

Rehabilitation of completely edentulous patient with implant supported fixed prosthesis- A case report

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Abstract

Full arch implant supported fixed prosthesis is a viable treatment option for edentulous patients seeking esthetics, function and comfort, providing the sense of security, naturalness, and immediate benefit over removable prosthesis. Proper treatment planning for placement of implants and further prosthetic rehabilitation without creating and minimizing biomechanical overload on the implants in maxillary and mandibular arches, accompanied by favourable occlusion and dedicated maintainance of the oral hygiene are the most important considerations for the success. This case report discusses the methodology of rehabilitation with full arch implant supported fixed prosthesis.

Keywords: surgical stent, implant supported fixed prosthesis, open tray impression technique, biomechanical overload

Introduction

Complete edentulism in a patient, whether young, middle aged or elderly brings about sudden change in psychological, physical and physiological well being of the patient. This transition from dentate to partially edentulous and then to complete edentulism poses challenges to the patient. Patient seeks treatment to restore function, esthetics and to improve the masticatory efficiency to lead balanced life. Nowadays, patients demand to restore their masticatory apparatus with

prosthesis, which is fixed and functional to create the appearance of natural teeth without the need to remove the prosthesis. Full mouth rehabilitation with implants in such cases has proved to be the treatment of choice for rehabilitation. Long-term clinical studies have shown that this type of restoration can be successful for many years¹⁻³ The aim of this paper is to report the treatment steps of a full-mouth implant supported fixed prostheses of a fully edentulous patient who underwent surgical insertion of 6 implants each in upper and lower jaws respectively with improper inclination and location.

Case Report

A male patient, aged 60 years reported to the clinic with a chief complaint of inability to eat food and difficulty in pronunciation of consonants during speech. The patient had concerns about his appearance due to edentulism and desired a fixed option for rehabilitation. Dental history revealed loss of teeth due to chronic generalised periodontitis fifteen years back. Medical history favoured the surgical intervention with dental implants.

Intraoral examination revealed edentulous maxillary and mandibular ridges with moderate ridge resorption (figure 1). Oral mucosa was normal with no signs of inflammation and hyperplasia.

Orthopantogram (OPG) and Cone beam tomography (CBCT) was done to evaluate the width and height of the bone available and to observe the anatomical references in

associated areas with respect to inferior alveolar nerve in mandibular ridge and maxillary sinus in the maxillary ridge (figure II). Patient was explained about the implant procedure and the consent form was duly signed.

For placement of implants in maxillary posterior areas, sinus lift procedure was initially planned, which patient didn't agree for. Therefore, implants were planned to be placed anterior to the lateral wall of maxillary sinus following the shortened dental arch concept of prosthetic rehabilitation. Surgical template was milled to mark the position of implants in maxillary and mandibular ridges making use of previous dentures

The implants were placed in the patient under the local anaesthesia (2% lignocaine with 1:100,000 adrenaline). Blood pressure, pulse and oximetric monitoring were done during the procedure. A total of 6 implants each were placed in the maxillary arch and the mandibular arch. The implant sizes placed were 3.5 mm x 10 mm at maxillary central incisor area and 3.5 x 11.5 mm at maxillary canine area and 3.5 x 10 mm posterior to it. In the lower arch, three implants of 3.75 x 8 mm and three of 3.5 x 11.5 mm were placed as per the available bone.

Standard surgical procedure for placement of implants was followed. Since the torque at different places in anterior maxilla was less than 20 NCM, the immediate loading protocol was not followed. The buccal cortical plate didn't favour parallel implant positions in the premaxilla leading to placement of angled abutment in the second quadrant.

After 1 week, sutures were removed and patient was asked to wear the previously fabricated dentures for mastication. The intaglio surface of the denture was relined with acrylic based soft liner to eliminate occlusal overloading of implants. After 3 months, uncover of the implants was done.

During the prosthetic phase:

A conventional alginate impression was made.

1. A rigid custom tray was manufactured with a window cut through over the implants.
2. At the next appointment, the healing abutments were removed (figure III).
3. Appropriate impression copings were selected and fitted (figure IV). These copings were splinted together intraorally to provide greater rigidity and possibly greater accuracy with dental floss and auto polymerising acrylic resin.
4. Creating holes at appropriate location of impression copings modified the stock trays. The impression copings should emerge level with the window. This permits easy removal of the impression copings, while ensuring that the copings were supported by sufficient impression material.
5. The window is sealed with wax.
6. An impression was taken in the open tray with a silicone impression material (figure IV). The tips of the impression copings were felt through the window.
7. Once the impression had set, the impression copings are unscrewed through the window on the tray and the impression is removed from the mouth along with all the impression copings in place. Healing abutments were paced back on the respective implants.
8. Jig try in was done to verify the implant positions in patient's mouth followed by metal try in (figure VI). Passive seating of the framework was verified intraorally and radiographically to avoid biomechanical overloading of the implants. Multiple FPD's were opted instead of single casting frame to ensure passive seating (figure VII).
9. Vertical dimension and centric relation was verified during the bisque trial of prosthesis.

10. Pick up impressions were made to take care of porcelain addition on ridge contour and occlusal table. The final prosthesis was fabricated in metal ceramic. An implant protected occlusion was selected and opted for occlusal rehabilitation (figure VIII). Centric stops with freedom in all lateral excursions were executed in the occlusion. The prosthesis was cemented with eugenol based temporary cement for occlusal adjustments. After recall appointment, definitive cement (zinc phosphate) was used to cement FPDs in respective positions.

Discussion

In case of full mouth rehabilitation with implant supported fixed prosthesis, the exact planning of the treatment steps and designing of the final prosthesis are mandatory. The concept of prosthesis-directed implant-supported restoration with ideal implant location would optimize the prosthetic procedure and outcome.

Cement retained definitive prosthesis has been preferred over screw retained prosthesis to facilitate occlusal and aesthetic considerations. It becomes often difficult task to close the screw hole visible in the aesthetic region using a composite of the exact shade. Moreover, the screw opening in the anterior for such restorations would occupy between 30% and 50% of the occlusal surface, compromising the aesthetic result, interfering with the development of optimal occlusion and jeopardizing the axial loading principle of implants.

Further, a passive fit cement-retained restoration is easy to fabricate when compared to the screw retained full arch metal-framework., otherwise greater level of forces may be transferred to the screw retained implant fixtures, which can cause crestal bone loss and failure of the implants. Conversely, machine made abutments used for the cement retained prosthesis result in more passive fit, and lack of screw access holes improve aesthetics and

improves the physical strength of porcelain resulting in fewer fractures.

The presence of a rigid framework in full-arch fixed prostheses provides a better load distribution that decreases the maximum values of stress at the levels of implants, prosthesis, and maxillary bone.⁴ High noble alloys, zirconia and base metal alloys can be used for framework fabrication in these cases, but base metal was preferred as the framework can be sectioned and soldered to circumvent any discrepancy of casting. Although zirconium oxide has good flexural strength and esthetics, but it was not preferred due to financial constraints.

Prosthetic design was planned and prepared to provide gingival embrasures that will allow the patient to function without compromise and maintain gingival health to preserve bone.

Gingival inflammation secondary to plaque is well documented and must be considered with full arch restorations.⁵ In the present case, patient was called for every 3, 6, and 12 months, professional removal of supragingival and subgingival deposits on a regular basis was done

Conclusion

Implants have become an integral part of rehabilitation in dentulous and edentulous patients, providing the benefit of fixed option of replacement of teeth. It is imperative to consider all the variables of age, bone quantity and quality, systemic and local conditions, soft tissue topography and functional and esthetic requirements of patient in treatment planning for providing a predictable success in fixed implant supported prosthesis.

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Legends Figures:



Figure I: Maxillary and Mandibular edentulous arches

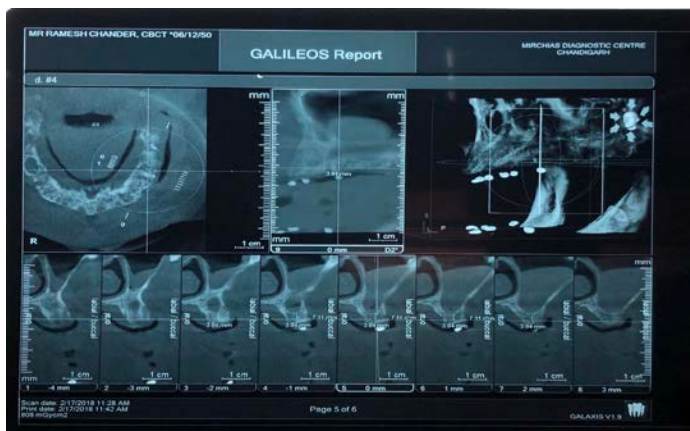


Figure II: CBCT of Maxillary arch showing available bone width and height



Figure III: Healing abutments placed on the implants after second stage surgery



Figure IV: Open tray impression copings were screwed on the implants to register impression



Figure V: Maxillary and Mandibular impression

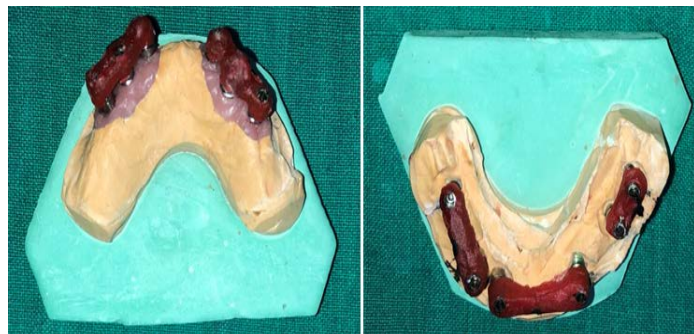


Figure VI: Jig- try- in made of pattern resin was done to verify implant positions



Figure VII: Passive seating of the metal framework was verified



Figure VIII: Full arch fixed implant supported metal ceramic prosthesis