

Socket Shield Technique: A New Concept of Ridge Preservation

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ABSTRACT

Healing of extraction sockets undergoes a remodeling process which leads to horizontal and vertical bone loss. Alteration of ridge contour may compromise the restoration-oriented three dimensional positioning of the implant. Various methods of guided bone regeneration have been described to retain the original dimensions of the bone after extraction. Socket shield technique has demonstrated the potential in preventing buccal bone from resorption in animal and clinical studies. Our article describes a case report of a young patient with failed apicoectomy procedure in left lateral incisor. Immediate implant placement with socket shield technique was undertaken. Immediate implant placement with socket-shield technique may be a feasible treatment option in areas with high aesthetic concern.

Keywords: immediate implant, socket-shield technique

INTRODUCTION

Resorption of the alveolar ridge following tooth extraction continues to be a reason of major concern for practitioners. Various researches prove that buccal part of the ridge is more compromised as it is primarily supplied by the periodontal membrane of the tooth. Therefore, after extraction, the buccal cortical plate starts resorbing at a faster rate than the



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palatal/lingual plate leading to its partial or total resorption.^{1,2} This process causes dimensional changes in the ridge and the aesthetic region is most affected by this process.

In order to overcome these negative consequences of tooth extraction various methods have been described in the literature such as hard and soft tissue augmentation following extraction with or without immediate implant placement

Recently, there have been publications regarding socket preservation suggesting they have the ability to maintain the ridge dimension to a certain amount. Socket shield technique³ first described in 2010 aims at leaving the buccal fragment of root intact and placing implant on the lingual aspect of that fragment so that the tissues which remain in contact with the buccal fragment retain their vitality and prevent the ridge from collapsing thus improving the aesthetics especially during implant in the anterior maxillary region. This technique can prove to be very helpful for implantologists when planning implants in aesthetic region.

CASE REPORT

A 23 year old female patient reported with failed apicoectomy procedure done somewhere else in upper left lateral incisor a few years ago with periapical pathology (Fig.1a and b). The patient however refused re-endodontic intervention.

Various treatment options were discussed and implant supported fixed restoration was the treatment of choice for replacing the failing lateral incisor. Cone beam computed tomography scan was done and it depicted a thin labial cortical bone overlying lateral incisor. (Fig 2(a-e))

Immediate implant placement with 'Socket shield technique' was planned for this case. Under strict aseptic conditions, tooth 22 was decoronated (Fig3). The tooth was sectioned vertically using long tapered fissure diamond bur (Fig 4).Conservative extraction of the palatal root fragment

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Figure 1(a): Preoperative clinical picture; (b) Pre-operative orthopantomogram



Figure 4: Vertical splitting of tooth

was done with luxators and forceps (Fig.5). This was followed by osteotomy preparation for implant placement (Fig.6). Debridement of granulation tissue was done from the previous apicoectomy site and implant placed (Fig.7, 8 and 9).

Bone graft was placed to fill the bony defect in the debrided site and sutures placed (Fig10a and b). The sutured site was covered with Periopack and a soft tissue conditioner lined removable prosthesis given to the patient. Definitive implant supported porcelain fused to metal crown was placed after 4 months of surgical phase. Currently patient is under active follow-up.

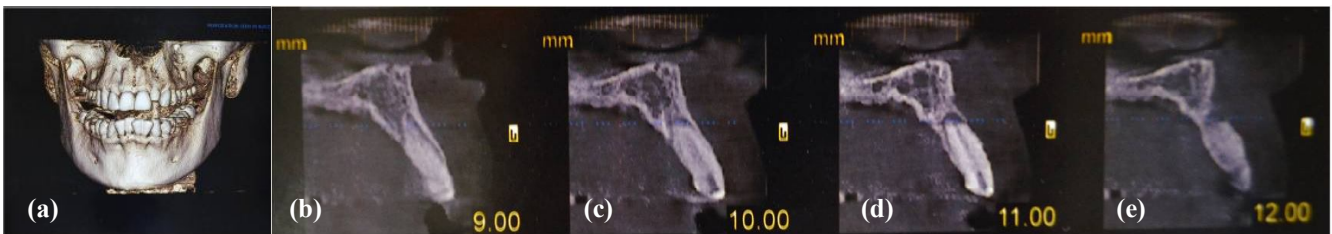


Figure 2(a-e): Preoperative CBCT showing thin labial cortical bone)



Figure 3: Decoronation



Figure 5: Extraction of palatal fragment

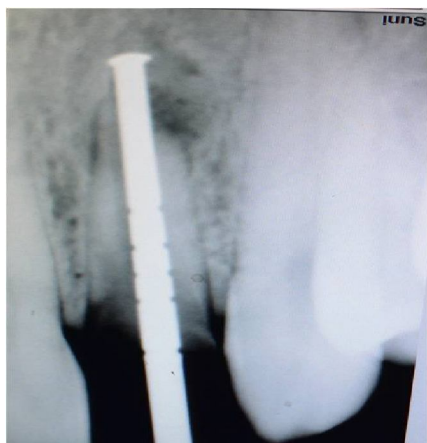


Figure 6: During Osteotomy

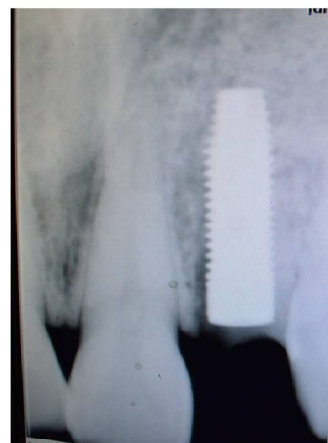


Figure 9: Radiograph showing the implant



Figure 7: Implant placement

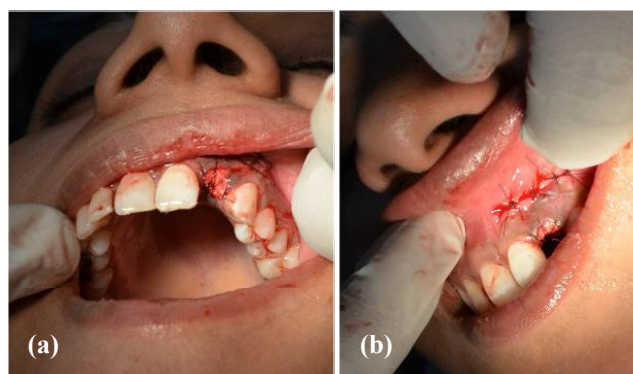


Figure 10(a) & (b): Closure of the socket and bone graft site



Figure 8: Occlusal view of the implant placed

DISCUSSION

Apart from aesthetics, alveolar ridge atrophy after tooth extraction has a negative impact on implant supported prosthetic restoration. Many methods have been described in the literature to counter these effects. Various bone grafts and membranes have been used in this regard. Immediate

implant has also been discussed in the literature stating that it is an established method for osseointegration. However, immediate implant placement still does not prevent buccal bone resorption as it is a biological phenomenon.⁴ Applying guided bone regeneration at the external surface of the ridge also does not prevent resorption.⁴ Some studies prove that de-crowned root fragments not only adequately preserve the bone volume but also cause vertical growth in coronal direction^{5,6}. Moreover, the search for minimally invasive procedures with minimal requirements always goes on. Cost is another factor which needs to be considered. Meeting these criterias is not possible with the current methods being used.

Ridge preservation is of utmost importance if good prognosis is required. This case report suggests one such method i.e the socket shield technique. This case report describes that by preserving the facial fragment of the root, thin labial cortical bone anatomy and the contour of the ridge was maintained. In this case bone graft was used to cover the large bony pathology. However, this technique can be used without the requirement of any bone grafts or membranes. Histological studies conducted have shown new bone formation in the small gap between implant in contact with the tooth fragment and the tooth fragment.⁷

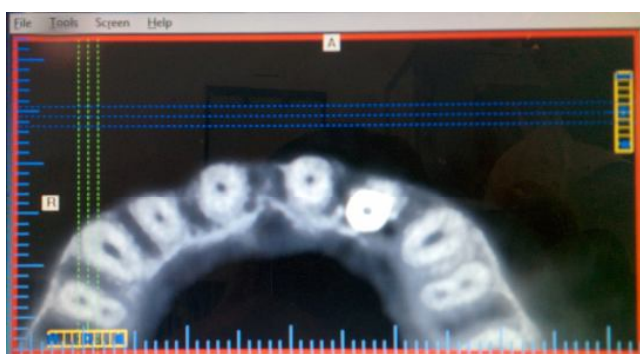


Figure 11: Post operative CBCT showing occlusal view of implant



Figure 12: Post operative CBCT showing tooth fragment with implant placement

However, a layer of new cementum was found between implant and tooth segment when enamel matrix derivative (Emdogain) was applied to the inner surface of the tooth fragment before implant placement.

Baumer *et al.*⁷ concluded that applied modification seems not to interfere with implant osseointegration and may still preserve the buccal plate. It may offer a feasible treatment

option for vertically fractured teeth.

Socket –shield technique meets the expectations of an ideal method of implant placement as it reduces invasiveness, reduces the requirements for various bone substituting materials.

In this case report it, it was shown that socket shield technique with immediate implant placement preserves the buccal cortical plate, and healthy peri-implant tissue has been observed. Though this technique is still in its infancy but with such promising results it will soon be incorporated as a routine procedure in ridge preservation.

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