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RESEARCH ARTICLE

Preservation of optimal gingival architecture through customised healing abutment in immediate implant placement: A clinical report

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Abstract

The upper anterior teeth and their associated gingival frame the smile of the patient and compliment the esthetic appearance of the face. With increasing pace of development in implant dentistry, achieving optimal pink aesthetics has become linked with the desire for faster, easier techniques that shorten treatment time and also satisfy patients. This clinical report summarizes an easy and accurate method of fabricating a customized healing abutment and a customized impression post in immediate implant, which in turn helps in creating a natural contour for the final restoration.

INTRODUCTION

The burgeoning popularity of dental implant usage in the maxillary anterior region is well recognized. Fabrication of esthetically pleasing restoration is a vital part in the rehabilitation of the patient. The practice of immediate implant placement and simultaneously maintenance of stable peri-implant zone can be a very rewarding way to deliver implant therapy to our patient.

The principle indications for immediate post extraction implant placement are tooth fracture, periodontal support loss, radicular caries, endodontic failure and non-restorable crowns (1). The immediate replacement of the lost root prevents the loss of alveolar bone in height and width (2). The results of extraction are well known: 40% to 60% alveolar bone loss in the first 2 to 3 years and a resorption rate of 0.5% to 1% every year for the rest of the patient's life (3, 4).

The free gingival margin in the maxillary anterior teeth plays a key role in the esthetics of the patient's smile. Restoring natural emergence profile of the restoration require sufficient soft tissue volume and proper three dimensional positioning of implant (5). Contours of the implant abutment and restoration dramatically affect the gingival form. The commercially available implant and healing abutments cannot met the demands of highly variable gingival architecture (6). Hence, a customized healing abutment is mandatory to create an optimum gingival architecture (7-10)

The aim of this article is to describe a clinical case in which a non-restorable maxillary central incisor was replaced by post extraction immediate implant and the natural gingival architecture was preserved by customizing the healing abutment.

A 23 year old male patient with no relevant medical history reported to the Department of Prosthodontics of Banaras Hindu University with a non-restorable right maxillary central incisor (Figure 1). Patient expressed his desire to have a rehabilitation that could offer a satisfactory and long term esthetic outcome. Treatment options were

reviewed, and informed consent was obtained. Based on the patient's express desire to reduce the treatment time, it was decided to perform a post-extraction implant placement since his clinical and radiographic examinations (Figure 1) revealed ideal hard and soft tissue contours for this procedure.

On the day of surgery, the patient received 2 g of Amoxicillin 1 hour before surgery and 1 g of Amoxicillin 6 hours after surgery to reduce the risk of infection. Local anaesthetic was injected into the oral mucosa and palatally (2% lignocaine with epinephrine 1:80,000). An atraumatic extraction was performed to preserve the integrity of the interproximal papillae and remaining buccal and lingual bone plates. The tooth was carefully extracted using a luxator and forceps, the extraction being accomplished with light twisting movements to avoid breaking the bony margins of the alveolus (Figure 2a,b). The extraction socket was debrided using a manual instrument and was irrigated with sterile saline. The alveolus showed the absence of fenestrations or dehiscence of the bone walls.

The implant site was prepared at the bottom of the socket according to standard procedures (Figure 2c). In the anterior maxilla implant placement was typically undertaken towards the palatal aspect of the extraction socket. Care was taken while preparing osteotomy in the palatal wall of the extraction socket as this is typically very dense and difficult to prepare. Appropriate countersinking of the palatal was undertaken to prevent the kicking out of the implant head towards the labial aspect during placement.

The implant was inserted into the osteotomy with a torque of 35Ncm to obtain optimal primary stability (Figure 2d). The implant shoulder was positioned 1.5-2 mm from the adjacent teeth, 3 mm apical to the anticipated gingival margin, and 1 mm apical to the height of the most coronal wall of the alveolus.

Healing abutment was customised extraorally using flowable composite (Figure 2e). Flowable composite was added to the healing abutment to initiate formation of subgingival collar. Incremental addition and curing was recommended with care to prevent resin from flowing onto the screw surface. The custom made healing abutment was subsequently tried in to assess the tissue support and subgingival emergence contour of the added material. After a final polishing, the supragingival extension of the custom healing abutment was adjusted to the level of the gingival margin. The custom made abutment was then inserted onto the implant (Figure 2f). The custom made healing abutment maintained the support for gingival architecture. After 2 weeks, healing abutment was contoured again to expand the peri-implant soft tissues for the final restorative phase.

After another healing period of 4 months, when optimal gingival architecture was achieved with the customized healing abutment (Figure 3a), a customized impression coping was connected to the implant (Figure 3b), and a final impression was made. 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. Till the fabrication of permanent metal ceramic restoration, customized healing abutment was connected to the implant. After cementation of the permanent crown, the soft tissue contours was in harmony with the adjacent teeth (Figure4a). 1 year follow-up revealed stable, healthy peri-implant soft tissue and a satisfied patient (Figure4c)

DISCUSSION

This clinical case shows that an immediate implant restoration placed in a post-extraction site can constitute a safe and successful treatment procedure. Correct clinical, prosthetic and surgical management of endosseous implants replacing missing teeth in the anterior maxilla enables the dental surgeon to achieve predictable aesthetic outcomes. The immediate placement in post-extraction sites is a surgical option capable of ensuring ideal peri-implant tissue healing, while at the same time preserving the pre-surgical gingiva and bone [11,12].

The advantages of placing implants in fresh extraction sockets and putting them in immediate/early function are many. A predictable protocol affords the possibility of performing a single surgical procedure and minimising the shrinkage of hard tissue and soft tissue recession [13]. There is a risk of mucosal recession and adverse soft tissue aesthetics with immediate implant placement. However, this risk may be reduced by avoiding a buccal position of the implant in the extraction socket [14].

Controlling gingival contour with available metal alloy abutments may be technically challenging and time consuming. Several techniques have been proposed to restore esthetically pleasing soft tissue phenotype. The customization of healing abutment served as scaffold to support the surrounding mucosa and papillae, thus contributing to peri-implant aesthetics. It is relatively easy, precise and predictable method for accurate duplication of soft tissue profile. It also helps in remodeling the soft tissue during healing process. To allow for the exact transfer of soft tissue architecture that has remodeled around the customized healing abutment, the fabrication of customized impression coping is inevitable (15).

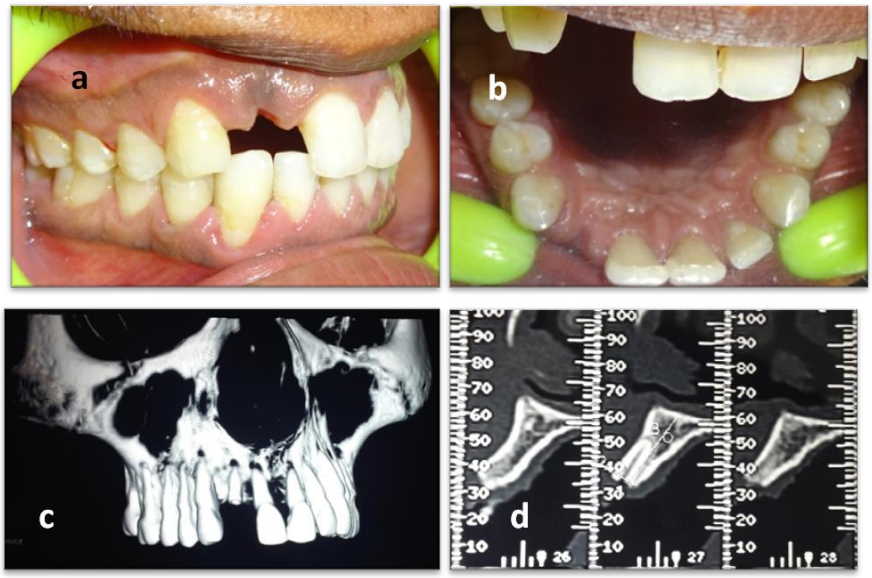

Figure 1. (a,b) Pre-operative clinical view;
(c) 3-Dimensional view showing root stump; (d) Axial view

Figure 2. (a)Surgical view after flap elevation; (b) Extracted root stump
(c)Prepared implant site; (d) Implant inserted into prepared site;
(e) Customised healing abutment; (f) Customised healing abutment in place

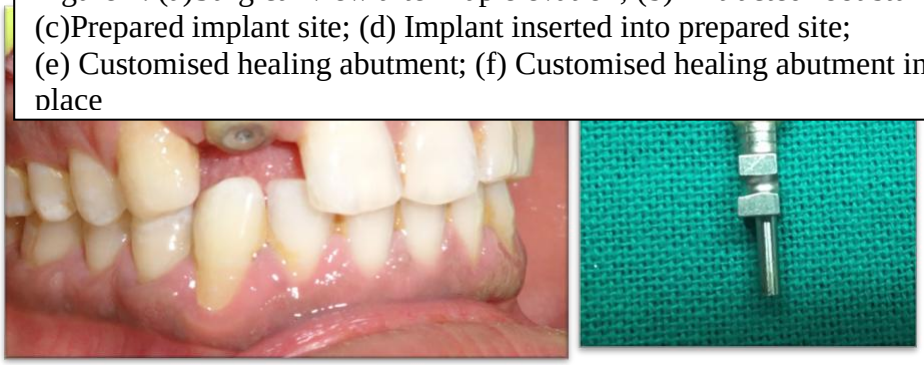

Figure 3. (a) Achieved optimal gingival architecture;

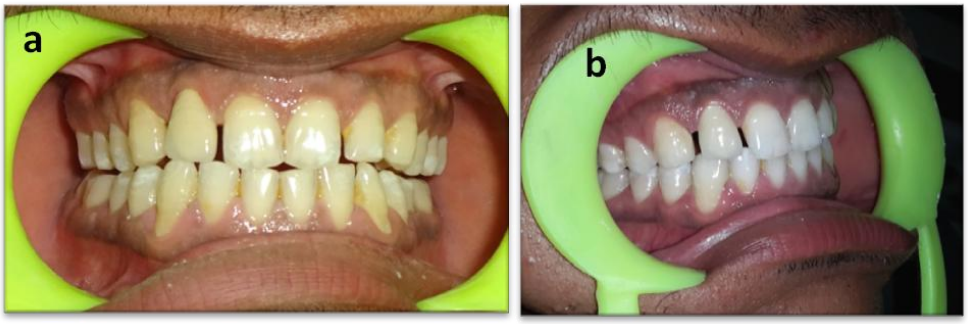

Figure 4. (a) Post-operative clinical view; (b) 1 year follow-up

CONCLUSION

Immediate placement of dental implant followed by customization of abutment with appropriate anatomical contours can allow the creation of imperceptible restoration that accurately mimic nature. This clinical report describes an easy and accurate technique to precisely contour the soft tissue architecture.

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