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*Short Communication*

# Immediate Implant Placement by Using Socket Shield Technique: A Case Study

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## ABSTRACT

One popular clinical treatment for missing teeth is immediate implant insertion. But sometimes, the aesthetic result is not as beautiful as anticipated, especially in the anterior maxillary region. The most important factor in determining an implant's success is adequate bone height and width. Poor cosmetic results and implant treatment failure might be caused by physiological bone resorption after extraction and insufficient pre-operative evaluation and preparation of the hard and soft tissues. Numerous methods have been reported for maintaining the thin buccal cortical plate as well as socket changes. To achieve ideal aesthetic results and prevent the detrimental effects of bone resorption of the buccal bone plate following a tooth extraction, the socket shield technique has been proposed in recent years in connection with the placement of immediate implants in aesthetic areas. The current case study describes the diagnosis and treatment of an unrestorable tooth that undergoes socket shield technique for immediate implant placement.

*Keywords:* Socket shield technique, immediate implants, labial bone plate preservation, esthetic zone.

## 1. Introduction

The sequence of events that follow the extraction makes the replacement of a maxillary anterior tooth with a dental implant a difficult surgical procedure [1,2]. While tooth extraction is sometimes the best course of action, it alters the alveolar ridge proportions, which directly affects the emergence profile of the implant prosthesis in the future, particularly in the anterior region. [3]. The buccal bone of the anterior maxilla is weak, and the periodontal ligament provides the majority of its vascular support. [4,5]. The loss of blood flow from the periodontal ligament during extraction contributes to alveolar resorption, a complex physiological process that is impossible to completely avoid. Following extraction, the soft and hard tissues undergo physiological healing, which may negatively impact the aesthetics [1,2,6]. Single-tooth implant placement using the socket shield technique in the aesthetic zone is a highly reliable option for replacing a missing tooth [7,8].

## 2. Material and methods

A 36-year-old female patient attended the outpatient clinic, Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Egyptian Russian University seeking to restore her badly decayed upper left central incisor.

Clinical and radiographic examinations were done, and the patient was informed about the details of the procedure and signed the informed consent.

I. Pre-operative assessment:

Personal data of the patient including the name, age, sex, address, and telephone number was taken. Medical history including the presence of any medical problems, diseases, or medications taken. The chief complaint was taken briefly in the patient's own words.

The patient was examined intra-orally by inspection, palpation, probing, condition of the remaining tooth structure, and measurement of gingival sulcus depth, & gingival thickness, to evaluate gingival and periodontal condition.

a. Inspection:

Oral and para-oral tissue inspection was done to evaluate: (Figure 1.).

- The current width, height, and shape of the alveolar ridge.
- Soft tissue attachments for presence of any ulcerations, inflammations, or scarring.

- The existence of current pathology.
- Dimensions of the Palatal vault.
- Depth of the vestibule.

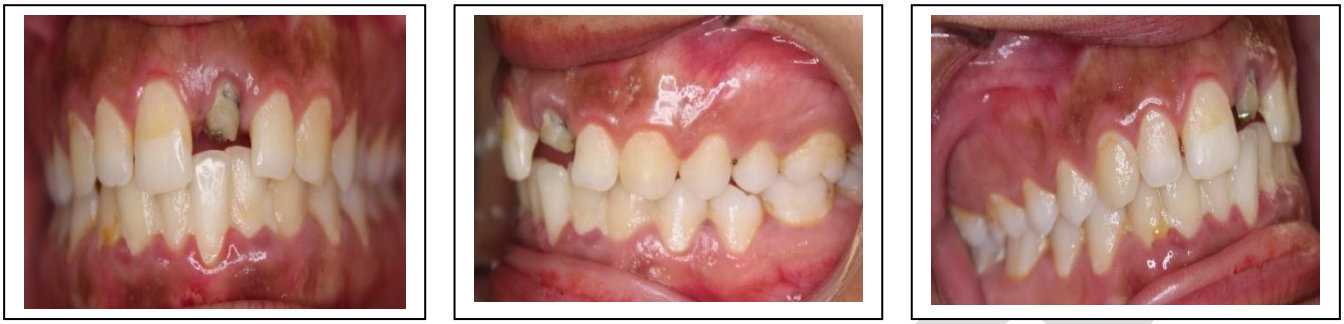

**Figure 1.** Clinical photographs showing oral and para-oral tissue examination.

b. Palpation:

The alveolar ridge was palpated in order to assess the following:

- Recognizing of the soft tissue and bone features.
- The amount of loose soft tissue.
- Assessment of anomalies in the bones.

c. Probing:

Probing around the tooth was performed to evaluate:

- Bleeding on probing (BOP).
- Pocket formation.
- Presence of suppuration.

d. Condition of remaining tooth structure:

It was evaluated by inspection, percussion, probing, and mobility tests.

II. Clinical application:

Before the procedure began, the patient was instructed to rinse their mouth with mouthwash containing 0.12% chlorhexidine. Betadine solution was applied to the target site. Using labial and palatal infiltration techniques, local anaesthesia was applied at the chairside to anaesthetize the anterior superior alveolar nerve labially and the nasopalatine nerve palatally during the procedure.

To relieve the TMJ's discomfort and prevent excessive strain on the joint, a bite block was used. The upper lip was retracted using a Minnesota retractor, and the surgical field was exposed by creating and reflecting a full-thickness pyramidal flap. A gingival incision and an oblique incision make up the two incision lines flap.

During the clinical procedure, the remaining root was sectioned into the labial shield and palatal part. A high-speed handpiece under copious irrigation and a fine tapered stone in a mesiodistal direction from the gingival margin was used. The palatal part was then removed atraumatically using a periotome and upper anterior forceps.. After removing the palatal part, we discovered that the apex of the root was not removed with it, after clinical trials to reach the apex, we failed to completely reach and remove the apex of the root. A surgical bur was used to decrease the labial fragment, leaving a thin layer of the root aspect attached to the labial bone plate. Following a meticulous debridement, a physiologic saline solution was used to irrigate the socket. The osteotomy was expanded using successive drilling in accordance with manufacturer's instructions until the ultimate diameter of the chosen implant. This was done after the implant bed was first prepared using a 2 mm pilot drill in accordance with the conventional procedure of implant placement. Ultimately, a healing collar was placed over the implant after it had been quickly placed into the palatal bone near the root. An interrupted suture technique was used to close the wound. (Figure 2.).

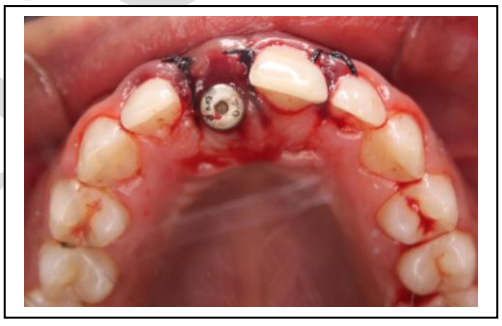

**Figure 2.**: Clinical photograph showing final closure with an interrupted suture technique.

III. Post-operative procedures:

A. Clinical examination was carried out:

- 48 hours post-operatively to assess the presence of any signs and symptoms of infection or inflammation.
- 1st-week post-operatively to remove the suture if present.

B. Radiographic examination:

Immediate cone-beam computed tomography (CBCT) revealed incomplete elimination of the root apex that was attached to the labial shield (Figure 3.).

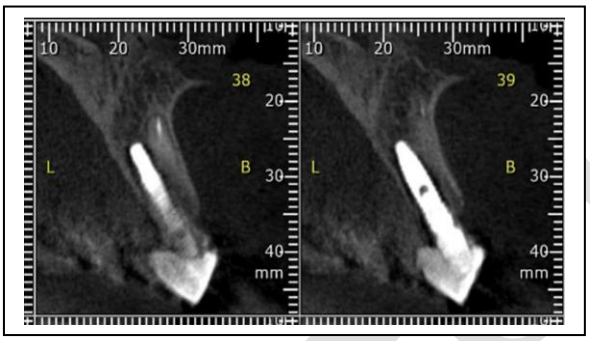


**Figure 3.**: Radiographic photo showing incomplete elimination of the root apex that was attached to the labial shield.

## 3. Discussion

A surgical bur with a long shank was used to prepare the shield as far apically as possible. This was carried out in accordance with the recommendations made by Gluckman et al. [9], who reported that the socket shield preparation method was less likely to result in labial bone plate fenestration when the socket shield was prepared as far apical as possible using a long shank surgical bur than when Baumer et al. [10] used the same technique, leaving only the coronal part of the labial shield during shield preparation after tooth decoronation, without specifying an exact length. In this instance, a long shank surgical bur was unable to reach the root apex. Furthermore, neither Baumer nor Gluckman provided a description of the precise method for separating the roots or the instruments used to cut the roots atraumatically into two

halves. The literature review confirmed that the root separation and socket shielding technique's lack of standardization was the primary cause of the failure.

According to Gluckman et al.'s 2019 study [11], the shield was prepared to the level of the labial bone crest using gingival retractors in order to avoid the problems associated with the previous technique's shield exposure.

The space between the implant and the shield was left empty of any graft material. This was consistent with the findings of Hurzeler et al. [12], who reported that when implants are placed directly into extraction sockets with an intact buccal wall, healing and osseointegration can occur even with a significant gap distance and without primary flap closure, a bone graft, or a barrier membrane. Also, it was in agreement with Siormpas and Mitsias et al [13]. Mitsias et al. [14], in an in vivo histology research that did not graft the gap, it was reported that the patient experienced several fractures of the craniomaxillofacial region and was involved in a catastrophic vehicle accident five years after implant loading following graftless socket shield. A little section of the maxillary bone, including the implant area, had to be removed as part of a maxillofacial surgical intervention to realign and recompose the shattered bones. Histological analysis was performed on the fixture and the surrounding hard tissues because this area seemed to be intact. They found that there was no grafting material present in the majority of the coronal threads between the implant and the shield, resulting in non-infiltrated connective tissue and a reported 76.2% bone-implant contact. On the other hand, Gluckman et al. [15], recommended using particle material to fill the gap and described using xenogeneic bone fragment to fill the jumping gap. Botticelli et al. [16], reported that a bone graft is not necessary to fill a gap if it is less than or equal to 0.5–1 mm between the implant surface and the socket wall; however, if the gap is greater than 1 mm, grafting is recommended.

A full mucoperiosteum flap was used in order to visualize the vertical endpoint of the vertical implant placement in relation to the crest of the bone and to measure the distance between the implant surface and the socket wall, and the distance between the crest of the bone and shield at the bony crest. Also, to ensure that there were no cracks to the labial bone plate, and the shield was immobile, and no sharp bony remnants. That was in agreement with the study

conducted by De Bruyn et al. [17], who observed in his study there was no statistical difference of marginal bone loss (MBL) after 4 years between flapped and flapless groups. Furthermore, in agreement with Al-Jubooriet al. [18], who noted that because the mucogingival tissues are not raised, it is not possible to observe the true topography of the underlying available bone and that the vertical endpoint of the vertical implant placement cannot be idealized because it is either too shallow or too deep. This might raise the possibility of perforations (such as fenestration or dehiscence), which could result in problems or even implant failure.

In our clinical study, we have documented a problem in our clinical investigation with using the method for preserving and separating the residual root. The clinical case experienced challenges when attempting to fully separate the palatal from the labial portion and preserve the labial part from any detachment while also separating the apical region of the root from the labial component. Follow-up periods reveal an intact labial shield and no apical resorption took place. No, mobility or infection was recorded. Although one apical resorption of the shield was recorded in the 2017 study by Baumer et al. [10], which may have been caused by microbiological remnants in the root apex, this shows the sensitivity of this technique. Furthermore, according to Gluckman et al. [15], three socket shields became infected and mobile in their study.

In spite of the technique being carried out as precisely as feasible, long-term data must be addressed in order to rule out potential risk factors.

## 4. Conclusion

The socket shield technique is a promising treatment approach for immediate implants that preserves the alveolar bone with high esthetic outcomes in comparison with conventional implantation. However, the procedure is technique-sensitive and challenging, and should still be reserved for the knowledgeable, experienced, and skilled clinician. Before using the procedure on a larger number of patients, it is advised to do an experimental study on extracted teeth.

- **Conflict of Interest**

The author declares no conflict of interest.

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