Immediate implant placement and restoration in the maxillary central incisor: A clinical report

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The maxillary anterior region is said to be the “esthetic zone” because of its influence on facial appearance and high visibility. It is well known that occurring horizontal and vertical absorption of alveolar bone after tooth extraction. A predictable esthetic result is considered a challenge when an extracted tooth must be replaced by an implant in the esthetic zone. The advantage of immediate implant placement and restoration prevent the absorption of alveolar bone, use of the healing and bone regeneration capacity, reduce the number of surgical intervention, reduce the number of dental visits, reduce the time between extraction and final prosthetic restoration and increased patient acceptance. In a 54-year-old man who showed root fracture of upper right central incisor, immediate placement and immediate temporization were planned after atraumatic extraction of fractured tooth. After healing phase, a definitive zirconia abutment and veneered zirconia crown was connected to that implant fixture.

Keywords: Dental implants, Immediate dental implant loading, Single-tooth, Tooth fractures

INTRODUCTION

Immediate implant placement and restoration has been an increasing treatment modality in modern implant dentistry. The traditional, conservative guidelines were suggested in the 1980s, recommending 3 months after extraction for a healing period and 3 to 6 months after implant placement for the osseo-integration period.1,2 Recently, many authors and patients are interested in immediate tooth replacement and restoration. However, a predictable esthetic result is considered a challenge when an extracted tooth must be replaced by an implant in the anterior maxilla. It is well known that occurring horizontal and vertical absorption of alveolar bone after tooth extraction.3 After tooth extraction, expected bone resorption would be accelerated in the first 6 months with as much as 40% of the alveolar bone vertical height and 60% of the alveolar bone horizontal width absorption which continues at a rate of 0.25–0.5% every year.4 Immediate implant placement and restoration method was first introduced by Lazzara way to shorten the healing period and highly esthetic implant prosthetics.5
immediate provisional restoration of anterior implants has been widely reported in the literature as a possible solution for maintenance of hard and soft tissue architecture.\textsuperscript{[6-9]} The advantage of immediate implant placement and restoration prevent the absorption of alveolar bone, use of the healing and bone regeneration capacity, reduce the number of surgical intervention, reduce the number of dental visits, reduce the time between extraction and final prosthetic restoration and increased patient acceptance. This report demonstrates a flapless immediate implant placement and immediate temporization in the maxillary right central incisor, to maintain the soft and hard tissue architectures with a predictable esthetic outcome.

CASE REPORT

A 54-year-old male patient visited to the Ajou University Dental Hospital with fracture in the right maxillary central incisor root. After clinical and radiographic examination, the tooth was decided to be extracted and must be restored (Figs. 1, 2). The treatment plan included a single implant-supported restoration or a 3-unit bridge. The patient didn’t want to prepare the adjacent teeth, so he desired implant-supported restoration. Moreover, the patient wanted to minimize the time without teeth in the esthetic zone. Finally, upper right central incisor was determined to be extracted and immediate implant placement and immediate temporization was planned under evaluation of cone beam computed tomography.

**Fig. 1.** Initial periapical radiograph.

**Fig. 2.** Intraoral photo at initial visit.

**Fig. 3.** Cone Beam CT.
scan (Fig. 3). There were no systemic factors would become problematic for implant surgery. Clinical and radiographic evaluation neither described any obvious active infection (Figs. 1-3). Periodontal type was revealed as a thick periodontal type and a smile line was determined as normal. The patient was informed that the existing open interproximal embrasures would not disappear. Potential benefits and risks of treatment plans were discussed with the patient, and immediate implant placement and immediate temporization were determined.

Atraumatic extraction is one of the most critical stage of immediate implant placement. Periodontal sulcus was incised using the surgical blade #12 to isolate the tooth from the periodontal tissue. Atraumatic tooth extraction was done, which conserved the soft and hard tissue architectures (Fig. 4). The bony architecture was detected using a periodontal probe and the extraction socket was cautiously debrided to remove any infectious source. The reference point during implant placement could be the incisal edges of the adjacent teeth. The shoulder of the implant must be even with the reference point or slightly palatal to that point. Sequential drilling procedures were
fulfilled according to the manufacturer’s instructions. Internal submerged type implant (4.0 mm × 11.5 mm AR, Biotem, Seongnam, Korea) was placed, which final implant insertion torque was greater than 30 Ncm. The implant to bone gap was about 3 mm. Between the implant and buccal bone was filled by bovine bone (Bio-oss, Geistlich Pharma AG, Wolhusen, Switzerland). Temporary resin abutment was tightened onto the implant and provisional crown was fabricated (Figs. 5, 6).

Three months after implant surgery, fixture level impression was taken using pick-up impression coping (IPA4813S & GPA 2017, Biotem, Seongnam, Korea). Then, secondary provisional crown with temporary metal abutment (SATA4510S, Biotem, Seongnam, Korea) was set for gingival molding (Figs. 7, 8).

Fig. 7. Impression coping connection.

Fig. 8. Secondary provisional crown for gingival molding.

Fig. 9. Zirconia abutment connection and porcelain fused to zirconia.
After the 7 months healing period, the final fixture level impression was taken using polyvinylsiloxane impression material (Express light body and regular body, 3M ESPE, St Paul, MN, USA) after connection of pick-up impression coping (IPA4813S & GPA 2017, Biotem, Seongnam, Korea). A CAD/CAM zirconia abutment and porcelain fused to zirconia crown was fabricated (Fig. 9). The definitive crown and abutment were delivered to patient (Fig. 10). The esthetic, marginal fit was evaluated and the zirconia abutment was tightened to 30 Ncm using torque controller and zirconia crown was set with a temporary cement (TempBond, Kerr, CA, USA).

Within the 2-year follow up after treatment, the patient satisfied with the functional and esthetic outcomes, and the gingival architecture preserved that form.

**DISCUSSION**

The studies of single implant placement and prostheses have described good treatment prognosis. Never-theless, an accurate diagnosis and treatment planning is important for the immediate implant placement and restoration. Immediate implant placement would be a sensitive technique because of the placement of implants in fresh extraction sites is difficult. The reasons for tooth extraction included retained root, trauma, and non-restorable crowns. Immediate implant placement should be avoided in case of ongoing inflammatory processes, such as active periodontal and periapical infection. In addition, it should be avoided when bone around root apex area is insufficient after extraction of the tooth. Several studies have reported low success rates when the prostheses were in light occlusal contact or in full functional loading. Patients have parafunctional occlusal habits must use a habit appliance or occlusal guard. This report presented the immediate implant placement and temporization on the upper right central incisor. The soft tissue reaction was favorable because of the existence of a temporary crown during the healing period. The temporary crown maintained the interdental papilla and gingiva, occurring highly esthetic results. The clinician should instruct the patient to perform adequate oral hygiene during the healing phase. Moreover, the temporary crown or fixed partial denture should not be taken out during the healing period of approximately 6 weeks. Several studies have reported that the marginal bone dimension was similar with immediate and conventional approach in the short term period of 5 years. However, more long-term research is required to support these conclusions.

**CONCLUSION**

This clinical report demonstrates esthetic treatment of fractured upper right central incisor using immediate implant placement and temporization. The clinical outcome showed black triangles not only of prosthesis but also adjacent teeth, however the patient was satisfied with the prosthesis and lack of anterior edentulous period.

**REFERENCES**


