10.5005/jp-journals-10012-1157

CASE REPORT

Full-mouth Rehabilitation with Implant-supported Fixed Prosthesis

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ABSTRACT

The objective of a dental prosthesis is to replace the teeth and adjacent tissues to restore function, esthetics, and speech. Oral rehabilitation of an edentulous patient is a challenge to the prosthodontist. Few patients have life-long problems with their complete dentures, such as difficulties with speech and mastication. Implant-supported prosthesis gives an opportunity to such patients a normal healthy life for their functional and esthetic demands. Implants are the most preferred treatment option to support and retain the fixed or removable prosthesis. Successful osseointegration enables both dentist and the patient to accept full-arch implant-supported prosthesis.

Literature is available on the use of full-arch fixed and removable implant-retained prostheses for completely edentulous patients; however, few patients are not satisfied with removable prosthesis even when supported by implants. Full-arch rehabilitation, a term used by many practitioners, has become a popular restorative option in prosthodontics. Full-arch implant-supported fixed prosthesis is a well-established treatment modality for edentulous patients. Long-term clinical studies have shown that this type of restoration can be successful for many years as success rates are high.

The aim of this study is to present a case report on full-mouth rehabilitation with implant-supported fixed prosthesis for completely edentulous maxillary and mandibular arches.

Keywords: Implant analogs, Implant-supported prosthesis, Impression copings.

How to cite this article: Rajgiri SU, Dayalan M. Full-mouth Rehabilitation with Implant-supported Fixed Prosthesis. Int J Oral Implantol Clin Res 2016;7(3):73-80.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Edentulism is associated with compromised esthetic, functional, and psychological complications. Rehabilitation of completely edentulous patient presents a challenge to the dentist. Previously conventional complete denture was the only treatment option for such patients. Many patients wearing conventional removable complete dentures face difficulty in adapting to their prosthesis because of physiological and psychological problems. Evolution of implant-supported removable prosthesis and fixed prosthesis has become an integral part of prosthodontic treatment planning. However, few patients do not accept removable prosthesis.

Implant-supported fixed prosthesis is an alternative treatment option. Success rates of fixed implant-supported prosthesis are high and postoperative complications are relatively low.[1-6]

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CASE REPORT

Diagnosis and Treatment Planning

A 45-year-old female patient reported to the Department of Prosthodontics, The Oxford Dental College and Hospital, Bengaluru, India, with a chief complaint of missing teeth in both upper and lower arches and wanted to be replaced by fixed prosthesis to restore esthetics and speech. A complete case history was recorded followed by thorough intraoral examination. Patient was advised to undergo routine blood investigation, full mouth radiography [orthopantomogram (OPG)], and cone beam computed tomography (CBCT) scan.

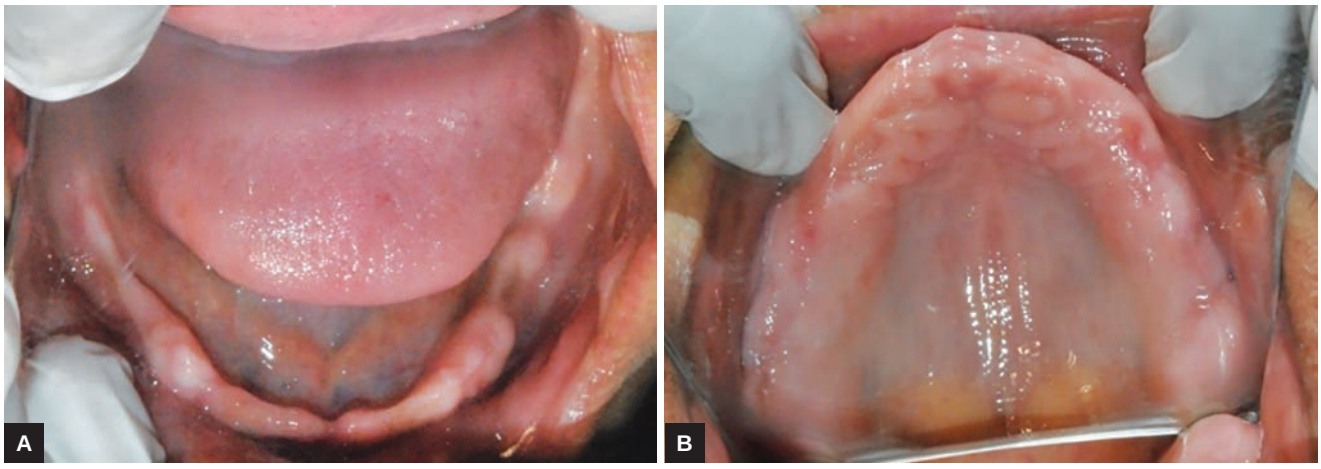
The patient was educated and motivated regarding implant-supported fixed prosthesis. Diagnostic impressions of both maxillary and mandibular arches were made with an alginate impression and casts were then fabricated. Preoperative photographs were taken (Figs 1A and B) for future reference.

Patient reported back with normal laboratory findings and radiographically D2 and D3 bone was present in mandibular arch and maxillary arch respectively. Implant sites were selected based on CBCT scan. Ten Equinox (Myriad-Plus implant systems) implants used in this study were selected according to the available bone (Table 1). Preoperative surgical template was fabricated with self-cure acrylic material (DPI), and the surgery was planned accordingly.

SURGICAL PHASE

First-stage Surgery

Patient consent was taken prior to the surgical procedure. Two stage surgeries were planned for second molar,



Figs 1A and B: Mandibular and maxillary preoperative views

Table 1: The CBCT findings and selected implant size

		CBCT scan findings (mm)		*Implant size (mm)*	
Arch	*Region*	*Length*	*Width*	*Length*	*Width*
Maxilla	Right second molar	12.6	5.4	11	3.8
	Right second premolar	13	5.9	11	3.8
	Right canine	22	5.4	13	3.8
	Left first molar	15.3	4.2	11	3.3
	Left canine	16.9	5	13	3.8
Mandible	Right second molar	15.3	5.2	13	3.8
	Right first premolar	12.8	4	11	3.3
	Right lateral incisor	12.6	3.9	11	3.3
	Left first premolar	15.3	4.7	13	3.8
	Left second molar	13.8	5.6	10.5	3.8

first premolar and lateral incisor region of fourth quadrant and first premolar, second molar region of third quadrant of mandibular arch and second molar, second premolar, canine region of first quadrant and canine, first molar region of second quadrant of maxillary arch and conducted in the Department of Oral and Maxillofacial Surgery under local anesthesia. All sterilization and disinfection protocols were followed prior to surgery.

During the first phase of surgery, patient was given preoperative medication. Midcrestal incision was made extending from left second molar to right second molar on mandibular arch under local anesthesia (Fig. 2) and flaps were reflected. A pilot drill followed by sequential drills were made to create osteotomy site in the left second molar region, Equinox implant was placed measuring 13 × 3.8 mm in the osteotomy site (Fig. 3) and wrenched with the help of wrench, primary stability was verified and cover screw was placed, remaining four implants were placed in the first premolar and lateral incisor of fourth quadrant and first premolar, second molar of third quadrant following the same procedure. Continuous with interrupted suturing was done (Fig. 4). Similar procedures were followed for maxilla and patient was advised postoperative medication and good oral hygiene. The patient was recalled back 3 months after and OPG was advised again to check for osseointegration (Fig. 5); based on radiography, second-phase surgery was planned.

Fig. 2: Midcrestal incision on mandibular arch

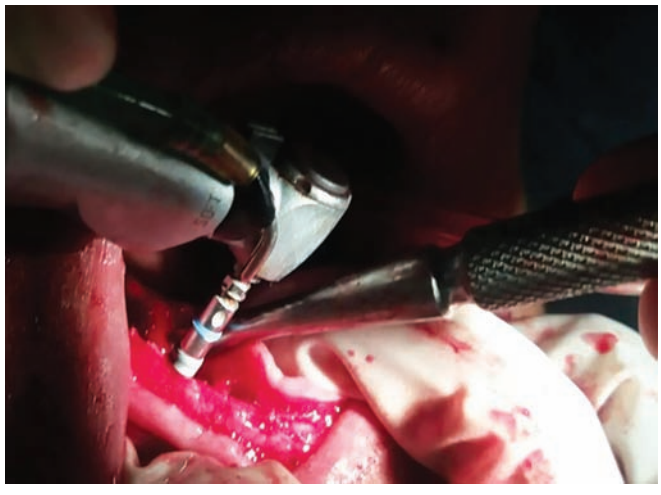


Fig. 3: Implant placement

Fig. 4: Suturing was done

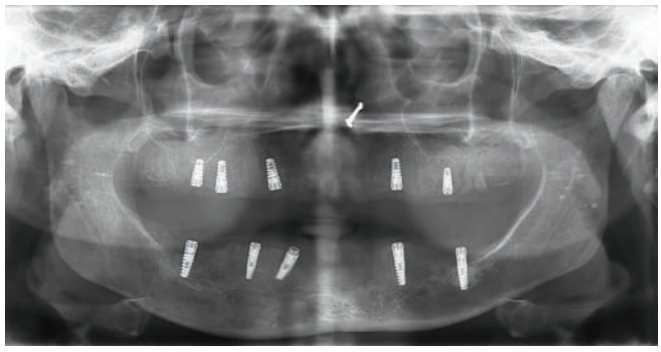
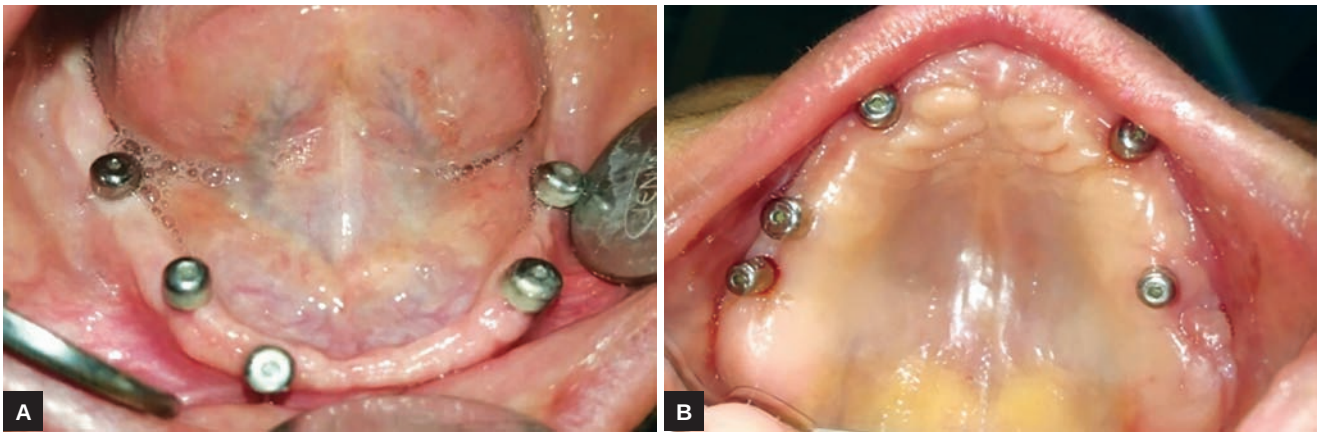


Fig. 5: Postoperative OPG after 3 months



Figs 6A and B: Healing abutments in place

Second-stage Surgery

During second-stage surgery, midcrestal incision was placed under local anesthesia and flaps were reflected, covering screws were removed and replaced by healing abutments (Figs 6A and B), and suturing was done. Patient was recalled after a week for suture removal and waited for 2 weeks for healing to take place.

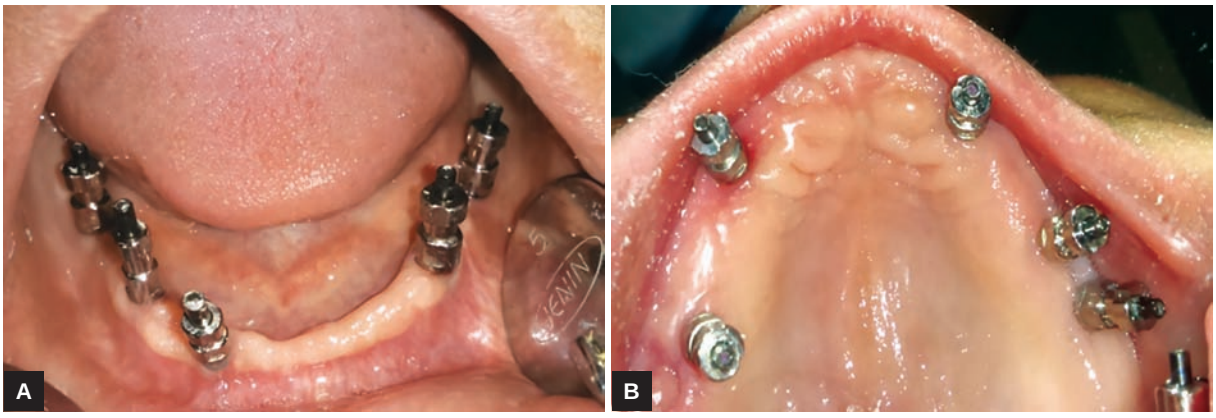
PROSTHETIC PHASE

Impression is the foremost and critical step to ensure passive fit of implant framework. An abutment level impression was planned to fabricate primary cast, and open tray implant level impression (pick-up impression) was planned for master cast as open tray implant level impression provides accurate casts and greater flexibility for the selection and modification for a definitive abutment by a laboratory technician, especially in case of multiple implants.[7] During the impression procedure, healing abutments were removed from fixture and replaced by abutments and primary impressions (abutment level impressions) of both maxillary and mandibular arches were made (Fig. 7) using an alginate impression and casts were fabricated, 1 mm thick modeling wax spacer was adapted over the cast, window was cut through the implant area, and the custom trays (Open window) were

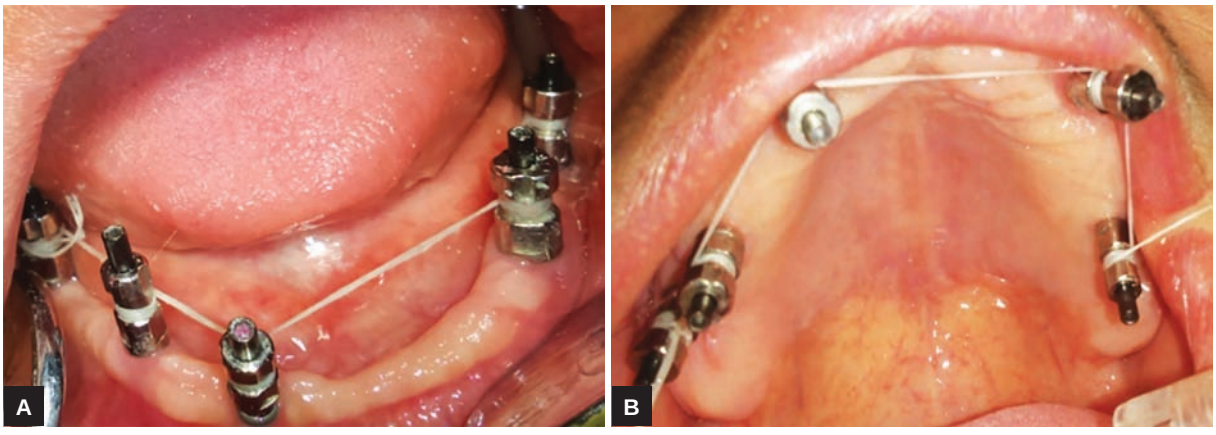
Fig. 7: Abutment level primary impression

fabricated with self-cure acrylic resin (DPI) for open tray impression.

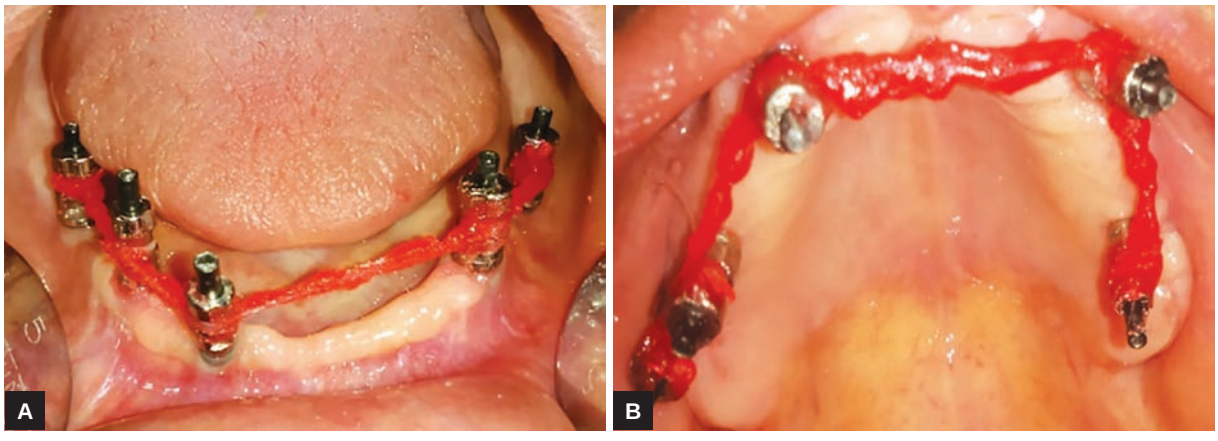
Mandibular impression was planned first. Five pick-up type transfer copings (Myriad- Plus implant systems) were connected and tightened on each fixture with guide pins (analogs) (Figs 8A and B) and splinted together with the help of flossing and pattern resin (Figs 9A, B and 10A, B) to provide a precise transfer of the spatial relationships of implants from the mouth to the master cast. Custom tray was tried intraorally for extension and open windows were sealed with modeling wax (Figs 11A and B), loaded with



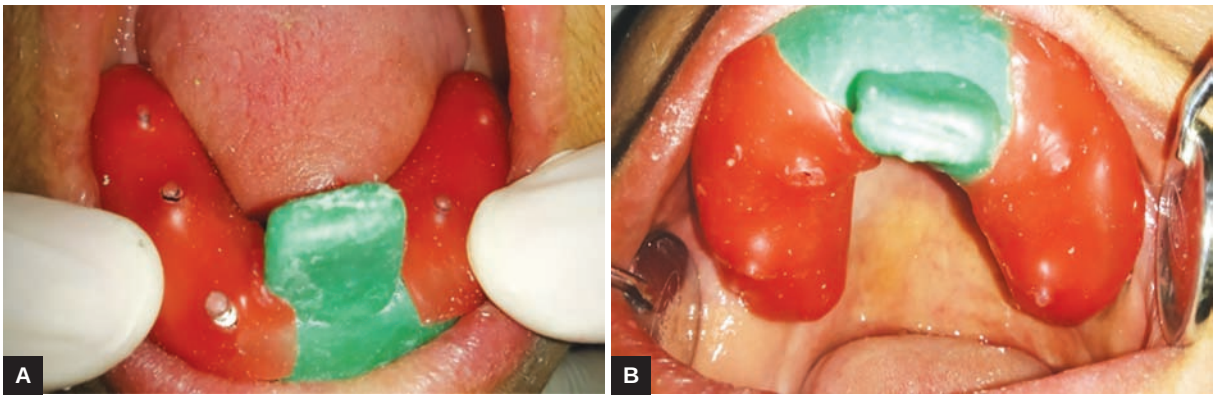
Figs 8A and B: Impression copings in place



Figs 9A and B: Flossing of impression copings



Figs 10A and B: Impression copings splinted together with pattern resin



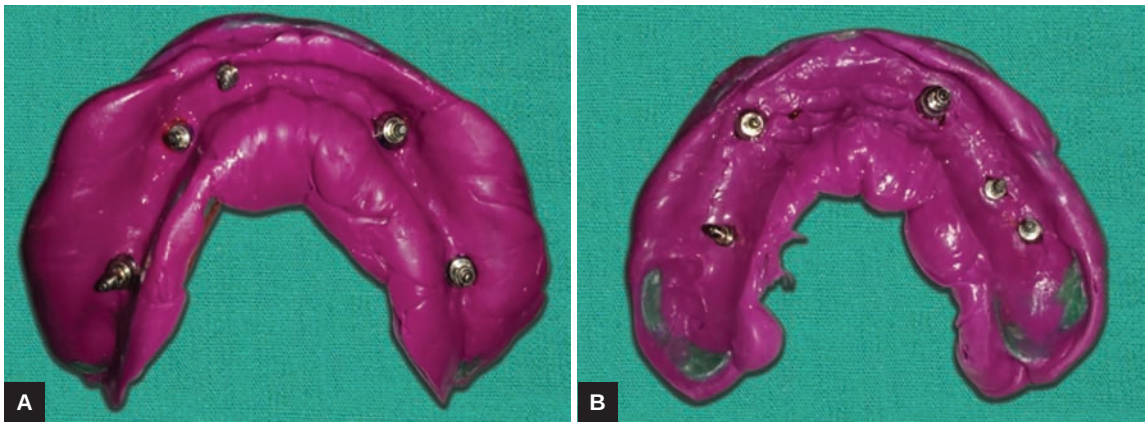
Figs 11A and B: Open windows sealed by modeling wax

monophase polyvinyl siloxane elastomeric impression material (Dentsply) and placed in patient's mouth; once material was set and impression analogs were unscrewed with the help of hex, impression was separated from the mouth (Figs 12A and B). Implant analogs were threaded to impression copings and mandibular master cast was fabricated (Figs 13A and B). Similar procedure was followed for maxillary arch.

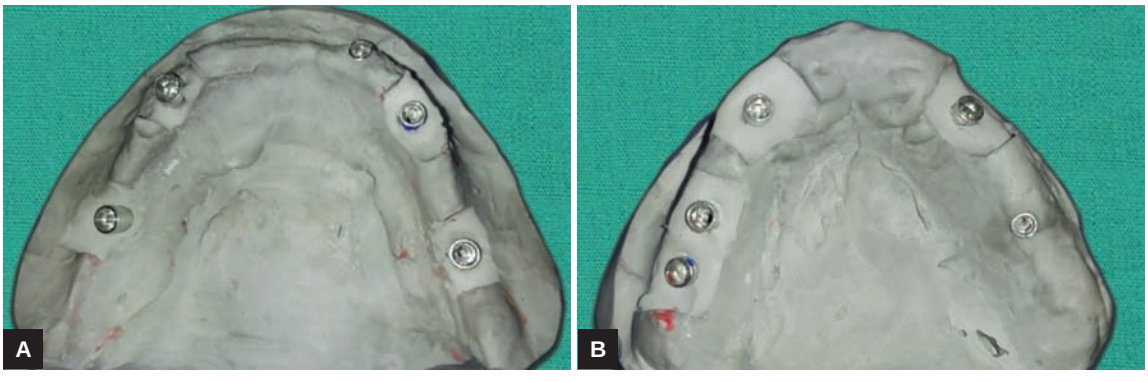
Denture bases with nonengaging abutments (Fig. 14) were fabricated (two nonengaging abutments on either side of maxillary arch and two on mandibular arch), occlusal rims fabricated for jaw relation record (Fig. 15). Once jaw relation was recorded, casts were mounted on the articulator and teeth were arranged. Try-in was done in patient (Fig. 16) and checked for occlusion, fullness, and visibility; later template of teeth arrangement was made with the help of polyvinyl siloxane putty material to get the same contour for the final ceramic buildup.

Resin jig was fabricated with the help of pattern resin in the cast with definitive abutments in place and verified both clinically (Figs 17A and B) and radiographically for marginal discrepancy, after confirmation of pattern rein jig both clinically and radiographically. Cobalt–chromium metal framework was fabricated by direct metal laser sintering.

Co–Cr metal framework trial was carried out in patient's mouth (Figs 18A to D) and interocclusal record was made



Figs 12A and B: Final impression of both mandibular and maxillary arch

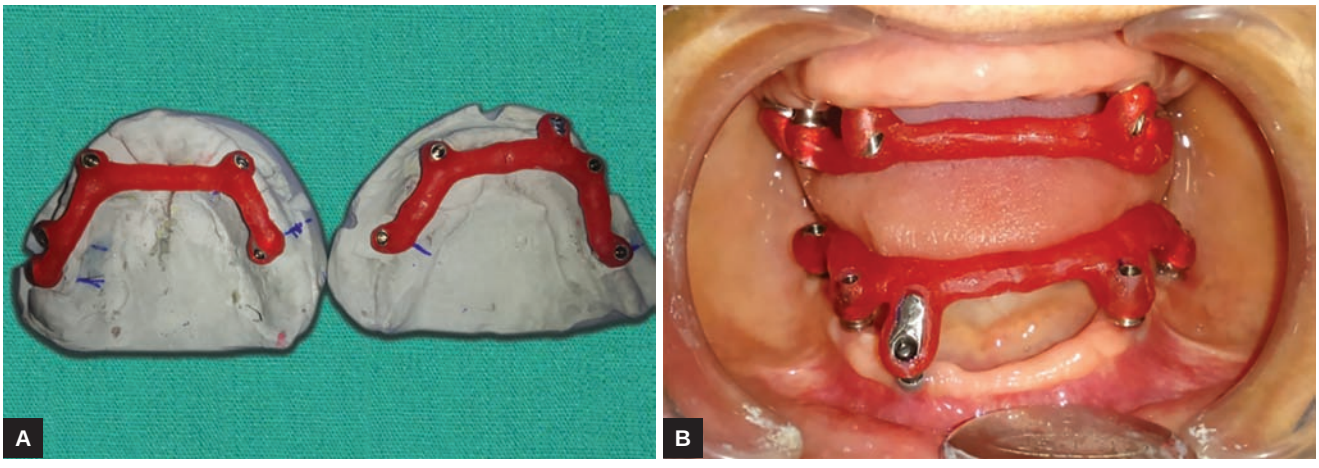


Figs 13A and B: Master casts of mandible and maxilla with implant analogs

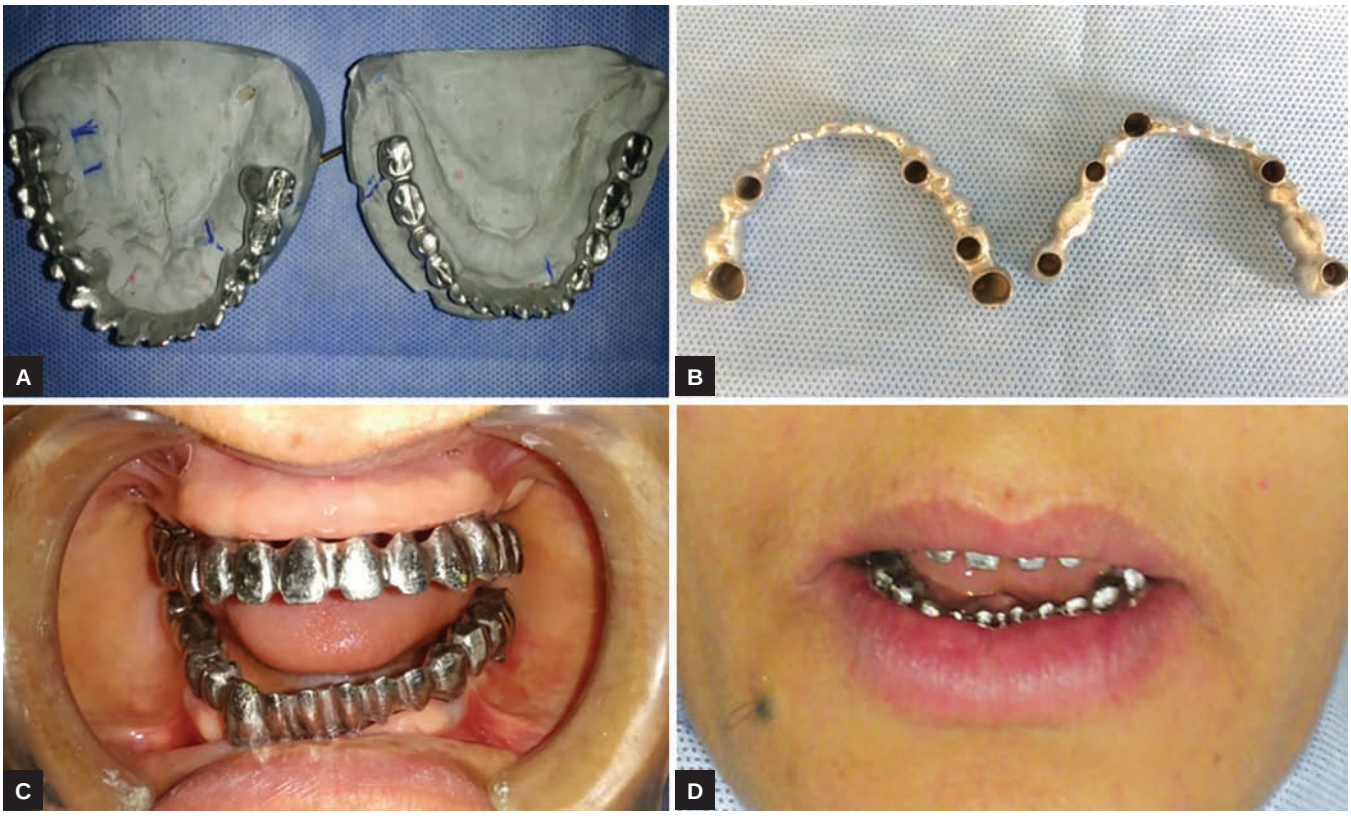
Fig. 14: Denture base with nonengaging abutments

Fig. 15: Intraoral view of jaw relation record

Fig. 16: Try-in done in patient



Figs 17A and B: Resin jig verification with definitive abutments



Figs 18A to D: Intraoral views of Co–Cr metal framework trial

Fig. 19: Co–Cr framework with interocclusal record

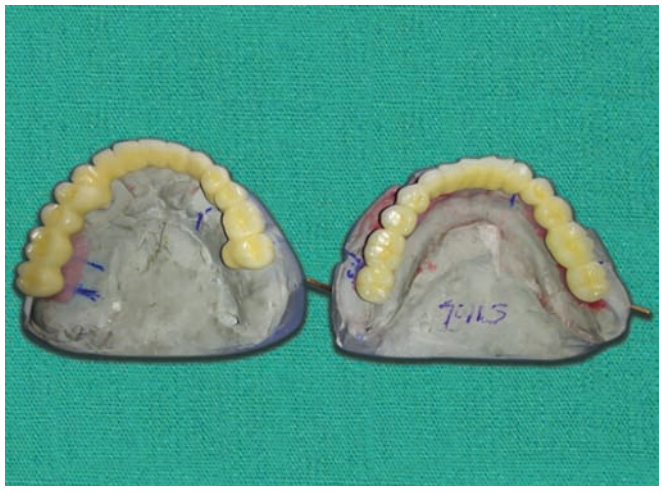
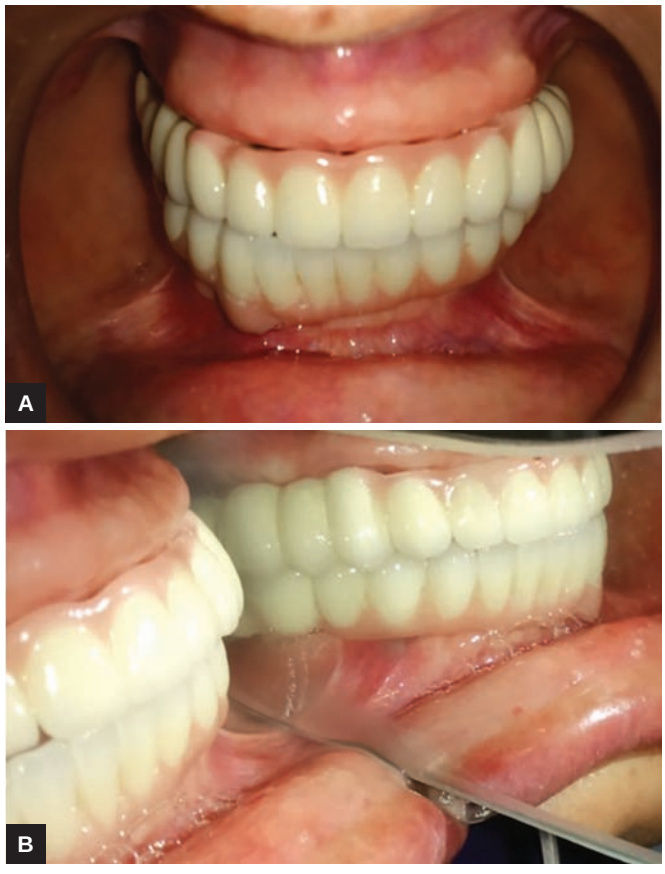


Fig. 20: Ceramic buildup

Fig. 21: Intraoral view of Bisque trial

Fig. 23: Postoperative view of the patient



Figs 22A and B: Final prosthesis verified for occlusion

with metal framework (Fig. 19). Shade selection was done and ceramic buildup was carried out (Fig. 20) according to template and bisque trial was done in patient's mouth; occlusal adjustments were carried out with articulating paper (Fig. 21); temporary cementation was done with the help of zinc oxide eugenol cement followed by glazing of the prosthesis and verified again for occlusion (Figs 22A and B).

Postoperative photographs were taken (Fig. 23) and postdelivery instructions were given regarding oral hygiene and good maintenance of the prosthesis.

CONCLUSION

Appropriate diagnosis and treatment planning is the key to successful full-mouth rehabilitation. However,

implant-supported prosthesis demands considerable skill from the prosthodontists and high degree of commitment from the patient for maintaining excellent oral hygiene.

REFERENCES

1. George AJ. Prosthodontic treatment for edentulous patients. 12th ed. St Louis (MO): Elsevier; 2004. p. 3-5.
2. Fischer K, Stenberg T. Three-year data from a randomized controlled study of early loading of single stage dental implants supporting maxillary full-arch prostheses. Int J Oral Maxillo Implants 2006 Mar-Apr;21(2):245-252.
3. Lindquist LW, Carlsson GE, Jemt T. A prospective 15-year follow-up study of mandibular fixed prostheses supported by osseointegrated implants: clinical results and marginal bone loss. Clin Oral Implants Res 1996 Dec;7(4):329-336.
4. Lemmerman KJ, Lemmerman NE. Osseointegrated dental implants in private practice: a long-term case series study. J Periodontol 2005 Feb;76(2):310-319.
5. Adell R, Lekholm U, Rockler B, Brånemark PI. A 15-year study of osseointegrated implants in the treatment of edentulous jaw. Int J Oral Surg 1981 Dec;10(6):387-416.
6. Adell R, Errikson B, Lekholm U, Brånemark PI, Jemt T. Long-term follow-up study of osseointegrated implants in the treatment of totally edentulous jaws. Int J Oral Maxillofac Implants 1990 Winter;5(4):347-359.
7. Lee H, So JS, Hochstedler JL, Ercoli C. The accuracy of implant impressions: a systematic review. J Prosthet Dent 2008 Oct;100(4):285-291.