

Provisional Prosthesis for a Long Span Edentulous Area in Cases of Delayed Implant Loading-A Simpler Technique

Angadi Kalyan Chakravarthy¹, Nelluri Vizaikumar Vasudha²,
Budiga Veerendra³, Maria Roseme⁴, Bhanu Chander⁵, Ramavarapu Avinash⁶

¹(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

²(Department of Prosthodontics, Government Dental College & Hospital, Hyderabad, Telangana, India)

³(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

⁴(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

⁵(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

⁶(Department of Prosthodontics, Meghna Institute of Dental Sciences, Nizamabad, Telangana, India)

Corresponding Author: Nelluri Vizaikumar Vasudha

Abstract: The phase of provisional restoration can be the most challenging aspect of implant dentistry. There are various options available today ranging from removable, tooth-supported provisional restorations to implant retained provisional restorations. The selection of the type of provisional prosthesis should be based on esthetic demands, functional requirements, duration, and ease of fabrication. This article gives a simpler technique using an arch bar retained fixed provisional / interim prosthesis after implant therapy in long span edentulous areas in cases of delayed loading.

Key words: Long span edentulous area, Arch bar, Provisional / interim prosthesis

Date of Submission: 20-04-2019

Date of acceptance: 04-05-2019

I. Introduction

Implant therapy has a high success rate to restore partially and fully edentulous patients^{1,2}. A well-constructed provisional prosthesis that covers the functional, aesthetic and phonetics needs is required prior to the delivery of the final restorations, which makes it more acceptable for the patient to undergo the implant treatment. An ideal provisional restoration should be strong, durable and aesthetic, and it should not exert excessive (transmucosal) pressure on the underlying soft tissue which can lead to interruption of healing at the grafted sites or implant osseointegration³. A tooth or implant supported provisional restoration is often the preferred option. It offers psychological benefit and convenience for the patient and the clinician has control over the amount of soft tissue pressure exerted. This case report describes a simpler technique of fabrication of arch bar supported fixed provisional/ interim implant prosthesis.

II. Case Report

A 25 year old female patient reports to the Department of Prosthodontics with a chief complaint of difficulty in speech and poor looks due to missing teeth in the lower front region. On intraoral examination, tooth numbered 31, 32, 41 & 42 were missing since one year due to trauma. The mandible presented with a square shaped arch contributing to a long edentulous span in the lower anterior region. Implant supported fixed prosthesis / bridge was planned to replace the missing teeth with implantation abutment in 32 and 42 regions. Root form dental implants with Titanium Implant body (Adin Dental Implant Systems Ltd. Israel) were surgically placed with simultaneous autogenous bone augmentation procedure. An insertion torque of 25 Nm was achieved and hence immediate loading was not considered. To offer psychological benefit and convenience for the next three to four months a tooth supported provisional prosthesis was planned with minimal disturbance to the adjacent natural teeth. A simpler technique for the fabrication of fixed provisional/ interim implant prosthesis using an arch bar (commonly used for inter-maxillary fixation in cases of maxillary and/or mandibular fractures) was planned, bonding onto the lingual surfaces of the tooth(33,34 & 43) adjacent to the edentulous areas.

III. Procedure

1. Maxillary and mandibular impressions were recorded with irreversible hydrocolloid impression material one week post –operatively after implantation. (Algitex, Dentsply India Pvt. Ltd.).

2. Master casts were obtained pouring the impressions with type III dental stone (Kala stone, Kalabhai Dental Products Pvt. Ltd., Mumbai, India).
3. An arch bar (Erich,Ortho Max Manufacturing Company Pvt.Ltd. Vadodara, Gujarat) usually used for fracture fixation was adapted onto the lingual surface of 33, 34 & 43 on the mandibular cast. The bent wings of the arch bar were straightened and contoured along the edentulous arch using orthodontic pliers [Figure 1].

Figure 1: Adaptation of Erich arch bar on the lower anterior lingual surfaces-Occlusal view



4. The contoured arch bar was stabilized 2mm above the gingival margin and mock wax up of missing teeth (32,31,41& 42) was made using modelling wax (Hindustan Dental Wax, HDP, Hyderabad, India).A putty index (Zhermack SpA – Badia Polesine(RO), Italy) was made of the entire assembly.
5. Later the mock wax up (Hindustan Dental Wax, HDP, Hyderabad, India), was removed and the contoured arch bar is roughened by sand blasting and grooving on the inner surface.
6. The roughened arch bar is again stabilized on the mandibular model and tooth colored self cure acrylic resin (Dentsply Pvt. Ltd. India) was loaded into the putty index (Zhermack SpA – Badia Polesine (RO), Italy) which was made previously in the dough stage. It was pressed over the model containing the arch bar. After complete polymerization the arch bar reinforced provisional /interim prosthesis is retrieved finished and polished [Figure 2 & 3].
7. Intra oral preparation was carried out prior to the bonding of the interim prosthesis. A polishing brush (Yancheng Diling Medical Instruments Co.,LTD. China) and an oil- and fluoride-free cleaning paste (Proxyl RDA 36, medium, Ivoclar Vivadent Inc) are used to clean the proposed bonding surfaces of the abutment teeth (the lingual surface of 33, 34 & 43).
8. Cementation procedure requires absolute isolation of the operative area. Isolation is done with cotton rolls and saliva ejector.

Figure 2: Finished and polished Provisional/interim prosthesis-Labial view



Figure 3: Provisional / interim prosthesis well positioned above the gingival margins-Lingual view



9. Pre-treatment of the bonding surfaces of the provisional/interim prosthesis is made by etching with 5% hydrofluoric acid (IPS® Ceramic etching gel, Ivoclar Vivadent, Inc.) for 60 seconds according to the instructions of the manufacturer followed by thorough rinsing with water spray and dried with oil-free air.
10. Primer agent (Monobond® N or Monobond-S, Ivoclar Vivadent, Inc.) was applied with a brush to the pre-treated lingual tooth surfaces. The agent was allowed to react for 60 seconds and dispersed with a strong stream of air.
11. Variolink N Base and Catalyst (Ivoclar Vivadent, Inc.)⁴ was mixed in a 1:1 ratio on a mixing pad for 10 sec immediately before application and applied it on the prepared surface of teeth. The prosthesis was placed on the prepared surface and excess cement was removed and light cured.
12. Borders of the bonded prosthesis are smoothed for smooth transition of borders of the prosthesis and the tooth surfaces. Occlusal interferences if any are corrected in all excursive movements [Figure 4].

IV. Discussion

Implant supported prosthesis now-a-days is a well accepted and a predictable treatment modality. Success rate of implant prosthesis has been shown to be over 90 percent⁵. Acceptance for the implant therapy is growing higher and expectation towards the implant therapy is increasing day by day. Fear of loss of social image or daily function is experienced by the patient facing edentulousness. Thus patient often expects immediate loading of dental implants through restoration similar to their natural dentition having function and esthetics. Immediate loading of dental implants is a predicable treatment option⁶. Delayed loading protocols wherein implants are left unloaded for 3 to 4 months until complete osseointegration is usually carried out in minimum insertion torque and poor bone density situations⁷. During this healing period, the patient would prefer prosthesis for esthetics or function irrespective of the technical concerns such as initial stability, insertion torque levels, bone factors and occlusal forces. Provisional restorations in implant therapy can be in the form of removable or fixed prosthesis. Removable provisional prosthesis is generally tooth and/ or soft tissue borne⁸. Fixed provisional restorations can be supported by adjacent teeth or implant retained' includes bonded extracted teeth, denture teeth or cast metal reinforced resin bonded fixed partial denture^{9,10}. Provisional prosthesis with fiber reinforced fixed partial denture in this region was challenging due to long edentulous span. An alternative method was chosen instead of fiber reinforcement to achieve improved strength.

Figure 4: Provisional/interim prosthesis *insitu*-Intra oral view



A simpler method described in this article is use of an Erich arch bar for fabricating provisional/interim restoration in the esthetic zone. This technique can be considered in long span edentulous ridges which require temporization for a long period of time and for better esthetics. The advantages of this new design are (1) Highly esthetic because there is no metal showing through the facial surface, (2) Simplicity of fabrication, cost and ease of cementation, (3) less time spent for adaptation and cementation unlike procedures involving casting or acrylization procedures, (4) its free of trans-mucosal loading, (5) stable because of lingual reinforcement with wings of the arch bar and (6) it is more durable due to usage of seventh generation resin cement. The disadvantages of this technique includes (1) preparation of the adjacent tooth however, minimally which includes surface roughening and etching of the abutment tooth and (2) chances of debonding of the prosthesis when encountered with heavy anterior biting forces.

V. Summary and Conclusion

A female patient with edentulism in the lower anterior region with esthetic concerns was planned for an implant supported fixed prosthesis with dental implants in 32 & 42 regions. Delayed loading protocol was selected due to poor bone quality and less insertion torque achieved during implantation. Fixed provisional/ interim prosthesis using an Erich arch bar (commonly used for inter-maxillary fixation in cases of maxillary and/or mandibular fractures) is planned, bonding onto the lingual surfaces of the tooth (33, 34 & 43) adjacent to the long span edentulous areas. To avoid debonding of the interim prosthesis, biting heavily in the anterior region is restricted. Patient is educated about its maintenance and limitations. Provisionalization of long span edentulous areas using of an arch bar supported fixed provisional/ interim prosthesis can be considered as a simple, cost effective and predictable treatment modality.

References

- [1]. Adell R, Lekholm U, Rockler B, Branemark PI. A 15- year study of osseointegrated implants in the treatment of edentulous jaw. *Int J Oral Surg* 1981; 10:387-416.
- [2]. Buser D, Mericske-Stern R, Bernard JP, Behneke A, Behneke N, Hirt HP et al. Long-term evaluation of non-submerged ITI implants. Part 1: 8- year life table analysis of a prospective multicentre study with 2359 implants. *Clin Oral Implants Res* 1997; 8: 161-172.
- [3]. Wang WCW, Hafez TH, Almufleh AS, Ochoa-Durand D, Manasse M, Stuart J Froum, et al. A Guideline on Provisional restorations for patients undergoing implant treatment. *J Oral Bio.*2015;2(2):7.
- [4]. Variolink® N Ivoclar vivadent clinical instruction manual. <http://downloads.ivoclarvivadent.com/zoolu>
- [5]. Resantosa. Provisional restoration options in implant dentistry. *Australian Dental Journal* 2007; 52 : (3):234-242.
- [6]. Tarnow DP, Emtiaz S, Classi A. Immediate loading of threaded implants at stage 1 surgery in edentulous arches: Ten consecutive case reports with 1- to 5-year data. *Int J Oral Maxillofac Implants* 1997; 12:319-24.
- [7]. Shivanad Aspalli, M Prebha. Delayed loading and peri-implant evaluation of dental implants: Keys to higher success in lesser dense bone. *Journal of Dental Implants* 2015;5:1.
- [8]. Moskowitr EM, Sheridan JJ, Celenza F Jr, Tovilo K, Munoz AM, et al. Essix appliances. Provisional anterior prosthesis for pre and post implant patients. *N Y State Dent J.* 1997; 63:32-35.
- [9]. Sang-Choon Cho, Saphal Shetty, Stuart Froum, Nicolas Elian, Dennis Tarnow. Fixed and removable provisional options for patients undergoing implant treatment. *Compend Contin Educ Dent.* 2007; 28:604-608.
- [10]. Shahram Emtiaz and Dennis P. Tarnow. Processed acrylic resin provisional restoration with lingual cast metal framework. *J Prosthet Dent* 1998; 79:484-8.

Nelluri Vizaikumar Vasudha. "Provisional Prosthesis for a Long Span Edentulous Area in Cases of Delayed Implant Loading-A Simpler Technique." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 05, 2019, pp 55-58.