Immediate Placement of Dental Implants Into Fresh Extraction Socket in the Maxillary Anterior Region: A Case Report

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The loss of the buccal alveolar plate following tooth extraction in the maxillary anterior may lead to palatal implant positioning with esthetic complications. Immediate placement of dental implants has been suggested because it may preclude dramatic postextraction bone loss. In this report, the harmony of soft and hard tissue was achieved by immediate implant placement with bone augmentation in an esthetically challenging situation.

Key Words: immediate placement, implant, anterior

INTRODUCTION

Traditional guidelines suggest 2 to 3 months of alveolar ridge remodeling following tooth extraction, but the loss of the buccal alveolar plate following tooth extraction in the maxillary anterior may lead to palatal implant positioning with esthetic complication. Immediate placement of dental implants has been suggested because it may preclude dramatic postextraction bone loss, and it may reduce the number of surgeries and treatment time. However, it is challenging to achieve esthetic results with anterior teeth having soft and hard tissue discrepancies. In this case report, the harmony of soft and hard tissue was achieved by immediate implant placement with bone augmentation in esthetically challenging situation.

CASE REPORT

A 21-year-old male patient presented to the Department of Periodontology at the Armed Forces Capital Hospital, Seongnam-si, Korea, for evaluation of the upper anterior region. The patient did not have any medical conditions and was not taking any medications that were associated with a compromised healing response. Clinical and radiographic examination indicated fractured tooth with unfavorable prognosis (Figures 1a, b, and c). There was disharmony in gingival margin and asymmetry in the anterior region. The right central incisor was positioned more labially compared with the left central incisor. The right central incisor had a space of 1.5 mm and 0.5 mm mesially and distally, respectively.

The patient was referred to the Department of Orthodontics and Prosthodontics for further evaluation and development of a treatment plan. The patient was given a detailed explanation concerning the present...
Immediate Placement of Dental Implant in Anterior Region

State, alternative treatment plans, and the proposed procedure, and informed consent was obtained from the patient. Treatment with immediate placement of dental implant was planned after precise consultation.

Immediately before the procedure, the patient rinsed for 2 minutes with a 0.12% chlorhexidine digluconate solution (Hexamedine, Bukwang, Seoul, Korea). Following an injection of 2% lidocaine with 1:100 000 epinephrine local anesthetic, the crown portion and the residual roots were atraumatically removed. The extraction socket was thoroughly debrided and degranulated to remove all tissue.

A surgical template was used to locate the desired implant position, but it showed that installing the implant at the desired position might compromise the initial stability and the esthetic result. Consequently, ridge expansion with an osteotome was done before implant installation. The site was prepared to accept a 3.8 × 12 mm implant (Implantium, Dentium, Seoul, Korea). The implant was placed with the insertion torque of 40 Ncm (Figure 2a). Marginal voids

Figure 1. (a) Clinical photograph at the initial visit. The upper central incisor was positioned more labially compared with the left central incisor, and the gingival margin on the right central incisor showed disharmony compared with the left central incisor. (b) Radiograph showing the subgingival fracture in the upper right central incisor. (c) Cross-section of computed tomogram view before operation.
about 1.0 mm wide were noted between the implant surface and the buccal cortex (Figure 2b). The buccal surface and marginal voids were grafted with bovine anorganic hydroxyapatite (Bio-Oss, Geistlich AG, Wolhusen, Switzerland) and covered with a resorbable collagen barrier membrane (Bio-Gide, Geistlich AG), such that the membrane extended at least 3 mm onto healthy bone and covered the occlusal surface completely. Undermining of mucoperiostal tissue was performed to cover the graft material and implant without tension. The wound was closed by means of single sutures (Ethicon,
Johnson and Johnson Medical Inc, Arlington, Tex). The patient was placed on amoxicillin 500 mg 3/day for 5 days, mefenamic acid 500 mg initially then mefenamic acid 250 mg 4/day for 5 days, and chlorhexidine digluconate 0.12% 3/day for 4 weeks. He was asked not to chew on or brush the surgical area for the first 4 weeks postoperatively. The patient was shown how to perform a roll-stroke brushing technique, and oral hygiene reinforcement was performed at each visit. The patient reported no specific symptoms and showed no adverse clinical signs. Healing was uneventful, and Figure 2c shows the 3-month postoperative photograph of soft tissue healing.

The submerged implant was exposed using an apically positioned flap. Selection of the abutment was done after evaluating the bony level and gingival thickness. Autopolymerizing acrylic resin (Alike; GC America, Alsip, Ill) was used to make the provisional restoration. The provisional restoration was adjusted to clear centric and eccentric contacts.

After 3 months, the provisional restoration was replaced by a permanent cemented restoration (Figure 3a). The prosthesis was functioning well up to 4 months (Figures 3b and c). The width of the ridge was well maintained, showing postoperative ridge width between 5 to 6 mm at the most coronal portion of the alveolar bone. The postoperative width of keratinized tissue was 4 to 5 mm on the buccal side. Symmetry of gingival margin was achieved with complete fill of the mesial interdental space between 2 central incisors.

**Discussion**

The extended treatment period and the need for a removable prosthesis during the healing phase of the traditional approach may be inconvenient to certain patients. The original approach has been modified by several authors to include 1-stage surgery, immediate implant placement, and immediate provisionalization. Immediate implant placement and provisionalization may be a good treatment option in the loss of anterior teeth, but this approach may be recommended when there is no need for a bone augmentation procedure.

In this case report, bone deficiencies with vertical and horizontal component was noticed more evidently after extraction was done, and the submerged approach was done because successful bone reconstruction requires primary stability and an undisturbed healing/remodeling phase of the bone graft. Ridge expansion was done simultaneously with extraction to prevent ridge reduction and to reduce the number of surgical intervention. The ridge deficiency was overcorrected because remodeling in the augmented alveolar defect may result in undesirable alteration in tissue volume, particularly following implant loading. Collagen barrier membrane was applied to retain the coagulum, maintain soft tissue contour, and preserve proximal bone level.

The establishment of a peri-implant soft tissue contour with intact papillae and gingival margins is a major esthetic concern. Limited papilla fill was seen in immediate implantation, and significant reduction in papilla height was found in immediate provisionalization, reaching a maximum of 0.64 mm on average for mesial papillae. In this case report the interdental space was completely filled with papilla with the aid of soft and hard tissue management.

Although debatable, the presence of peri-implant keratinized tissue is regarded as beneficial, especially for the longevity of rough-surfaced implants, and it was also suggested that a certain minimum width of the peri-implant mucosa may be required to avoid bone resorption. Soft tissue closure over immediate implants was achieved by...
coronal advancement of the buccal flap, and apically positioned flap was utilized to increasing the width of keratinized tissue and to match the adjacent gingival contour.

In this report, the harmony of soft and hard tissue was achieved by immediate implant placement with bone augmentation in esthetically challenging situation. Further evaluation is needed to monitor hard and soft tissue changes on a long-term basis.

REFERENCES


