Case Report

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Immediate loading and Hind's technique

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ABSTRACT

Immediate loading aims to rapidly restore the patient's aesthetics, function, and phonation by placing a temporary prosthesis on dental implants immediately after or shortly following the surgical procedure. The goal of immediate loading with a temporary prosthesis during the same session as tooth extraction is to preserve or enhance both hard and soft tissues. Temporary restorations are a key step in guiding the design of permanent prosthetic restorations. Clinical studies support the successful outcome of immediate implant placement into fresh extraction sockets. This case presentation discusses immediate loading and Hind's technique in the anterior region. Due to mobility issues, it was deemed appropriate to extract teeth numbered 11, 21, and 22. Immediate implant placement was decided for the 11 and 22 regions. On the same day, prosthetic rehabilitation was provided with a temporary prosthesis on the implants. After three months, the temporary prosthesis was removed, an impression was taken using Hind's technique to match the shaped emergence profile, and the permanent prosthesis was fabricated. The immediate loading of the implants prevented the patient from experiencing a period of edentulism, facilitated soft tissue healing, and established the emergence profile for the permanent restorations. It was observed that the tissues shaped with Hind's technique were transferred to the laboratory more accurately, resulting in more precisely fabricated permanent restorations. Immediate implant loading provides more aesthetics, fonetic and predictable treatment. The immediate implant placement protocol not only shortens the overall treatment time and minimizes the number of surgical interventions but also maximizes the utilization of the existing bone to achieve optimal primary stability for the implant.

Keywords: Hind's technique, immediate implant placement, temporary restorations, immediate loading, emergence profile, temporary abutment

INTRODUCTION

Today, patients undergoing implant treatment are often unfamiliar with prosthetic immediate loading protocols. Frequently, when patients require extraction of anterior teeth, they prefer traditional fixed partial dentures or resin-bonded bridges over implant treatment, to avoid even a brief period of edentulism.[1,2]

In the planning phase of treatment, it should be determined whether the implant will be placed immediately after tooth extraction or after the alveolar bone and soft tissue have healed a few weeks or a few months after tooth extraction. This decision is based on the identification and understanding of the changes that will occur in the alveolar bone and soft tissue following tooth loss.[3]

Timing After Tooth Extraction

- Immediate implants: Placement on the day of extraction,
- Early implants: Placement 6 to 8 weeks after tooth extraction,
- Delayed/late/conventional implants: Placement after 3 months or later.

Timing of Loading/Restoration

- Immediate loading/restoration: Within 48 hours after implant placement ,
- Early loading/restoration: >48 hours and <12 weeks ,
- Delayed (conventional) loading: 3 months or more after implant placement,[4]
- With increasing research and clinical case reports, the immediate implant placement and immediate loading protocol is a clinically documented protocol.[5]

The concept of placing an immediate dental implant into a tooth extraction socket was first described by Schulte and Heimke in 1976. Lazzara further supported immediate implant placement into fresh extraction sockets with three case reports in 1989. Since then, immediate implant placement in partially

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edentulous patients has significantly increased in dentistry. Today, especially in cases of anterior tooth loss, waiting approximately six months after tooth extraction for implant placement is no longer an attractive option for patients. Consequently, the timing of implant placement has become an important topic in dentistry.[6]

Hind's technique is one of the immediate loading protocols in implantology. This method involves placing the implant immediately after tooth extraction and fabricating a temporary prosthesis during the same session.

The advantages of this technique are that it quickly meets the aesthetic and functional needs of the patient, prevents patients from being toothless for a long time, especially in the anterior region, helps the patient to relax socially and psychologically, and contributes to better integration of the implant with the bone.[7]

CASE

A 44-year-old male patient presented to the Dicle University Faculty of Dentistry department of Prosthodontics with complaints of mobility in the upper anterior teeth. Radiographic and clinical examinations revealed advanced bone resorption and periodontal pocketing in teeth numbered 11, 21, and 22. Due to mobility, extraction of teeth 11, 21, and 22 was deemed appropriate, and tomographic data confirmed adequate bone quantity for primary stability. Immediate implantation in regions 11 and 22 was planned (10x3.7 mm Bioinfinity, Turkiye) (Figure 1).

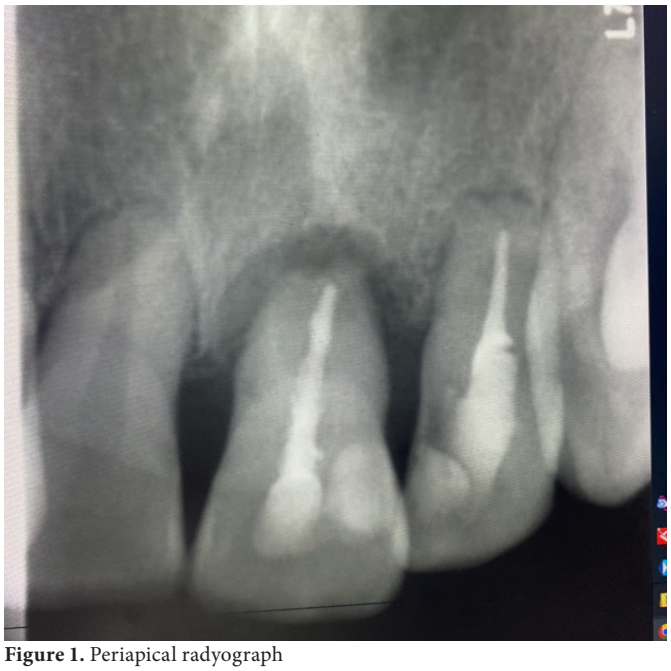

Figure 1. Periapical radyograph

On the same day, aesthetic and biological contouring of the gingiva was performed using composite resin on screw-retained non-hex PEEK abutments. A temporary restoration was fabricated on the PEEK abutments using a layering technique with restorative composite resin (Charisma composite, KULZER) that did not impede hemostasis. The temporary restoration was protected from occlusal and lateral contact (Figure 2-4).

Figure 2. Temporary peek abutment

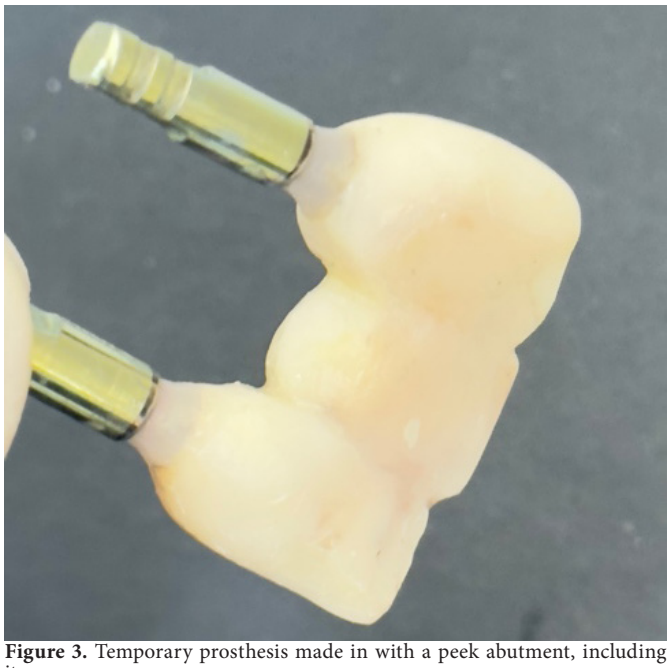

Figure 3. Temporary prosthesis made in with a peek abutment, including its appearance

Figure 4. Intraoral view of the immediately placed temporary restoration

The screw-retained temporary restoration was kept in the mouth for 3 months to allow for the completion of the osseointegration process and gingival shaping (Figure 5). Periapical radiography showed that our patient had excessive bone loss. Since the patient had periodontitis, no further surgical treatment was performed. Our aim was to organize the tissue with a temporary restoration and to create an emergence profile. The screw-retained temporary restoration was removed after 3 months, and closed impression posts were used to take an impression. In the laboratory, open impression posts were prepared with pattern resin, and an acrylic open tray was made (Figure 6, 7).

Figure 5. Emergence profile established by the provisional restoration

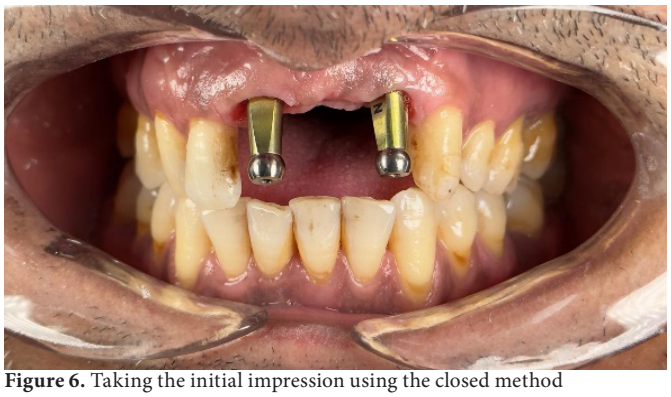

Figure 6. Taking the initial impression using the closed method

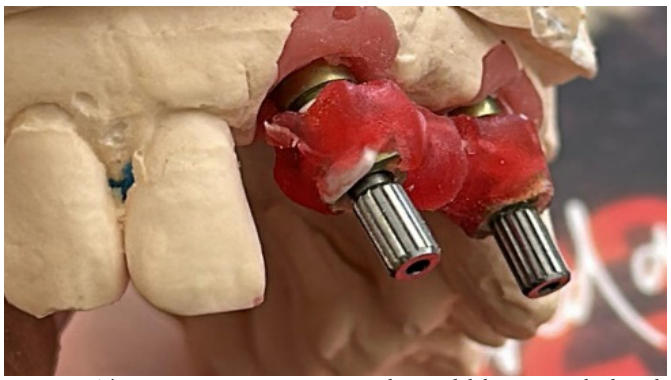

Figure 7. The open impression post on the model being atteched with pattern resin

Before the open impression procedure, the screw-retained temporary restoration was removed and secured to the implant analog. A small plastic cup was filled with A- type silicone impression material (Elite HD+, Zhermack, Italy) and the provisional restoration and analog were buried until the interproximal contact areas were submerged according to Hind's technique. Reference marks were made on the silicone impression material for orientation (Figure 8).

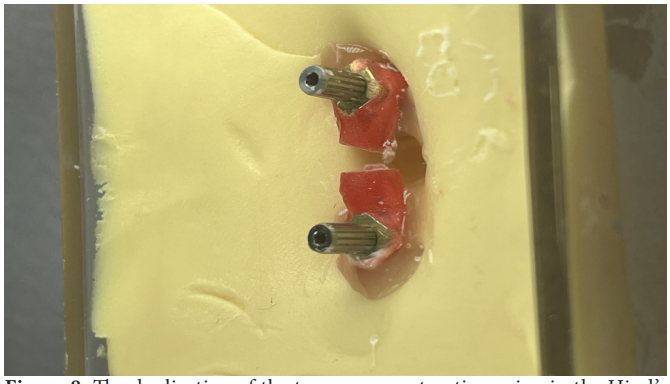

Figure 8. The duplication of the temporary restoration using in the Hind's technique

The provisional restoration was removed from the mold and placed back into the mouth to prevent the shape of the tissue from changing. The registration of the cervical part of the provisional restoration was transferred to the cup filled with silicone impression material. Open impression posts bonded with pattern resin were placed in the impression material in the mold and the space in between was filled with dual cure composite resin (GC G-CEM ONE Self-adhesive dual cure resin cement) and cured. The customized open impression posts were removed from the mold and placed in the mouth and the compatibility of the impression post with the periapical film was checked (Figure 9).

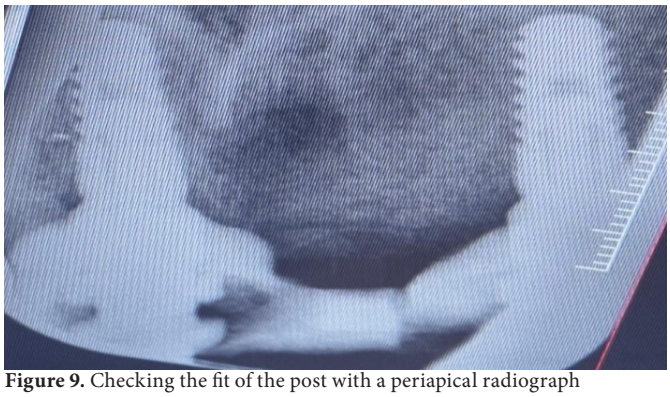

Figure 9. Checking the fit of the post with a periapical radiograph

The impression process was performed in a single step with type A silicone-based impression material and open tray impression technique. The impression posts in the impression tray were connected with analogs (Figure 10).

The temporary restoration was reinserted into the patient's mouth. Occlusal records were taken, and impressions were made of the opposing arch for the final bite registration, followed by shade selection. Due to the screw access channel remaining on the vestibular surface, a cemented restoration was chosen, and 15-degree angled abutments were used (Figure 11).

The final restoration was planned as a three-unit fixed partial denture. The framework was designed using zirconia material (3Y-TZP UPCERA, CHINA) (Figure 12). Mechanical polishing was applied to the portion of the prosthesis in contact with the soft tissue, and glazing was performed on the crown portion. (Figure 13). Follow-up examinations were conducted at 1 and 6 months. No complications were observed during this period (Figure 14, 15).

Figure 10. Transfer of the emergence profile of the provisional restoration to the permanent impression

Figure 12. Intraoral view of zirconia based

Figure 13. Final restoration

Figure 11. Intraoral view of angled abutments

Figure 14. Periapical view of final restorations at 1 months

DISCUSSION

In this case presentation, one of the most suitable techniques for immediate loading cases has been discussed. The advantages of the immediate implant placement protocol include a significant reduction in waiting time, a decrease in the number of surgical procedures, and optimal utilization of the existing bone for primary stability of the implant. Additionally, post-extraction osteogenic activity may enhance bone-implant contact.[8]

The interval between tooth extraction and implant placement is a crucial factor in the aesthetic and functional success of the final restoration. It has been observed that the resorption rate in the alveolar bone decreases by approximately 5-7 mm

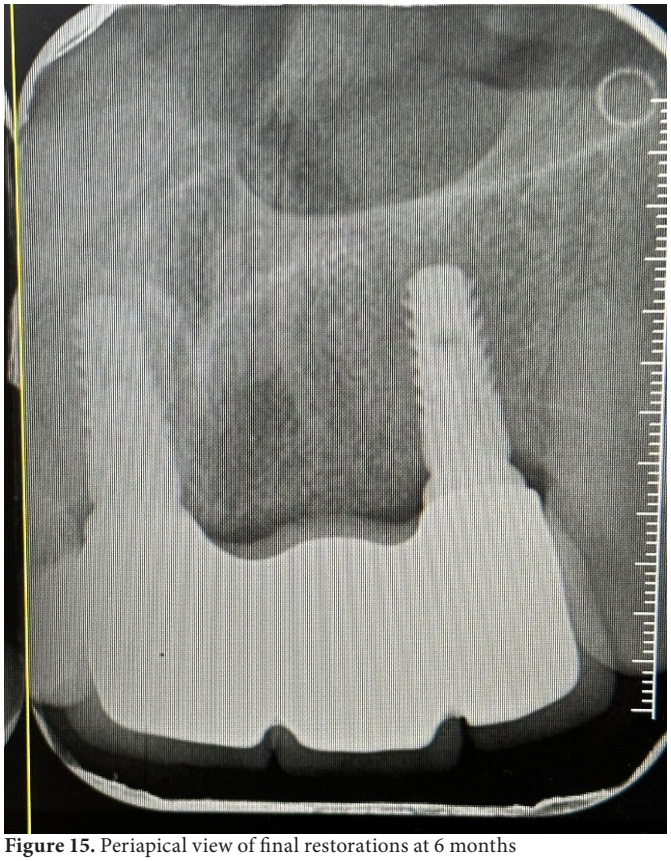

Figure 15. Periapical view of final restorations at 6 months

over a period of 6-12 months post-extraction, with most of the reduction occurring within the first 4 months.[9] Furthermore, bone loss in the alveolar bone also affects the gingival profile.[10,11] Considering this, implants are placed as soon as possible to avoid significant bone loss.[12]

In a study by Drago et al.,[13] a placement torque of 30 Ncm was indicated as appropriate for primary stabilization in implants placed with immediate loading. Slagter et al.[14] found that, with primary stability values ranging from a minimum of 25 Ncm to 35 Ncm, the immediate placement of prosthetic restorations significantly reduced bone loss in immediate implants.

In recent years, the option of prosthetic rehabilitation with immediate loading has become popular. Barone et al.[15] have conducted studies supporting this procedure.

Degidi et al.[16] reported that the 5-year success rate for implants immediately loaded with temporary restorations is 97.2%.

Chen et al.[17] reviewed studies on the 1-3-year follow-up results of immediately placed implants and noted that, in 25 out of 35 studies, the success rate of immediate implantation was over 95%.

Two different materials are used as temporary abutments on implants: titanium and polyetheretherketone (PEEK). Titanium is generally not recommended for use as a temporary abutment due to difficulties in adjustment in a clinical setting and its color disadvantages.[18]

In contrast, temporary PEEK abutments are preferred due to their ease of adjustment in clinical settings and their white color, which enhances aesthetic appearance and success rates.[19]

Within the limitations of a laboratory study, the results suggest that biofilm formation on the surface of PEEK is equal or lower than on the surface of conventionally applied abutment materials such as zirconia and titanium. As abutment surfaces are usually prone to subgingival biofilm formation, which are-in most cases-not regularly removed, it is wishful that materials employed for the fabrication of implant abutments feature low biofilm formation on their surface.[20]

In prosthetic design, screw-retained temporary restorations are more commonly used than cemented restorations. One of the main reasons for this is that remnants of cement, which can cause peri-implantitis, are not present in screw-retained systems. Additionally, the ability to easily remove and adjust the temporary restoration is another reason for preferring screw-retained systems. However, if the screw access channel creates aesthetic problems on the buccal aspect of the restoration, a cemented restoration may be used temporarily.[21,22]

The most commonly used materials for temporary restorations are acrylic and composite resins.[21] Studies have not demonstrated a significant advantage of composite or acrylic materials over each other in terms of aesthetics, marginal bone loss, and periodontal measurements.[21-23]

However, in cases with fewer implants, composite temporary materials are preferred over laboratory-produced acrylic temporary prostheses due to their ability to reduce the number of clinical visits and facilitate faster placement of the temporary prosthesis. Temporary restorations should be left in occlusion and protected from contacts during lateral movements for at least 6 weeks.[22,24] Any discoloration in the soft tissue caused by ischemia during shaping should resolve within 10 minutes.[25]

A temporary restoration placed in the same session results in more stable mesial and distal papillae, buccal midline mucosal levels, and horizontal soft tissue dimensions.[26]

The use of temporary restorations with immediate loading of implants is crucial for achieving an optimal emergence profile for the final restoration in conjunction with soft tissue healing. Hind's technique facilitates the transfer of healed anatomical tissues to the laboratory, allowing for the creation of a precise model and more accurate fabrication of the final restorations. This ensures that the laboratory technician can produce a restoration with appropriate contour, function, and aesthetics.[7]

When bone volume is reduced, either augmentative procedures are necessary, or the existing bone structure should be modified to achieve both aesthetic and functional suitability. In the study by Mengel et al.,[27] it is recommended to avoid augmentative procedures in patients with periodontitis. Furthermore, it must be considered that augmented structures in these patients are highly prone to significant resorption.

To protect damaged tissues and ensure a complication-free healing process, implant placement should be performed as minimally invasive as possible.[28] In this case gingival emergency profiles have been created however due to the high inter-occlusal distance, tooth lengths were optimized by utilizing gingival porcelain. In fixed prostheses, the use of restorative materials that match gingival color is essential to maintain optimal tooth dimensions.[29,30]

CONCLUSION

Restoring aesthetic and functional losses in anterior tooth loss is crucial. During approximately three years of follow-up, no complications or failures were observed. This study demonstrates the success of Hind's technique in transferring the emergence profile created with a temporary prosthesis to the laboratory. Additionally, it shows that immediate implant placement and immediate prosthesis application in aesthetic areas represent a predictable treatment option.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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