal interferences were removed (fig 11, 12).



Fig. 11 Mutually protected occlusion



Fig. 12 Final prosthesis

The patient was instructed to regularly perform oral hygiene measurements including using an interdental brush and super floss as well as the conventional brush and floss. The patient was asked to return for regular follow-ups which were every three months during the first year, and then every six months. After two years, patient condition was re-evaluated according to Albrektsson's criteria. Radiographically and clinically the condition was satisfactory (fig 13).



Fig. 13 OPG

DISCUSSION

A recent shift in practice paradigm has been to minimize treatment costs and patient morbidity while providing the most satisfying patient-centered

treatment outcomes according to the state of the art of dental practice. The “All-on-Four” treatment concept is an attempt to reach these objectives by providing relatively straight forward, predictable treatment option to rehabilitate edentulous patients with a high outcome of quality of life (7). The All-on-4 protocol immediate function approach to rehabilitate edentulous jaws combines immediate function techniques: 4 implants (2 straight medially and 2 tilted distally) to support a fully fixed prosthesis.

Fixed prostheses for the restoration of a fully edentulous arch with four implants could be either made of metal-resin (hybrid) or porcelain-metal structures. The Toronto prosthesis is usually used when the inter-arch space is too much to be restored with a conventional fixed implant-supported prosthesis (8).

Malo *et al.* (2011) described the protocol for the insertion of implants following standard procedures, except that under-preparation was used to achieve an insertion torque of at least 35 Ncm before final seating of the implant. The authors showed this to be typically done by full drill depth with a 2-mm twist drill followed by step drills of 2.4/2.8 mm and 3.2/3.6 mm (depending on bone density). In cases of high bone density, 3.8/4.2 mm step drills were used only in cortical bone. The implant neck was aimed to be positioned at bone level, and bicortical anchorage was established whenever possible (9).

In the present case report, Angulated implants were placed in mandible owing to the close approximation to the anatomical structures and to increase the anteroposterior spread. And then multiunit abutments of 30 degree angle were placed to make the implant parallel and to get tissue level prosthesis.

CONCLUSION

Less support is provided to counteract the occlusal loading when there are only four implants to support a full arch fixed prosthesis. In these conditions, the All-on-4 prosthesis design might be according to the Toronto Bridge or metal-resin (hybrid) prosthesis.

However, regardless of the prosthesis design, careful follow-up is warranted to resolve the associated problems.

REFERENCES

1. Misch CE. Dental Implant Prosthetics, ed 2. St. Louis: Elsevier Mosby, 2015:263, 604, 885.
2. Turkyilmaz I, Company AM, McGlumphy EA. Should edentulous patients be constrained to removable complete dentures? The use of dental implants to improve the quality of life for edentulous patients. *Gerodontology* 2010; 27:3-10.
3. Maló P, Rangert B, Nobre M. All-on-4 Immediate-Function Concept with Brañemark System® Implants for Completely Edentulous Maxillae: A 1-Year Retrospective Clinical Study. *Clin Implant Dent Relat Res.* 2005;7(1):S88-94.
4. Guerrero C, Lopez P, Figueroa F, et al. Three-dimensional alveolar distraction osteogenesis. In: Bell W, Guerrero C, editors. *Distraction osteogenesis of the facial skeleton*. 1st edition. Hamilton (Canada): BC Decker, 2007; 457-93.
5. Hashemi HM. Neurosensory function following mandibular nerve lateralization for placement of implants. *Int J Oral Maxillofac Surg.* 2010; 39:452.
6. Peñarrocha Diago M, Maestre Ferrín L, Peñarrocha Oltra D, Canullo L, Calvo Guirado JL, Peñarrocha Diago M. Tilted implants for the restoration of posterior mandibles with horizontal atrophy. An alternative treatment. *J oral Maxillofac Surg.* 2013;71:856-864.
7. Rangert B, Jemt T, Jönemark L. Forces and moments on Brañemark implants. *Int J Oral Maxillofac Implants.* 1989;4:241-247
8. Montero J, Macedo de Paula C, Albaladejo A. The "Toronto prosthesis", an appealing method for restoring patients candidates for hybrid overdentures: A case report. *J Clin Exp Dent.* 2012 Dec;4(5):e309-12.
9. Malo P, de Araujo Nobre M, Lopes A, Francischone C, Rigolizzo M. “All-on-4” immediate-function concept for completely edentulous maxillae: a clinical report on the medium (3 years) and long-term (5 years) outcomes. *Clin Implant Dent Relat Res.* 2012;14:e139-50.