Surgical Considerations in Placement of Immediate Dental Implants- A Case Report

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Abstract

Immediate implant placement can be challenging in the surgical and prosthetic fields. However, immediate implant placement is sometimes the first treatment option of tooth loss in the esthetic zone. Proper treatment planning is imperative to obtain a successful esthetic and functional result of the final prosthesis. The present case report shows a step-by-step technique for dental implant placement in the anterior maxilla, detailing the importance of an atraumatic surgical technique to preserve the hard and soft tissues at the extraction site and to better position the implant. This article also shows patient and site considerations that are necessary for the application of this technique in the clinic.

Keywords: Immediate Implant Placement; Extraction; Socket; Ridge Preservation

Introduction

Dental implant therapy is the most conservative treatment option for the lost dentition [1]. Despite the high success rate of this treatment modality, long-term follow-up studies have shown unesthetic results and the need for additional surgical procedures [2], resulting in implant removal and/or additional procedures to recover hard and soft tissue losses [3]. Clinical demand focused on reduction of dental implant therapy time has lead research studies in the field of immediate implant placement [4]. To achieve this goal, studies have focused on immediate implant placement [5], immediate loading [6], and improving implant surface technology [7].

The residual socket morphology including the inclination of axial wall, the root curvature, the residual bone present on all four walls, the position of the apex, proximity to anatomical structures and absence of infection dictate the placement of implant in the extraction socket. If the residual space between implant and the socket wall is more than 1.5mm, bone graft is recommended between the implant and socket walls. For soft tissue management around the implant a temporary crown can be used as part of the restorative plan to shape and manage the cervical gingival tissues for improved esthetics. The surgical requirements for immediate implant placement include atraumatic tooth extraction [9-11], ridge preservation [12], thorough alveolar curettage to eliminate possible pathologies [13]. Primary stability is an essential requirement, and is achieved with an implant exceeding the alveolar apex by 3–5 mm [14]. Esthetic emergence in the anterior zone is achieved by 1–3 mm sub-crest implantation [15].
Case Report

A twenty-three-year-old non-smoker male patient with non-contributory medical history reported to the department of Periodontics with a chief complaint of pain in #9. The patient gave a history of trauma in the maxillary anterior region two years ago resulting from a football game. Tooth #9, deemed non-vital and further treated with root-canal treatment, showed coronal discoloration as time progressed (Figure 1).

The patient reported dull pain and discomfort in #9 for the previous 2-3 weeks, aggravated by contact and eating. Intraoral examination revealed discolored, slightly extruded #9 which responded positively for pain on percussion. The probing depths were 2-3mm overall except for disto-buccal #9, which was 7mm with bleeding on probing (Figure 2). The facial gingiva had thick phenotype with adequate keratinized tissue while palatal gingival tissues showed marginal erythema, edema, and bleeding on probing (Figure 3). Radiographic examination revealed endodontically treated #9 with horizontal fracture through the middle third and slight displacement of coronal half (Figure 4). Clinical and radiographic examination deemed #9 to have a hopeless prognosis and was treatment planned to be extracted. The patient was given multiple restorative options including no treatment, removable partial dentures, resin-bonded fixed partial dentures, conventional fixed partial dentures, and implant placement either at the time of extraction or delayed after ridge preservation procedure for #9.

Surgical phase: Proper diagnosis and meticulous treatment planning are the key requisites of any surgical procedure, and it is important to pay close attention to all the surgical considerations discussed previously. Written and verbal consents were obtained from the patient for extraction, ridge preservation, bone grafting and implant placement since it is always prudent to plan for multiple treatment options when immediate placement of implants is considered. Local anesthesia was obtained with 2 carpules of 4% septocaine, 1:100,000 epinephrine and 1 carpule of 0.5% Bupivacaine, 1:200,000 epinephrine with local infiltration. Using a 15C scalpel blade intrasulcular incisions was made circumferentially around #9 to release periodontal fibers. #9 was extracted traumatically using periotomes in the PDL of #9, with utmost attention to keeping the buccal plate and all 4 socket walls intact (Figures 5, 6). The socket was debrided with curettes and copious saline irrigation.
The decision to place an implant the extracted socket stemmed from the following considerations:

- non-smoker medically healthy patient
- absence of purulent discharge from the socket present
- thick phenotype with adequate keratinized tissue
- presence of intact socket walls after extraction including the buccal plate.
- adequate thickness of the buccal plate
- adequate bone apical (>5mm) to the socket to achieve primary stability
- linear anatomic configuration of the socket resulting from linear and non-dilacerated root
- absence of interference from anatomic structures like nasal cavity and incisive canal
- Sound adjacent teeth with adequate (>1.5mm) bone thickness between the roots and implant.

Implant motor and a reduction implant handpiece with copious irrigation was used to prepare implant osteotomy at #9 site in a typical progressive drilling sequence, following the manufacturer’s instructions, engaging the palatal wall. A Straumann 4.1 x 16 mm bone level tapered implant was placed in the osteotomy with 35Ncm insertion torque. The implant engaged the palatal wall and the apical 5 mm beyond the socket. The head of the implant exited palatally for the future implant crown screw access hole to exit through the cingulum of the central incisor crown. Apico-coronally, the implant head was 3 mm below the CEJ of the adjacent teeth (Figures 7,8). The position was confirmed radiographically. (Figure 9). 0.5cc of Freeze-Dried Bone Allograft (FDBA), hydrated with saline was placed in the space between the implant and buccal wall (Figure 10). A prefabricated custom healing abutment was placed over the implant to achieve a favorable emergence profile (Figure 11,12). Amoxicillin antibiotic, Ibuprofen for pain and Chlorhexidine mouth rinse were prescribed post operatively. The patient was instructed to rinse twice daily for 2-weeks with 10 mL of 0.12% chlorhexidine Di gluconate. The patient was discharged in excellent condition with an Essex retainer and seen at 2 weeks for post-op appointment. The patient had no discomfort and tissues appeared healing adequately (Figure 13).
Conclusion

This case report gives a step-by-step guidance for the clinician to obtain an appropriate esthetic and functional result for the implant crown.

References
