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A Technique to Improve an Ailing Interim Implant-Supported Fixed Partial Denture

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Abstract

Objective: Implant-supported interim prostheses aims to preserve the natural periodontal architecture, protect the surrounding tissues, and provide patients with immediate esthetic and functional outcomes. The objective of this clinical technique article is to present a reliable method to replace an ailing interim implant-supported fixed partial denture (FPD).

Clinical considerations: Patient presented with an ailing interim implant-supported fixed partial denture (FPD) replacing all lower anterior incisors. After case was clinically and radiographically evaluated, diagnostic casts were mounted. Once the interim FPD was retrieved, provisional abutments were dislodged and cleaned. Implant impression copings were carried out intraorally using pattern resin; its respective implant replicas were attached and screwed. Healing abutments were hand-screwed to keep the periimplant tissue architecture until the delivering of the newly fabricated interim FPD. The implant impression copings and its respective implant replicas were positioned on the diagnostic cast using dental stone. The two provisional abutments were positioned on the implant replicas and screwed in place for the relining of the new interim prosthesis previously made with acrylic resin. The new interim FPD was finished, polished and delivered.

Conclusion: This clinical technique presents a reliable method for fabricating an immediate interim implant-supported FPD to replace an existing ailing interim prosthesis.

Introduction

A great dental educator once wrote: Provisional restorations are the blueprint for success [1] such principle should be indeed applied to implants prostheses undoubtedly. Pjetursson and colleagues, by comparing survival and complications rates from studies published before and after the year 2000 (from 1994 to 2012), concluded that dentistry shows a continuous positive learning curve in dental implants: the 5-year survival rate of implant-supported prostheses significantly increased in newer studies (97.1%) compared with older studies (93.5%) [2]. On the contrary, there was a significant increase in the number of technical complications for the overall results. It might be that lack of attention to the provisional stage could have a negative impact on the predictability of our implant treatment. Thus, the significance of the provisional stage on implant dentistry cannot be overstated [3].

The use of implant-supported interim prosthesis on partially edentulous patients aims to confirm the initial diagnostic restorative design [1,4-7], implement acceptable esthetics [1,4,5,8], phonetics [7], comfort and function [7,9]. Potentially, it facilitates a clear and objective communication between patient, dentist and technician [1,10-13]; improves the periimplant conditions [1,7,10,14,15]; and assess proposed occlusal schemes before definitive restoration is placed [9].

Provisional restorations designs appertain to implant therapy range from the removable acrylic resin complete denture to implant-supported fixed prosthesis [4-8,10,14-20].

The multiple clinical challenges (e.g. complex biomechanics, time management and periimplant tissue' architecture), dictates the type of material required. Generally, the aforementioned techniques are modeled by anecdotal and observational information, and are conveyed from natural tooth provisional techniques.

Contemporary materials for interim prostheses include polymethyl methacrylate (PMM), polyethyl methacrylate, polyvinyl ethyl methacrylate, bis-acryl composite resin, and visible light-polymerized urethane dimethacrylate [21]. Besides its inherent exothermic reaction [9,22-24] and volumetric shrinkage [23,25-27], PMM have shown-among the literature-better physical properties [9,27-30], color stability [27,31], and durability [9,27,32]. The present technique utilizes an indirect approach, were its fabrication takes place on the laboratory. The indirect technique eliminates the problems associated with the direct technique such as less accuracy on the margins, more chemical and thermal irritants around the tissues and more chances to locked the interim prostheses due to surrounding undercuts [28,29].

By utilizing the indirect technique with PMM in implant dentistry, our expected clinical outcomes have more chances to be colored by the "tincture of time" [33]. The objective of this clinical technique is to present a reliable method for fabricating an immediate interim implant-supported fixed partial denture (FPD) to replace an ailing interim prosthesis.

Clinical Case Report (Replacement of an Ailing Interim Implant-Supported FPD #23-26)

Patient presented to the Post Graduate Operative Dentistry Clinics at Nova Southeastern University with an ailing interim

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implant-supported acrylic resin (Jet, Lang, Wheeling, IL). FPD replacing the lower anterior incisors. Two Osseo Speed TX 3.5S Astra Tech implants (Dentsply Implants, Waltham, MA) were placed on positions of the lower right and lower left lateral incisors 1 year before the initial appointment. Clinical and radiographical examination of the area and surrounding structures revealed normal conditions; however the interim implant-supported FPD presented grade II mobility, general discoloration and lack of structural integrity (Figures 1A and 1B).

Prior to removal of the ailing interim FPD, diagnostic impressions were taken using fast set alginate impression material (Jeltrate, Dentsply Caulk, Milford, DE); face-bow registration and occlusal records (Regisil, Dentsply Caulk, Milford, DE) were also obtained. Diagnostic casts already mounted on a semi-adjustable articulator (Whip Mix, Louisville, KY), were duplicated. A wax-up of the objective area was made using the duplicated model (Figure 2).

The area of the lower anterior incisors as well as 15 mm below were demarcated and posteriorly grinded out on the model (Figure 3), using a Mio Motor (NSK Dental LLC, Hoffman States, IL) with carbide burs. Space was created to allow placement of the implant replicas (Dentsply Implants, Waltham, MA).

Clinically, the provisional abutments (Dentsply Implants, Waltham, MA) and interim FPD were retrieved; periimplant tissue was examined on the implant sites and deemed within normal limits. Copious irrigation using digluconate chlorhexidine (Peridex, 3M, St. Paul, MN) on a plastic syringe was made, to remove plaque and debris from the area. Implant impression copings (Dentsply Implants, Waltham, MA) were adequately screwed on both implants manually. Dental floss (Oral-B Essential floss, Procter and Gamble, Cincinnati, OH) was tied between the implant impression copings, followed by an application of pattern resin (Duralay, Reliance Dental Mfg. Co., Worth, IL) extended towards the incisal edges and occlusal surfaces of adjacent teeth (Figure 4). Subsequently, the implant impression coping-pattern resin unit was carried out intraorally.

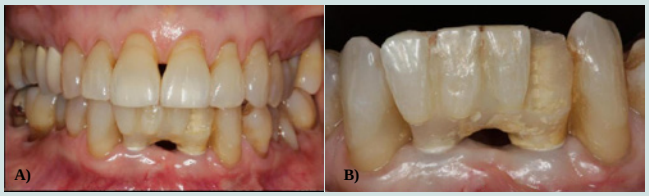

Figure 1: A) Ailing interim FPD rehabilitating lower anterior incisors. **B**) Closer view of the lower anterior interim FPD.

Figure 2: Wax-up of the proposed FPD on the duplicated model.

Figure 3: Model with demarcation of cutting area.

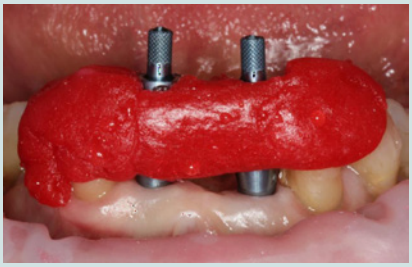

Figure 4: Extension of pattern resin over the incised edges of adjacent teeth.

On the laboratory, implant replicas were screwed to their respective implant impression copings and subsequently positioned on the model using dental stone (Microstone, Whip Mix, Louisville, KY) (Figure 5A). The implant impression coping-pattern resin unit was unscrewed from the implant replicas (Figure 5B). A new set of a screw-retained interim FPD was built using metallic provisional abutments (Dentsply Implants, Waltham, MA) in conjunction with an indirect technique and acrylic resin (Jet, Lang, Wheeling, IL).

After finishing and polishing, the interim FPD was disinfected following manufacturer's recommendations. Clinical try-in confirmed adequate insertion, interproximal contacts and occlusion. Subsequently, the prosthesis was screwed in place following manufacturer's recommendations using a torque of 15 N/cm^2 (Figure 6A). Patient was satisfied with clinical outcomes. Postoperative instructions were discussed; emphasis was given to maintain proper oral hygiene, avoid chewing solids and provide post-operative inputs. The definitive porcelain-fused-to-metal implant-supported FPD, was placed 2 months later (Figure 6B).

Clinical Significance

The described technique offers the following advantages: (1) provides the nonparallel abutments with an immediate alternative to reestablish occlusion and esthetics, (2) reduces the time of relining hence, less heat is generated intraorally, (3) minimizes chair side time on the subsequent appointment, since most of the procedures are completed before the patient's next visit, and (4) reduces time of direct contact between PMM and periimplant tissue. Nonetheless, the present technique is not recommended for single appointments; and the use of the dental stone, pattern resin and extra implant components add extra cost to the treatment.

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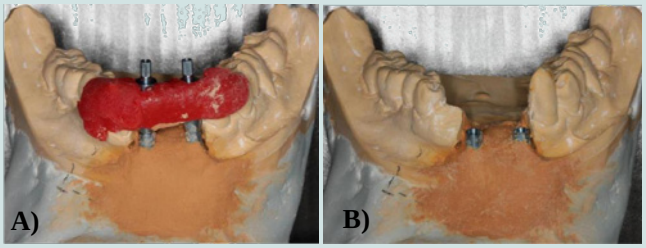

Figure 5: A) Implant impression copings with pattern resin positioned on duplicated model. Dental stone applied around implant replicas. **B)** Confirmation of proper positioning of the implant replicas on model.

Figure 6: A) Clinical delivery of the implant-supported interim FPD. **B)** Definitive PFM implant-supported FPD in place.

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