World Journal of Biology Pharmacy and Health Sciences
eISSN: 2582-5542
Cross Ref DOI: 10.30574/wjbphs
Journal homepage: https://wjbphs.com/

(CASE REPORT)

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Provisional freehand chairside crown over immediate loading implant in aesthetic zone

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World Journal of Biology Pharmacy and Health Sciences, 2025, 23(01), 230-237

Publication history: Received on 03 July 2025; revised on 04 July 2025; accepted on 10 July 2025

Article DOI: https://doi.org/10.30574/wjbphs.2025.23.1.0675

Abstract

The restoration's compatibility with the gingival structure is crucial to implant dentistry's aesthetic success. This is particularly true for the front-of-mouth maxilla. Recent trustworthy solutions to decrease surgical stages include instantaneous provisionalization and immediate implant insertion. Both methods reduce numerous surgical steps. Preserving soft tissue characteristics is another benefit.

Standard procedures like laboratory-fabricated provisionals or digitally guided same-day restorations are possible, but patients' tastes and budgets frequently need alternative therapy. This is true even if these techniques are feasible.

A 23-year-old female patient went to Prince Ali Hospital, Royal Medical Services, to replace a missing upper central incisor. The patient would not undergo the three-month healing process before the ultimate restoration. The patient concerned about their appearance, thus this choice was taken. Budgetary restrictions prevented us from using a lab-made temporary crown or a digitally prepared permanent prosthesis. Both alternatives were unavailable.

To address these issues, a freehand chairside resin composite temporary crown over temporary abutment was made immediately after implant insertion. This crown was designed to be attractive and temporary for optimal effects.

Direct composite resin provisionalization, atraumatic extraction, and rapid implant implantation were chairside procedures that did not need a surgical guide or laboratory staff. No help was needed for these steps. The temporary crown was precisely crafted to fit the gums and tooth's increasing profile while it heals. This was done to preserve the tooth's look.

The challenges were adequate occlusion, soft tissue stability, and temporary repair strength. The temporary crown protected gingival structure and ensured patient satisfaction at the follow-up session. This worked until the permanent prosthesis was supplied.

This case shows that freehand chairside provisionalization is practical and suitable for patients who are unwilling to undergo prolonged treatment or live in low-resource areas. Despite its flaws, the approach shows that clinical implementation may fulfil practical and aesthetic goals quickly. To prove its predictability compared to existing methods, further long-term study is needed.

Keywords: Immediate implant loading; Provisional crown; Aesthetic zone; Chairside fabrication; Freehand technique

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1. Introduction

Prior preparation is crucial prior to the replacement of an anterior tooth with a dental implant to optimise both aesthetic and functional outcomes [1]. This guarantees success. Maintenance poses challenges due to the influence of the anterior maxilla on aesthetics, phonetics, and the soft tissue architecture surrounding implants [2]. All traits are contingent upon the anterior maxilla. Methods one and two demonstrate potential as therapeutic approaches provisionalization and immediate implantation [3]. Both treatments have improved patient satisfaction by decreasing therapy duration, surgical procedures, aesthetics, and recovery time [4].

Prolonged recovery is essential prior to the rehabilitation of prostheses. Earlier implant surgeries may necessitate delayed loading in certain cases [5]. Patients require visually unappealing intermediate edentulousness. This therapy may facilitate osseointegration [6]. CAD/CAM restorations and laboratory-fabricated temporary crowns can address this issue effectively. Both methods are effective and both options are excellently applicable [7].

Access to these solutions is limited for many individuals due to factors such as cost, logistics, and the requirement for additional medical visits [8]. Temporary solutions may involve a freehand provisional crown following implant placement. This method customises emergence profiles and shapes soft tissue in real time. Each benefit holds significant value. Cost-effectiveness and chairside efficiency are additional advantages [9]. The gingival architecture surrounding the implant should be optimised to ensure long-term aesthetic outcomes [10]. Specialists are capable of shaping the temporary repair within the oral cavity [11]. An aesthetic zone implant was immediately loaded, and a chairside temporary composite resin crown was placed freehand on top.

This case study delineates the methodology employed. This technique, while adhering to biological and mechanical principles, proved feasible by delivering effective therapy to patients with time or financial constraints in a timely manner. This facilitated its implementation. This study examines therapeutic approaches, aesthetic concerns, and prompt outcomes.

2. Case Report

2.1. Patient History and Presentation

A 23-year-old female presented to Prince Ali Hospital, operated by Royal Medical Services, with increased mobility of her maxillary right central incisor (#11), diagnosed as grade III mobility. The condition notably impaired her capacity to eat and speak, while also presenting significant aesthetic issues. The patient chose an implant-supported restoration to restore both function and aesthetics. The decision was reached following the patient's expression of dissatisfaction regarding the aesthetic compromise associated with the mobile tooth. . No systemic diseases, drugs influencing bone metabolism or repair, smoking, diabetes, or osteoporosis are in the patient's medical history. It appears the patient has no contributing variables

2.2. Background and Aetiology

Loss of anterior maxillary teeth presents significant challenges. The loss of anterior teeth impacts both aesthetics and function [12]. Immediate implant placement with provisionalization can prevent ridge collapse and soft tissue recession, while also addressing patient preferences for expedited treatment. This strategy may be more advantageous for patients [13].

2.3. Clinical and Radiographic Examination

2.3.1. Clinical Examination:

Eight years before, tooth #11 was damaged and endodontically treated. The patient was asymptomatic for years after treatment. Three years ago, the tooth received a full-coverage crown. The crown creates a beautiful, defect-free tooth. Clinical examination shows that tooth #11 has Grade III mobility, meaning it can move in all directions and may be depressible in the sockets. The crown is healthy with a marginal fit and no pain during percussion or palpation. Periodontal probing of tooth #11 shows 5–7 millimetres with no bleeding. With probing depths of one to three millimeters, adjacent teeth #12 and #21 are healthy and stable. Around tooth #11, gingival inflammation was noted. Occlusal examination shows tooth 11 has minor damage.

2.3.2. Radiographic Examination

Cone-beam computed tomography (CBCT) indicated that there was adequate bone volume to enable an implant placement, hence removing the requirement for bone grafts. The buccal bone thickness was around 3 millimetres, and the apical bone density was high.

According to the sagittal scans, the root is located in a Class I sagittal root position (SRP), which indicates that it is still located inside the alveolar housing and against the labial cortical plate. It is because of this that the implant will be positioned appropriately there.

Teeth #11 had characteristics of external root resorption, notably in the apical third of the root, as well as buccal bone dehiscence, which indicated localised bone loss and the possibility of a threat to the labial plate. These characteristics were visible in the axial pictures. The patient's history of the tooth's mobility and destruction leads to these results, which make sense when taken into consideration.

Due to the fact that the panoramic imaging demonstrated that the bone structure was generally healthy and that there was no major damage to the teeth that were next to the affected area, bone grafting is not required in this set of circumstances.

The panoramic scan provided additional evidence that the problem with tooth #11 was quite minor. This was proven by the fact that the neighbouring teeth did not display any signs of periapical radiolucency or bone loss.

2.3.3. Diagnosis

According to CBCT, tooth #11 exhibits signs of long-term localised periodontitis, including buccal bone dehiscence, grade III mobility, and external root resorption that are all associated with the condition. The structure of the tooth and the gums have already been compromised, which means that even with endodontic treatment and a crown that covers the entire tooth itself, the long-term outlook is not favourable. It is possible that a subtle traumatic occlusion will make movement more challenging. The teeth that are adjacent to each other (numbers #12 and #21) do not exhibit any symptoms of illness. According to the results of the examination, the area around tooth #11 is where the inflammation is most concentrated, and mild gingivitis can be seen throughout the gums. The individual does not have any systemic health problems, and they do not smoke. Additionally, they are not taking any medications that could potentially hinder bone or healing.

2.3.4. Treatment Plan

The patient refused a long rehabilitation and financial constraints necessitated the treatment. Immediate implant placement after atraumatic socket debridement if root fragments remain. Chairside previsualization with a freehand resin composite crown over temporary abutment ensured excellent soft tissue contouring. Zirconia crowns are delayed after three to six months of osseointegration. [16].

2.4. Clinical Procedure

2.4.1. Step 1: Tooth Extraction and Implant Placement

The patient received an injection of 2% lidocaine and 1:100,000 epinephrine. The buccal bone plate was maintained by periotomes, minimising extraction damage. To ensure primary stability, a tapered implant measuring 3.5 millimetres in diameter and 13 millimeters in length was implanted with an insertion torque surpassing 50 Ncm [17].

2.4.2. Step 2: Provisional Crown Fabrication

A freehand method and composite resin were used to construct a temporary crown for tooth #11, which was then built directly on top of a temporary abutment at the time of construction. To ensure that the bonding would not interfere with the procedure, the gums and the teeth that were adjacent to them were separated during the procedure.

A piece of sterile latex glove was used to separate the gums from the gum line in order to protect the soft tissues and assist in achieving the desired shape and profile for the teeth to emerge.

The temporary restoration was meticulously fashioned in such a way as to provide support for the gums without exerting an excessive amount of pressure on them and to prevent the bite from being disrupted. In order to reduce

plaque retention, improve appearance, and make the tissue more compatible, the final restoration was polished very well. This was done to ensure that the surfaces were smooth [18].

2.4.3. Step 3: Soft Tissue Contouring

To preserve gingival architecture and papillary form, the emergence profile was rigorously changed. The patient learnt implant-related oral hygiene to decrease irritation. [19].

2.5. Follow-Up and Final Restoration

2.5.1. Postoperative Monitoring:

Five days later, a further exam showed a favourable soft tissue reaction without irritation or pressure on the provisional crown. later, the peri-implant mucosa showed steady adaptation to the interim repair.

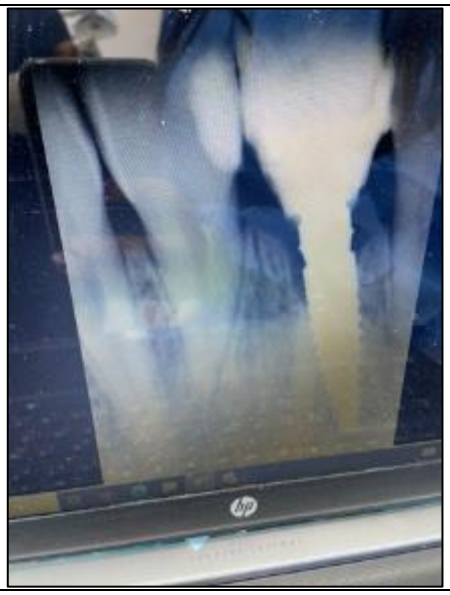

Figure 1 A periapical radiograph after implant insertion and provisionalization. The picture shows the dental implant and interim repair precisely positioned in the extraction socket. The implant's alveolar bone contact, main stability, and tooth connection are crucial. The radiograph shows appropriate depth and mesiodistal alignment for osseointegration. This visualisation helps diagnose post-surgical placement and prosthesis temporisation

Figure 2 The pre-extraction clinical status of tooth #11 in a patient's dentition includes visible fractures, wear, inflammation, recession, and poor restoration. Pathology may show signs of infection, discoloration, or resorption. Radiographic correlations may reveal periapical radiolucency, root fracture, or inadequate root canal treatment. The tooth was deemed non-restorable due to extensive caries, vertical root fracture, or advanced periodontal involvement. The patient's dentition was evaluated for signs of infection, discoloration, or resorption

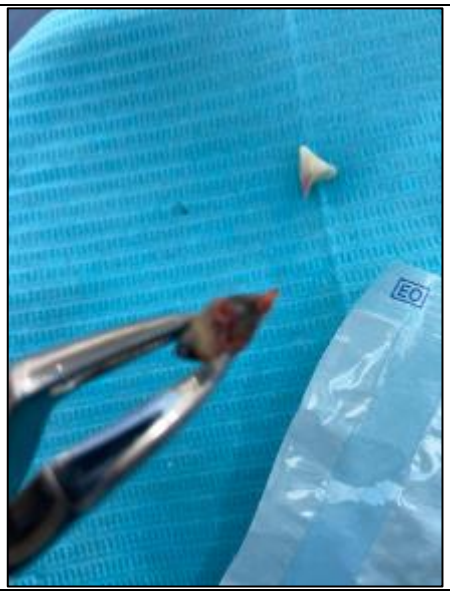

Figure 3 The image depicts a tooth post-extraction

Figure 4 Post-extraction, the implant is placed into the fresh socket, engaging the apical bone for primary stability, preserving alveolar anatomy and reducing treatment time, as depicted in the schematic representation

Figure 5 Temporary abutment in place, demonstrating proper isolation from adjacent teeth and soft tissue to maintain periodontal health and ensure optimal provisional restoration fit.

Figure 6 Steps involved in the fabrication and placement of a temporary crown. The process includes tooth preparation, impression-taking, temporary crown fabrication, adjustment, and cementation, ensuring patient comfort and protection until the final restoration is ready

Figure 7 "Cone-beam computed tomography (CBCT) cross-sectional view of the maxilla at the level of tooth #11 (left central incisor). The image demonstrates buccal bone dehiscence (arrow), indicating localized bone loss on the facial aspect of the root."

Figure 8 A panoramic radiographic view shows root resorption in tooth 11, revealing shortening and irregular contours. The image suggests progressive resorptive changes, possibly due to traumatic, orthodontic, or idiopathic causes, requiring further clinical evaluation

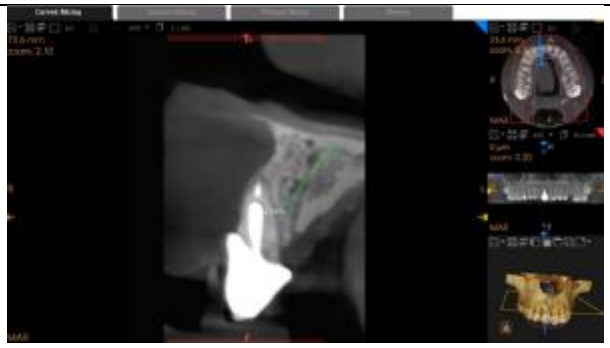

Figure 9 The sagittal view of tooth #11 shows adequate bone height, width, and density for implant placement, with sufficient bucco-palatal dimension and apical bone integrity for optimal primary stability and implant positioning

3. Discussion

Immediate aesthetic zone implant and provisionalization is beneficial. Minimising edentulous time saves treatment time and improves patient satisfaction [22]. This method needs careful implementation to succeed in utility and beauty. Stability of peri-implant soft tissue, proper emergence profile, and avoidance of biological problems such as gingival recession and implant failure are crucial [23].

In resource-constrained scenarios, the freehand chairside temporary crown approach is more efficient and cost-effective than digitally guided prosthetics. This method allows chairside personalization that CAD/CAM and temporary crowns cannot [24]. This approach speeds crown shape and soft tissue adaption. Soft tissue management, occlusal loading control, and anatomically appropriate crown sculpting are needed to sustain the peri-implant mucosa structure.

Maintaining gingival architecture during simultaneous implant provisionalization is crucial. Research shows that provisional crown emergence profiles affect soft tissue stability, with overcontouring inducing compression and undercontouring recession [25]. The interim restoration was meticulously contoured to support the interdental papilla and labial gingival zenith line, minimising aesthetic compromise.

Immediate loading methods also matter. Immediate loading can improve patient satisfaction, but strict case selection criteria must be met, including appropriate primary stability (50 Ncm insertion torque) and no excessive occlusal forces [26].

The case met osseointegration criteria for bone density and biomechanical circumstances. Since composite resins are strong and polishable after application, the chairside freehand technique allows for greater material selection options. To ensure long-term durability, the prosthesis must be replaced after osseointegration. [27-28].

4. Conclusion

This case study shows that a freehand chairside provisional crown on an instantaneously loaded implant can be an affordable choice for patients with financial constraints who need high anterior maxilla aesthetics. Success depends on patient bone volume, main implant stability, and occlusal stress reduction. This begins the arduous case selection process. A careful surgery protects sensitive tissue. Also helpful are flapless or minimally invasive methods.

The provisional crown should look like the tooth and provide mucosal support and hygienic. This concerns prosthetic precision. Regarding biofactors, the long-term success requires minimising overload and maintaining the soft tissue around the implant. immediate implant and a chairside provisional crown make the anterior zone cosmetic rehabilitation strategy reliable and efficient. This method must be tested with more samples and longer follow-ups to prove its reproducibility.

4.1. Key Learning Points

In contexts with limited digital workflow access, freehand chairside works. Aesthetic success requires soft tissue control and crown contouring. Immediate implantation and provisionalization reduce treatment time and improve patient satisfaction. Biomechanical concepts must be considered while loading immediately to prevent implant failure. Long-term follow-up is needed to evaluate peri-implant tissue stability and prosthesis durability. These ideas help physicians obtain predictable results in complicated aesthetic contexts while balancing cost-effectiveness and therapeutic efficiency.

Compliance with ethical standards

Acknowledgement

Our appreciation goes to staff of the department of Jordan's Prince Ali Bin Al-Hussein Hospital for their enormous assistance and advice.

Disclosure of conflict of interest

There is no conflict of interest in this manuscript

Statement of ethical approval

There is no animal subject involvement in this manuscript. The Jordanian Royal Medical Services (JRMS) Institutional Review Board (IRB) initially approved this study at 3 June 2025 with the registration number 54_7/2025. This approved study was formally cleared for publishing after being reviewed by our institution's directorate of professional training and planning at 23 June 2025.

Statement of informed consent

Owing to the retrospective design of this study, the informed consent form was waived.

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