

Accurate registration of peri-implant soft tissues to create an optimal emergence profile

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Abstract

One of the challenges in restoring anterior space with implant restoration is maintaining the natural looking of peri-implant area. This case report presents a clinical procedure to create the soft tissue emergence profile for anterior maxillary teeth. A 49-year-old male presented with missing right maxillary lateral incisor. A provisional restoration was inserted 1 week after implant placement. Area of the provisional restoration related to the gingival tissue (transmucosal area) was adjusted to create an optimum emergence profile. Two months later, an indirect method was used to accurately transfer the soft peri-implant tissues to the master cast. This clinical technique minimizes surgical procedure and avoids the possibility of soft tissue collapsing that may occur during the impression procedure.

Keywords: Emergence profile impression, provisional restoration, soft tissue

Introduction

Implant restoration is a common practice and considered the first choice for replacing maxillary anterior teeth.^[1-5] One of the challenges in restoring anterior space with implant restoration is maintaining natural looking for the restoration. To reach patient satisfaction, optimal esthetic result has to be achieved for the teeth and the soft tissue to create a natural emergence profile. One method of preserving soft and hard tissue is through immediate implant placement and placement of a provisional restoration.^[6] However, this is not always possible with implant treatment. With delay implant placement cases, bone resorption and soft tissue collapse occur following tooth extraction, results in flat anatomical contour.^[7,8] Restoring natural emergence profile of the restoration require sufficient soft tissue volume and proper position of implant placement.^[6] Provisional restoration for implant-supported restoration can help in predicting

and achieving the esthetic result. One of the important advantages of provisional restorations is modeling of soft tissue during the healing process.^[9] Provisional restoration is a guide and important step to control the definitive prosthetic design.^[10] Several techniques have been proposed to restore gingival contour and create emergence profile for an esthetic restoration during provisional restoration. Neale and Chee, Chee and Donovan advised performing gingivoplasty procedures to recontour the tissues before making provisional restorations.^[11,12] Hinds^[13] described the fabrication of a custom impression coping for the replication of the healed tissue around the implant. Bain and Weisgold^[14] and Ormianer *et al.*^[15] recorded the soft tissue contour by inserting autopolymerizing acrylic resin directly into the sulcus during impression making. However, use of acrylic resin monomer intraorally may cause thermal and chemical irritation of the soft tissue. Attard and Barzilay^[16] presented a technique using a provisional restoration-level impression to register the soft tissue configuration and shape, as well as the implant position.

The aim of this clinical article is to report a simple, indirect and nonsurgical clinical procedure to create a soft tissue emergence profile for anterior maxillary teeth. This clinical method helps to avoid soft tissue collapse that may occur during final impression, and minimize peri-implant soft tissue irritation.

Clinical Case

A 49-year-old nonsmoking male presented to the dental office complaining of missing maxillary right lateral incisor [Figure 1]. The tooth was extracted 2 months before presenting to the clinic due to root fracture. Previous dental history revealed that the tooth had received a root canal treatment and had a postretained crown. A removable partial denture was fabricated

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for him by his previous dentist immediately after extraction to restore the space of the extracted maxillary lateral incisor.

Radiographic examination revealed a socket of recently extracted maxillary lateral incisor with bone level 2–3 mm below the cemento-enamel junction (CEJ) of the adjacent teeth [Figure 2a]. Intra-oral examination revealed a fair oral hygiene with 1–2 mm recession of the gingival margin below the CEJ. The space available of the area related to maxillary lateral incisor was 6 mm mesio-distally and 7 mm interocclusal distance. Upon presentation of the various options of treatments, the patient opted to restore the space with implant treatment. Clinically, there was enough bone to place an implant size 3.5–4 mm. Radiographically, enough bone height was available to receive up to 13 mm implant. The decision was made to proceed with a single implant to restore the space of the maxillary right lateral incisor and to maintain and to create natural soft tissue contour and emergence profile around the tooth to improve esthetic.

Maxillary and mandibular study models with a face bow transfer were obtained, and a diagnostic waxing of the maxillary lateral incisor was performed. A surgical guide was then fabricated to insure proper position of the implant during placement procedure. The patient had decided to concentrate only on replacing the missing lateral incisor, declining esthetic enhancement of the surrounding dentition.

Before surgery, the patient received a session of prophylaxis with oral hygiene instruction. New periapical radiograph was taken [Figure 2b], and surgical placement of the implant completed using surgical splint. Single implant with 3.5 mm diameter and 13 mm height (replace select TiU NP, Nobel Biocare, Switzerland) was placed and covered with 3 mm height healing abutment [Figure 3]. One week later, the healing abutment was removed and replaced with an immediate temporary abutment with a plastic coping (Nobel Biocare, Switzerland). The temporary abutment was screwed to the implant, and a provisional crown was fabricated using temporization material (Pro temp, 3M ESPE, MN, USA) directly on the plastic coping. Area related to the gingival tissue (transmucosal area) was built up by adding composite resin (Filtek Z100, 3M ESPE, MN, USA). The composite resin has been added buccally and interproximally to gently push the soft tissue and create a concavity on the ridge area until the optimum esthetic result of the emergence profile achieved. Finishing and polishing were completed using finishing polishing discs (Sof-Lex, 3M ESPE, MN, USA), and the occlusal was adjusted to keep the provisional nonfunctional. Finally, the provisional crown was cemented using temporary cement (Temp Bond, Kerr, Bioggio, Switzerland), and it served as a guide for soft tissue healing [Figure 4].

Two months later, the provisional restoration was removed, and the implant was examined for osseointegration. Soft tissue healing was completed and stable with the required gingival contour to keep the emergence profile created [Figure 5]. The area was ready for final impression. One of the objectives during the final impression was to transfer the created emergence profile to the permanent restoration accurately.



Figure 1: Pre-treatment clinical view, missing of maxillary right lateral incisor

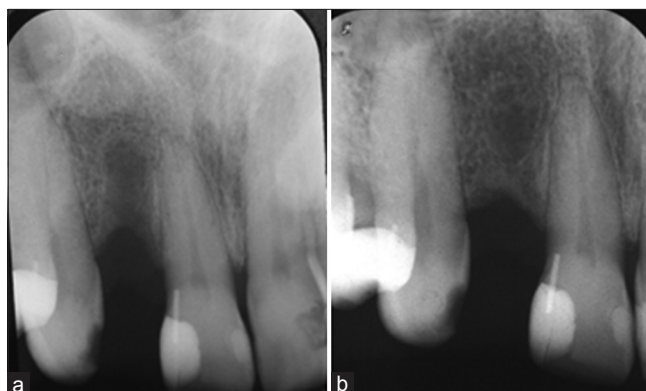


Figure 2: Periapical radiograph: (a) Two months after extraction, (b) immediately before implant placement



Figure 3: Clinical view, immediately after placement of the implant and healing abutment

The temporary abutment was removed, and the provisional restoration was cemented properly on the abutment. A silicon putty impression material was mixed and placed in a plastic cup. While the putty material was still soft, the temporary abutment with the restoration fitted on an implant replica (NP, Nobel Biocare, Switzerland), and placed directly in the soft mix. The implant replica and the gingival third of the crown were immersed in the putty material as shown in Figure 6a. After complete setting of the putty material, the temporary abutment with the restoration was removed [Figure 6b], and impression coping was screwed to the implant replica [Figure 6c]. A resin material powder and liquid (Duralay, Reliance dental Mfg, Worth, IL) was mixed and placed around the impression coping to fill the area of the gingival contour [Figure 6d]. After complete setting, the impression coping transferred to patient mouth and fitted accurately [Figure 6e]. Final impression was taken using vinyl polysiloxane impression material (Virtual®, Ivoclar vivadent®, Italy) [Figure 6f]. The impression was sent to the laboratory, and screw-retained porcelain-fused to metal crown was fabricated. Figure 7 shows the natural soft tissue emergence profile obtained after crown placement.

Discussion

This case report describes a clinical method that helps to control gingival contour around implant crown to create an emergence profile for the crown. It is relatively easy, precise and predictable method for accurate duplication of soft tissue profile. Achievement of the good result is dependent on the amount of keratinized mucosa, height and thickness of bone and shape and material of the transmucosal implant prosthetic components. The technique presented in this article differs from other techniques in that it reduces gingival trauma by eliminating the intra-oral use of resin monomer that avoid chemical or thermal insult to the tissues. It also minimizes surgical procedure by remodeling the soft tissue during the healing process to create the proper contour needed. In addition to that, the important advantage is avoiding the possibility of soft tissue collapsing that may occur during the impression procedure, which gives accurate of the peri-implant soft tissue contours. The emergence profile recorded with this technique from the contour of the provisional restoration not the soft tissue contour. This technique can be used for one (or more) single implant-supported restoration (s) in anterior areas, where an optimal esthetic result is required.



Figure 4: Clinical view for the provisional restoration



Figure 5: Clinical view for the peri-implant soft tissue, two months after placement of the provisional restoration

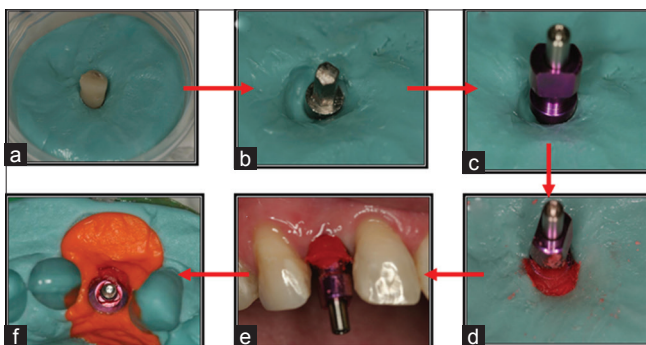


Figure 6: Clinical steps for taking final impression: (a) Provisional restoration with implant replica immersed in putty impression. (b) The provisional restoration removed from the immediate temporary abutment (c) Impression coping screwed to the implant replica. (d) Acrylic resin (duralay) added to the impression coping. (e) The impression coping screwed to the implant. (f) Final impression with the impression coping



Figure 7: Clinical view for the final restoration

In this clinical case, composite resin, rather than acrylic resin, has been used in the transmucosal area to reduce soft tissue irritation. Using screw-retained provisional restoration was not possible with this case. However, screw-retained will simplify corrections/modifications required for the provisional restoration, and will eliminate the needed for cementation and possible soft tissue irritation, especially in subgingival areas.

Conclusion

This clinical report describes an alternative indirect impression procedure that accurately captures the emergence profile and soft tissue contours around implants after a provisional restoration has been placed. The definitive restoration is shaped exactly like the provisional, and excellent esthetics results can be achieved.

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