Immediate Placement of Single Implant in Maxillary Anterior Tooth by Transferring the Emergence Profile from the Provisional Restoration to the Definitive Restoration: A Case Report

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임시 수복물의 출현윤곽의 이행을 통한 상악 전치부 즉시 식립 단일 임플란트 수복 증례

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전치부의 임플란트 수복 시, 연조직의 적절한 외형은 성공적인 심미적 결과를 위해 중요하다. 임플란트의 즉시 식립은 발치 후 주변 조직의 회복이 임플란트의 심미적 수복 결과를 얻는데 유리하며, 임시수복물의 출현윤곽을 여러가지 방법을 통해 최종 수복물로 옮겨 치은 조직의 적절한 외형을 형성할 수 있다. 70세의 여성 환자가 상악 좌측 중절치의 기존 보철물 파절을 주소로 내원하여 발치 후 골 이식을 동반한 즉시 식립 임플란트를 시행하였다. 임시 수복물을 이용하여 잇몸 외형을 재형성해주었으며, 임시 수복물의 출현윤곽이 이행된 임프레션 코핑을 제작하여 수정된 임프레션 코핑을 통해 임시 수복물의 잇몸 외형을 재현할 수 있었다. 최종적으로, 만족스러운 심미적 결과를 가진 최종 보철물을 얻을 수 있었기에 이를 보고하는 바이다.

Key words : Dental implant, Immediate placement, Emergence profile, Maxillary anterior tooth, Modified impression coping

Introduction

Maxillary anterior is called “esthetic zone” because of its importance on facial appearance and high visibility. Restoration of dental implant in maxillary anterior region is very difficult due to esthetic problem from loss of soft and hard tissue after tooth extraction. To accomplish aesthetic outcome of the anterior single implant, many factors should be considered.

Single implant treatment in the anterior maxilla is considered highly predictable and successful, at least in terms of implant survival and hard tissue remodeling following conventional implant surgery.[1] Immediate placement and provisionalization of anterior single implants can effectively optimize peri-implant esthetics by maintaining the existing hard and soft tissue architecture of the replaced tooth.[2]

A favorable emergence profile is very important for the health of peri-implant tissues because it affects the effectiveness of oral hygiene.[3,4,5] Especially in the anterior region, implant prosthesis with proper soft tissue contours is important for successful esthetic results. The gingival

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tissue at the interdental papillae can be formed into the desired shape if supported properly by a provisional restoration. In order to achieve a natural emergence profile, the clinician can take advantage of this characteristic and fabricate a provisional that guides the soft tissue into a natural-looking form.[6]

There are several ways to transfer emergence profile of provisional restoration to final restoration. The first one is modification of the impression post by adding composite resin intraorally. The customized impression post can allow the accurate transfer of the emergence profile.[7,8] Another one is fabrication of a working cast mimicking the soft tissue contour. By using the provisional restoration when impression in place, the working cast will reproduce the soft tissues with a silicone material. And this impression will include information of cervical circumference of the restoration.[7,9] Using CAD/CAM technology, once the emergence profile of the provisional restoration is made, then its morphology can be copied with the intra-oral scanner. After scanning, the final restoration will be fabricated by the cervical circumference of the provisional restoration.[7,10,11]

A screw-retained restoration is the provisional of choice because of its soft-tissue re-contouring ability, retrievability and the absence of provisional cement. Screw-retained provisional restorations- because of the lack of provisional cement – offer a smoother surface at the crown-abutment junction, facilitating tissue healing.[12,13]

Case report

In this case report, the emergence profile was transferred from provisional restoration to final restoration by fabricating customized impression coping.

A seventy years old female patient visited to the Kyung Hee University Dental Hospital with fracture of the existing prosthesis on left maxillary central incisor. After clinical and radiographic examination, the tooth was planned to be extracted (Fig. 1, 2). Implant placement was planned under evaluation of cone beam computed tomography scan with radiographic stent. Implant placement was guided by surgical stent with bone graft (MaxPore; SigmaGraft Inc., CA, USA).

It was predicted that after extracting tooth, the mesial and buccal gingiva will be collapsed. Therefore, after

Figure 1. Pre-surgical intraoral photograph on first visit (frontal view).

Figure 2. Pre-surgical intraoral photograph on first visit (occlusal view).

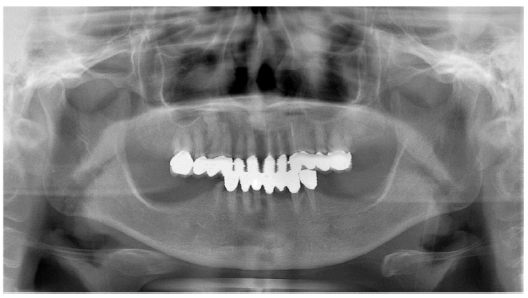

Figure 3. Pre-surgical panoramic radiograph on first visit.

Figure 4. Maxillary left central incisor was extracted.

Figure 5. Implant was immediately placed (Periapical radiograph).

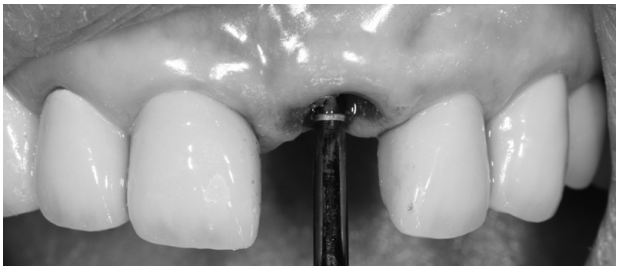

Figure 6. Provisional restoration was fabricated on temporary abutment.

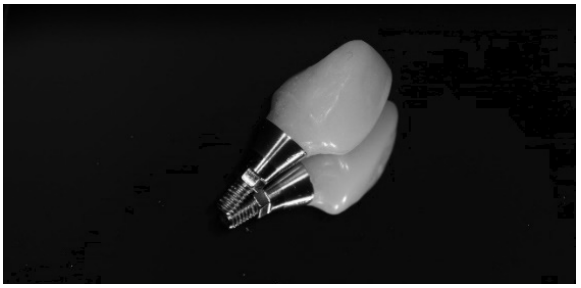

Figure 7. Provisional restoration.

Figure 8. Implant provisional restoration was delivered.

Figure 9. Gingiva was re-contoured by using provisional restoration.

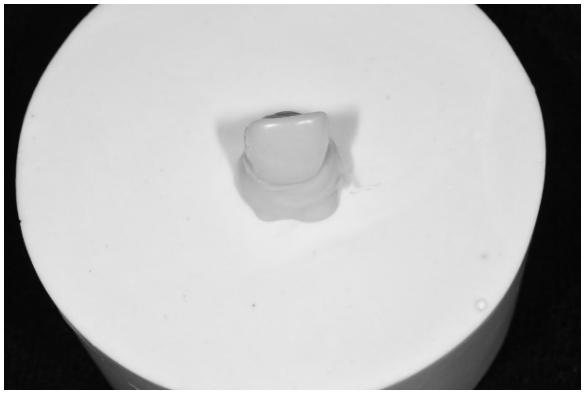

Figure 10. Emergence profile of implant provisional prosthesis was transferred.

Figure 11. Customized impression coping was fabricated.

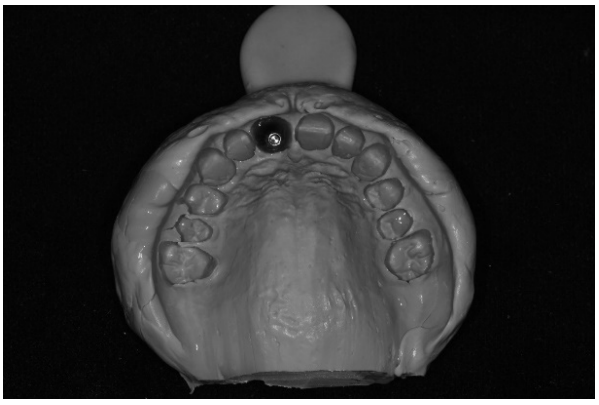

Figure 12. Impression was done by using customized impression coping.

Figure 13. Definitive prostheses were delivered.

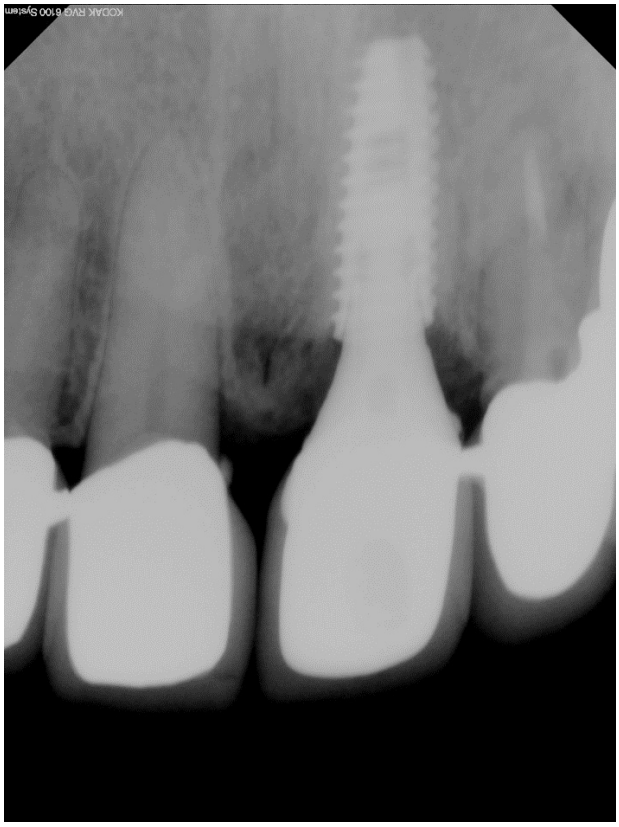

Figure 14. Periapical radiograph after definitive prosthesis was delivered.

extraction of the tooth, gingiva molding should be followed to enhance the gingival esthetics (Fig. 3).

After extraction of anterior tooth, an internal submerged type 4.0×10.0 mm dental implant (Luna; Shinhung, Korea) was placed immediately. To get an esthetic emergence profile, implant was placed apically 3 mm from cortical bone (Fig. 5, 6). To maintain the soft tissue contour, provisional crown with temporary abutment was placed (Fig. 7).

After placing the provisional crown, gingiva contour was not symmetric (Fig. 8). Gingiva contouring was performed by modifying the buccal contour of provisional crown. After gingiva contouring, we can get a symmetrical esthetic prosthesis (Fig. 9).

To transfer the emergence profile of provisional crown to final prosthesis, customized impression coping fabrication was done. Duplication of emergence profile of provisional crown was done by silicone impression material (Imprint II light body; 3M ESPE, St Paul, MN, USA). Transferring the emergence profile to the impression coping was done by adding pattern resin (Pattern Resin LS; GC America Inc., IL, USA). Finally, customized impression coping was fabricated (Fig. 10, 11). Final impression was taken using polyvinylsiloxane impression material (Imprint II regular body and Penta Heavy; 3M ESPE, St Paul, MN, USA) (Fig. 12).

Definitive prostheses were delivered with porcelain-fused metal crown and customized abutment (Fig. 13).

Discussion

The final impression can be made after soft tissue contour has matured, and the provisional restoration supports the papillae adequately in the desired emergence profile. Because the provisional serves as an exact replica of the final restoration, it is crucial that the earlier mentioned outcome must be transferred with a simple, fast, and accurate technique.[7]

Spyropoulou et al. and Schoenbaum et al. used emergence profile transfer technique by direct adding auto-polymerized 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.[8] Although appointment time of whole treatment process will be increase, because the customized impression coping is fabricated, this technique will transfer the emergence profile accurately.[14]

Because of atrophic ridge change after tooth extraction, delayed implant placement often requires extensive bone graft prior to implant surgery. In contrast, immediate implant placement in a correct three-dimensional position shortens overall treatment time and can facilitate good esthetic results.[15] However, to achieve optimal results, simultaneous augmentation procedures to compensate for horizontal and vertical remodeling are still necessary.[16]

Conclusion

This clinical report demonstrates esthetic treatment outcome of maxillary anterior central incisor using gingival re-contouring and emergence profile transfer technique. By this, favorable clinical outcome is achievable.

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