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Case Report

A Single Appointment Chair-Side Procedure of Transforming Cast Partial Denture into Interim Immediate Acrylic Partial Denture: A Case Report

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Abstract.

With increasing patient's demands in developing countries (like Pakistan), and within limited budget, poses significant challenges for clinicians to meet their patient's requirements and level of satisfaction, which arises the need for making modifications in existing techniques. In this case, patients needed an economical immediate denture to avoid edentulous period after extraction. This case-report presents a novel single-appointment, chair-side procedure using patient's existing prosthesis (cast-partial denture) to fabricate interim-immediate partial denture. This procedure offers retained aesthetics and facial support, while maintaining occlusal vertical dimension during the healing phase. Overall, treatment was economical and spared patients of inconvenience.

Keywords: Partial denture; Immediate prosthesis; Transitional denture; Direct technique

1. Introduction

The transition from having natural teeth to complete or partial edentulism is both physiologically and psychologically traumatic for patients, often resulting in impaired mastication, speech, and facial aesthetics. Dental professionals recognize the need to avoid an edentulous period by fabricating immediate dentures for their patients. However, patients' increasing demand for the natural appearance and function of the lost teeth presents significant challenges to dentists.[1,2]

When tooth removal is unavoidable, the expectation of mutilation generates great anxiety, especially when aesthetic impairment is involved.[3] This issue is typically addressed by constructing a rehabilitation prosthetic device planned for immediate placement after tooth removal.

Generally, two types of immediate dentures are discussed in the literature: conventional immediate dentures (CID) and interim immediate dentures (IID).[4,5] CID involves fabricating a prosthesis to be placed immediately after the extraction of natural teeth, which can be relined and used as a definitive or long-term prosthesis. IID, on the other hand, is used temporarily after tooth extraction and replaced with a final denture after the healing period.[6] The use of IID is recommended for patients to help them adapt to an artificial substitute for their missing teeth until more definitive prosthetic therapy can be provided.[5] IID has been reported to offer numerous advantages, including preservation of facial appearance and height, muscular tone, mastication, occlusal support, phonetics, and a reduction in post-extraction pain.[5,7]

Several novel techniques to fabricate IID have been reported to reduce the complexity of lab work and the time required for fabrication. For example, Khan *et al*. used cold-cure, tooth-colored acrylic, and visible light-cured resins.[12] Joffe *et al*. fabricated IIDs using a vacuum-forming machine, eliminating the need for conventional laboratory processes.[13] Gooya *et al*. created IIDs using existing fixed partial denture pontics, modifying Jiffy's denture.[5] More recently, Neumeier *et al*. fabricated digital immediate dentures using CAD/CAM technology.[14]

The purpose of this case report is to present a novel technique that utilizes a patient's existing prosthesis to fabricate an interim immediate denture in a single appointment. This technique maintains occlusion, occlusal vertical dimension (OVD), and facial support during the healing phase, providing an efficient and effective solution for immediate denture needs.

2. Case description

A 60-year-old female patient from a moderate socio-economic background presented with complaints of an ill-fitting cast partial denture and marked Grade II-III mobility in the right maxillary canine, first and second premolars, second molar, and left maxillary second molar due to decay and periodontal disease. These mobile teeth supported the cast partial denture via wrought-wire clasps. Clinical examination revealed Kennedy Class III Modification I with significant bone loss (greater than 5 mm), gingival recession, and pocket formation, confirmed radiographically. The patient also reported a severe gag reflex, which led her previous dentist to avoid complete palatal coverage in the maxillary cast partial denture. Instead, the existing design included an anterior palatal strap.

The patient's medical history included mild osteopenia, borderline diabetes, and past treatment for depressive illness. Her expectations were high: she desired an aesthetically pleasing, time-efficient, and cost-effective solution.

Based on her clinical and medical profile, three treatment options were considered:

1. Denture re-lining and root planing: This conservative approach would require guided bone regeneration and guided tissue regeneration to save the periodontally compromised teeth. However, given her systemic risk factors, the prognosis was poor.
2. Implant-supported overdenture: Although an ideal solution, this was unaffordable for the patient and unsuitable due to borderline diabetes and mild osteopenia, which could compromise implant success.
3. Conventional immediate denture: While this option offered better success rates, it was expensive and time-consuming, making it impractical for the patient.

Ultimately, a novel, modified approach was selected, involving a chair-side fabrication technique that restricted the procedure to a two-hour appointment.

After obtaining informed consent, pick-up impressions were made using alginate (Tropicalgin, Zhermack, Badia Polesine, Italy) while the patient wore her existing upper and lower dentures. These impressions were used to prepare diagnostic and study models [Figure 1, panels A-E].

All five maxillary mobile teeth were atraumatically extracted, ensuring preservation of the buccal and lingual plates [Figure 2, panels A, B]. On the study model, the crowns of the extracted teeth were trimmed using orthodontic pliers, while the cast partial denture remained seated [Figure 2, panels E, F]. The partial denture was modified by trimming its borders to create retentive tags for mechanical retention of auto-polymerizing resin (DPI Cold Cure, DPI, Mumbai, India). Palatal coverage was extended minimally to the vibrating line to address the patient's gag reflex issues [Figure 2, panels D, F].

The extracted teeth were cleaned with saline and immersed in hydrogen peroxide for 10 minutes. Debris and decayed portions were removed, and the roots were amputated at the middle third using a high-speed tapered fissure bur [Figure 3, panels A-I]. The natural crowns of the extracted teeth were prepared as pontics, following the established concept.[8] The apical openings of the pulp canals were cleaned, slightly enlarged, and sealed with calcium hydroxide filling (Calcipex, Nishika, Shimonoseki, Japan) [Figure 4, panels A, B]. These natural crowns were then fused to the cast partial denture with auto-polymerizing resin [Figure 4, panels C-E].

A chair-side re-lining technique was employed to ensure a suction-fit for the upper denture [Figure 5, panels A, B]. All sharp margins were rounded off, and occlusion was adjusted using articulating paper to eliminate premature contacts. The patient was instructed to wear the denture continuously for 24 hours to stabilize the blood clot and promote healing.

Post-operative instructions included a soft diet, avoidance of spitting, antibiotics (Amoxicillin 500 mg, TID for five days), a painkiller (Ibuprofen 400 mg as needed), and the use of chlorhexidine mouthwash (0.12%, BD). Detailed oral and denture hygiene instructions were

provided, emphasizing the importance of cleaning the prosthesis after meals and overnight immersion in a denture-cleansing solution.

At the 48-hour follow-up, minor mucosal ulcerations were identified and addressed by trimming the denture, followed by polishing [Figure 6, panels A-C, and Figure 7, panels A-C]. One week postoperatively, the patient reported no pain or discomfort, with good healing and no signs of infection. The patient expressed satisfaction with the aesthetics and function of the prosthesis. Interim immediate denture photographs were recorded at this stage [Figure 8].

After three weeks, the extraction sites had healed sufficiently to allow impression-taking for a definitive removable partial denture. The definitive prosthesis, fabricated and delivered within a week, met the patient's expectations for comfort, aesthetics, and functionality.

Figure 1(a-e): A diagnostic cast was made and cast partial denture was seated on it. **Figure 2(a/b):** Mobile teeth were extracted. **Figure 2(c):** Extracted teeth were immersed in a concentrated hydrogen-per-oxide (H_2O_2) solution. **Figure 2(d-f):** Crown removal of extracted teeth from diagnostic cast and using self-cure acrylic, palatal coverage was added to the denture. **Figure 3(a-i):** After ten minutes, extracted teeth were taken off from H_2O_2 sol. Using tapered fissure bur, cavitated areas and debris were removed, re-soaked in H_2O_2 solution, and taken off; Pontic teeth were prepared. **Figure 4(a/b):** Apical root canals were located using a sickle probe and calcium hydroxide filling done. **Figure 4(c-e):** Self-cure acrylic powder and monomer-liquid were mixed to form a viscous medium, using it to adapt 'Natural teeth Pontics' to denture, and allowed to set. **Figure 5(a/b):** showing immediate denture being re-lined to achieve suction-fit retention. **Figure 6(a-c):** After 48hrs follow-up reveals good healing of extracted sites. **Figure 7(a-c):** Extended areas on the denture were trimmed and the patient was satisfied.

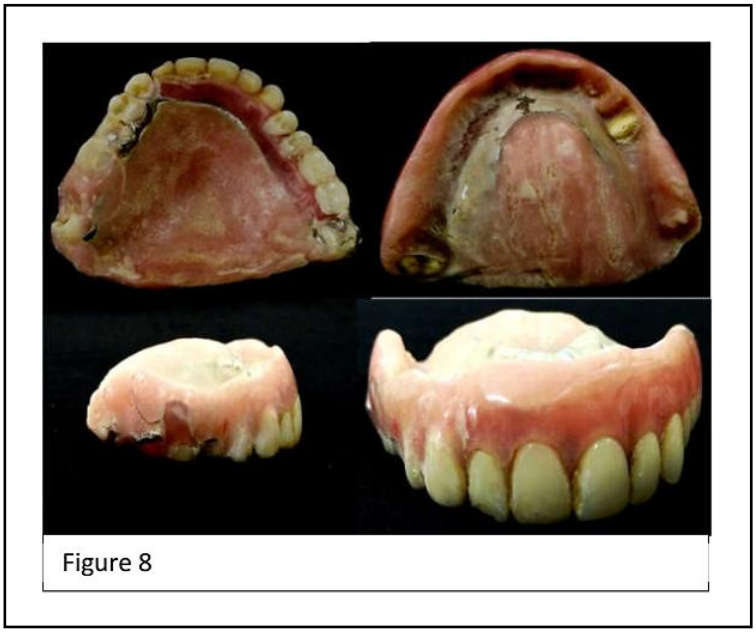

Figure 8. Interim-immediate denture pictures were taken on a one-week follow-up appointment.

3. Discussion

Modern dentistry is increasingly challenged by patients' growing aesthetic demands and the need to meet these expectations within an economical framework.[1,2,10]. Immediate prosthetic replacement is often essential to address psychological and social concerns, offering patients a sense of normalcy after tooth loss.[8] In this case, the patient required a cost-effective, immediate aesthetic solution. While interim dentures were initially considered, their higher cost led to a decision to reline and modify the existing denture. This approach included extending palatal coverage and enhancing retention and fit to meet the patient's needs.

The innovative concept of using the patient's natural teeth as pontics was employed in this case.[8] This approach preserved aesthetics, ensured functional harmony, and enhanced the psychological acceptance of the prosthesis. The unique chair-side technique of relining and modifying an existing denture with natural teeth as pontics proved to be both a rapid and economical option, minimizing patient inconvenience. The idea was inspired by Gooya *et al*., who

introduced a similar approach with the use of fixed partial denture pontics (modified jiffy denture).[5]

A wide range of immediate denture fabrication techniques has been documented, including the conventional flask technique[1], CAD/CAM methods[14], visible light cure systems[13], silicon mold techniques[11], and vacuum-forming methods.[12] However, a review of the literature reveals no previously documented chair-side, single-appointment clinical technique for interim immediate denture fabrication similar to the one employed in this case.[1–13] This novel technique represents a significant advancement, offering multiple advantages for both dentists and patients.[15-17] These benefits include the restoration of the patient's appearance and aesthetics, maintenance of facial height, normal speech and deglutition, improved masticatory efficiency, and stabilization of muscle tone and tongue positioning.[1–7,18] Additionally, immediate dentures provide protective coverage over extraction sites, promoting clot stabilization, minimizing hemorrhage, and preventing contamination, thus facilitating effective healing. They also aid in bone contouring and the preservation of OVD. In this case, the pre-existing OVD was carefully recorded and successfully maintained throughout the three-week healing phase. The high level of patient satisfaction observed further supports the success of this approach, offering results comparable to immediate implant placement and loading but at a significantly lower cost.[10]

Nevertheless, this prosthesis is not without its limitations. The bulkiness and increased weight of the auto-polymerizing acrylic resin make it more susceptible to food particles and microorganism adhesion.[15,16] This issue was addressed by providing the patient with detailed maintenance instructions, including rinsing and scrubbing the denture with soap after each meal and immersing it in a disinfectant solution overnight.[17] The decision to replace the cast partial denture with an auto-polymerizing acrylic resin removable partial denture was based on the patient's complaint of looseness and poor fit due to mobile teeth and resorbed ridges, particularly in the maxilla. One of the primary drawbacks of cast partial dentures is their rigid dimensions, which limit their adaptability to the dynamic changes in oral anatomy often seen in geriatric patients.

In elderly patients with systemic conditions such as diabetes or bone metabolic disorders, where the success of implant therapy may be uncertain[19], conventional complete dentures remain a viable and important treatment option.[20-23] This case highlights the importance of a comprehensive evaluation, encompassing both intra-oral and extra-oral factors, combined with meticulous treatment planning to achieve functionally and aesthetically acceptable results with immediate dentures.[1]

4. Conclusions

In this case, the patient expressed satisfaction with the aesthetic and functional outcomes of the prosthesis, highlighting the successful resolution of her pre-treatment concerns. The innovative approach of using natural teeth as pontics not only preserved aesthetics but also ensured functional harmony and psychological acceptability. During periodic follow-up evaluations, the prosthesis

demonstrated satisfactory stability, retention, and comfort, further validating the effectiveness of this technique.

This chair-side, single-appointment method for modifying and relining an existing denture represents a cost-effective and practical solution, especially for patients seeking immediate prosthetic replacement on a budget. While certain limitations, such as bulkiness and increased susceptibility to microbial adhesion, need to be addressed with proper patient education and maintenance protocols, the overall results indicate that this technique can provide a viable alternative to more costly or complex prosthetic options. Future research is warranted to evaluate the long-term success and applicability of this technique across diverse patient populations and clinical scenarios.

Abbreviations

CID	Conventional immediate dentures
IID	Interim immediate dentures
OVD	Occlusal vertical dimension
CAD/CAM	Computer-Aided Design / Computer-Aided Manufacturing

Declarations:

Supplementary Materials: Not applicable.

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