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Emergence Profile Aesthetics in Implant-Supported Lateral Tooth Rehabilitation; 2 Years Follow Up

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Case Report

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ABSTRACT

Anterior aesthetic restorations are among the most challenging areas of prosthetic dentistry. The soft tissue emergence profile of implant-supported restorations plays a critical role in both aesthetics and long-term success. The permanent restoration and the peri-implant mucosa should mimic the natural tooth's relationship with adjacent teeth and soft tissues. However, after the removal of the healing abutment, a circular and narrow soft tissue geometry is often observed. An inadequate emergence profile can negatively affect the cleanability and aesthetics of the restoration. In order to achieve a long-lasting and aesthetic restoration, reshaping of the emergence profile is required. In delayed loading protocols of restorations, the emergence profile can be shaped using a provisional restoration. Although this approach may require more appointments and chair time, considering the clinical outcomes, it enables aesthetic, successful, and cost-effective treatments. In this case report, the process of achieving a successful and harmonious soft tissue emergence profile in an implant-supported lateral incisor restoration is presented.

Keywords: Soft tissue, gingiva, dental implantation, esthetics, dentistry

İmplant Destekli Lateral Diş Rehabilitasyonunda Çıkış Profili Estetiği; 2 Yıllık Takip

Olgu Sunumu

Süreç

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ÖZET

Ön bölgede estetik restorasyonlar, protetik diş tedavisinin en zorlu alanlarından biridir. İmplant destekli restorasyonların yumuşak doku çıkış profili hem estetik hem de uzun vadeli başarı açısından kritik rol oynamaktadır. Kalıcı restorasyon ve implant çevresindeki mukoza, doğal dişin komşu dişlerle ve yumuşak dokularla ilişkisini taklit etmelidir ancak çoğu kez iyileşme başlığı çıkarıldıktan sonra dairesel ve küçük bir yumuşak doku geometrisi izlenmektedir. Uygun olmayan çıkış profili restorasyonun temizlenebilirliğini ve estetiğini etkilemektedir. Estetik ve uzun vadeli bir restorasyon sağlayabilmek için çıkış profilinin yeniden oluşturulması gerekmektedir. Restorasyonun gecikmeli yüklemelerinde çıkış profili şekillendirme geçici bir restorasyonla sağlanabilmektedir. Bu yaklaşımda randevu sayısı ve hasta başında geçen zaman fazla olsa da klinik sonuçlar göz önüne alındığında estetik, başarılı ve aynı zamanda düşük maliyetli tedaviler yapılabilmektedir. Bu olgu sunumunda, implant destekli lateral diş restorasyonunda başarılı ve uyumlu yumuşak doku çıkış profili oluşturma süreci anlatılmaktadır.

Anahtar Kelimeler: yumuşak doku, diş eti, diş implantasyonu, estetik, diş hekimliği

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Introduction

Dental implants are a widely preferred option in the fixed prosthetic treatment of patients with tooth loss. A successful treatment involves not only the implant itself but also the aesthetics and function of the implant-supported prosthesis. Achieving a successful aesthetic restoration after implant placement is influenced by several factors, including the use of appropriate provisional restorations, shaping of the gingival contour, and the material selected for the final restoration.[1] In anterior regions where aesthetics are critical, the location of the crown margin, the zenith point, and the emergence profile of the gingiva are essential for soft tissue shaping. Implants differ from natural teeth in terms of dimensions and shape at both the crestal bone and mucosal levels. After the healing abutments are removed, the geometry of the gingival emergence profile is circular. This circular form is often incompatible with the anatomical emergence profile of the missing tooth and the contours of adjacent dental tissues.[2] An appropriate gingival emergence profile not only ensures the aesthetics of the implant-supported prosthesis but also facilitates hygiene, thereby affecting the health of the peri-implant tissues.[3]

The definitive restoration and the peri-implant mucosa should mimic the relationship between the natural tooth, adjacent teeth, and surrounding soft tissues. In order to achieve a successful and long-term aesthetic outcome, re-establishment of the emergence profile is essential. Various case-specific approaches exist for soft tissue contouring. In delayed loading protocols, peri-implant mucosa can be shaped through controlled and continuous pressure applied with a provisional restoration. This method is also referred to as the dynamic compression technique. In this approach, the provisional restoration supports the gingiva in the interdental area and the emergence profile with appropriate contours, thereby allowing the tissue to be shaped into the desired form.[4–7]

In soft tissue contouring achieved through provisional restorations, it is recommended to use screw-retained provisional abutments that eliminate the need for cement and to ensure that the surfaces of the provisional restoration are smooth in order to support soft tissue healing. Smoothly prepared restoration surfaces reduce the risk of contamination.[8–10]

When the provisional restoration is placed, the initial response of the peri-implant soft tissue to pressure is of an ischemic nature, typically observed as a temporary moderate blanching of the tissue. In order to manage this reaction, the restoration margins should be adjusted in a controlled manner during the shaping process, and the final emergence profile form should be achieved gradually in stages.[10] During soft tissue shaping with the provisional restoration, the gingival form can be modified, supported, and preserved, allowing the soft tissue profile to be accurately transferred to the definitive restoration. Provisional restorations not only maintain the patient's esthetics and function, but also serve as a diagnostic tool for the final restoration.[2,11]

Case Report

A 44-year-old female patient presented to the Department of Prosthodontics at Sivas Cumhuriyet University with a complaint of missing tooth number 12. Medical history revealed no systemic diseases and no current medication use. In the patient's dental history, it was learned that there was a mobile primary tooth in the area of tooth number 12, which she had previously lost, and that an implant (Ø3.3 / L13.0 Megagen, Korea) was placed in this area 4 months ago and the healing cap was placed 2 weeks ago (Figure 1A and 1B).

Intraoral examination following removal of the healing abutment revealed that the peri-implant soft tissue contour was insufficient and narrow to support the emergence profile of a lateral incisor (Figure 2). From a labial view, the gingival zenith was not in harmony with the contralateral lateral incisor. The patient declined any minor soft tissue surgical procedures. Given the patient's high esthetic expectations, it was decided to perform soft tissue conditioning prior to the definitive screw-retained zirconia-based ceramic crown restoration. Preparations for the restoration were initiated.

At the first appointment, the healing abutment was removed and a suitable temporary abutment was selected intraorally (Figure 3). To create the desired soft tissue emergence profile, a free-hand composite provisional restoration was fabricated by adding composite resin (3M Filtek Universal Restorative Composite, 3M, USA) both intraorally and extraorally onto the selected abutment. Considering the abutment–composite bonding strength, the restoration was prepared with reduced occlusion (Figure 4). All composite surfaces were carefully polished to promote optimal soft tissue healing.

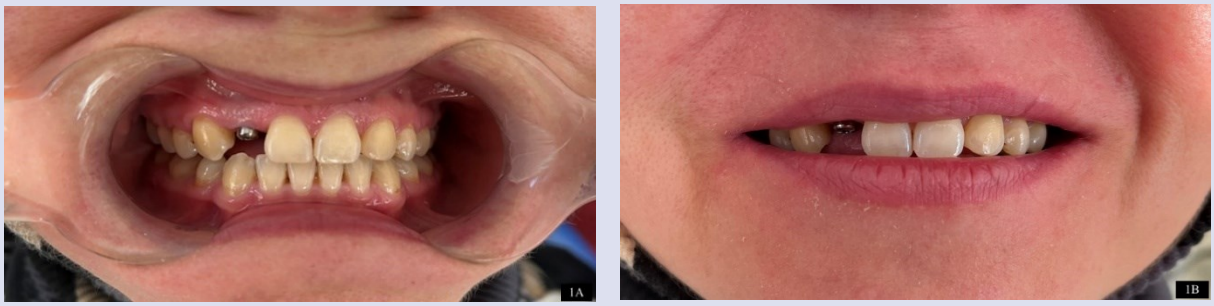

Figure 1A and 1B: *Intraoral view 2 weeks after placement of the healing abutment*

Figure 2: *Emergence profile after removal of the healing abutment*

Figure 3: *Selection of the temporary abutment intraorally*

Figure 4: *Screw-retained temporary composite restoration*

After placement and fixation of the provisional restoration, the screw access channel was sealed with an isolation band, but not closed with composite to facilitate future access between appointments. The contours of the restoration were gradually shaped in a controlled manner by incremental additions of composite to avoid soft tissue ulceration or recession. Weekly appointments were scheduled until the desired emergence profile form and width were achieved (Figure 5). During clinical try-ins, the gingival margin was marked using a marker pen, and necessary adjustments were made. The emergence profile of the lateral incisor was fully developed over a 3-week period (Figure 6).

Impression procedures for the definitive restoration were then initiated. The provisional composite restoration was removed for the emergence profile impression. To accurately transfer the soft tissue form, light-body impression material was applied to the emergence surface of the provisional restoration, which was then repositioned intraorally. A-type monophase impression material (Zhermack Hydrorise Monophase, Italy) was used to take an impression over the provisional restoration. After removal, the provisional restoration was connected to an implant analog and transferred into the impression (Figure7). Opposing arch impressions and the interocclusal relationship were also recorded. Immediately after the maxillary model was

obtained, the provisional restoration was reinserted to maintain soft tissue contours and prevent collapse.

A screw-retained zirconia-based ceramic definitive restoration was fabricated in a dental laboratory. At the clinical try-in, the fit, occlusion, and esthetics of the restoration were evaluated. Following the manufacturer's instructions, the titanium base (T-base) abutment was torqued to 25 N/cm. The screw access hole was sealed with an isolation band and covered with composite resin to complete the permanent restoration (Figure 8). Intraoral and radiographic evaluations at the 3-month follow-up revealed clinically and patient perceived satisfactory outcomes (Figure 9).

Figure 5: *Changes in the emergence profile over time*

Figure 6: *Emergence profile at the end of the third week*

Figure 7: *Transfer of the emergence profile to the impression*

Figure 8: *The final restoration*

Figure 9: *Radiograph of the final restoration at 3 months*

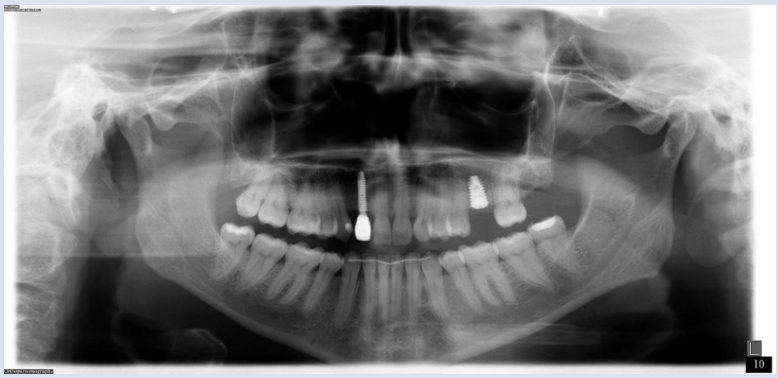

Figure 10: *Radiograph of the final restoration at 2 years*

At the two-year follow-up, the absence of patient-reported complaints was corroborated by consistent intraoral and radiographic findings (Figure10). The restoration continued to demonstrate esthetic and functional success (Figure 11A and 11B)

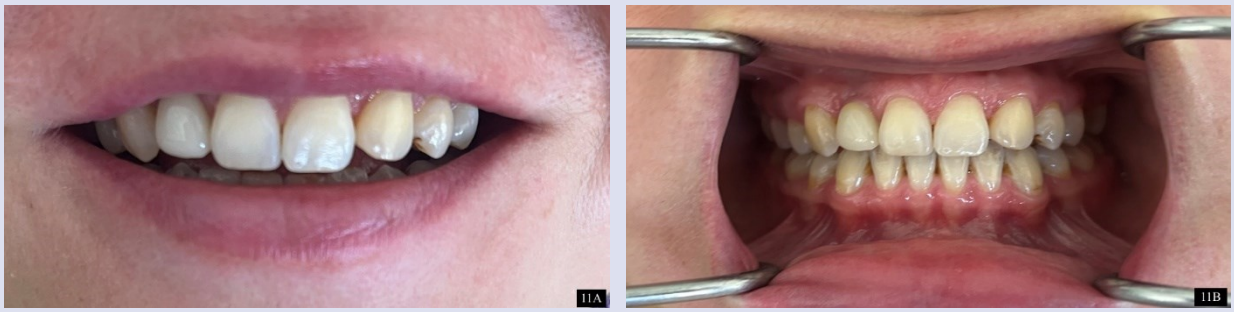

Figure 11A and 11B: *Clinical view of the final restoration at 2 years*

Discussion

Creating an ideal emergence profile is a challenging procedure that involves various approaches, particularly in esthetically demanding anterior regions. Following implant placement, an additional healing period of up to three months may be required to allow for complete soft tissue healing and osseointegration. In order to accelerate the restorative process in the esthetic zone, immediate provisional restorations can be fabricated after implant placement. There are systematic reviews indicating that peri-implant tissue levels and soft tissue changes are comparable between immediate and conventional loading protocols.[12,13] In immediate loading protocols, an ideal emergence profile can be achieved without the need for additional surgical intervention by using screw-retained provisional restorations with either temporary or definitive abutments. While some studies suggest that the use of definitive abutments is more beneficial for maintaining marginal peri-implant tissue health, there are also reports indicating that temporary abutments do not result in statistically significant soft tissue loss. [14–16]. However, these procedures are not suitable for all cases, as they are limited by factors such as initial implant stability, hard and soft tissue defects, and occlusal relationships.[17] In this case, since the patient did not present to our clinic within the appropriate timeframe for immediate loading conditions, a treatment plan was developed based on the existing circumstances.

Minor surgical procedures, such as gingivoplasty, can help shape the emergence profile before the placement of provisional restorations; however, such operations can affect the stability of the tissues.[18–20] In this case, no surgical intervention was performed to modify the emergence profile prior to prosthetic treatment.

Achieving an optimal emergence profile requires careful consideration of various factors from the early stages to the final phases of treatment. When there is sufficient soft tissue, reaching an ideal emergence profile depends on the selection of the implant, the healing abutment, and the appropriate provisional prosthetic restoration.[21] Different approaches may be preferred in the use of implant-supported provisional restorations depending on the case and timing.[22] Spyropoulou *et al.* recorded the soft tissue contours after intraoral soft tissue conditioning using a provisional restoration made of autopolymerizing acrylic resin. The intraoral use of acrylic resin monomer may cause thermal and chemical irritation to the soft tissues.[23] In this case, composite resin was preferred as the provisional restoration material due to its ease of polishing and ability to accept additions.

Screw-retained provisional restorations can be utilized to achieve an optimal emergence profile. Temporary cements may cause irritation to the soft tissues in cases requiring frequent removal of the provisional restoration. Another advantage of using screw-retained restorations is the elimination of the rough surface created at the crown–abutment interface, providing a highly polished surface that facilitates soft tissue healing.[24]

In this case report, a screw-retained abutment was preferred to eliminate the disadvantages that may arise from the use of temporary cement between appointments.

Accurate transfer of the emergence profile created by the provisional restoration to the impression is crucial. When the gingiva is left unsupported, it tends to shrink and collapse. Therefore, during the impression phase, the emergence profile should be accurately recorded and adequately supported. Various techniques have been described in the literature to achieve this.[25,26] With the advancement of technology, many implant companies have developed various components to facilitate provisional restorations and the transfer of the emergence profile.[27,28] In a study, an ideal emergence profile was achieved by fabricating a temporary restoration using a silicone index, which is indicated in cases where the existing soft tissues have completely healed and need to be shaped entirely through prosthetic procedures.[29] In cases where the implant manufacturing company does not offer access to these advantageous components—which reduce the number of appointments and chair time—or when the patient's financial resources are limited, alternative techniques may be considered. Each method presents its own case-specific advantages and disadvantages. Therefore, the most ideal technique is the one tailored to the clinical scenario. Within the limitations of this case report, a suitable approach was selected, resulting in successful long-term outcomes.

Conclusions

The use of provisional restorations to create the gingival emergence profile is currently an acceptable treatment option in clinical practice, providing a natural-looking implant-supported restoration. The emergence profile approach applied in this case successfully met the patient's functional and esthetic expectations. Since a failed prosthetic restoration can negatively impact both the patient's health and aesthetic outcomes despite successful osseointegration of the implant, long-term follow-up of the results is recommended.

Conflict of Interest Statement

No potential conflict of interest to report

Patient consent

Verbal and written signed consent was taken before the rehabilitation.

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