Anterior Restoration Splinting Implant with Natural Tooth: A Clinical Report

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Abstract

The maxillary anterior region is considered the “esthetic zone” because of its importance on facial appearance and high visibility. Especially in the anterior region, implant prosthesis with proper soft tissue contours is important for successful esthetic results, this method may also help to reduce soft tissue complications with a gradual molding of the soft tissues profile. Commonly, it is recommended that dental implants should not be splinted with natural teeth due to the difference in biomechanics and mobility. However, in some cases, the splinting of a natural tooth with an implant seems to be needed. Several studies have described clinical cases where fixed partial dentures are supported by a connection between implants and natural teeth. In a 39-year-old man who showed periapical abscess of maxillary right central incisor, extraction were planned and after healing period, provisional crown was restored. After transferring the emergence profile of provisional crown, splinted zirconia prostheses were delivered.

Keywords: Dental implants, Emergence profile, Natural tooth splinting

I. Introduction

Implant prostheses are ideal when they are in harmony with the surrounding soft tissue profile and imitate natural teeth. This is even more important when the missing tooth to be replaced in the anterior area. The extraction of tooth usually results in change and collapse of the soft tissue, sometimes resulting in improper soft tissue profile. Hence, the preservation or improvement of the existing soft tissue profile is important for implant restoration in the esthetic region. Provisional implant restorations enable to modify soft tissue profile at implant placement, at implant exposed, and even at the definitive impression process. Emergence profile transfer technique is a method of transferring the profile of the provisional implant prosthesis to the definitive cast for the fabrication of a definitive prosthesis with proper emergence profile and contour.
In this study, crown restoration was carried out in connection with adjacent implant crown for the protection of relatively weak natural tooth, and a favorable prognosis was confirmed.

II. Case report

A 39-year-old male patient visited to the KyungHee University Dental Hospital with periapical abscess in the right maxillary central incisor. After clinical and radiographic examination, the tooth was planned to be extracted. The patient didn’t want to prepare the additional adjacent teeth. The right maxillary central incisor was planned to restore implant restoration and the left maxillary central incisor decided to proceed re-endodontic treatment and crown restoration (Fig. 1). Because of relatively young age of the patient, there was a lot of interest in esthetic results. Therefore, we planned to make provisional implant restoration and make a definitive prosthesis duplicating the emergence profile of the provisional restoration, and planned to use zirconia abutment when restoring the definitive prosthesis. First, preparation of maxillary left central incisor was done and maxillary right central incisor was extracted and cantilever provisional restoration was restored (Fig. 2, 3). Re-endodontic treatment of maxillary left central incisor was also progressed. After 3 months
healing periods, implant placement was planned under evaluation of cone beam computed tomography scan with radiographic stent (Fig. 4). Implant placement was guided by surgical stent with bone graft (Bio-oss, Geistlich Pharma AG, Wolhusen, Switzerland) (Fig. 5, 6) and there were no systemic diseases would become problematic for implant surgery. Clinical and radiographic evaluation neither described any obvious active infection. Internal submerged type implant (4.0

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**Fig. 3.** Cantilever type provisional prosthesis was delivered.


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**Fig. 4.** CT was taken.


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**Fig. 5.** Implant placement using surgical guide.

mm × 12.0 mm Implantium, Dentium, Korea) was placed and healing abutment was tightened. After surgery, provisional restoration was modified (Fig. 7). 3 months after implant surgery, fixture level impression was taken using pick-up impression coping (DPU 40 15 HL, Dentium, Korea) for provisional restoration (Fig. 8). Then, provisional crown with plastic provisional abutment (RAB 45 20 PHL, Dentium, Korea) was set for gingival molding (Fig. 9). During 3 weeks of provisional restoration period, the patient was satisfied with the function and the appearance of the provisional

Fig. 6. Bone graft after implant placement.


Fig. 7. Correction of the cantilever type provisional prosthesis.


Fig. 8. Pick-up impression for provisional restoration.

restoration. To transfer the emergence profile of provisional restoration, transfer technique was used with polyvinylsiloxane impression material (Silagum, light body and putty, GmbH, Germany) (Fig. 10) and impression coping was modified. 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 modified pick-up impression coping (Fig. 11). A CAD/CAM zirconia abutment was milled and abutment adapted. Resin material (Pattern Resin LS; GC, America) and

Fig. 9. Gingival shaping with provisional prosthesis.


Fig. 10. Emergence profile of implant provisional prosthesis was transferred.


Fig. 11. Customized impression coping.

wooden sticks were used for delivery to laboratory of anterior teeth horizontal line. Midline also marked (Fig. 12). Splinted porcelain fused to zirconia prosthesis was fabricated. The root of the maxillary left central incisor being short and the prognosis being poor, so the crown was splinted with the maxillary right maxillary incisor implant prosthesis. The definitive crown and abutment were delivered to patient (Fig. 13). The esthetic, marginal fit was evaluated and the zirconia abutment was tightened to 30 Ncm using torque controller and splinted maxillary right and left definitive prostheses was set final cementation with resin-modified glass ionomer cement (FujiCEM™, GC, Japan). Within the 3 years follow-up after treatment, the patient satisfied with the functional and esthetic outcomes, and the gingival architecture preserved that form.

III. Discussion

In some cases, clinicians may not be able to connect a provisional prosthesis immediately after implant placement because of failure from loading force or at the uncovering session for proper
gingival contouring\textsuperscript{10}. Relatively narrow healing abutment may result in improper soft tissue profile, usually larger than healing abutment, but proper emergence profile of a definitive restoration is placed. Whereby soft tissue complications result from placing a definitive restoration with a larger emergence profile compared with a relatively narrow healing abutment. Because, definitive restoration with the wider diameter may inflict pressure on thick soft tissue around the prosthesis\textsuperscript{9}.

Clinicians fabricate definitive restorations with proper soft tissue contours with this technique where a provisional prosthesis was not placed immediately after implant placement or uncovering, but at the final impression session. Even though appointment time at the definitive impression procedure may slightly increase because the modified impression coping is fabricated, this technique may minimize the patient’s soft tissue complications by staged contouring of the soft tissues\textsuperscript{11}. Spyropoulou et al.\textsuperscript{5} and Schoenbaum et al.\textsuperscript{12} used emergence profile transfer technique by direct adding autopolymerized acrylic resin, quickly around the impression coping tightened on the implant. However, the patient’s discomfort and irritation of the peri-implant tissue could be increased by this direct adding technique. This alternative impression method is suitable for sensitive patients, who are easy to soft tissue change and to the irritation generated by the monomer and the heat caused by the autopolymerized acrylic resin. A limitation of this technique waiting time while the modifying impression coping.

Originally, the Branemark protocol\textsuperscript{13} for dental implant recommended that dental implants should be functioned independently from natural teeth due to the difference in biomechanics. In fact, natural teeth have a much larger physiological mobility than implants, which are rigidly ankylosed to bone. Natural teeth with a healthy periodontium demonstrate a mobility of about 50-200 $\mu$m whenever a force of 0.1 N is applied\textsuperscript{14}. On the other hand, mobility of an osseointegrated dental implant is less than 10 $\mu$m upon similar forces\textsuperscript{15}. In some cases, however, the splinting of a natural tooth with an implant seems inevitable. Several studies have described clinical cases where fixed partial dentures are restored with a connection between implants and natural teeth\textsuperscript{16,17}. These studies indicated the possibility of splinting implants to natural teeth in a fixed partial denture with a relatively good prognosis. In some studies have showed the good long-term prognosis of connecting implants to natural teeth\textsuperscript{18,19}. In this case report, natural tooth restoration was splinted with implant restoration. This resulted in a favorable prognosis for both implant and natural tooth, providing adequate support and stability.
**IV. Conclusion**

This clinical report demonstrates esthetic treatment outcome of maxillary right and left central incisor using emergence profile transfer technique and zirconia abutment and porcelain fused to zirconia crown. By connecting implant to natural tooth, the favorable clinical outcome is achievable, with fair long-term prognosis.

**References**


