

Full Mouth Rehabilitation with all on 4 Protocol using two Different Implant Supported Prosthesis

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Abstract

Aim: To describe in a stepwise manner the various treatment options for treating patients insisiting on fixed treatment using all on 4 treatment protocol.

Background: Various approaches have been developed for the rehabilitation of severely resorbed maxillary and mandibular arches with implant supported restorations. Most of these treatments are expensive and complex.

Case description: 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. This article describes the rehabilitation of two patients, one with fully edentulous arches and the other with an edentulous mandible opposing partially edentulous maxillary arch using two types of definitive fixed implant-supported prostheses.

Conclusion: Predictable treatment outcome can be achieved using the all on four treatment protocol with two different prosthetic designs.

Clinical significance: It covers the selection criteria for various treatment options which could be helpful to a general dentist long term follow up of both patients showed improvement of the oral health and the quality of life.

Keywords: Full mouth rehabilitation • All on 4 treatment concept • Hybrid denture • Malo bridge

Introduction

Implant-supported prostheses are successful treatment options that can be used for full mouth rehabilitation [1]. However, some of the patients present with minimal posterior bone support. Also, due to the proximity of anatomical structures like maxillary sinus and inferior alveolar nerve, additional surgical procedures like sinus lifting and ridge augmentation are required. A solution for such situations is the All-on-4 concept which advocates tilting distal implants thus enabling the placement of longer implants in the anterior area. In addition, screw retained immediate fixed provisional restoration can be delivered immediately to restore patients’ oral function and aesthetics. Definitive prosthesis can be made of metal-acrylic resin supported by titanium or cast metal substructure and acrylic resin posterior teeth (Hybrid denture) or individual metal ceramic or ceramic zirconia crowns cemented over titanium framework (Malo bridge) [2].

This case series presents the clinical experience and outcome of rehabilitation of two cases with two different types of implant supported prosthesis with 3 years follow up [3].

Materials and Methods

Rehabilitation of maxillary and mandibular arches by all on 4 methods and Malo bridge prosthesis

A 58 years old female patient, reported to Department of Prosthodontics for replacement of missing teeth [4]. Patient was also unhappy with her smile. The pre-operative cbct revealed multiple failing restorations, bone resorption and periapical lesions in remaining natural teeth. It was decided to rehabilitate the patient with the “All-on-Four” technique (Figure 1).



Figure 1: Preoperative Extraoral and Intraoral view

Full mouth extractions were carried out followed by fabrication of upper and lower complete dentures. After 2 months, radiographic markers were placed in the dentures and the patient was sent for a dual CBCT scan and all on four implant planning was carried out using the denture as a guide. The all on 4 concept was carried out in the mandibular arch first followed by maxillary arch 20 days later. Four regular platform implants (Replace Select; Nobel Biocare) of diameters 4.3 mm and length of 11.5 mm and 13mm were inserted in canine and second premolar region of the mandible respectively with initial stability of 35Ncm (Figure 2).



Figure 2: Implant placement in mandible, B,C: Fixed provisionals in mandible.

Once implants were placed, 30° multi-unit abutments were placed on posterior/tilted implants and 17° Multi-unit Abutment on anterior implants. These implants were temporized immediately by converting the removable complete denture to fixed implant bridge following standard procedures. After 20 days, 4 regular implants of length of 13mm and 15

mm were placed in canine and second premolar region of maxilla with initial stability of 35 Ncm. The provisional prosthesis was adjusted to achieve implant protected occlusion. The patient was recalled after 4 months for the definitive prosthesis (Figure 3).

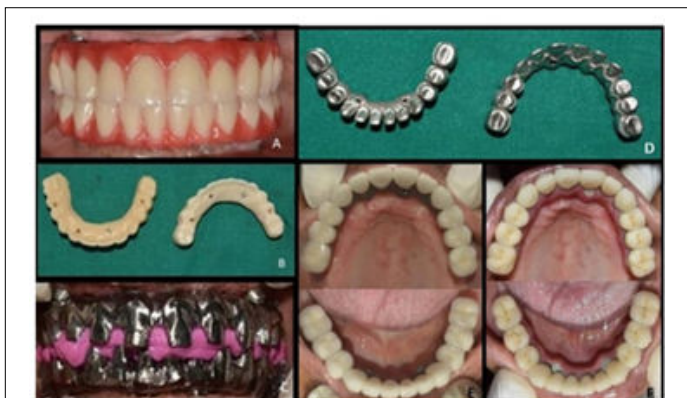


Figure 3: Wax trial of Prosthesis, B: Polymethyl methacrylate (PMMA) trial, C: Titanium Framework trial, D: Metal trial of prosthesis, E: Bisque trial of prosthesis, F: Final Prosthesis

Definitive restoration

For the definitive prosthesis fabrication, following steps were followed.

- Maxillary and Mandibular Preliminary impressions were made for fabrication of custom trays.
- Open Tray Multi Unit Impression Copings were attached to the Multi Unit Abutments and joined together with pattern resin to create a rigid frame. Final impression were then made using a custom tray.
- Jig trial was done to ensure accuracy of the impressions. Jaw relation, facebow recording and bite registration were done in the conventional manner. Aesthetic mock-up was done on the existing provisional bridges and recorded.
- Wax try in was carried out to ensure esthetics, function and patient acceptance. Following this, Polymethyl methacrylate (PMMA)trial was carried out incorporating all the changes and sent to the lab for milling of titanium framework.
- Try-in of the Titanium framework was done and passive fit was verified with X-ray. This was followed by metal try in of individual crowns, shade selection and bisque trial. The occlusion was adjusted to implant protected occlusion.
- At delievery, it was ensured that final prosthesis fitted firmly against the soft tissue. Prosthetic screws were fixed and torqued to 15 Ncm attaching them to Multiunit Abutments. screw access holes were blocked with Teflon Tape and sealed with composite resin.
- Patient was called after 24 hours post delievery of the prosthesis. Oral Hygiene Mantainance was reinforced.

Rehabilitation of maxillary and mandibular arches by all on 4 method with metal-resin (hybrid) prosthesis

A 56-year-old female patient with a history of ill-fitting lower cast partial dentures was referred for full mouth rehabilitation to the department of prosthodontics, at Goa dental college and hospital. The patient was unhappy with the retentiveness of the lower denture. On examination, severe bone resorption in mandibular arch and excessive inter arch space was seen Considering the presented situation, a smile makeover was planned for the maxillary arch and the All-on-4 protocol with hybrid denture selected for the mandibular arch (Figure 4).



Figure 4: Postoperative Intraoral and Extraoral view.

Impressions and study models were made. All the remaining mandibular teeth were extracted and immediate complete lower denture was delivered to the patient.

After 2 months, planning for all on 4 treatment was carried out using dual scan of lower denture as a guide.

Four Regular Platform (RP) implants (Replace Select; Nobel Biocare,) with the diameter of 4.3 mm and the length of 11.5 mm and 13mm were inserted in the canine and second premolar areas respectively. The implants were torqued at 35 Ncm. The standard procedures were followed and the provisional prosthesis was converted to a provisional implant supported fixed prosthesis.(Figure 5)

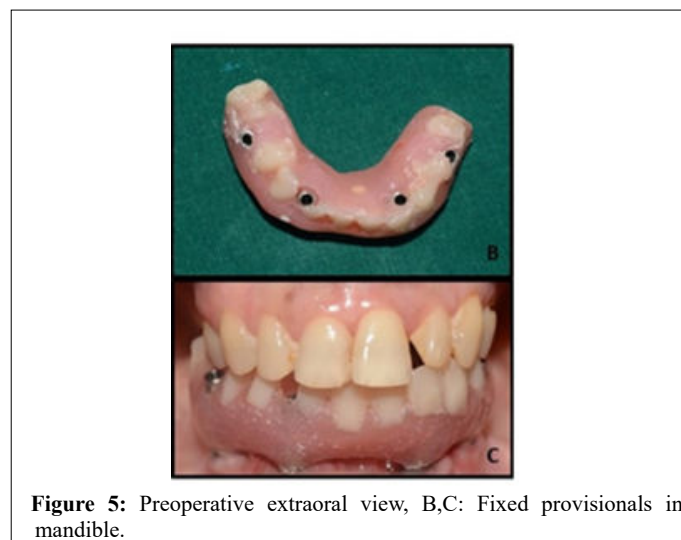


Figure 5: Preoperative extraoral view, B,C: Fixed provisionals in mandible.

After a 3 months healing period, definitive prosthesis construction was performed. Conventional steps were followed for the fabrication of master cast and jaw relation recording. The fit and occlusion of the mandibular arch was checked using wax trial followed by PMMA trial against the maxillary crowns and bite registration was made. Metal framework trial and X-rays were taken to confirm the passive fit followed by acrylization of the denture.

The definitive metal-resin prosthesis was adjusted with mutually protected occlusion. The multiunit abutments were torqued to 15 Ncm, the screw access was blocked with Teflon tape and sealed with flowable composite. A night guard was provided (Figure 6).

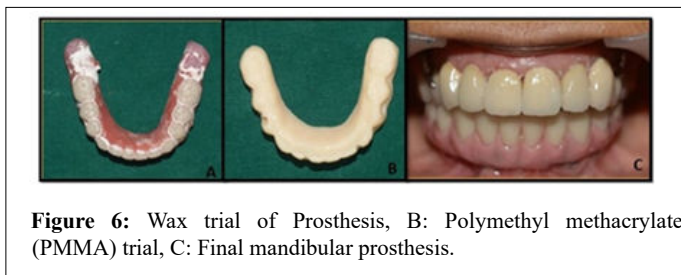


Figure 6: Wax trial of Prosthesis, B: Polymethyl methacrylate (PMMA) trial, C: Final mandibular prosthesis.

Discussion

The all on four treatment concept is a straight forward and predictable treatment option to rehabilitate edentulous patients with improved prosthetic support having shorter cantilever arm, improved inter implant distance and improved anchorage in the bone with overall improvement in quality of life. Published data on this concept, have shown a high cumulative survival rates to range between 92.25% and 100% [5]. The prime advantage is that patient is benefitted with immediate rehabilitation which helps maintain self-confidence and improve quality of life followed by a definitive prosthesis approximately 4 months later.

Before starting the all on 4 treatment concept, it is important to establish a firm occlusion. For this, well-fitting dentures were fabricated with proper occlusion. These dentures were used for dual scan procedure which aids in implant planning by inserting radiographic markers [6]. The

same dentures are further used as provisional implant supported bridges during the healing phase. soft food diet was recommended while the implants osseointegrate for about 3-4 months. During the waiting period of 4 months, repeated follow up appointments were scheduled to assess the condition of the provisional fixed implant bridge prosthesis and the hygiene maintenance by the patient.

Patient 1 presented with chief complaint of compromised aesthetics with good perioral support and was rehabilitated with a Malo Implant bridge. the implant surgeries were carried out 20 days apart for the comfort of patient. The Malo implant bridge fabrication involves fabrication of substructure which consists of a screw retained titanium framework and crowns fabricated separately with Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) [7]. In the present case, computer milled titanium screw retained framework was used. Studies have compared cast frameworks to milled titanium frameworks and have shown more accurate fit with the latter [8,9]. Passive fit of the prosthesis was ensured at each step of prosthesis fabrication with radiographs. This is important to maintain integrity at bone implant interface and to prevent any mechanical and biological complications of prosthesis and surrounding tissues [10,11]. Customized screw-retained titanium of the framework was layered with gingiva-colored porcelain to resemble soft tissue in gingival areas to improve the esthetics. Pink laboratory composites can also be used, however, they are known to have weaker bonding to the metal substrate and have water resorption over time [12].

The individual metal ceramic crowns were cemented onto the titanium framework producing desirable morphology and esthetics without considering the location of screw access openings on the framework. the crowns on the screw access were luted with provisional cements to enable easy retrievability of the framework for ease of maintenance and repair.

Patient 2 presented fixed retentive treatment as her primary goal for treatment she also presents with excessive intraarch dimension (18mm). Hybrid prosthesis was preferred mainly for economic reasons and excessive interarch space [13]. Hybrid prosthesis has merits of decreasing the impact force of dynamic occlusal forces, less expensive to fabricate while being esthetic [14]. Since patient presented with severely atrophic ridge and titanium substructure being lighter than cr-co framework, the former was selected. Screw access holes location should be ideally on a lingual aspect for esthetic reason. In this case, screw access was on the right buccal area which was masked by the tooth-coloured composite resin. The prosthesis was planned such that there was slight contact to the mucosa so that speech was not impaired. Also, proper access was maintained to permit oral hygiene effectively.

Conclusion

The all on four treatment protocol with two different prosthetic designs can be used to achieve predictable treatment outcome. It is important to have a sound knowledge about proper prosthesis selection depending upon the patients criteria. Moreover, good follow up procedure is important to achieve successful treatment in a long term.

Clinical Significance

It covers the selection criteria for various treatment options which could be helpful to a general dentist long term follow up of both patients showed improvement of the oral health and the quality of life.

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References

- Fortin Y, Sullivan RM, Rangert BR (2002) The Marius implant bridge: surgical and prosthetic rehabilitation for the completely edentulous upper jaw with moderate to severe resorption: A 5-year retrospective clinical study. *Clin Implant Dentistry Related Res* 4:69-77.
- Maló P, Rangert B, Nobre M (2005) All-on-4 immediate-function concept with Brånemark System® implants for completely edentulous maxillae: A 1-year retrospective clinical study. *Clin Implant Dentistry Related Res* 7:88-94.
- Taruna M, Chittaranjan B, Sudheer N, Tella S, Abusaad M (2014) Prosthodontic perspective to all-on-4 concept for dental implants. *J Clin Diagnos Res* 8:16.
- Thumati P, Reddy M, Mahantshetty M, Manwani R (2015) "All-On-4/DIEM 2" A concept to rehabilitate completely resorbed edentulous arches. *J Dental Implant* 5:76.
- Orentlicher G, Abboud M (2011) Computed Tomography-Guided Surgery and All on Four. *J Oral Maxillofacial Surgery* 69:2947.
- Kodama T (2012) Implant-supported full-mouth reconstruction Malo Implant Bridge. *J California Dental Ass* 40:497-508.
- Al-Fadda SA, Zarb GA, Finer Y (2007) A comparison of the accuracy of fit of 2 methods for fabricating implant-prosthodontic frameworks. *Int J Prosthodontics* 20.
- Örtorp A, Jemt T, Bäck T, Jälevik T (2003) Comparisons of precision of fit between cast and CNC-milled titanium implant frameworks for the edentulous mandible. *Int J Prosthodontics* 16.
- William KR, Watson CJ, Murphy WM, Scott J, Gregory M, et al. (1990) Finite element analysis of fixed prostheses attached to osseointegrated implants. *Quintessence Int* 21.
- Kallus T, Bessing C (1994) Loose gold screws frequently occur in full-arch fixed prostheses supported by osseointegrated implants after 5 years. *Int J Oral Maxillofacial Implants* 9.
- Petridis H, Garefis P, Hirayama H, Kafantaris NM, Koidis PT (2003) Bonding indirect resin composites to metal: Part 1. Comparison of shear bond strengths between different metal-resin bonding systems and a metal-ceramic system. *Int J Prosthodont* 16:635-639.
- Aglietta M, Siciliano VI, Zwahlen M, Brägger U, Pjetursson BE, et al. (2009) A systematic review of the survival and complication rates of implant supported fixed dental prostheses with cantilever extensions after an observation period of at least 5 years. *Clin Oral implants Res* 20:441-451.
- Misch CE (1999) Contemporary implant dentistry. *Implant Dentistry* 8:90.
- Gulnar A, Altintas S, Yilmaz O, Ates G (2020) Rehabilitation of the completely edentulous young patient with the'Malo Bridge': A case report. *Nigerian J Clin Practice* 23:1328.