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The Use of Acrylic Resin Material with Partial Denture Cases Immediate: Case Report

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KEYWORDS
Immediate denture, acrylic resin, Denture, Aesthetic

ABSTRACT
Tooth loss, particularly in the anterior maxillary region, can significantly affect a patient's aesthetics, speech, and psychosocial well-being. This case report presents the treatment of a 29-year-old male with grade III mobility in tooth 21 and impacted molars 38 and 48, following a prior dental trauma. The research objective was to describe the process and effectiveness of using an immediate partial removable denture with acrylic resin material following tooth extraction. A descriptive case study method was employed, including clinical examination, radiographic analysis, impression-taking, and denture fabrication using the Jerbi cast modification technique. The procedure was completed in one visit, with tooth extraction followed by immediate denture insertion. Results indicated successful restoration of aesthetic and functional needs without significant postoperative complications. Denture retention and patient comfort were reported to be excellent. The findings suggest that immediate denture application, supported by accurate mold modification and patient education, can significantly enhance rehabilitation outcomes. Implications point toward the importance of interdisciplinary collaboration and individualized prosthodontic planning in similar clinical contexts.

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INTRODUCTION

Immediate dentures can be in the form of complete or partial dentures that are immediately inserted after removal. Patients feel more comfortable with a tooth replacement. Overall, the creation of immediate complete dentures can contribute to aesthetics, mastication and phonetic functions. In this case, the type of treatment carried out is included in conventional immediate complete denture. There are two types of immediate denture, namely, conventional immediate denture and interim immediate denture. Conventional immediate denture is indicated only in the remaining anterior tooth, and the residual ridge in the posterior has healed, while interim immediate denture is indicated if both the anterior and posterior teeth are extracted at the same time (Caputi et al., 2014).

Immediate Denture is one of the best contributions that dentists offer to patients. The worst part of Immediate Denture can be traumatizing to the patient. Immediate Dentures are made before tooth extraction, which is installed immediately after the extraction of the remaining teeth. After years of avoiding edentulous in patients, dentists recognize the patient's wants and needs resulting in the construction of an Immediate Denture that is installed in the patient's mouth immediately after the extraction of the original tooth, especially the anterior teeth of the upper jaw and lower jaw. Nowadays, the manufacture of Immediate Denture is mainly for aesthetic reasons. The long-term success of Immediate Denture depends on the correct indication of clinical and laboratory procedures (Shalini, 2019). The advantage of immediate denture is that the patient does not feel a period of toothlessness after extraction, so they do not feel any aesthetic changes, the function of their muscles and oral tissues,

mastication and phonetic functions can be corrected. The wound can be immediately closed with artificial scarring, bleeding, swelling, pain and complications due to extraction are greatly reduced, The wound healing process is even faster because the prosthesis acts as a blood clot splint (Gavazzoni et al. 2015; Rangarajan & Padmanabhan, 2024: Tuncel & Celik, 2015).

This Immediate Denture treatment is one of the dentist's choices for patients, because it has psychological benefits for patients, namely it can prevent toothless areas after extraction. Tooth loss that is not immediately replaced can cause disturbances in the chewing function, and aesthetic disturbances during the healing process period after tooth extraction, affecting the patient's physical and mental condition, the tongue and cheek mucosa may widen so that it can interfere with the installation of dentures in the future, loss of the vertical dimension of occlusion of the patient causing TMJ disorders, excessive resorption of residual ridge, the occurrence of flabby mucosa that can interfere with the installation of dentures (Emami et al., 2013; Saleh, 2023).

The success of denture manufacturing depends on retention and stabilization. Retention is the ability of dentures to withstand the force of gravity, the adhesion properties of food and forces related to the surface of the jaw, so that it will produce permanent dentures in their position in the oral cavity. Stability is the ability of dentures to remain stable or constant in position when in use. Stability provides physiological comfort to the patient, while retention provides psychological comfort. Lack of stability often makes retention and support factors ineffective. In the jaw molding process, the entire supporting tissue must be printed to obtain maximum retention and stabilization (Oetami & Handayani, 2021).

According to the National Institute of Health Resin, Acrylic has become the most in-demand denture material. This Acrylic resin is perfectly attached to the desired space. Acrylic resin is the easiest material to make because it can adjust the edentulous shape and is more comfortable for the patient. The material used for Immediate Denture is 10 Acrylic Resin. Acrylic resin has several advantages, including relatively low price, the color resembles gingiva, manipulation and manufacturing are easy, it does not dissolve in saliva, it can be repaired and the dimension change is small (Dama et al., 2013; Muradova et al., 2023). On the downside of Acrylic Resin, dentures tend to wear out quickly and the shape of the teeth can change as you continue to bite into food over time. Patients may need to replace acrylic dentures within five years unless the attached dentures contain some good strength denture material. Proper care is very important to maintain dentures with this Acrylic Resin material. With proper care, these dentures can last longer. However, if teeth are not cleaned correctly and regularly, then the worst thing will happen, namely an infection of the gums (Shalini, 2019).

This research presents the treatment of a 29-year-old male with grade III mobility in tooth 21 and impacted molars 38 and 48, following a prior dental trauma. The novelty of this case report lies in its practical demonstration of Jerbi's 1966 cast modification technique applied to the fabrication of immediate partial dentures using acrylic resin for anterior tooth loss, particularly tooth 21, post-trauma. While previous studies such as Caputi et al. (2010), Gavazzoni et al. (2015), and Sharma et al. (2020) have discussed general indications, psychological benefits, and stepwise procedures of immediate dentures, this study uniquely emphasizes real-time retention performance, post-operative adaptation without complications, and mold modification details, especially in young adult patients. It also integrates patient-centered prosthodontic outcomes, such as rapid aesthetic satisfaction and speech comfort, after a single-visit extraction and insertion approach.

METHOD

This study employed a qualitative descriptive case report design focusing on a single patient presenting with anterior tooth loss and the need for immediate prosthodontic rehabilitation. The

population targeted in this context is individuals experiencing partial edentulism in the anterior region with an urgent need for aesthetic and functional recovery. The sample consisted of a 29-year-old male patient with grade III mobility of tooth 21 and previous history of dental trauma. Given the clinical nature of the research, purposive sampling was applied to select a representative case that meets the criteria for immediate denture placement.

The research instrument comprised clinical observation sheets, radiographic evaluation, and patient interview protocols. To ensure validity, diagnostic procedures such as intraoral examination, panoramic radiography, and dental mobility tests using standardized instruments were employed. The reliability of clinical findings was cross-verified by a supervising dentist. Data collection was performed through direct clinical examination, photographic documentation, impression taking, and observation of postoperative adaptation and patient response to the immediate denture.

The procedural steps included preliminary examination, treatment planning, impression with alginate material, fabrication of the study and working models, cast modification based on Jerbi's method, tooth extraction, and immediate denture insertion. Postoperative evaluations and control appointments were scheduled to monitor healing and denture fit. No specialized statistical software was utilized, as this is a descriptive case report. The data analysis was performed qualitatively by comparing clinical outcomes with prosthodontic principles of retention, stability, and patient satisfaction documented throughout the treatment process.

RESULT AND DISCUSSION

A male patient, aged 29, came to dr. Soekantyo Jahja Hospital with the left upper front teeth swaying (Figure 1). On intraoral examination, missing teeth were seen in 11 teeth, 21 teeth were shaken of the 3rd degree, 38 impactions accompanied by deep caries, 48 impactions as well, can be seen in the results of panoramic photos of the patient (Figure 2). Patient's oral hygiene is good, previously a year ago the patient had an accident that resulted in the loss of 11 teeth, then a removable denture was made. After almost a year of using the dentures, the patient complained that the next tooth was shaking, from the radiography examination of tooth 21 there was a radioluscent image of 2/3 of the root of the tooth. It means that there is a fracture in the tooth. The best therapy for this case is exodonation. The patient did not want the tooth after it was removed later so it was decided to plan for the creation of an upper immediate denture. The patient felt embarrassed by the loss of his front teeth. The patient does not have any systemic disorders and his blood pressure is normal (Anita, 2021).

At the first visit, an anamnesis, intra and extraoral clinical examinations, radiographic examinations and consideration of treatment plans according to the results of discussions with the patient were carried out. The patient does not object to the removal of the prescribed tooth, as long as it does not undergo a toothless phase. The first printing is done with alginate material, and then casting to obtain a study model. Consideration for the removal of the upper jaw at once needs to be accompanied by special attention in maintaining the vertical dimensions of the patient's occlusion (Anita, 2021).

Figure 1. The Patient's Condition during Occlusion with Tooth 21 Shaking ˚3˙ Tooth 11 using the previous denture. Over jet then over bite normal 2 mm

The next course of action is to perform tartar cleaning, dental vitality tests and the patient's periodontal state support the decision for tooth extraction 21. Tooth shaky examination was carried out using 2 instruments in the labial and lingual directions with a pressure of 500g. The patient has agreed to this treatment plan along with the stages of work, the number of visits and the estimated costs that need to be prepared (Anita, 2021; Salmond & Echevarria, 2017).

On the second visit, a working model was printed followed by determining the color of the teeth was discussed by prioritizing the patient's wishes. The next stage is a laboratory procedure which includes mold modification in the form of cutting teeth to be extracted, forming gum contours around it for planning for the preparation of immediate dentures (Anita, 2021).

The next visit is tooth extraction by the dentist (operator). The procedure begins with signing an informed consent, checking the general condition of the patient and preparation including the provision of preremediation. Tooth extraction 21 is carried out in 1 visit. Bleeding is normal, but the patient is asked to wait until signs of clotting are seen so that immediate denture insertion of the upper jaw can be admitted. For this reason, the dentist must ensure that the patient's condition is good, does not have dizziness and the bleeding has stopped (Anita, 2021).

Figure 1. Panoramic Photo Results of Patient's Teeth

The immediate dentures of the upper jaw are made to grip on teeth 15 and 24. At the time of installation, the patient felt that he did not experience nausea or vomiting because he quickly adapted to the use of dentures because he had previously experienced using dentures/dentures and the patient felt more comfortable. The retention of dentures is quite good with the presence of claws, buccal wings, so that it does not interfere with the movement of the lips, tongue and cheeks. In the case of our patients, there were no complaints after immediate denture insertion, the dental function did not experience difficulties especially in terms of ariticulation and aesthetics of dentures. Patients are trained to be able

to remove and install dentures on their own, are given instructions on how to clean and schedule a post-installation control schedule for the immediate dentures (Anita , 2021). (Figure 3)

Patients were instructed to wear dentures for the first 24 hours, avoid hot, spicy foods and alcohol, take antibiotics and pain relievers as per the dosage given and control the next day. The dentures are opened at the time of control to check for the extraction wound to ensure there is no irritation/inflammation and food residue in the area. After this, irrigation is carried out with an antiseptic, asking complaints and giving further instructions to remove dentures at night before going to bed. Periodic control is approximately 1-2 weeks for thread removal, then 3 months after removal (Anita, 2021).

Figure 3. Immediate tooth application on the upper jaw of the front tooth, after tooth extraction 21, occlusion is appropriate before and after immediate denture insertion

DISCUSSION

The denture procedure is generally performed within 8-12 weeks after tooth extraction, as alveolar bone resorption generally occurs. Therefore, periodic control is needed on the installation of immediate dentures, considering that changes can occur in the alveolar bones that cause dentures to be less stable. The relining procedure is generally performed after 3-6 months after the immediate denture insertion, this is done to fill the gaps formed due to alveolar bone resorption6 (Nayak et al,. 2020).

Indications of immediate denture in general are patients with teeth that are indicated for partial or full extraction, as well as in patients who need aesthetics due to social and work demands without feeling tooth loss after partial or full tooth extraction1. Contraindications for immediate denture are patients with a history of heart disease, bleeding disorders, patients undergoing radiotherapy of the head and neck area (Tuncel & Celik, 2015).

The main advantage of Immediate Denture is that it maintains the aesthetics and facial profile of the patient because there is no edentulous period after tooth extraction. Vertical connections, jaw connections, muscle tone can all be maintained. Due to the protection of the extraction site with dentures, postoperative pain can be reduced. Patients with poor dental and oral hygiene status, poor general health as well as being identified as uncooperative because they cannot understand the scope and limitations of Immediate Denture Care may not be a suitable candidate for Immediate denture placement. The main disadvantage of Immediate Denture is that dentures are tested first after extraction to find out what the dentures will look like according to the condition of the teeth after extraction. Resurfacing of dentures may be necessary at a later date. It's a difficult procedure, more time, extra time, extra appointments and added costs (Shalini, 2019).

The success of immediate dentures needs to be supported by several stages ranging from case selection, diagnosis, planning, careful surgical protocols, proper mold modification, denture

manufacturing and patient wishes. The right case selection plays an important role in success because not all cases can be made with immediate dentures (Sharma et al. 2020).

Difficulties are often encountered in planning the preparation and installation of immediate dentures. Laboratories must be able to predict the arrangement of dentures, given the impossibility of trials on patients. Based on these considerations, the laboratory will use special provisions to modify the mold as stipulated by Jerbi in 1966. Mold modification aims to provide enough space to place dentures, without the need to perform alveoloplasty (Anita, 2021).

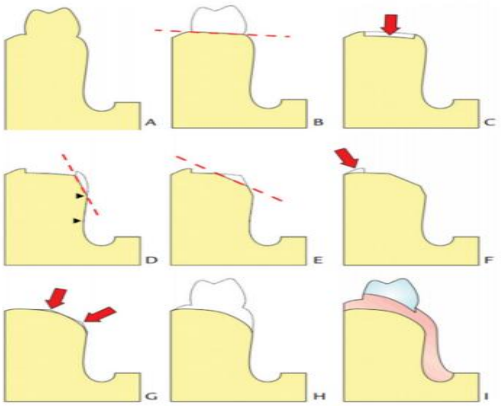

Figure 4. Mold medification according to Jerbi
(Shalini, 2019)

Modifikasi cetakan menurut Jerbi (1966) : P(hoenix & Fleigel, 2008).
(A) Penampang melintang dari model pada gigi belakang
(B) Bagian mahkota dibuang menggunakan gergaji laboratorium
C) Dibuat ceruk dengan kedalaman 1 mm sebagai daerah yang ditempati akar
(D) Vertical cutting extends from the facial to the meeting of the cervical part and the middle third of the facial part,
(E) Cut the extension from the lingual facial midsection of the socket to the middle of the previous cut in figure D
F) The socket base is extended to the lingual part
(G) Contoured surfaces are rounded on the facial and lingual parts
(H) The result of contour reduction is visible, the lines of spots are a picture of the teeth before the cut is carried out
(I) the cross-section of the tooth placement and the base of the modified denture.

Difficulties often occur during the installation of immediate dentures especially for the adaptation between the base of the dentures and the supporting tissue after extraction, many authors suggest the use of a surgical guide to get a good adaptation. A surgical guide is a rigid tool, in the form of a transparent mold made to duplicate the surface of the intaglio that will be in contact with the denture base and can be seen visually to correct the adaptation of the denture base8.

The cutting stage of the model is very important because poor execution will result in the difficulty of adapting the denture base to the supporting tissue during installation and this can affect the retention and stability of the denture. A loose denture cannot protect the extraction wound, but it can cause unwanted infections.

This case report uses Jerbi modification for model cutting with the consideration of the extraction of 21 teeth at once so that it is necessary to remove more interdental bones to rounding the alveolar bone. The adaptation of dentures is well obtained and so is the retention supported by the largest grip or the largest contour of the teeth on the remaining teeth. Periodic control and relining after the extraction wound closes perfectly, so the appropriate material for the immediate denture case is acrylic resin-based

Mold modification is an important factor in the manufacture of immediate dentures, good contouring and good denture finishes help the wound healing process. Sharp denture edges that can cause inflammation of the oral mucosa need to be avoided. All denture surfaces must be polished well, so as to avoid food accumulation and the patient can maintain good oral hygiene. Immediate dentures are expected to function optimally, providing good aesthetic support and occlusion after removal.

CONCLUSION

In this case, a patient with upper jaw tooth loss, severe mobility of tooth 21, impacted teeth 38 and 48, and minor tartar buildup underwent a one-visit extraction as the primary treatment, followed by the placement of a partial removable denture (PRD) using acrylic resin. This prosthetic aimed to restore chewing function, aesthetics, speech, and maintain the health of remaining oral structures and occlusion. Key considerations in PRD fabrication include retention, stabilization, aesthetics, and occlusal harmony, all of which contribute to patient comfort. Proper education on denture use is essential to prevent injury and ensure longevity. Successful outcomes rely on accurate case selection, precise planning, and collaboration among dentists, patients, and technicians. Future research is recommended to evaluate long-term functional outcomes of PRDs, compare materials like acrylic and flexible nylon in terms of comfort and durability, and assess the effectiveness of patient education in improving oral hygiene and denture maintenance, thereby advancing clinical prosthodontic practices.

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