

Full Mouth Rehabilitation of a Patient Using Tooth Supported and Implant Supported Fixed Prosthesis: A Case Report

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ABSTRACT

Background: The aim of modern dentistry is to restore the edentulous patients to normal function, contour, comfort, aesthetic, speech and health, inspite of the atrophy, disease or injury to the stomatognathic system. The use of dental implants to provide support for prosthesis offers a multitude of advantages compared with the use of removable soft tissue borne restorations. Full arch rehabilitation with implant supported prosthesis is a well-established and promising treatment option for partially or completely edentulous patients. The Malo's clinical ceramic bridge is the most aesthetically advanced form of fixed prosthodontic rehabilitation for the edentulous patients. This prosthesis is the epitome biomedical engineering combined with Computer aided design/computer assisted machine CAD/CAM technology. The prosthesis consists of a titanium or cobalt chromium metal framework over which individual crowns are fabricated.

Keywords: Tooth supported, Implant supported, Case report CAD/CAM, Malo's ceramic bridge.

INTRODUCTION

Edentulism is associated with compromised aesthetics, functional and psychological problems. Modern dentistry aims to return patients to normal oral health and function. Oral rehabilitation of an edentulous patient is a challenge to the Prosthodontist.¹ Implant-supported fixed prostheses have increasingly been the first-choice treatment for the rehabilitation of edentulous areas. Replacement of complete dentures with fixed implant retained prostheses has achieved predictable high acceptance level and high survival rates.²

Various treatment options available for the edentulous arch include conventional implant supported fixed partial dentures, implant supported overdentures, and conventional complete denture. Patient's need, resources and conditions must be considered before initializing any treatment plan.³

In this case report, treatment plan was based on Paulo Malo protocol. The Paulo Malo Implant bridge consists of a removable occlusal screw-retained superstructure; fabrication of the framework with a computer-aided design/computer-aided manufacturing system allowing accurate adaptation; and use of the final tooth position model with guide temporary crowns allowing easy porcelain build-up and satisfying the patient's esthetic concerns.^{3,4}

CASE REPORT

A 53 year old female patient presented to the Department of Prosthodontics of JCD Dental College, Sirsa with chief complaint of difficulty in eating and unpleasant esthetics. Clinical and radiographic evidence revealed generalized periodontitis, multiple root stumps and missing teeth in the lower posterior region. The patient was given a detailed

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explanation concerning the present state, alternative treatment plans and the proposed procedure which included multiple extractions and implant placement. The patient was very conscious about her aesthetics and was very keen for earliest possible restoration of her teeth so, she opted for proposed procedure.



Fig 1: Pre-treatment photographs of the patient.



Fig 2: Mucoperiosteal flap was reflected.

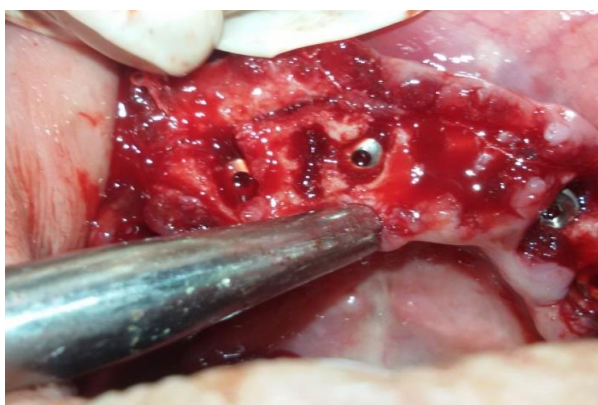


Fig 3: Implant placement was done.

Necessary investigations such as complete blood count, bleeding time, clotting time, blood sugar levels and orthopantomograph was done. Patient's medical history was non contributory. A complete case history was recorded followed by complete intraoral and extraoral examination. Patient's intraoral examination revealed root stumps in 13, 14, 16 & 26 region and missing 44,46,47 and 36,37.

The remaining teeth in the mandibular arch along with maxillary anteriors (11,12,21,22) were periodontally compromised with grade II mobility. Pre-treatment photographs were taken. (Fig.1)



Fig 4: Final impression was made with polyether impression material.



Fig 5: Jig trial was performed.



Fig 6: OPG taken to evaluate the passivity of fit.



Fig 7: Titanium framework.



Fig 8: Intraoral trial of Titanium framework.



Fig 9: Individual crowns fabricated over Paulotitanium framework.



Fig 10: Mandibular arch restored with malo bridge.



Fig 11: 11 Post operative panoramic radiograph.



Fig 12: Intraoral post operative photograph of patient.

TREATMENT PLANNING

Considering the clinical and radiographic examination of the patient, the treatment plan for the patient consisted of extraction of periodontally compromised mandibular and maxillary teeth with hopeless prognosis followed by immediate placement of implants. Scaling and root planning was done on the remaining maxillary teeth followed by crown preparation. Fixed partial denture was planned w.r.t 15,16,17 and 23,24,25,26,27. An implant supported fixed partial denture in maxillary anterior region and restoration of mandibular arch with Palo-Maulo Bridge was planned for the patient.

Surgical Phase:

Patient's consent was taken prior to the surgical procedure. Immediate implant placement was planned for the patient after the extraction of all the periodontally compromised mandibular teeth.

Surgical procedure was done under local anaesthesia. Crevicular incision was placed from the distal aspect of 45 to distal surface of 35. A full thickness mucoperiosteal flap was reflected with the help of periosteal elevator. All the periodontally compromised teeth in the mandibular arch were extracted (Fig.2).

Lower anterior teeth were extracted

Five immediate implants were placed in the inter foraminal region(Fig.3). All the bony spicules were removed and the ridge was contoured with the help of bone rounders and bone filing was done. Flaps were approximated and were closed with the help of interrupted sutures Pressure pack was applied to

the surgical sites. Post-operative instructions were given to the patient and proper medication was also prescribed.

Patient was recalled after 7 days for the suture removal and evaluation of her condition. After 7 days, sutures were removed and the extraction of periodontally compromised maxillary anterior teeth and root stumps and immediate placement of maxillary implants was done. The procedure was done under local anaesthesia. A full thickness mucoperiosteal flap was reflected and the extraction of periodontally compromised maxillary anterior teeth followed by immediate implant placement in the region of 11, 13, 14 & 22 was done. Maxillary ridge was re-contoured, flaps were approximated and sutures were placed. The root stumps in the region of 16 & 26 were extracted and pressure pack was applied. Proper medication was given to the patient.

After 7 days patient was recalled for a follow up and sutures were removed. During the time being before the second stage surgery, endodontic treatment for 15, 17, 23,24,25 &27 was also done followed by immediate temporization.

Pre-Prosthetic Phase:

After a healing period of 16 weeks, implant sites were evaluated. They were completely healed without any inflammation. Incision was placed in both the maxillary and mandibular arch to uncover the implants. Cover screw were removed and healing abutments of proper height and width were placed in the implants. Flaps were approximated and sutures were placed.

Prosthetic Phase:

After 10 days of healing, preliminary impressions for both the arches were made

using alginate impression material. Preliminary casts were obtained and primary denture bases with occlusal rims were fabricated for the tentative jaw relations. Crown preparations were done for the maxillary root canal treated teeth and occlusal plane for the patient was also corrected using these tentative jaw relations. Closed tray transfer copings were placed in the maxillary implants. Putty wash impression technique was used for making the final impression for the maxillary implants and the

prepared teeth. Custom tray was also fabricated over the mandibular preliminary casts for the open tray impression. Open tray transfer copings were placed over the mandibular implants intra-orally and final impression was made using polyether monophase impression material. (Fig.4) Master casts were obtained with impression analogs and soft tissue replica to duplicate soft tissue contour.

Impression copings were joined using pattern resin and jig trial was performed. (Fig.5) & (Fig.6) Temporary denture bases and occlusal rims were fabricated and jaw relation was recorded. Casts were mounted over the semi adjustable articulator. Maxillary arch was restored with the help of Pfm bridge and crown using the natural teeth as abutment in the posterior region and maxillary anterior region was restored with the help of implant supported PFM bridge.

Mandibular arch was restored with the help of Paulo Malo bridge over the 5 implants placed in the anterior region. Teeth arrangement was done over the lower denture base. A tentative trial was done for the patient to access the aesthetics, phonetics and occlusion.

Once the trial was done, the titanium framework was milled for the mandibular arch (Fig7) and tried in the patient's mouth (Fig.8). The framework was checked for the passive fit using the Schefield's one screw test. All the prosthetic screws were tightened using a hex driver and a diagnostic OPG was taken to ensure that there was no marginal gap between the titanium framework and implants. Shade selection was done. Pfm crowns were fabricated over the milled abutments in the frame work. (Fig.9) Bisque trial was done for the maxillary and mandibular arch. The fit of the framework was again verified. After occlusion adjustment all the pfm crowns were glazed. Palo- Maulo bridge was tightened with the help of prosthetics screws over the mandibular implants. (Fig. 10)

The prosthetic screws were tightened to 30N torque using a torque wrench followed by cementation of the PFM crowns over the milled abutments over the frame work with the help of dual cure resin cements.

Edentulism is often correlated with functional and esthetic concerns for the patient and is related to psychological problems possibly affecting routine activities.² Tooth absence can severely affect a patient's psychosocial status, even for patients who seem to adapt well to a conventional complete denture. Restorations supported by implants offer multiple advantages over ordinary removable prostheses. Efficient retention and stability are simply achieved by creating a fixed restoration, or at least by using overdenture attachment instead of counting on the weak physical ways used with regular dentures.¹

The treatment procedure used in this case report was introduced by Maló which allows the rehabilitation of edentulous jaws without bone graft in one surgical step through the placement of four (or more) implants and optimizing the available bone.^{1,2}

Implant frameworks should be biocompatible, should have excellent physical properties in terms of strength, fit accurately to implants and abutments, and be compatible with esthetic veneering materials such as ceramic and acrylic resins. The advantages of using a framework produced by one specific CAD/CAM system are high precision of fit, longer cantilever lengths, use of fewer implants to support the prostheses, biocompatibility, elimination of rigid connectors, frameworks less susceptible to human error, and standardized fabrication procedures.¹⁰ The framework can be made either of titanium or cobalt chromium. In this case, titanium framework was used. The weight of titanium framework is less as compared to cobalt chromium framework but it is expensive and technique sensitive.¹¹

A passive fit of implant-supported prostheses is considered a prerequisite for the prevention of mechanical complications, and therefore prosthetic success. The framework should have passive fit otherwise it will produce more load on the underlying implants and can lead to failure.^{14,15}

The prosthesis in this case report was fabricated with individual crowns over the titanium framework. The prostheses designed with individual crowns have following advantages: high

esthetics, high capacity of repair.¹² It is possible to repair without removing the whole structure. Fabrication of implant-supported fixed prostheses with CAD/CAM fabricated frameworks and individualized crowns incorporate the advantages of both CAD/CAM and lost wax technologies.¹³

Placement of dental implants in attempts to treat the severely resorbed maxilla and mandible has had only limited success. But the rehabilitation of completely edentulous, atrophied maxilla and mandible by the placement of implants using the Paulo Malo protocol gives new hope for a perceivable success, while becoming a promising treatment method of choice and standard in the care for severely compromised patients.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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