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Malo Implant Bridge- Refurbishing The Prosthetic Precision

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Abstract

Oral implants have become the most helpful therapeutic option to overcome functional and aesthetic deficiency. Replacement of missing teeth in the anterior esthetic zone is a challenging task. Specifically, when there is a deficient soft and hard tissue. Clinical circumstances with the compromised architecture of the supporting tissues would require surgical augmentation to enhance the configuration for implant surgery. This clinical report presents the successful application of Malo implant bridge protocol in rehabilitating maxillary anterior region with compromised supporting tissue architecture. The prosthetic treatment enabled to restore esthetics and function without additional surgical reconstruction of the deficient supporting foundation.

Keywords: Ridge defect, Esthetic zone, Malo Implant Bridge, CAD/CAM, Fixed Prosthesis

Introduction

Carl Misch [1] stated the fundamental axiom in implant dentistry is to identify the end result before the task begins. Multiple prosthetic options exist for rehabilitating partial and total edentulous arches with implants. The treatment options should be carefully evaluated early in the planning process. Introduction of CAD/CAM technology and the availability of versatile dental materials, dental implantology have reached an era where oral implant therapy has become a part of routine dentistry. But till today successful implant therapy is questionable. The most challenging part of oral implant therapy being the prosthetic phase. Multiple prosthetic options exist for rehabilitating partial and total edentulous arches with implants using different loading protocol.

In 1999, Randow et al., [2] advocated the “Nordiac Bridge” concept for early loading of Branemark system implants within 20 days of insertion. The prosthesis consisted of bilateral cantilevers corresponding to 2 premolars and superstructures fabricated in porcelain fused to gold alloy.

Chow et al., in 2001 [3] proposed “Hong Kong Bridge” concept in which the patients were provided with the

provisional fixed prosthesis, over immediately loaded Branemark system implants.

Marius implant bridge was explained by Fortin Y et al., in 2002 [4]. The prosthesis involved a combination of the fixed bridge and the overdenture for edentulous maxillae.

Later Branemark et al., [5] in 2003 described "Branemark Novum Bridge" concept in this technique on the day of fixture placement 67% of the patients received Novum prosthesis. The fixtures were immediately splinted with a prefabricated substructure and fixed prosthesis extending from first molar to first molar with cantilevers of 9-22mm.

In 2003 Malo et al., [6] reported prosthetic rehabilitation of "All- On - 4" concept with Malo implant bridge. The prosthetic design included either metal-ceramic implant-supported fixed prosthesis with a titanium framework and all-ceramic crowns, or metal-acrylic resin, implant-supported fixed prosthesis with titanium framework and acrylic resin prosthetic teeth.

The following case report reveals the detailed description of surgical and prosthetic phases including the strategic treatment planning of restoring an esthetic zone having defective supporting tissues using Malo implant bridge. The role of Malo implant prosthesis for achieving optimum prosthetic needs and patient satisfaction has been described.

Case Report

A 20 years old male patient reported to the department of prosthodontics for the prosthetic phase of implant placed in upper front region. The chief complaint was missing teeth in the upper front teeth region. The patient gave a history of exfoliation of 12, 11 and 21, due to trauma during road traffic accident 6 months back. And underwent implant therapy concerning above region 8 months ago. He was wearing a removable dental prosthesis and he was dissatisfied because of poor aesthetics, phonetics and compromised function.

Extra oral examination showed no gross facial asymmetry or any other abnormality. Intra-oral examination revealed partially edentulous maxillary arch with missing 12, 11 and 21 and dentulous mandibular arch (Fig.1). Edentulous region examination presented Siebert's class II-ridge defect [7] having compromised vertical bone dimension resulting in increased crown height space with respect to missing teeth region. Orthopantomography revealed 3 implants fixtures placed in 12, 11 and 21 regions (Fig. 2). Implants were well osseointegrated no pathology was evident. Clinical examination of the edentulous region revealed excessive mesiodistal width and apicocoronal height.

Misch [1] proposed 3 prosthetic options for implant supported fixed prosthesis (FP) as FP-1 to 3. The FP-3 prosthetic design includes a hybrid restoration of metal substructure denture teeth or a porcelain-metal restoration. Malo Implant prosthesis successfully justifies the Misch proposal to restore the missing teeth crowns, deficient soft and hard tissues. Hence Malo implant prosthesis was planned to rehabilitate compromised supporting tissues.

Prosthetic phase

Implant level impression was planned using custom-made open tray technique. Wax spacer (Fig. 2) was adapted and custom-made tray fabricated (Fig. 3). Gingival formers were removed and impression posts were attached and radiographically evaluated (Fig. 4). Definitive impression was made using mono phase addition silicone impression material (Aquasil Ultra Monophase- Dentsply, India). Lab analogs were attached to impression posts (Fig. 5). Gingival mask placed and cast poured. Verification jig was received from the lab and evaluated in patient's mouth. Inaccuracy was found between jig with relation to 11 and 21 regions. Hence, jig was sectioned (Fig. 6) and accurate fit was ensured followed by which jig was splinted using composite resin material (Fig.7) and new

impression was made for further lab work. Designing (Fig.8) and milling (Fig.9) of Titanium framework was fabricated by using CAD/CAM technology and milled Titanium framework having gingival area fused with acrylic resin was tried-in patient mouth (Fig.10) and implant framework interface was verified with radiograph (Fig.11). Shade selection was done for three individual porcelain fused to metal crowns. Metal ceramic crowns were tried on Titanium framework (12). This final prosthesis was tried in patient's mouth. Occlusal interferences were evaluated and eliminated. Titanium framework was screw retained over implant and individual PFM crowns were cemented using zinc oxide eugenol cement following standard clinical protocol. Later, screw access openings were concealed with composite resin material (Fig. 13).

Patients esthetic concern was highly satisfied. Patient was recalled for periodic follow up. Clinical and radiographic examination of one year follow up showed no signs of inflammation and mobility (Fig. 14) or bone loss.

Discussion

In this case report, due to trauma, there was a deficient bone in relation to 12, 11 and 21 region resulting in Seibert's class II ridge defect. Depending on hard and soft tissues architecture in 1991 Misch [1] suggested 3 prosthodontic options for fixed prostheses as FP-1, FP-2 and FP-3. FP-3 is the option that replaces the missing tooth, gingiva and portion of the ridge tissues. The restorative material of choice for FP-3 is a hybrid restoration of denture teeth acrylic and metal substructure or a porcelain-metal restoration. Prosthetic treatment plan of the present case intended to restore the excessive crown height space by fabricating small titanium framework to support the 3-porcelain fused to metal crowns along with the esthetic replacement of soft tissue.

The clinical condition of the current case report belongs to FP-3 option due to compromised edentulous in maxillary anterior esthetic zone. Malo implant bridge allowed correction of ridge defect without any additional surgical invasion for ridge correction. Paulo Malo et al., [8] in 2011 reported longitudinal study with 10 years follow up including 245 patients and 980 immediate function implants treated with Malo prosthesis concluded high prosthetic survival rate with his invention.

The bone defect was successfully corrected with CAD/CAM designed Titanium framework and this screw retained framework makes it easy to retrieve for further evaluation and corrections with minimal complications. Prosthesis with individual PFM crowns enhanced the esthetics. Use of Titanium framework provided splinting mechanism, more precision fit and uniform stress distribution. So, fulfilling the biomechanical requirements of prosthesis with reliable success rate.

Conclusion

Once Osseo integration has been achieved, the clinical fate of the prosthesis primarily relates to the precise fitting of the prosthetic superstructure on the implant fixtures that will determine the patient satisfaction and overall treatment success. This precision was achieved by strategic treatment planning of Malo implant prosthesis making it a novel concept for prosthetic rehabilitation.

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Legends Figures

Fig. 1: Siebert's class III-ridge defect with respect to 11, 12 & 21 region.

Fig. 2: Wax spacer

Fig. 3: Open Impression Tray

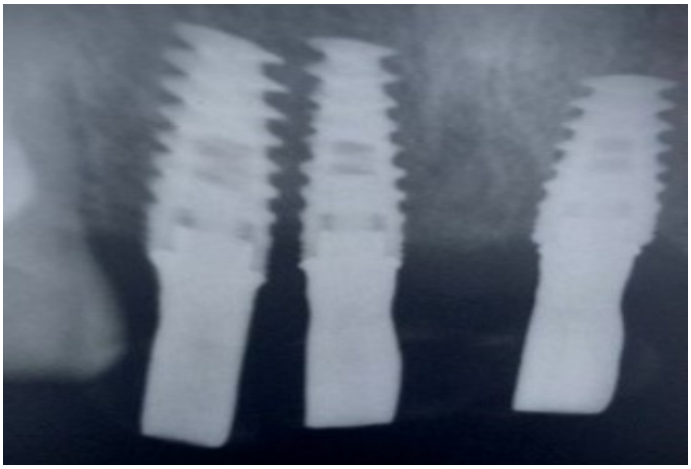

Fig. 4: Periapical radiograph of Impression post

Fig. 5: Final Impression with lab analogues

Fig. 6: Acrylic Jig sectioned

Fig. 7: Acrylic jig splinted with composite resin

Fig. 8: CAD-CAM design for Titanium framework

Fig. 9: CAD-CAM designed Titanium framework

Fig. 10:Titanium framework try- in

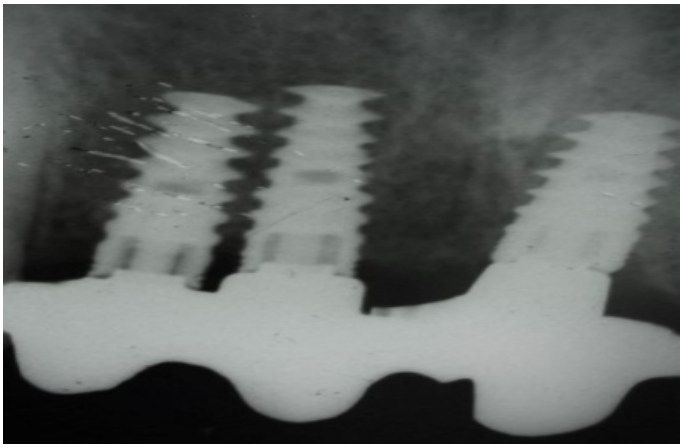

Fig.11: Periapical radiograph of framework implant interface

Fig.12: PFM crowns and Titanium framework

Fig.13: Screw access openings covered with composite resin material

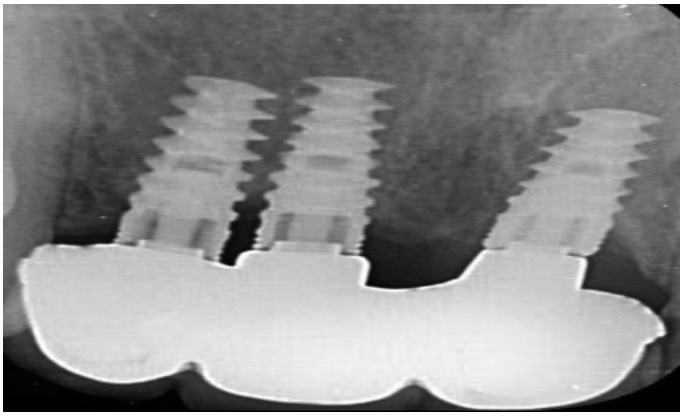

Fig. 14: One-year post-operative periapical radiograph