

ADJUVANT PROCEDURE IN IMPLANTOLOGY: A REVIEW AND CASE SERIES

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Abstract

A lot of techniques are available to increase bone volume for implant placement such as bone grafting, guided bone regeneration, distraction osteogenesis, ridge expansion, ridge split, socket shield technique and direct or indirect sinus lift. The sequelae of tooth extraction lead to resorption of the alveolar bone around the socket and labial bone loss. There are possibilities of vertical and horizontal bone loss due to traumatic extraction. Bone loss requires soft and hard-tissue reconstruction to achieve adequate alveolar ridge in implant placement region.

Conclusions: In this case series, a hopeless fractured maxillary central incisor was replaced by an immediately placed implant in combination with the socket shield technique. It can be concluded that socket shield technique (SST) for tissue preservation at the implant site was successful in maintaining peri-implant tissue. Patient is now under observation and prosthetic part has to be done. This treatment modality may be suitable for esthetically challenging anterior single implant restorations. In second case posterior maxillary site was prepared using direct sinus lift, gap area was filled with bone graft, PRF and collagen membrane. It can be concluded that direct sinus lift procedure at implant site was successful to achieve adequate bone height for the placement of implant.

Key words: Alveolar bone preservation, extraction socket, socket shield, sinus lift.

INTRODUCTION

Alveolar bone loss is main problem for implant placement in many patients due to dento-alveolar trauma, disuse atrophy, traumatic extractions, infection, periodontal disease.¹ A lot of procedures are available to achieve adequate alveolar ridge.

Patients who require implant placement in pneumatized or atrophic posterior maxillary region, the method of choice is augmentation of the maxillary sinus. In maxillary posterior region 2 augmentation techniques can be used to lift the sinus membrane such as the direct and indirect sinus lift techniques. A direct sinus lift approach can be used when more than 3 mm bone augmentation is required, otherwise an indirect sinus lift technique can be planned.²

Loss of labial bone is very common even if atraumatic extraction is tried. There may be vertical, horizontal or inter-proximal bone loss result in difficult prosthetic rehabilitation.³ The loss of alveolar bony ridge and soft tissue apical migration may lead to formation of black triangles between teeth which is unaesthetic and is challenging condition to a clinician in restoring the missing tooth esthetically, especially in the maxillary anterior teeth region. Several preventive procedures like ridge preservation and pre-prosthetic procedures, such as soft-tissue augmentation, bone augmentation or combined procedure have been used to compensate this loss.^{4,5} In the socket-shield technique (SST), the main purpose is to preserve the labial two-third of the root in socket so that the periodontium, along with the bundle bone and the labial bone remains intact.⁶

Indications of socket-shield technique are firm but non-restorable tooth, teeth with healthy periodontal status, adequate palatal/lingual and apical bone, small periapical lesions and for multirooted teeth, having larger interradicular bone while contraindications are mobile teeth, absence of labial bone, large periapical lesions, internal resorption and thin labial and palatal bone

In this study we represent two case series of socket shield technique and direct sinus lift.

CASE REPORT 1: Socket shield technique.

A 16-year-old, healthy female patient reported to the Department of Oral and Maxillofacial Surgery, TMDC & RC, Moradabad with chief complaint of fractured crown in relation to 11 caused by hand pump injury. Patient had undergone endodontic therapy in relation to 11. Patient wanted prosthetic rehabilitation of the tooth by implant. Patient was advised for Cone beam Computed Tomography. CBCT revealed that 11 had RCT treated root stump, the labial bone plate was thinner than 1.5 mm. Implant placement with SST was selected as treatment of choice. Oral prophylaxis was done before surgery. Surgical site was prepared with the help of povidine iodine 5% both extraorally and intraorally. Local anesthesia with adrenaline was administered at surgical site, crown portion of the tooth was trimmed with the help of round carbide bur 1 mm below the gingival level, and implant site preparation was performed according to the manufacturer's guidelines, through the root present in the alveolar socket. The drilling was initiated using a lancet drill to engage the

palatal half of the root so that the labial aspect would remain intact. The resistance during drill through dentine was found to be feeling like D1 type bone. The osteotomy was performed with special care to keep the drills stable in vertical direction along root canal toward palatal direction. After implant bed preparation, a tapered internal hex implant, 3.6 mm × 13 mm was placed in correct position [Figures 6]. The implant which was placed had bony walls on mesial, distal, and palatal aspect. On the labial side, there was thin layer of dentin followed by cementum, PDL, and bundle bone in socket-facial direction. After the implant placement, a cover screw was placed on fixture of implant and closure was done using 3-0 silk suture. Post-operative instructions were given including antibiotics and analgesic medication and chlorhexidine 0.2% oral rinse was advised. The patient was also instructed to avoid any mechanical trauma in the area for 2 weeks. IOPA radiograph was taken post-operatively to see final placement of implant. After 1 week, the patient was asked to return for a postoperative evaluation and suture was removed. The patient has been kept under observation and prosthetic rehabilitation will be performed after 3 month follow up.



Fig no – 6 Implant placement



Fig no – 7 Implant placed Fig no – 8 closure



Fig no – 9 Post-operative IOPA

CASE REPORT 2: Direct sinus lift technique.

A 57-year-old, healthy female patient reported to the Department of Oral and Maxillofacial Surgery, TMDC & RC, Moradabad with the chief complaint of missing tooth with respect to 24, 25, 26 and 27 tooth region and wants to replace fixed prosthesis. There was history of extraction and implant placement in 24 tooth region. The alveolar ridge thickness was 3 to 4 mm due to pneumatization of maxillary sinus. Direct sinus lift technique was selected as treatment of choice to achieve alveolar bone height. Surgical site was prepared with the help of povidine iodine 5% both extraorally and intraorally. Local anesthesia with adrenaline was administered at surgical site. The lateral approach was used; a mid-crestal along two vertical releasing incisions was given to expose the surgical site (sinus). The incision should be extended at least 1 tooth past the planned osteotomy on either side.

A full-thickness mucoperiosteal flap was raised and round carbide bur was used to produce an oval or rectangular osteotomy into the lateral maxillary sinus wall in such a way not to perforate through sinus membrane. The Schneiderian membrane was gently elevated from floor of the sinus and associated walls that produced a pocket to pack the bone with bone graft and PRF used as membrane. Approx 12 to 15 mm of bone height was achieved because the site was planned for a 10-mm implant, grafting to a height 2 mm more than needed is advisable to allow for some loss of graft material during heal. Closure was done using 3-0 silk suture. Post-operative instructions were given including antibiotics and analgesic medication and chlorhexidine 0.2% oral rinse was advised. The patient was also instructed to avoid any mechanical trauma in the area for 2 weeks. PNS radiograph was taken post-operatively to see elevation of membrane. After 1 week, the patient was



Fig no – 1 Preoperative CBCT Fig no – 2 Preoperative intra oral view



Fig no – 3 Horizontal cut till gingival level



Fig no – 4 Labial shield preservation Fig no – 5 parallel pin in osteotomy site

asked to return for a postoperative evaluation and suture was removed. The patient has been kept under observation and prosthetic rehabilitation will be performed after 6 month follow up.



Fig no – 10 Incision Fig no – 11 Osteotomy into sinus wall



Fig no – 12 Schneiderian membrane Fig no – 13 PRF placed



Fig no – 14 Graft material placed Fig no – 15 Closure



Fig no – 16 Pre-operative PNS Fig no – 17 Post-operative PNS

DISCUSSION:

During extraction of teeth, periodontal ligament can be injured and there may be gingival recession showing unaesthetic appearance due to both soft and hard tissue resorption. To overcome this drawback, Guided Bone Regeneration (GBR) was used in the immediate implant site.^{7,8} Peri-implant tissue resorption is unavoidable even by using GBR^{7,9} at aesthetic areas. Bone regeneration is difficult due to lack of cancellous bone and blood supply. The subsequent tissue shrinkage after GBR made it difficult for clinicians to predict the pink aesthetic outcomes after horizontal and vertical bone augmentation at the anterior region.^{9,10} Although overbuilding of labial bone could not guarantee a satisfactory aesthetic outcome.¹¹ On the basis of the Root Submergence Technique (RST), which was first documented in 1960s,¹² the SST was first reported by Hurzeler et al,⁴ this provided an alternative idea for immediate implant sites at anterior aesthetic regions, with the goal of preserving, rather than augmenting, peri-implant tissue. In a histology study, Gray and Vernino¹³ indicated that cementum-like calcified materials would form around the implants without inflammation, similar to the osseointegration process.

Sinus augmentation is a procedure that plays a large role in maxillary implant placement in the posterior maxilla. Arriving at a diagnosis and treatment plan for the augmentation is paramount to the success of the graft and future implant placement. A variety of surgical maneuvers are used, the direct techniques offer the best visualization and control. The indirect techniques are good options when 3 mm or less augmentation is required. The decision to place implants at the time of augmentation should be based on the availability of approximately 5 mm of native bone to produce primary stability. When considering grafting material, autogenous bone has the best chance of success; however, in areas of small grafting demands, or if it is not possible to obtain sufficient autogenous bone, other materials heal well with good success.²

CONCLUSION:

In this case series, a hopeless fractured maxillary central incisor was replaced by an immediately placed implant in combination with the socket shield technique. It can be concluded that socket shield technique (SST) for tissue preservation at the implant site was successful in maintaining peri-implant tissue. Patient is now under observation and prosthetic part has to be done. This treatment modality may be suitable for esthetically challenging anterior single implant restorations. In second case posterior maxillary site was prepared using direct sinus lift, gap area was field with bone graft, PRF and collagen membrane. It can be concluded that direct sinus lift procedure at implant site was successful to achieve adequate bone height for the placement of implant.

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