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Case Report

Immediate complete overdenture: optimizing patient's quality of life with endodontic - prosthodontic approach

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ABSTRACT

Background: *Immediate complete overdentures are designed for placement denture immediately following the extraction or decapitation of natural teeth. This procedure overcome the challenges associated of esthetic problems, including functional difficulties and psychological issues.* ***Purpose:*** *The article aims to highlight the advantages of endodontic-prosthodontic approach through immediate overdenture, such as the preservation of alveolar bone and improvement in patient's psychological well-being and quality of life.* ***Case:*** *A 60-years-old female came into Universitas Airlangga Dental Hospital with the chief complaint of missing multiple teeth with upper front teeth becoming loose and desire to replace them because of difficulty in chewing food.* ***Case Management:*** *Diagnostic impressions were taken using irreversible hydrocolloid material, then poured in the dental stone to create final impression. The treatment plan included endodontic treatment, scaling and root planning for 11. The vertical dimension of occlusion was established using a bite rim and mounted on an articulator. Then, the immediate overdenture was created by arranging artificial teeth. Before the denture insertion, 11 was decapitated and filled the orifice with glass ionomer cement. Extraction of 21, 22, 23 was carried out and after ensuring hemostasis, the immediate overdenture was inserted. To finalize the denture insertion, occlusion was assessed using articulating paper. Control was done after day 1,3 and 7 after denture insertion.* ***Conclusion:*** *This case report describes the effectiveness of immediate overdentures as a valuable treatment option through endodontic-prosthodontic approach. By providing a functional and aesthetic solution while minimizing the edentulous period, immediate dentures significantly enhance patient's quality of life.*

Keywords: *immediate denture, overdenture, endodontic treatment, quality of life, dental rehabilitation*

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INTRODUCTION

Tooth loss can significantly impact an individual's quality of life, leading to functional difficulties in chewing, speech, and swallowing, as well as psychological issues such as social isolation and diminished self-esteem.[1] The transition from having natural teeth to being edentulous can be particularly challenging for patients, often resulting in a prolonged period without teeth, which can exacerbate these issues.[2]

Immediate complete overdenture offers a viable solution to these challenges by allowing for the placement of a prosthesis immediately following the extraction or decapitation of natural teeth. This approach not only provides patients with a functional and aesthetic restoration but also helps preserve the alveolar ridge and maintain the integrity of the surrounding bone. By retaining some natural tooth roots, overdentures can enhance proprioception and reduce the risk of bone resorption, which is a common consequence of tooth loss.[3]

Dentures can be made as complete, partial, or overdenture. Sometimes patients may feel less than fully satisfied or comfortable when the denture is inserted because try-in is not possible. However, an immediate denture can provide advantages such as aesthetics, avoidance of edentulous period, chewing ability, social interactions, and psychological well-being following tooth loss.[4]

Endodontic treatment is performed to prevent extractions and preserve the natural teeth, showing consistently high rates of success and long-term preservation. Endodontic treatment is a dental procedure aimed at treating infection or damage within the pulp of a tooth. In the context of immediate overdentures, endodontic treatment becomes particularly relevant when a tooth is retained as an abutment for the overdenture but is compromised. By performing endodontic treatment on a decapitated tooth, dental

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Figure 1. Pre-operative photograph, (A) Frontal view; (B) Left lateral view; (C) Right lateral view.

Figure 2. Panoramic radiograph.

professionals can maintain the integrity of the alveolar bone and prevent further resorption, which is crucial for the stability and longevity of the overdenture.[5]

CASE

A 60-years-old female came into Universitas Airlangga Dental Hospital with the chief complaint of missing multiple teeth with upper front teeth becoming loose and desire to replace them because of difficulty in chewing food. The patient has never used dentures. It is found that the patient has no systemic disease or allergy and no adverse habits.

Extraoral examination and temporomandibular joint movement were normal. Intraoral examination revealed partially edentulous on the upper jaw and fully edentulous on the lower jaw (Figure 1). Grade II mobility on 11 and grade III mobility on 21, 22, 23 were found. Panoramic radiographic assessment (Figure 2) revealed missing teeth on 17, 16, 15, 14, 13, 12, 24, 25, 26, 27, 37, 36, 35, 34, 33, 32, 31, 41, 42, 43, 44, 45, 46, 47. Periapical radiograph showed alveolar bone loss on teeth 11, 21, 22, 23 (Figure 3). The planned treatment was an immediate complete overdenture after endodontic treatment on tooth 11.

CASE MANAGEMENT

The initial phase in fabricating an immediate overdenture involved taking diagnostic impressions of the upper and lower jaw using irreversible hydrocolloid material. The

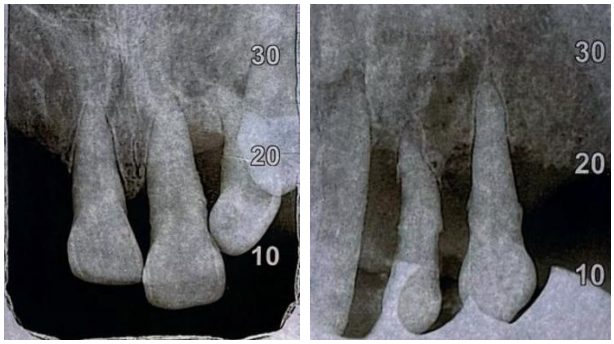

Figure 3. Periapical radiograph.

impressions were poured in dental stone to create diagnostic casts. Tooth 11 was planned for endodontic treatment and then decapitated and restored with glass ionomer cement (GIC). The patient was then referred to periodontics department for scaling and root planning on the remaining tooth. Endodontic treatment was done on tooth 11, irrigation was done with activation, using sodium hypochlorite, sterile saline and EDTA sequence. Calcium hydroxide dressing material was used to eliminate intracanal microorganisms. Obturation was done using gutta percha and bio-ceramic sealer, and then covered with temporary cement.

Fabrication of an individual tray based on a diagnostic cast and taking the final impression (Figure 4). After that, final impressions were taken and poured in dental stone. And then, vertical dimension of occlusion (VDO) was taken using bite rim and mounted on articulator. The next step involves the immediate complete overdenture by placing

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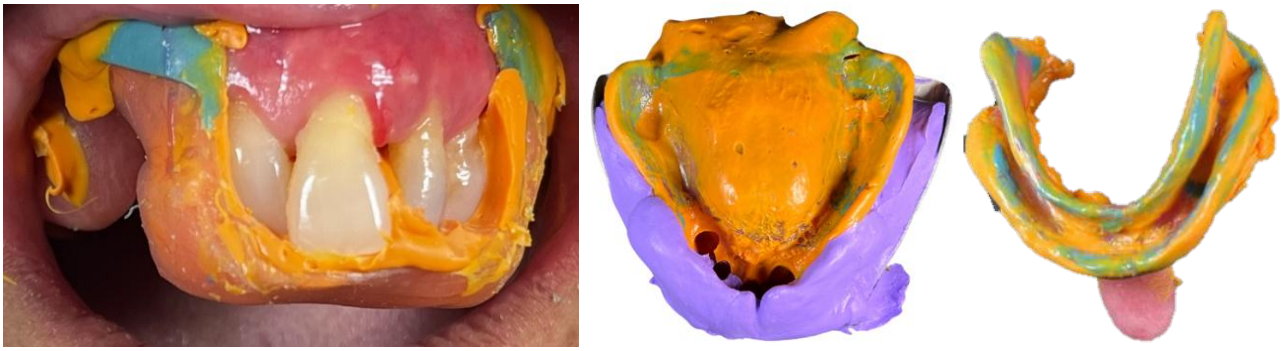

Figure 4. Final impression.

Figure 5. Try-in of non-immediate artificial teeth.

Figure 6. Modification of working cast.

Figure 7. Arrangement of immediate teeth.

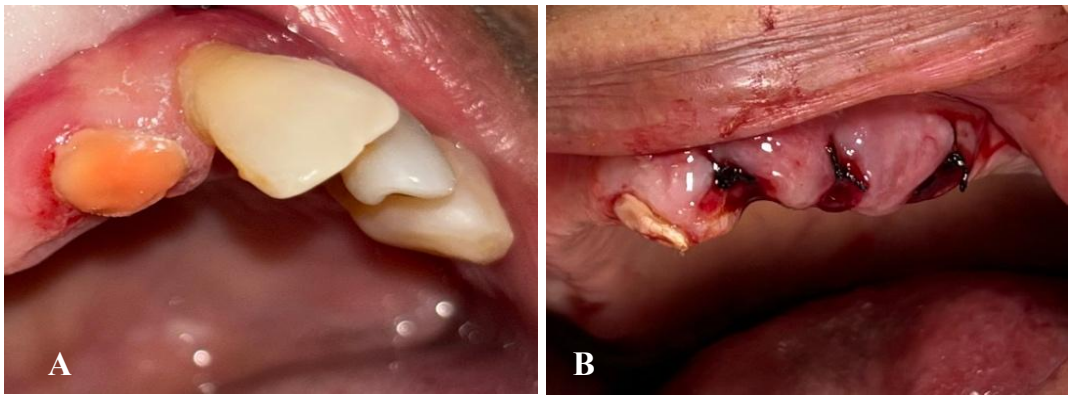

Figure 8. Before extraction (A) After extraction and decapitation (B).

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Figure 9. Immediate overdenture insertion.

the artificial teeth and then try in (Figure 5). the color and size of the teeth were matched according to the skin and facial profile of the patient.

In the working cast, the teeth that were planned to be extracted were grinded under trimmed under gingiva margin by 1-2 mm. The teeth were planned to be decapitated were cut above the gingiva margin (Figure 6). Teeth were arranged to correct the overjet and achieve the optimal tooth alignment (Figure 7). Once the patient agreed, the denture was the processed.

Prior to the insertion of the denture, tooth 11 was cut 1 mm above gingiva and beveled to accommodate the dome shape and then covered with GIC type VII (Figure 8A). Teeth 21, 22, 23 were extracted using a minimally invasive technique under local anesthesia (Figure 8B). After the bleeding was controlled and the patient received the instructions following the tooth extraction, the denture was inserted immediately and the occlusion was assessed using articulating paper (Figure 9).

The patient was instructed to wear the denture for a full 24 hours and then was scheduled for a follow-up appointment the next day. The patient received instructions on how to eat, talk, and properly clean their denture. The patient was also informed about the option of adjusting or replacing the denture in the future. At the recall visit, fluoride application was performed on the abutment teeth to reduce the risk of caries.

DISCUSSION

Losing front teeth has the potential to cause psychological trauma for some patients. Immediate dentures serve as a solution by allowing for the replacement of teeth immediately after extraction and before the natural teeth are reduced, thus maintaining aesthetics and enabling proper chewing, speech, and comfort.[3]

Maintaining the healthy tooth roots under the denture helps preserve proprioception and prevent bone resorption. By keeping the maxillary incisive when using an overdenture, it was demonstrated that the resorption of the alveolar bone around these teeth decreased.[6] Successful immediate complete overdenture is related to the successful endodontic treatment on the remaining teeth. Considerations when performing endodontic treatment include efficient instrumentation, elimination of microorganisms through irrigation and dressing materials and hermetic obturation.[7,8] Effective irrigation and dressing materials is one of important factors which support the success of endodontic treatment. Irrigation material must have potent antibacterial effect on root canal microorganisms.[9-12] Especially microorganisms which are hard to eliminate and bring detrimental effect on treatment such as *Enterococcus faecalis* and *Porphyromonas gingivalis*.[13,14] If root canal microorganisms are not eliminated, they will lead to periapical diseases, such as apical periodontitis.[15,16] Calcium hydroxide is the golden standard for dressing material because of its antibacterial, alkalinity, and other positive properties.[17-19] Hermetic obturation is key to seal the apical portion of tooth.

In this case, after endodontic treatment was performed on tooth 11, then followed by reducing the tooth into a dome shape 2 mm above the gingival margin. Decreasing the height of the crown for an overdenture comes with numerous benefits. For example, it provides adequate space for the artificial tooth and denture base placed over it. Moreover, it reduces the lateral stresses and lever actions of the tooth.[3] The remaining tooth roots, used for overdenture pass on occlusal forces to the alveolar bone through the periodontal ligament and preserving the morphology of the alveolar ridge.

Other advantage of immediate overdenture is that it can enhance the patient's sensory function compared to complete denture in discriminating between occlusal forces. The periodontal receptors play an integral role in guiding the cyclic joint movements of mastication through their interaction with the muscles of mastication by their proprioceptive feedback mechanism.[20]

GIC was used due to its chemical bond that adheres to the dentin surface. Furthermore, it also includes fluoride that helps prevent tooth decay. The immediate overdenture presents itself as one of the best solutions for patients who experience a period of being edentulous.[21] This treatment can be done based on the cooperativeness of the patient on treatment visits, as cooperation is one of the foundations of a successful treatment.

In conclusion, immediate denture can improve the quality of life for patients undergoing tooth extraction or tooth decapitation. By providing a timely solution to replace missing teeth, immediate dentures help maintain facial aesthetics, improve functionality, and psychological trauma associated with tooth loss.

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