

# Restoration of Anterior Facial Cortical Bone Defect with Grafts and Placement of Immediate Implants for Restoring Facial Esthetics : A Success Story

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## Abstract

The placement of dental implant is a well-established treatment option for replacing missing teeth. Mostly, compromised teeth are removed and implants are placed in bone deprived sites. This article describes a protocol for immediate placement of endosseous implant into debrided infected dentoalveolar socket. A total of 2 implants were placed in a patient with infected dentoalveolar socket in relation to 11. The Immediate placement protocol emphasized the meticulous debridement of the infected tissue in combination with periapical osteotomy of socket. Bone grafting along with Collagen membrane was accomplished to support bony healing of alveolar defects surrounding implantation site. Pre-surgical and postsurgical antibiotic therapy was administered. Results showed the benefits of Immediate implant placement coupled with bone grafting for esthetic rehabilitation of an anterior missing teeth & anterior facial cortical bone defect. Both the implants osseointegrated after 6 months follow up and were functional 6 months postoperatively.

**Keywords:** Immediate implants, Infected socket

## Clinical Report

A 21 year old male patient (Fig. 1) reported to the Prosthodontic clinic with a complaint of inadequate esthetics. On clinical examination it was found that 11 & 21 was missing with patient giving a history of broken 11 because of trauma 2 years back. Orthopantomograph (Fig. 2) revealed that patient had root stumps in relation to maxillary anterior 11 with loss of one-third of the labial cortical plate.

Intra oral periapical X-Ray showed radiolucency at the apex of 11 suggesting a

periapical lesion. Peridontal ligament attachment and alveolar crest level appeared to be normal except for there was resorption of the facial cortical plate with respect to 11 which required bone grafting. A restoration driven treatment plan was developed which included extraction of infected root stumps followed by thorough debridement of the socket, augmentation of the defective socket with bone graft & subsequent placement of implant followed by prosthetic rehabilitation. Informed consent was taken from the patient before the beginning of the surgical procedure. Diagnostic casts were prepared & bone mapping was done by measuring the ridge width in the patient's mouth utilizing endodontic reamers & subtracting soft tissue width on the diagnostic cast by scraping. A oral prophylactic dosage of 500mg amoxicillin and 400mg metronidazole daily was initiated at 8 hourly, 2 days before surgery. Precautions were taken to maintain a strict aseptic regimen. Pre-operative Intraoral and extra oral scrubbing and draping was done.

Infiltration anesthesia was given in relation to maxillary 11 & 21. A papilla preserving full thickness incision (Fig. 3) was given & tissue reflected which showed loss of bone. Atraumatic extraction of the root stump (Fig. 4) was carried out. The sockets were then completely debrided with curettes to remove any infected granulation tissues. Through Irrigation of the socket was carried out using a combination of Sodium hypochlorite solution (2.5%) with Chlorhexidine gluconate (0.2%)<sup>18</sup>. Root length of the tooth and diameter of the periapical radiolucency was measured and 2mm length was incorporated in the obtained value to determine the length of the implant to be placed. The site was initially prepared with

implant drills & subsequently with osteotomes (Fig. 5 & 6) for receiving the implants of chosen dimensions. Two ADIN implants of size 3.75 x 11.5 mm were carried to the site with the help of an implant carrier (Fig. 7) & wrenched into place with a Torque wrench till primary stability was achieved (Fig 8). Cover screws were then placed over the implants.

Hydroxy apatite bone powder (Osseograft; Advanced Biotech Products (P) Ltd.) was then packed into the extraction socket area (Fig. 9). A scaffold sheet comprising of Sterile Demineralized bone matrix xenograft (type 1 collagen) granules with Calcium sulfate hemihydrates (Osseograft; Advanced Biotech Products (P) Ltd.) of appropriate dimension was used to stabilize the bone graft (Fig. 10). Surgical site was then closed with the help of self resorbable polyvicryl sutures (Fig. 11). Primary (water tight) closure of the soft tissue is usually recommended so as to prevent the dislodgement of the graft material. An immediate removable partial denture (Fig. 12) was given to the patient as an interim denture for temporary esthetic rehabilitation. Patient was kept on a daily dose of 500mg amoxicillin and 400mg of metronidazole, 8 hourly, orally 3 days post-operatively to prevent any infections.

After 3 months, a periapical radiograph (Fig. 13) was taken, which showed satisfactory implant-bone integration along with bone regeneration in the region of facial cortical bone defect area. Cover screw were removed & Gingiva formers (Fig. 14) were placed. After two week, gingiva formers were removed & screw retained standard abutments for the ADIN implants were placed onto the implants.

Impressions were made using direct technique with elastomeric impression



Fig. 1 Pre-op picture.



Fig. 2 Pre-op OPG.



Fig. 3 Incision on surgical site.



Fig. 4 Extracted infected root stumps

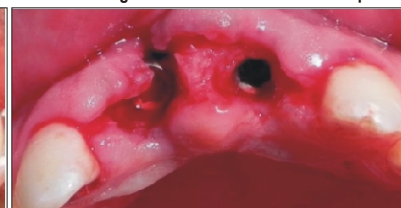
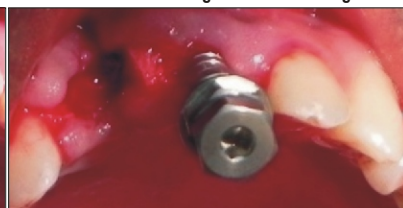
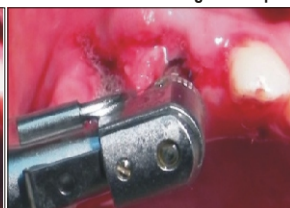
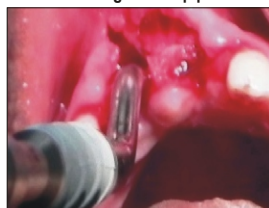


Fig. 5 & 6 Preparation of the surgical site using osteotomes & implant drills

Fig. 7 & 8 Implant being carried to the site with implant carriers & subsequent placement of the implants.



Fig. 9 Bone graft placement.



Fig. 10 Scaffold placement to stabilize the graft.



Fig. 11 Sutures placed



Fig. 12 Immediate R.P.D Placement.

materials. Two separate metal ceramic crowns were then fabricated & cemented using Zinc phosphate cement. Excess cement was removed. Care was taken to keep the crowns out of contact during centric & eccentric movements of the mandible. Oral hygiene instructions were reinforced for the patient. A review was done after 3 months (Fig. 15) which showed that patient was satisfied with the esthetics & functional rehabilitation with no signs of abutment or crown loosening or soft tissue defect. A Periapical radiograph taken, showed no signs of recurrence of periapical pathology or bony defect re-emerging. Osseointegration of both the implants was found to be satisfactory.

#### Discussion

The advent of implant dentistry changed our ideas about tooth replacement therapy for our patients. Traditionally, before placing dental implants, the compromised teeth were removed and the extraction sockets left to heal from months to 1 year.<sup>1,2</sup> If following a conservative methodology, implant is placed after 1 year of tooth extraction to allow alveolar bone to recover,<sup>2,3,4</sup> which is one of the major disadvantage of traditional implant surgery.

Placement of Implants into fresh extraction Sockets was introduced as a treatment modality in the late 1970s.<sup>5</sup> The advantages of immediate implant placement includes, a reduced operative time, preservation of esthetics, shorter treatment time, maintenance of socket walls, better actual implant placement, better patient satisfaction & reduces the number of surgeries.<sup>6,7</sup> Disadvantage of immediate implant placement is that if remnants of infection remain after extraction of the natural teeth, it may contaminate the initial healing site, resulting in implant failure.<sup>8</sup>

Immediate placement of implant in chronic pathologies has always been questionable. Clinical reports suggest that periapical infections are a predictive marker for implant infection and failure.<sup>9,12</sup> However,

successful immediate implantation in infected alveoli can be obtained, depending on complete removal of all contaminated tissues and controlled regeneration of the alveolar defect.<sup>13,14</sup>

Literature suggests three methods to augment the site before immediate implant placement. One method includes placement of a bone graft and/or a scaffold or a combination of both followed by implant placement.<sup>15</sup> Newer techniques suggested using autogenously harvested bone rings<sup>16</sup> & placement of protein rich plasma followed by implant placement.<sup>17</sup> However, long term studies with larger number of samples are required to substantiate these treatment protocols. Many studies on immediate placement of dental implant in newly extracted tooth socket has been done with most of them showing a success rate of 90%<sup>18</sup> making it a widely accepted and established treatment protocol.

Most of the teeth that were extracted were due to either periodontal or periapical infection and updated review of literature on immediate implant suggests that this procedure should be avoided in the presence of periapical or periodontal pathosis<sup>18</sup>. Clinical experience has led most clinicians to avoid the immediate placement of endosseous dental implants at infected site and to consider infection contradictions for immediate implantation.

The protocol followed in this patient situation includes-

- Extraction of tooth
- Debridement
- Bone graft and collagen membrane
- Placement of implants
- Loading of implants following a healing period of 6 months<sup>18,19</sup>

Ericksson et al<sup>20</sup> suggested that proper antibiotic coverage with immediate implant surgery could minimize the implant failure rate. Studies on immediate implant placement protocol have suggested that osseointegration and healing proceeds simultaneously. Locally

produced conditions inside the newly extracted socket are in fact favorable for osseointegration of dental implants.<sup>21</sup>

As has been seen in this case and all the other cases associated with alveolar defect, healing of these defects is essential for the overall success of the immediate implant as it contributes to the functional stability of the dental implant. Therefore we strictly maintained a protocol that completely removes the contaminated tissue and allows successful bone regeneration of the previously infected alveolus.

Our goal was to achieve sustainable implant osseointegration in relevance to this case as there was increased possibility of soft tissue growing between implant surface and bone because of alveolar defect. In order to prevent that we filled the defective site with allograft and covered the grafted site using barrier technique.<sup>22,23</sup> These materials will prevent connective in growth between implant and bony wall that might interfere with osseointegration of implant.<sup>24</sup> We have used allogenic bone graft material (Hydroxy-apatite) and a collagen membrane to stabilize the graft and achieve osseointegration.

One of the problems which can be observed by the clinician during immediate implant placement is the difficulty to assess depth of insertion as implants are being placed in natural tooth socket. Appropriate diagnostic measures should be taken pre-operatively to correctly assess the depth of the socket in order to avoid any hindrances during implant placement. It is always advisable to allow the bone graft to properly augment the site before placement of the implant but then the objective of immediate implant protocol would stand defeated.

#### Conclusion

Immediate implant along with bone grafting has been promising prospect as treatment protocol. In this case report, we tried to achieve satisfactory implant-bone integration, good soft tissue healing & esthetically acceptable prosthetic rehabilitation under a controlled procedure and by following a strict protocol. We achieved most of our pre-operative objectives on the basis of which it can be argued that implants can be successfully introduced into the debrided dentoalveolar socket immediately after extraction.

#### References

References are available on request at [editor@healtalkht.com](mailto:editor@healtalkht.com)



Fig. 13 I.O.P.A after 3months.

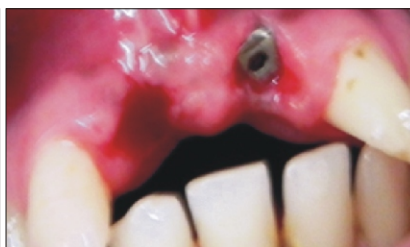


Fig. 14 Gingiva formers in place.



Fig. 15 Metal-ceramic crowns placed in relation to 11& 21.