

## CASE REPORT

### Management of bare root complete overdenture in patients with a history of methamphetamine abuse: A case report

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#### ABSTRACT

**Keywords:** Bare root overdenture, Methamphetamine abuse, Alveolar bone preservation

Methamphetamine abuse has severe consequences on oral health, commonly leading to rampant caries, advanced periodontal disease, and early tooth loss. These patients frequently become edentulous at a relatively young age. In such cases, a bare root overdenture can be an effective treatment option. This report aims to present the advantages of a bare root complete overdenture for a patient with a history of methamphetamine abuse. A 44-year-old male presented with multiple missing teeth in both arches and a history of non-prescription methamphetamine use for approximately 17 years, with abstinence over the past 7 years. This resulted in dry mouth and extensive tooth decay. Additionally, he had been a heavy smoker for the past 28 years. Clinical examination revealed the absence of teeth 18–16, 14–22, 26–28, 31–38, and 45–48. Radiographic analysis showed that the retained roots of teeth 23–25 and 42–44 were relatively long (9–12 mm) with no mobility. After recording tentative vertical dimension and evaluating the occlusal plane, teeth 15, 23–25, and 41–44 were found to be extruded by 4–6 mm. Tooth 15 and 41 were extracted due to poor prognosis. A bare root complete overdenture supported by abutment teeth 23–25 and 42–44 was selected due to severe tooth extrusion and limited interocclusal space. In this case, the bare root complete overdenture improved the retention, support, and stability of the prosthesis, enhancing the patient's quality of life. Oral hygiene improved after drug cessation, enhancing long-term prosthesis outcome. (IJP 2025;6(2):92–96)

#### Introduction

Chronic methamphetamine use has detrimental effects on oral health, including xerostomia, decreased salivary pH and buffering capacity, widespread brown carious lesions that may extend to the free gingival margin, tooth erosion, dysgeusia, periodontal disease, increased plaque accumulation and calculus deposits, poor oral hygiene, and ultimately tooth loss.<sup>1,2</sup> Tooth loss itself is a major oral health issue in Indonesia. According to the Basic Health Research (RISKESDAS) survey in 2018, 51.4% of individuals experienced loss of fewer than 28 natural teeth (dentulous), while 1.3% had lost more than 28 teeth (edentulous). The proportion of dentulous individuals was 4.1% at age 15 years, 55.6% at 35–44 years, and 78.2% at more than 65 years, whereas the proportion of edentulous cases reached 9.0% (Kementerian Kesehatan RI, 2018). This issue becomes more critical in individuals with a history of methamphetamine use, where destructive oral changes accelerate tooth loss and may cause edentulism at a relatively young age compared to the general population. In such cases, a bare root overdenture can be an effective treatment option.

According to GPT-9, overdenture is any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants. Among the various types of overdentures, the bare root overdenture is one option that utilizes retained natural roots without copings or attachments. Tooth roots play an important

role in preserving the residual ridge volume as well as enhancing the support and stability of overdentures.<sup>3,4</sup> Bare root overdentures can be applied in cases where the crown structure is extensively damaged yet the roots remain sound, free from caries, and stably anchored in the alveolar bone.<sup>4</sup> In situations where the abutment teeth present a questionable prognosis, fabrication of a bare root overdenture is advantageous, as it allows for further evaluation of the abutment condition.<sup>5</sup> If the abutment teeth eventually require extraction, the bare root overdenture can be modified into a conventional complete denture through relining. Nevertheless, bare root overdentures have certain limitations, such as not directly improving retention and the potential risk of caries development on exposed dentin.<sup>3</sup> This report aims to present the advantages of a bare root complete overdenture for a patient with a history of methamphetamine abuse.

#### Case Report

##### Case Presentation

A 44-year-old male patient presented to the Dental Hospital of University of Indonesia, with the chief complaint of difficulty in chewing due to multiple missing teeth in both the maxillary and mandibular arches. The patient had a history of illegal methamphetamine use for approximately 17 years but reported cessation of drug

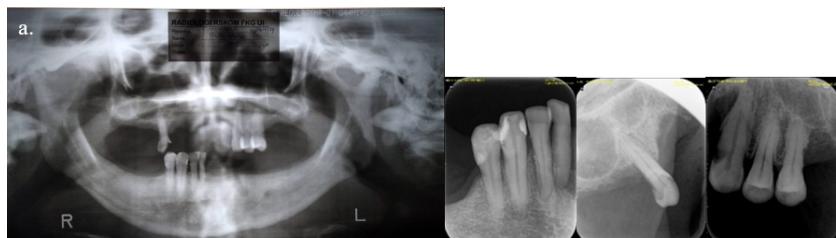
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**Table 1.** Oral manifestations of methamphetamine use

Oral manifestations	Methamphetamine use
Signs	Rampant caries Buccal/interproximal cervical caries Darkly stained, crumbling teeth Missing teeth Decreased salivary pH Erosion Candidiasis infection Cheilitis Glossitis Periodontal disease
Symptoms	Severe xerostomia Bruxism Attrition Temporomandibular joint pain Jaw clenching Myofacial pain

**Figure 1.** Intraoperative condition, A. Upper occlusal view, B. Lower occlusal view, C. Anterior view**Figure 2.** Radiographic examination, A. Panoramic radiograph, B. Periapical radiograph showing teeth 41-44, C. Periapical radiograph showing tooth 23, D. Periapical radiograph showing teeth 23-25**Figure 3.** Study models mounted on articulator at tentative vertical dimension. Teeth 15, 23-25, and 41-44 were extruded by approximately 4-6 mm**Figure 4.** Root canal treatment of teeth 23-25 and 42-44

use during the past seven years. He also had a smoking habit for the last 28 years and currently smoked around 10 cigarettes per day. At the time of presentation, the patient reported no history of systemic disease and was not under any regular medication. The patient reported having a history of bruxism during methamphetamine use, but the habit no longer persists.

Clinical examination revealed the absence of teeth 18-16, 14-22, 26-28, 31-38, and 45-48. Tooth 15 and 41 exhibited grade 2 mobility, while tooth 42 showed grade 1 mobility. Attrition was observed on teeth 23 and 41-44. The patient's oral hygiene was fair, with reduced salivary flow. The residual ridge demonstrated adequate form and height, with normal tissue support. All frenula and vestibules were within normal limits. The retromylohyoid space was deep. The maxillary tuberosities were small, and the palate was oval-shaped and deep, with a small maxillary torus present. No undercuts were detected in either the maxilla or mandible.

At the first visit, a complete examination was performed, including panoramic and periapical radiographs, as well as study model impressions using a stock tray with alginate. Panoramic and periapical radiographic examinations revealed a crown-to-root ratio of teeth 24, 25, and 42-44 were 2:3. Tooth 23 showed a crown-to-root ratio of 1:1, while teeth 15 and 41 had a ratio of 3:2. The roots of teeth 23-25 and 42-44 were embedded in the alveolar bone with a length of approximately 9-12 mm.

To determine the prosthodontic treatment plan, tentative vertical dimension (VD) was recorded. Once the tentative vertical dimension was established, the study models were mounted on a mean value articulator.

Teeth 23, 24, 25, 42, 43, and 44 were preserved because they had a favorable crown-to-root ratio, no mobility, and sufficiently long roots embedded in the alveolar bone. Tooth 15 was extracted due to grade 2 mobility. Bare root preservation was expected to maintain alveolar bone height and volume, thereby providing additional support and stability. A bare root overdenture without copings was selected because of limited interocclusal space. Then, the patient was referred to the Department of Conservative Dentistry for root canal treatment of teeth 23-25 and 42-44.

After confirming satisfactory endodontic outcomes and absence of patient complaints, decoration of teeth 23-25 and 42-44 was performed.

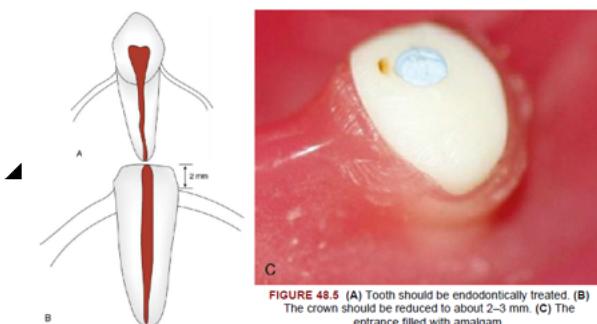
On the same day, border molding and the final impression were performed using a custom tray with polyvinyl siloxane (PVS) light-body material, and the impression was poured with type IV dental stone to obtain the working cast. At the subsequent visit, the definitive vertical dimension was established using the occlusal rims, and the master casts were mounted on a semi-adjustable articulator (Stratos 100) for occlusal refinement. A try-in of the anterior and posterior tooth arrangement was then carried out. The acrylic denture



**Figure 5. Decoration of teeth 23–25 and 42–44**



**Figure 6. A. Insertion of complete dentures (Intraoral), B. Insertion of complete dentures (Extraoral)**



**Figure 7. Bare root overdenture**

was processed and inserted, followed by evaluation of tissue adaptation using pressure-indicating paste and occlusal adjustment. At the 24-hour follow-up, minor phonetic difficulties were identified and corrected. One month later, the patient's phonetics had improved, and the decoronized abutment teeth remained stable. Regular follow-up every six months was advised to maintain optimal prosthesis function and oral health.

## Discussion

Methamphetamine strongly activate the central nervous system, leading to marked euphoria, increased energy, and a sense of self-confidence. Initially, it was used in the treatment of fatigue and depression. However, methamphetamine is classified as an illegal drug due to its high potential for addiction. The association between methamphetamine use and oral health has been widely reported. The characteristic oral manifestations, commonly referred to as "meth mouth," including

xerostomia, gingivitis, periodontitis, extensive caries, and tooth fractures.<sup>6</sup>

Rommel et al. (2016) reported that among one hundred methamphetamine users, 72% experienced dry mouth. Decreased blood perfusion of salivary glands caused by METH results in reduced salivation, which causes xerostomia.<sup>7</sup> In addition to dry mouth, 68% of patients reported clenching habits, and 47% complained of temporomandibular joint pain. A salivary buffering capacity below pH 5.5 was observed in 83% of participants, which was attributed to a reduction in sodium bicarbonate concentration.<sup>7</sup> When the protective function of saliva diminishes, rampant caries can develop progressively. Deep carious lesions are commonly found in the cervical regions and tend to extend apically and occlusally. Patients with a history of drug abuse often present challenges in prosthodontic management, including loss of posterior support, secondary occlusal trauma, erosion or attrition, and reduced vertical occlusal dimension.<sup>6</sup>

Boyer et al. (2015) found a correlation between methamphetamine use and an increased incidence of dental caries, particularly among individuals who brushed their teeth less than once a day. The combination of methamphetamine use and poor oral hygiene was shown to significantly elevate the risk of caries.<sup>8</sup> Consistent with these findings, Skrypnyk et al. (2025) concluded that the deterioration of oral conditions in methamphetamine users is influenced by three main factors: limited access to dental care, negative health behaviors, and the direct pharmacological effects of the drug itself. In the present case, the patient reported using methamphetamine for approximately seventeen years, predominantly through inhalation. The clinical findings were typical, characterized by extensive cervical caries extending proximally.

According to GPT-9, overdenture is any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants. This concept is particularly advantageous in the mandible, where bone resorption occurs up to four times more rapidly than in the maxilla. Overdentures offer several benefits, including the presence of implants or retained natural tooth roots that provide physiological stimulation to the alveolar bone, promoting its maintenance and remodeling. Consequently, the alveolar bone volume can be better preserved. In addition, younger patients are strong candidates for overdenture treatment to prevent future progressive bone loss. The presence of vertical stops also helps minimize the development of hypertrophic soft tissue.<sup>5</sup>

Another advantage of overdenture fabrication is the improvement in denture stability and support, which helps minimize horizontal and torque forces. By retaining natural teeth, proprioceptive feedback can be preserved. Additionally, overdentures offer psychologi-

cal benefits for patients who are highly motivated to retain their natural teeth.<sup>9</sup> Overdenture fabrication can be performed while evaluating the condition of the abutment teeth. If extraction of the abutment teeth becomes necessary in the future, the existing denture can be relined and converted into a conventional complete denture, as overdentures are reversible in nature.<sup>5</sup>

The abutment teeth are more susceptible to caries and periodontal tissue damage if plaque control is inadequate. Overdentures also require greater interocclusal space compared to conventional complete dentures and may appear bulkier. In addition, the presence of bony undercuts on the labial aspect of the abutment teeth can create difficulties due to the limited path of insertion, potentially resulting in an overcontoured or undercontoured denture base.<sup>5</sup> In this case, topical fluoride application, regular follow-up visits, and patient education on proper oral hygiene practices were implemented to prevent caries development on the abutment teeth.

Overdentures are indicated to enhance denture support and stability, particularly in patients with few remaining abutment teeth of unfavorable distribution, maxillofacial defects, severely worn dentition, congenital anomalies such as microdontia, amelogenesis imperfecta, or partial anodontia, and in cases with abnormal jaw relationships where orthognathic surgery is contraindicated.<sup>10</sup> Contraindications for overdenture treatment include poor oral hygiene, the presence of recurrent caries or periodontal disease, absence of attached gingiva around the abutment teeth, excessive tooth mobility, and financial limitations.<sup>9</sup>

Several factors must be considered when selecting abutment teeth for an overdenture. In general, the gingiva surrounding the abutment tooth should be firmly attached to the cervical region and underlying bone, with no angular bone defects. The tooth should be free of caries, have a well-sealed root canal filling, and exhibit minimal mobility after decoronation, leaving approximately 2–3 mm above the gingival margin. From a positional standpoint, abutment teeth should ideally be distributed bilaterally, with at least one tooth on each side. When connected by an imaginary line forming a fulcrum, a line that is perpendicular to the sagittal plane provides better support than a diagonal one. The canine is considered the most favorable abutment tooth, followed by the premolars. Maxillary incisors may also serve as abutments, particularly when the opposing teeth are natural.<sup>5</sup>

Interocclusal space must be carefully considered in overdenture fabrication. The use of attachments and copings requires additional vertical space. The available space between abutment teeth should also be evaluated to ensure adequate clearance for oral hygiene procedures. When multiple adjacent abutment teeth are present, it is preferable to restore them individually rather

than splinting them. From a periodontal standpoint, at least 5 mm of periodontal ligament or one-third of the apical root length should remain, along with a minimum of 3 mm of attached gingiva. The decoronation procedure significantly reduces the potential for leverage or dislodging forces.<sup>5</sup>

In general, overdentures are classified into two main types: tooth-supported overdentures and implant-supported overdentures. Heartwell further categorized tooth-supported overdentures into several types based on the method of abutment tooth preparation and the length of the coping. In addition, various types of attachments can be used in both tooth-supported and implant-supported overdentures. In this case report, the type of overdenture discussed is the bare root or non-coping overdenture. The overdenture is placed directly over teeth that have undergone root canal treatment, either as an interim or definitive prosthesis. Following endodontic treatment and coverage with amalgam, glass ionomer cement (GIC), or composite resin, the clinical crowns are decorated approximately 2 mm above the gingival margin. The occlusal surface of the remaining root is shaped into a dome or convex form and polished smoothly. This design helps minimize lateral forces transmitted to the abutment teeth.<sup>5</sup>

The bare root overdenture is a simple and cost-effective treatment option that requires minimal interocclusal space. However, its main drawback is the risk of caries on the exposed dentin surface.<sup>3,5</sup> The indications for bare root overdenture fabrication include:<sup>3</sup> The tooth roots are preserved primarily for residual ridge conservation and denture support, with retention and stability being secondary considerations. Elderly patients with compromised general health conditions. Cases requiring additional time to evaluate questionable abutment teeth. Patients with a history of poor oral hygiene, resulting in questionable abutment prognosis. Situations where additional time is needed to improve home care and assess progress before undertaking more extensive dental treatment. Financial limitations that significantly influence treatment planning. Tooth roots that are free of caries. Low caries index.

In this case, due to the limited interocclusal space, a non-coping or bare root overdenture was selected. The roots of teeth 23–25 and 42–44 were retained because they exhibited a favorable crown-to-root ratio, were embedded 9–12 mm within the alveolar bone, showed no mobility, and were free of caries. The retained roots served to preserve the residual ridge volume and provide support for the overdenture. Following decoronation, adequate spacing between the abutment roots was achieved, allowing for proper oral hygiene maintenance. To prevent root caries, topical fluoride application and oral hygiene instructions were provided. At the final follow-up, approximately two

months after denture insertion, the bare root abutments remained intact, with no evidence of plaque accumulation or caries formation.

## Conclusion

Overdentures offer several advantages, including the preservation of alveolar bone volume through physiological stimulation, improved denture stability and support, maintenance of proprioceptive sensation, and psychological benefits for patients who wish to retain their natural teeth. Moreover, overdentures allow continuous evaluation of the condition of the preserved abutment teeth. One of the simplest and most cost-effective types of overdenture is the bare root overdenture, which requires minimal interocclusal space. In this case, with proper indication and maintenance, a functional and esthetic prosthetic outcome was achieved.

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