

# A promising era of immediate esthetic rehabilitation

### ABSTRACT

The extraction of a tooth in the anterior region can result in resorption of alveolar bone around the socket, especially the buccal bone leading to horizontal as well as vertical bone loss. This makes rehabilitation in the anterior region an esthetically complex situation. To preserve the buccal bone, the root is bisected and buccal two-thirds is preserved in the socket. This is called socket shield technique. Immediate implant placement and immediate provisionalization yield an esthetically pleasing and more acceptable outcome.

**Keywords:** Aesthetic rehabilitation, alveolar bone preservation, immediate temporization, socket shield technique

### INTRODUCTION

The most interesting challenge faced recently in implant dentistry for the rehabilitation of the maxillary anterior tooth is the bucco/facial collapse of the post-extraction ridge. Extraction of an anterior maxillary tooth-traumatic as well as atraumatic leads to alveolar bone loss sooner or later along with recession of soft tissues which may lead to the black triangles and sometimes increase in the incisal cervical height of the final prosthesis which may account for the esthetic failure. This bone resorption and soft tissue recession is mainly due to the loss of bundle bone-PDL complex after the total tooth extraction/loss.<sup>[1]</sup>

To avoid the post-extraction ridge collapse, various techniques such as root submergence technique, pontic shield technique, and socket shield technique (SST) collectively known as Partial extraction therapies (PET) were proposed in the literature.<sup>[2]</sup> Root Submergence Technique involves leaving behind the root with intact periodontium in pontic sites or below the denture to retain the ridge. Any peri-apical pathology and absolute requirement of endodontic treatment remain the limitation of this technique. The Pontic shield Technique requires the placement of graft material in the gap available in the extraction socket. Various other post ridge collapse techniques have been used in the past to compensate

for the defect such as bone or soft tissue augmentation, or a combination of both.<sup>[1]</sup> With these techniques, there is associated morbidity of donor site along with surgical complications.

“Socket shield technique/Root membrane therapy” have emerged as less invasive, more aesthetically predictable as well as cost and time effective.<sup>[3,4]</sup> Also known as partial root retention, this technique is indicated to restore the function and aesthetics with a fixed prosthesis in an unrestorable tooth crown or tooth indicated for extraction, tooth root with or without apical pathology, intention to preserve the alveolar ridge specifically to prevent buccopalatal collapse, immediate implant placement, ridge preservation in conjunction with other PET.

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The main principle is to prepare the root of a tooth indicated for extraction such that the buccal/facial section remains in place keeping the periodontium, along with bundle bone and buccal bone intact. According to SST classification, Type I buccal shield was prepared usually indicated in the single edentulous area with both mesial and distal tooth present.<sup>[5]</sup> In this case report, we are presenting two cases of the esthetically challenging situation as accordance with Normative SAC Classification.

## CASE REPORTS

### Case 1

A 50-year-old male reported to the Department of Prosthodontics and presented with a grossly decayed maxillary right central incisor. Clinical examination showed nonrestorable root canal treated the tooth with healthy gingival and periodontal tissue [Figure 1a]. IOPA revealed root canal treated tooth with crown margin almost at the crestal bone level [Figure 1b]. According to the cone-beam computed tomography (CBCT) finding, a 3.5 mm diameter and 15 mm length self tapering, aggressive thread implant was selected for the placement to achieve optimum primary stability. While examining the CBCT, it revealed the presence of thin buccal cortical plate which may get fracture during the extraction, so socket-shield procedure was carried out to preserve a buccal fragment of the tooth.

Following routine protocol, 500 mg amoxicillin 1 h before surgery was given and rinsing with 0.12% chlorhexidine done. The face was scrubbed with betadine. Infiltration anesthesia was given. After profound anesthesia, Tooth 11 was decoronated with a round coarse-grained diamond bur till the crest of the bone, and straight diamond bur was used to remove the gutta-percha filling from the root. An endodontic hand file was used to determine the working length with the help of an IOPA and a long shank bur, with the stopper placed at the determined working length, was used for the sectioning of the root which was done in two steps. In the first step, sectioning was done till apical two-third of root length with the help of tapered diamond bur mesiodistally in parallel to the long axis of tooth direction. A dip in bur movement and slight bleeding indicates the complete sectioning of the root mesiodistally. In the second step, the direction of the bur was changed to an oblique direction toward the buccal surface to detach the buccal fragment from the palatal. The



Figure 1: (a) Preoperative Case 1: Fractured 11. (b) Case 1 preoperative radiograph

palatal portion was extracted atraumatically and a 1.5 mm buccal shield was left in the socket [Figure 2a]. Then, the free buccal gingiva was pulled away gently and the coronal part of the shield was trimmed 1 mm with a round bur.

The osteotomy was initiated with lance drill to get a purchase point in the apical 1/3<sup>rd</sup> at the palatal wall of the socket, and then, the sequential drilling was done to prepare the osteotomy site one drill lesser than the final implant diameter drill. The direction indicator was used after every drill to confirm the direction of osteotomy to the adjacent tooth. Touareg CloseFit™ (ADIN, Dental Implant System, Israel) 3.5-mm diameter and 15-mm length was placed [Figure 3a], the primary stability of >35 Ncm was achieved and ISQ value recorded. The apico-coronal position of the implant platform was situated 3-mm apical to the buccal marginal gingiva and 5 mm apical to the interproximal bone. The jumping gap was assessed to be >1 mm, hence space was filled with a bio xenograft (Bio-Oss, Switzerland). Postoperative radiograph was done to verify the implant placement [Figure 3b]. Immediate screw-retained temporization was done using polycarbonate crown which is matched with 21 for size, shape, and color [Figure 4a]. High points were evaluated and removed so that there is no contact during maximum inter-cuspation and no interferences on protrusive and lateral excursions. Postoperative antibiotics and painkillers were prescribed and instructions were given for follow-up and the patient was recalled after a week. No postoperative complication was noticed and healing was uneventful. The permanent restoration was followed after 3 months. The temporary prosthesis was removed and implant level impression was made using polyvinyl siloxane impression material with a close-tray implant impression technique. The temporary prosthesis was seated again till the screw-retained permanent restoration was available for placement. Finally, a screw-retained metal-ceramic prosthesis was given to the patient [Figure 5a].

### Case 2

A 35-year-old female presented with a fractured prosthesis with maxillary left lateral incisor. Clinical examination showed nonrestorable root canal treated the tooth

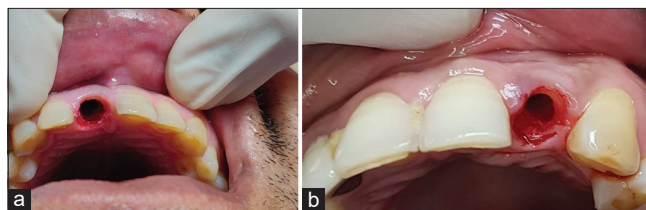


Figure 2: (a) Prepared socket with intact buccal shield: Case 1 (b) Prepared socket with intact buccal shield: Case 2

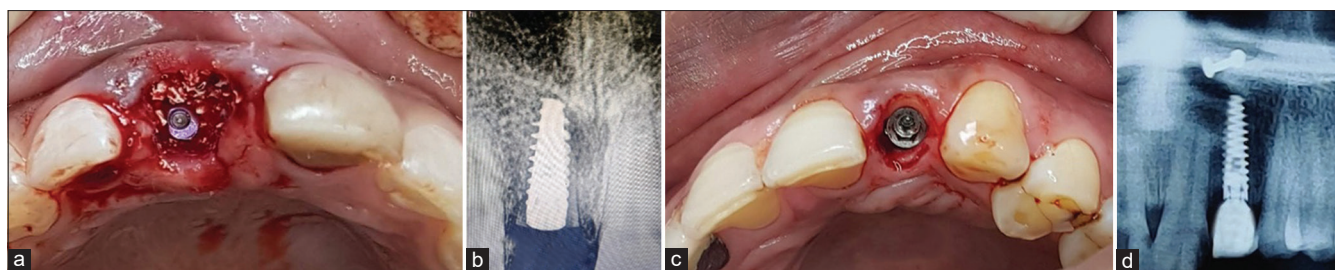


Figure 3: (a) Implant placement 11 (b) Case 1 postoperative radiograph. (c) Implant placement 22 (d) Case 2 postoperative radiograph

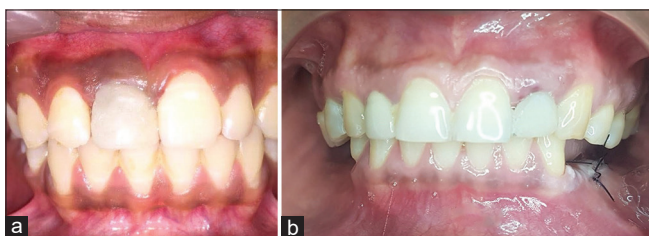


Figure 4: (a) Immediate temporization with 11 Case 1. (b) Immediate temporization with 22 Case 2

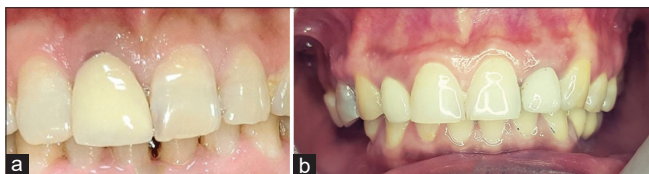


Figure 5: (a) Permanent restoration with 11 Case 1. (b) Permanent restoration with 22 Case 2

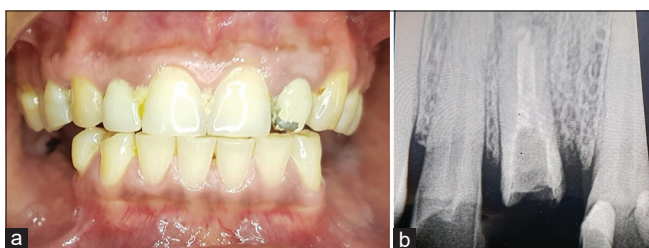


Figure 6: (a) Preoperative Case 2: Restorably compromised 22. (b) Case 2 preoperative radiograph

with healthy gingival and periodontal tissue [Figure 6a]. IOPA revealed root canal treated tooth with fractured crown and post space visible [Figure 6b]. According to the CBCT finding, a 3.5 mm diameter and 13 mm length self-tapering, aggressive thread implant was selected for the placement to achieve optimum primary stability. As the buccal cortical plate was assessed to be thin and prone to fracture, the socket shield procedure was planned for this case. All the surgical steps [Figures 2b and 3c], steps for provisionalization [Figure 4b] and permanent restoration [Figure 5b] followed were the same as described in Case 1, with the difference that in this case as the jumping gap was  $<1$  mm, no grafting procedures were undertaken.

## DISCUSSION

Various techniques have been reported to improve the esthetics in complex cases. Salama *et al.* reported the root submerge technique.<sup>[6]</sup> The bone ring augmentation technique was introduced by Stevens *et al.* to augment the defective socket three-dimensionally with autologous “bone rings” and immediate implant placement in a one-stage procedure.<sup>[7]</sup> Hürzeler *et al.* (2010) first described the SST, with the socket-shield 1-mm coronal to the facial bone crest. This technique may result in perforation of the shield through the overlying soft tissue, known as exposure. Modifications of this technique came into existence wherein the prepared buccal shield was kept either at the level of the buccal crest or below the crest. In this case series, SST was executed to preserve the esthetic integrity of the maxillary anterior region as the buccal bone thickness was found to be  $<2$  mm and the soft tissue belonged to thin biotype which can lead to crestal bone and soft tissue loss post-extraction. SAC Tool was used to assessing the complexity of the procedure, which makes use of the ITI’s highly regarded classification system referred to as SAC: Straightforward, Advanced, Complex. It identifies the degree of complexity and potential risk involved in individual cases. Our cases were classified under prosthetically complex cases. According to SST classification by UdattaKher *et al.*, (2018)<sup>[2]</sup> both the cases falls under Type I Buccal Shield as single edentulous site with both mesial and distal tooth were present. Immediate implant placement followed by temporization made this technique less timeconsuming, less invasive with more predictable esthetic outcomes. Temporization was done using NFIT, and to obtain a good emergence profile umbrella concept was used wherein the temporary crown was recontoured at each recall till the final prosthesis was delivered. The use of composite material to relin the polycarbonate temporary crown was preferred to ensure adequate tissue healing.

Histological studies of Hürzeler showed the cementogenesis between the implant surface and the retained root surface and clinically successful osseointegrated implant. According to Botticelli, if the distance between the implant surface

and the socket wall is 0.5–1 mm, there is no need for the bone graft to fill the space, but if space is >1 mm, grafting is indicated.<sup>[8]</sup> Three-month follow-up at the time of permanent rehabilitation showed satisfactory healing and preservation of soft and hard tissues enhancing the final esthetic outcome.

## SUMMARY

This present case series of immediate implant placement along with immediate temporization with socket-shield technique shows successful preservation of post-extraction tissue and thin buccal bone with the esthetically promising results and is of significant value in implant and esthetic dentistry. Further studies are required to find out the long-term success rate of this technique.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Gluckman H, Salama M, Du Toit J. Partial extraction therapies (PET) Part 1: Maintaining alveolar ridge contour at pontic and immediate implant sites. *Int J Periodontics Restorative Dent* 2016;36:681-7.
2. Kher U, Kumar T, Kulkarni S. *Partial Extraction Therapy in Implant Dentistry*. Switzerland, Springer: International Publishing; 2020.
3. Hürzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S. The socket-shield technique: A proof-of-principle report. *J Clin Periodontol* 2010;37:855-62.
4. Bäumer D, Zuhr O, Rebele S, Schneider D, Schupbach P, Hürzeler M. The socket-shield technique: first histological, clinical, and volumetrical observations after separation of the buccal tooth segment – A pilot study. *Clin Implant Dent Relat Res* 2015;17:71-82.
5. Kumar PR, Kher U. Shield the socket: Procedure, case report and classification. *J Indian Soc Periodontol* 2018;22:266-72.
6. Salama M, Ishikawa T, Salama H, Funato A, Garber D. Advantages of the root submergence technique for pontic site development in esthetic implant therapy. *Int J Periodontics Restorative Dent* 2007;27:521-7.
7. Stevens MR, Emam HA, Alaily ME, Sharawy M. Implant bone rings. One-stage three-dimensional bone transplant technique: A case report. *J Oral Implantol* 2010;36:69-74.
8. Botticelli D, Berglundh T, Buser D, Lindhe J. The jumping distance revisited: An experimental study in the dog. *Clin Oral Implants Res* 2003;14:35-42.