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Optimizing Gingival Morphology In Implant Esthetic Zone By Customization Of Healing Abutment – A Case Report

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Abstract

Risks of esthetic complications have been reported following dental implant insertion; hence it was suggested that a customized healing abutment could improve the peri-implant tissue healing. Anatomically contoured healing abutments (also called customized healing abutments) help to contain and protect the slow – Resorbing bone grafts, resulting in bone and soft tissue volume augmentation. Even in healed sites, customized healing abutments have shown a favourable outcome as compared to standard healing abutments. This article describes a simple chairside fabrication of precisely contoured healing abutment which will eventually result in a natural contoured soft tissue enhancing the esthetics of the restoration.

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Keywords: Customized healing abutment, Esthetics, Implant supported restorations, Gingival Architecture.

Introduction

Dental implants with their increasing success rates and predictability of final outcome are fast becoming treatment of choice for replacing missing teeth. However, over the years, clinicians have realized a paradigm shift from osseointegration to esthetic integration. Replacement of anterior teeth, particularly maxillary incisors, is often a matter of challenge to the clinician. This is due to the fact that loss of teeth very often results in loss of a considerable amount of gingival architecture also (1,2). Successful Implant restoration depends on function and esthetics too. Fulfilling the esthetic expectations of a patient is a challenging task keeping in mind that there are multiple factors involved in the esthetic outcome of a implant supported restoration such as position of the implant, quantity and quality of hard and soft tissues, as well as their adaptation over time (3).An

optimal aesthetic implant restoration is a combination of a visually pleasing prosthesis and adequate surrounding peri-implant soft tissue architecture (4).
This surrounding framework of hard and soft tissues must either be preserved at the time of extraction or subsequently regenerated so that the implant-supported restoration emerges out of the gingival tissue similar to that of an adjacent natural tooth. Healing abutments guide the healing of the soft tissue in the desired form after placement of the implant in single-stage surgical protocols or after implants have been uncovered in two-stage surgical protocols.(5) Conventional healing abutments have a circular cross section and they create a similar gingival architecture which may not be conducive for producing an aesthetic restoration. Hence, a customized healing abutment is mandatory to create an optimum gingival architecture (6).Incorporation of such technique in the management of a young patient who lost his maxillary central incisor is described below.

Case report

A 22 year old male patient reported to the Department of Prosthodontics and Crown & Bridge, Subharti Dental College & Hospital, Meerut, Uttar Pradesh with a complaint of missing upper front teeth due to trauma (Figure 1).The patient was given several treatment options and preferred fixed replacement of the tooth with an implant. Relative medical history was sound. Study casts were prepared after proper history taking. Clinical examination, radiographic and hematological investigations were carried out, and the patient was found to be fit for undergoing placement of an implant. However, on detail discussion with the patient, he informed about the midline diastema he had before the tooth loss and desired to maintain that in the future restoration as well.

Surgical procedure

After thorough treatment planning an end-osseous implant (Alpha-Biocare) was selected. Following the administration of a local anesthesia in the missing area,a crestal incision was made raising a full thickness mucoperiosteal flap (Figure 2). Bone width was measured and was found insufficient on the buccal aspect indicating the placement of a bone graft and securing it with a collagen membrane. A parallel sided, threaded rough surface implant was then placed and primary stability was achieved at 35N. A resorbable suture was given. The patient was prescribed a course of appropriate antibiotics and analgesics with all the post surgery instructions. He was advised to have a soft diet, and was asked not to disturb the surgical site to facilitate healing. He was recalled on the seventh day for removal of sutures.

Fabrication of Customized Healing Abutment

Patient was then called for II-stage surgery (standard implant protocol). Healing abutment was now customized using flowable composite material (IVOCLAR Te-Econom Flow Composite) to mimic the architecture of the gingival collar (Figure 3). A transitional acrylic tooth was also attached with the healing abutment keeping it out of occlusion (Figure 4).

Impression Procedure Using Customized Impression Post

After 3 months of implant placement, the patient was re-called for Prosthetic-Phase of treatment. The customized healing abutment was removed to attach the impression post to the implant fixture. The impression post was modified to support the newly formed gingival cuff and thus facilitate the accurate reproduction of the gingival cuff on the cast. For this, a flowable composite material was poured around the impression post placed in patient's mouth and a closed tray impression was made with a customized impression post to give an optimal emergence profile (Figure 5).
This modified impression post was used while making the impression to transfer the exact gingival cuff morphology to the cast. The impression was made using Polyvinylsiloxane impression material (Figure 6 & 7).
The impression post was removed and the transitional prosthesis was replaced, shade selection was done and was sent to the laboratory for final abutment fabrication (Figure 8)
Patient was re-called for abutment trial to confirm the accurate seating of the abutment over implant (Figure 8 & 9). Final prosthesis (All-ceram Crown) was screwed over the abutment and luted with a resin modified glass ionomer cement (Figure 10) The patient was satisfied with the final outcome of the prosthesis
(Figure 11). Oral hygiene instructions were given and a regular check up after 3 months was advised.

Discussion

Touati summarized that single-tooth implant replacement in the esthetic zone presents the greatest challenge in implant dentistry (7,8). Gingival aesthetics become more critical in patients who have a high lip line or a gummy smile. As every anterior maxillary tooth is unique, prefabricated healing abutments are unlikely to yield an ideal result in terms of tissue support and guided soft tissue healing (9). A customized healing abutment fabricated on the cast thus obtained helps in shaping the peri-implant tissues in a natural contour. The impression coping should have the same gingival dimensions as the healing abutment so that there is no gap between the impression coping and the walls of the gingival cuff (10). The fabrication of a customized impression coping is not a time consuming process but is critical in achieving optimum esthetics in implant restorations, as it allows the exact transfer of soft tissue architecture that has remodelled around the customized healing abutment.

Conclusion

Understanding the management of gingival tissues in relation to implants in esthetic zone is of utmost importance. The clinician needs to understand these relations to maximize the esthetic result. With careful patient selection and execution, customized healing abutments can provide an effective method to enhance the esthetic and emergence profile for anterior implant restorations.

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Figure 1: Preoperative Intraoral view

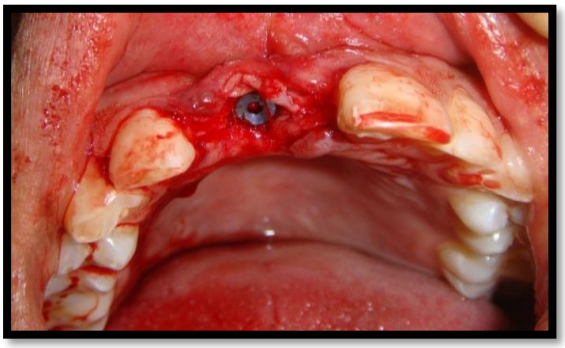

Figure 2: After implant placement

Figure 3: Healing abutment customization using flowable composite material (light polymerization done)

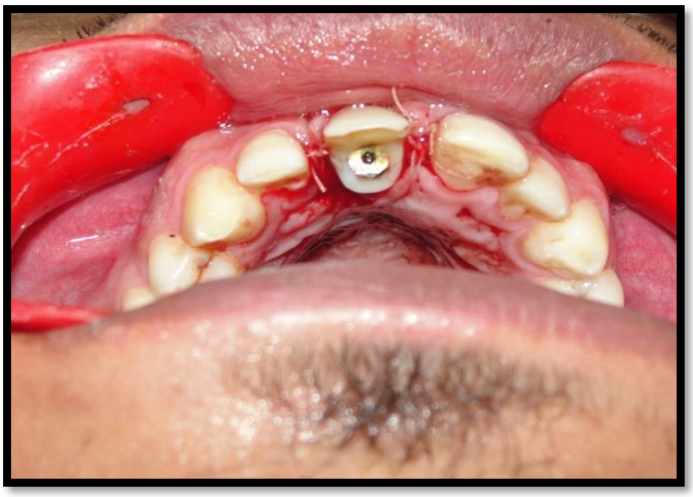

Figure 4: Interim prosthesis attached with the customized healing abutment

Figure 5: Customization of impression post using flowable composite material (IVOCLAR Te-Econom Flow Composite)

Figure 6: Final impression with customized impression post

Figure 7: Customized Impression Post

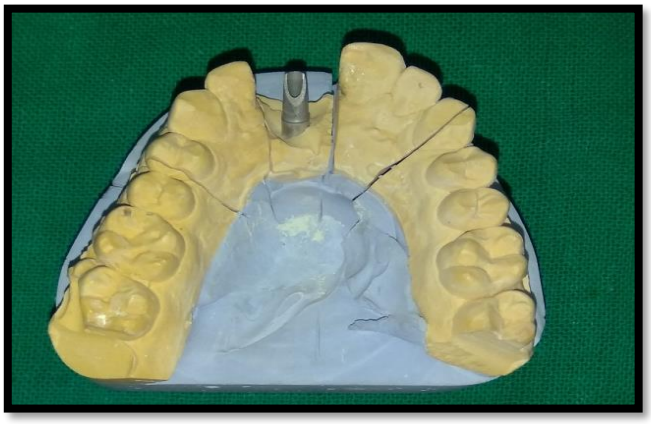

Figure 8: Definitive Abutment on Cast

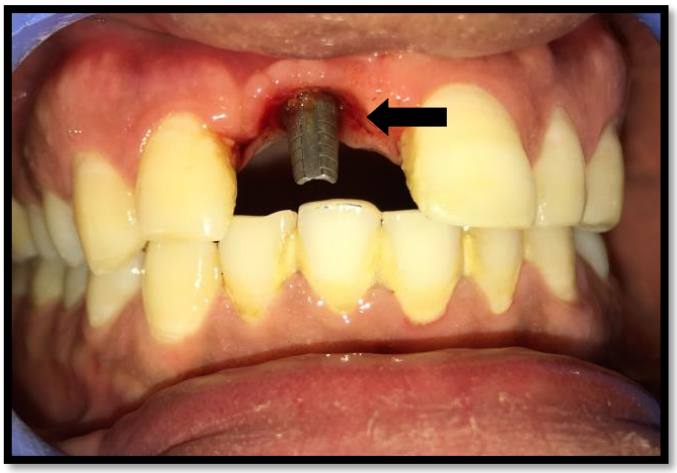

Figure 9: Definitive Abutment Trial (appreciating the gingival cu
Figure 10 – Final Prosthesis All Ceramic Crown Cemented On Abutment Tooth

Figure 11 – Postoperative View