

Socket Shield Technique for Immediate Implant Placement in the Esthetic Zone: A Case Report

Pahari S¹, Joshi SP², Shrestha P³, Sah S⁴, Verma A⁵

¹PG resident, NAMS, Bir Hospital, Kathmandu, Nepal

²Professor, NAMS, Bir Hospital, Kathmandu, Nepal

³Associate Professor, NAMS, Bir Hospital, Kathmandu, Nepal

^{4,5}Assistant Professor, NAMS, Bir Hospital, Kathmandu, Nepal

ABSTRACT

The placement of implant following removal of compromised tooth is a common practice. Hard and soft tissue changes following tooth extraction, particularly on the labial aspect are known to occur. These changes compromise aesthetics, particularly in anterior maxilla leading to esthetic failure. Socket shield technique is known to prevent resorption of buccal bone, maintaining contour of buccal mucosa and achieving better result aesthetically. The purpose of this case report is to demonstrate the socket shield technique for immediate implant placement in anterior maxilla and restoration with cement retained prosthesis.

Key words: Socket Shield; Immediate Implant; Aesthetics

INTRODUCTION

Immediate implant placement is one of the frequently used treatment options following extraction, with clinical success similar to delayed implant placement.¹ Although the time factor as well as number of surgical interventions are reduced, the changes in hard and soft tissues following extraction present challenges in maintaining optimal esthetics, particularly in esthetic zone.²⁻⁴ The esthetic risk increases subsequently in patients with high lip line and thin gingival biotype.

The cause of labial bone loss following extraction is due to the severed blood vessels

of periodontium, that subsequently lead to alteration of soft tissue position and overall volume.⁵ The socketshield technique, which was first described by Hürzeler,⁶ involves preserving the prepared buccal / facial root section with its physiologic relation to the intact buccal plate. The periodontal attachment apparatus of the prepared section remains undamaged, preventing remodeling to support the associated hard and soft tissue. This case report describes the socket shield technique for immediate implant placement in anterior maxillary esthetic zone, prosthetic aspect and its esthetic outcome.

CLINICAL REPORT

A 35 years old male patient reported to the department of Prosthodontics, Bir hospital with chief complaint of fractured tooth in the upper front region of jaw and wanted tooth replacement. Patient presented with the fracture tooth along with dislodged metal ceramic crown with tooth structure within it. The fracture margin was below the margins of crown. Extra-oral examination revealed average smile line

Conflict of Interest: None

***Corresponding Author**

Dr. Samrat Pahari,
PG Resident, Prosthodontic Unit, Dental Department,
National Academy of Medical Sciences (NAMS), Bir
Hospital, Kathmandu
Phone No: +977-9862205087
E-mail: samratpahari19@gmail.com

(Tjan et al)⁷. Intra-oral examination revealed fractured tooth w.r.t 21 with complete loss of crown structure and fracture line below the gingival margin except on facial part which was equi-gingival (Fig 1,2).

Radiographic examination showed endodontically treated tooth w.r.t 21 with fracture margin almost at the crestal bone level (Fig 3). Cone Beam Computed Tomography (CBCT) revealed thin buccal cortical plate (Fig 4). After consultation of all available treatment options with patient, immediate implant placement and immediate restoration was planned. Considering the location of tooth in esthetic zone and average smile line of patient, socket shield technique for treatment was adopted for preservation of buccal cortical plate thus maintaining the soft tissue level.

SURGICAL ASPECT

Infiltration of Local anaesthetics (2% lignocaine with 1:200,000 epinephrine) was done on the treatment site. The gutta-percha was removed from the root canal using peeso reamer. The apex of the tooth root located using apex locator (Fig 5). The length of corono-apical part of root was also verified using Intra-Oral Peri Apical Radiograph (IOPAR) (Fig 6). Mesio-distal sectioning of root was done using long shank tapered diamond (Fig 7). After verification of complete sectioning, the palatal portion with complete apex was extracted carefully using periosteal elevator and forcep (Fig 8). The retained buccal segment was prepared for socket shield technique by levelling it approximately 1mm coronal to alveolar crest.

Shield was prepared of approximately 2/3rd length of root, approximately 1/4th width of bucco-palatal width of root and chamfer margin was given on coronal aspect of root to create space between emerging crown and socket shield (Fig 9). Osteotomy was prepared using sequential drilling sequence for Straumann bone level tapered implant (Fig 10). A 3.3X12 mm implant (Fig 11) (Straumann Roxolid SLA) was placed in prepared site w.r.t 21 approximately 1mm apical to the coronal extent of shield maintaining approximately 1.5 mm space between platform and shield and the space was not grafted. The torque obtained was approximately 25 N-cm, so instead of immediate restoration, a customized healing abutment was fabricated and screwed (Fig 12). Follow up was done in 1 week and 1 months for evaluation.

PROSTHETIC ASPECT

After 3 months IOPAR evaluation (Fig 13) and evaluation of healing was done (Fig14). The profile of customized healing abutment was copied and transferred to impression coping (Fig 15) before final impression for incorporating the emergence profile of peri-implant tissue in prosthesis. Customized abutment was fabricated (Fig 16) and Implant was restored with cement retained Zirconia crown (Fig 17). The occlusion was checked, there was no contact in maximum intercuspation and no interferences in protrusive, right and left lateral movements Follow up was done after 1 week, 3 months and 6 months, which showed stable soft tissue clinically (Fig 18) and stable hard tissue radiographically.



Figure 1: Frontal view

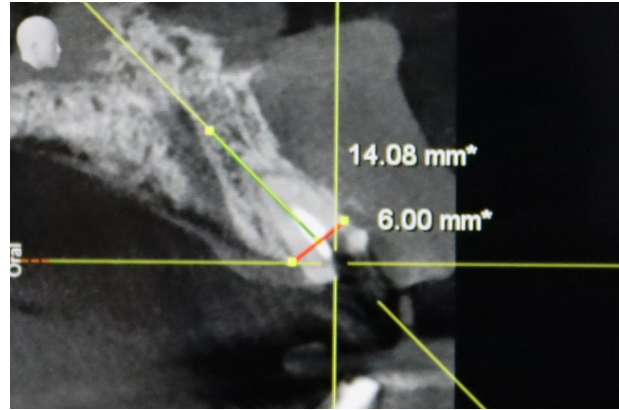


Figure 4: CBCT showing thin cortical bone



Figure 2: Intraoral occlusal view



Figure 5: Apex locator for locating apex



Figure 3: Diagnostic IOPAR



Figure 6: IOPAR showing adequate length



Figure 7: Mesio-distal sectioning



Figure 11: Implant (Roxolid SLA, Straumann)



Figure 8: Removal of palatal segment with apex



Figure 12: Customized Healing abutment in place



Figure 9: Prepared shield



Figure 13: IOPAR: 4 month follow up



Figure 10: Osteotomy preparation



Figure 14: Healing showing emergence profile

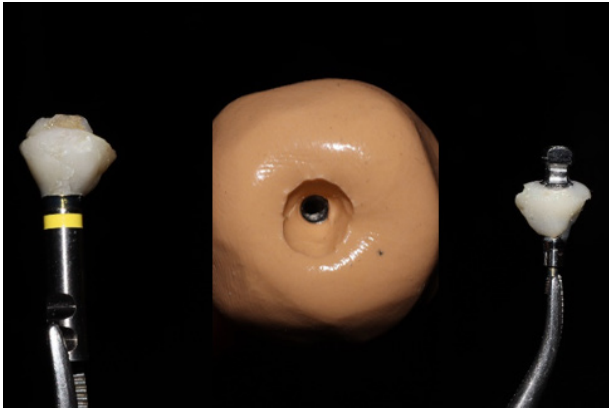


Figure 15: Copying of profile to impression coping



Figure 17: Cementation



Figure 16: Customized definitive abutment in place



Figure 18: Three months follow-up

DISCUSSION

During immediate Implant placement, there is almost always alteration in the alveolar bone after extraction due to physiologic healing process. This has direct effect on the final outcome regarding the amount of hard and soft tissue around implant, which adversely affects the esthetic outcome, particularly in esthetic areas. To achieve optimal results, simultaneous augmentation procedures to compensate for horizontal and vertical remodeling are necessary.⁸ Although these augmentation techniques are validated in literature, some amount of shrinkage is to be always expected.⁹

Advantage of socket shield technique can be appreciated for preventing physiological remodeling as described by Hürzeler et al.⁶ The results of our case were consistent with this original technique. The preservation of

the buccal cortical plate and maintenance of soft tissue contours were possible due to the socket shield technique. The socketshield technique allowed us to preserve the bone at the proposed implant site, while the thin and prone to resorption buccal bone was retained. Prevention of alveolar bone resorption following retention of root/root fragments have been extensively described in literature. Salama et al reported complete preservation of alveolar ridge for development of pontic site beneath FPD by preserving the attachment apparatus.¹⁰ Similarly, Kan and Rungcharassaeng described the shielding the proximal area to preserve the papilla.¹¹

The methodology of this case followed the original technique described by Hürzeler with gap between shield and implant, but no any graft materials were used in between.

CONCLUSION

Socket shield technique shows promising result in prevention of physiologic remodeling of alveolar bone post-extraction, giving higher esthetic result for immediate implant placement in esthetic zone. Proper clinical judgement and technique play important role in the successful outcome.

REFERENCES

1. Lang NP, Pun L, Lau KY, Li KY, Wong MC. A systematic review on survival and success rates of implants placed immediately into fresh extraction sockets after at least 1 year. *Clin. Oral Implants Res.* 2012;23(5):39-66.
2. Tan WL, Wong TL, Wong MC, Lang NP. A systematic review of post-extraction alveolar hard and soft tissue dimensional changes in humans. *Clin. Oral Implants Res.* 2012;23(5):1-21.
3. Schropp L, Wenzel A, Kostopoulos L, Karring T. Bone healing and soft tissue contour changes following single-tooth extraction: a clinical and radiographic 12-month prospective study. *Int J Periodontics Restorative Dent.* 2003;23(4):313-23.
4. Chen ST, Buser D. Esthetic outcomes following immediate and early implant placement in the anterior maxilla—a systematic review. *Int J Oral Maxillofac Implants.* 2014;29(Suppl):186-215.
5. Araújo MG, Lindhe J. Dimensional ridge alterations following tooth extraction. An experimental study in the dog. *J Clin Periodontol.* 2005;32(2):212-8.
6. Hürzeler MB, Zuhr O, Schupbach P, Rebele SF, Emmanouilidis N, Fickl S. The socket-shield technique: a proof-of-principle report. *J Clinical Periodontol.* 2010;37(9):855-62.
7. Tjan A, Miller GD. Some esthetic factors in a smile. *J Prosthet Dent.* 1984;51(1):24-8.
8. Grunder U. Crestal ridge width changes when placing implants at the time of tooth extraction with and without soft tissue augmentation after a healing period of 6 months: report of 24 consecutive cases. *Int J Periodontics Restorative Dent.* 2011;31(1):9-17.
9. Gluckman H, Du Toit J, Salama M. The socket-shield technique to support the buccofacial tissues at immediate implant placement. *Int Dent Afr Ed.* 2015;5(3):6-14.
10. 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(6):521-7.
11. Kan JY, Rungcharassaeng K. Proximal socket shield for interimplant papilla preservation in the esthetic zone. *Int J Periodontics Restorative Dent.* 2013;33(1):24-31.