AN INTACT SOCKET SHIELD FOLLOWING THE REPLACEMENT OF A FAILED IMPLANT: A CASE REPORT WITH FIVE YEARS FOLLOW UP

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Many cases have been reported and many studies have been conducted, describing the successful results of the socket shield technique which is becoming widely used in implant dentistry as a way of socket preservation to prevent bone remodeling after teeth extraction, this technique exceeds by far the other techniques of socket preservation in terms of final aesthetic outcome, regarding soft tissues around the implant-borne prosthesis.

This case report describes the management of the implant failure which was encountered after immediate placement in association with the technique

Keywords: Dental implants, Socket shield, Bone loss, Failed implants

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INTRODUCTION

Following tooth extraction, a series of changes take place in the alveolar bone, these changes result in dimensional changes in the bone and soft tissues upon the healing of the extraction socket.¹

Future dental implant placement is directly affected by the changes in the bone height/width and associated soft tissues alterations thus, many techniques were proposed to overcome this problem, though these techniques minimize the loss of dimensions in the bone following tooth extraction yet the studies did not report complete preservation of the bone.²

One of these techniques is the socket shield technique (SST), which was originally demonstrated by Hürzeler et al in a study on beagle dogs. The technique involved the Hemisection of the mandibular premolar and a buccal fragment of the distal root was retained 1 mm coronal to the buccal bone plate. The immediate implant placement was done lingually to the retained root piece with or without contact with the root fragment. $^{\rm 2}$

The promising results of this technique in reducing the dimensional changes of the alveolar bone as well as lessening the need for bone grafting procedures around dental implants, especially in the esthetic zone.³ Different modifications of the original SST technique (pontic shield technique and proximal shield technique) were performed by many clinicians.^{4,5}

This case report describes the replacement of a failed implant which was immediately placed following the socket shield technique.

This case was approved by the ethics committee of the Jordanian dental association JDA

CASE REPORT

A 40-year-old female patient reported a chief complaint of broken tooth #14 that she wanted to be restored. No history of pain, swelling, or pus discharge, the medical history taken was non – contributory, and no smoking.

On intra-oral examination, a badly fractured crown of tooth #14 with a history of RCT was done 3 years back. The tooth was non-restorable.

Treatment options were discussed with the patient and she choose dental implant placement and consented to the use of the socket shield technique with immediate implant placement.

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Fig 1: Preoperative OPG showing tooth #14: non-restorable, root canal treated, with short filling, but doesn't show any radiographic periapical reaction



Fig 2: Pre-operative lateral photograph of tooth #14



Fig 3: Occlusal view of the extraction site with the Socket shield after preparation



Fig 4: Periapical radiograph of the implant after placement



Fig 5: Flap reflection exposing the apical part of the socket shield before performing the apicoectomy to the apex of this root fragment



Fig 6: Transverse plan section showing the tooth fragment "socket shield" after implant removal



Fig 7: Lateral view showing the screw-retained crown just after delivery



Fig 8: Periapical radiograph showing the implant after loading



Fig 9: Lateral view showing the exposure of the coronal part of the socket shield



Fig 10: Lateral view showing the management of the exposed part of the socket shield by reduction using a high-speed diamond round bur



Fig 11: Lateral view showing the healing of the site

Clinical procedure

The procedure started by restoring the crown of tooth # 14 with a composite filling, then an impression was taken to serve as the key to fabricate the temporary crown.

1 Socket shield and immediate implant placement

Anesthesia was obtained by infiltration with 2% lidocaine hydrochloride with 1:200,000 epinephrine to the buccal vestibule and palatal mucosa of the tooth. Using high-speed diamond burs (round and pear-shaped), the occlusal surface of the restored crown was reduced to a level deeper than the gingival margin by 1mm, thus reaching the gingival sulcus.

The tooth was split into two roots; lingual which

was extracted and buccal which was left intact, the buccal root was prepared using a high-speed diamond tapered fissure bur, leaving a semilunar piece of the tooth intact to the buccal plate of the socket.

The osteotomy was performed using a 3.3 mm diameter osteotomy drill, the Implant "4.1 X 12 natea, euroteknika systems" was placed with an insertion torque of 35 Ncm, the implant was immediately loaded by a temporary acrylic crown and the occlusion was adjusted to have a 1mm clearance space.

Two months later a localized swelling was noticed by the patient on the soft tissue buccal to the implant, the swelling was tender on palpation and filled with puss, and the implant was immobile.

2 Surgical removal of the apical part of the Shield

Following the administration of local anesthesia, a semilunar flap was elevated and an apicoectomy procedure was performed to remove the apical tip of the socket shield while the implant was still in place, then the implant was removed, a curettage was performed to remove the infected tissues followed by irrigation with normal saline then the wound was sutured.

The CBCT taken at 6 months post-operatively showed an intact shield, on intraoral examination, there were no signs of infection.

A new dental implant was placed "4.2X8 root form type implant, Roott Dental Implant System" with an insertion torque of 35 Ncm, a temporary Maryland bridge was bonded to the adjacent teeth, as a replacement for the missing tooth, for aesthetic reasons.

After 8 months, the patient showed up for the final restoration, an impression was taken using the closed technique, and a cement-retained PFM crown was fabricated with an opening on the occlusal surface for the passing by of the screw and screwdriver.

Follow-up was conducted for five years, clinically there was a stable level of soft tissue around the prosthesis without any signs of infection, and radiographs show no significant changes in bone level around the implant.

DISCUSSION

Tooth extraction results in dimensional alterations in the alveolar bone. A ridge width reduction of up to 50% during the first year following tooth loss in the premolar and molar sites, where two-thirds of the total changes take place within the first 3 months postextraction.⁶ Several factors affect the extent and severity of this loss including the angulation of the tooth, the thickness of the labial/buccal wall, and anatomical variations at tooth sites.⁷ For dental implant replacement of extracted teeth, the preservation of bone volume and preventing soft tissue shrinkage provide a better esthetic and functional outcome.⁸

Socket shield technique SST was proposed as an alternative treatment option to bone graft procedures, studies reported a promising outcome that encourages clinicians to treat their patients using this technique.⁹

Complications related to the technique might exist as loss of buccal bone loss, shield exposure, or failure.¹⁰ Understanding the nature of the complication will help in management, this will ensure the long-term success of SST. The infected shield in this case report was treated and the case followed over 5 years, the shield is intact and the implant is successfully in function.

CONCLUSION

SST can provide an alternative option to the invasive bone grafting procedure, especially in the esthetic zone, complications related to the technique are reported in the literature, and with good management, the shield, and the implant can successfully serve the patient.

More studies on the management of complications are encouraged.

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