



CASE REPORT

ORAL CANDIDIASIS ASSOCIATED WITH TRAUMATIC BRAIN INJURY: A CASE REPORT

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Abstract

Background: Oral candidiasis is a common opportunistic fungal infection that can develop when local or systemic factors disturb the normal balance of the oral microbiota. Patients with traumatic brain injury (TBI) may experience difficulties with oral hygiene because of impaired motor function, cognitive limitations, dysphagia, behavioral changes, or reduced ability to perform daily self-care. These problems may be accompanied by plaque accumulation and inadequate denture hygiene, creating conditions that favor Candida colonization and denture-associated oral disease. Oral health problems in patients with acquired brain injury have received considerably less attention than other consequences of neurological injury.¹⁻³

Case Presentation; A 43-year-old man with a history of severe traumatic brain injury presented for comprehensive dental rehabilitation. Clinical examination revealed poor oral hygiene, substantial plaque accumulation, continuous denture wearing, and traumatic lesions of the edentulous ridges. A tongue ring with visible plaque accumulation was also present. The oral mucosal findings were clinically compatible with oral candidiasis in the setting of several interacting local risk factors, including inadequate denture hygiene, continuous denture use, plaque accumulation, and limited capacity for independent oral care. Microbiological confirmation of Candida infection was not obtained.

Management consisted of antifungal therapy, improvement of oral and denture hygiene, removal of dentures during sleep, removal of the plaque-retentive tongue ring, and adjustment and smoothing of the denture surfaces. Follow-up demonstrated clinical resolution of the lesions consistent with candidiasis and improvement of the traumatic mucosal lesions.

Conclusion: This case illustrates that oral candidiasis in patients with traumatic brain injury should be considered within a multifactorial clinical context rather than attributed directly to the neurological injury itself. Functional limitations, inadequate oral hygiene, persistent denture use, plaque accumulation, and prosthesis-related factors may interact to create conditions favorable for Candida-associated disease. Comprehensive oral assessment, appropriate denture hygiene, individualized oral-care support, and correction of local traumatic factors are important components of management, particularly in patients who have limited capacity for independent oral self-care.

Keywords: traumatic brain injury; oral candidiasis; Candida; denture stomatitis; oral hygiene; dental plaque; denture hygiene; case report

Traumatic brain injury is a major neurological condition that can result in persistent motor, sensory, cognitive, behavioral, and functional impairments. Although these neurological consequences are well recognized, their effect on oral health is less frequently considered in routine clinical care. Patients with acquired brain injury may experience difficulties with oral hygiene, eating, swallowing, communication, and other activities required for maintaining oral health. A systematic review of oral health in patients with acquired brain injury found evidence of poorer oral health, increased tooth loss, greater plaque accumulation, and other oral-health problems in this population.¹

The relationship between brain injury and oral disease is likely to be indirect and multifactorial. Effective oral hygiene requires regular and coordinated toothbrushing, interdental cleaning, rinsing, and, in patients wearing removable prostheses, appropriate denture cleaning and handling. When motor, cognitive, or behavioral function is compromised, these activities may become difficult or may require assistance. In patients with traumatic brain injury, structured oral-hygiene interventions have been shown to reduce plaque accumulation, supporting the importance of individualized oral-care programs during rehabilitation.²

Dysphagia may represent an additional concern in patients with acquired brain injury. Difficulty swallowing can complicate routine oral care and may coexist with poor oral hygiene and oral microbial imbalance. Odgaard and Kothari reported an association between oral candidiasis and dysphagia in individuals with acquired brain injury, suggesting that oral fungal disease may be clinically relevant in this population.³

Plaque accumulation is important because dental and denture plaque provide a favorable environment for microbial adhesion and biofilm development. *Candida* species, particularly *Candida albicans*, are common members of the oral microbiota and may be present without producing clinical disease. Under favorable local conditions, however, *Candida* may increase in number, adhere to oral surfaces, and develop structured biofilms that contribute to clinical infection.⁴⁻⁶

Removable dentures are particularly relevant because their acrylic surfaces can support microbial adhesion and biofilm formation. *Candida* biofilms have been demonstrated directly on denture acrylic obtained from patients with denture stomatitis, supporting the concept that the prosthesis may function as a persistent microbial reservoir.⁷ Clinical studies have also demonstrated an association between denture hygiene, *Candida* colonization, and denture-related stomatitis.^{5,6}

Denture stomatitis is a common multifactorial condition among removable denture wearers. Poor oral hygiene, inadequate denture hygiene, continuous denture wearing, particularly overnight use, and *Candida*-containing biofilms have all been identified as important factors.^{8,9} Continuous denture use is clinically relevant because it prolongs contact between the prosthesis and the underlying mucosa and limits the opportunity for both prosthesis cleaning and mucosal recovery. Compagnoni et al. demonstrated a significant relationship between continuous denture wearing and *Candida* counts, supporting the importance of avoiding prolonged or nocturnal denture use when clinically appropriate.¹⁰

The presence of *Candida*, however, should not automatically be interpreted as evidence of active infection. *Candida* may colonize the oral cavity without causing clinical disease. Therefore, diagnosis should take into account the clinical appearance of the mucosa and the presence of relevant local and systemic predisposing factors.⁴⁻⁶ In cases in which microbiological testing has not been performed, the diagnosis should be described cautiously as clinically consistent with oral candidiasis rather than as a microbiologically confirmed infection.

Several local factors may contribute to *Candida* colonization and persistence, including poor oral hygiene, denture plaque, inadequate denture cleaning, prolonged denture wearing, mucosal irritation, and other plaque-retentive surfaces.^{5,6,8,9} In a patient with impaired ability to perform independent oral care, these factors may occur simultaneously and reinforce one another.

The clinical management of denture-associated candidiasis should therefore address both the oral mucosal disease and the prosthesis that may harbor *Candida*-containing biofilm. Antifungal treatment may be indicated according to the clinical presentation, but denture hygiene and prosthesis disinfection are also important. Current clinical guidance recommends denture disinfection together with appropriate antifungal therapy in patients with denture-related candidiasis.¹² Reviews of denture stomatitis similarly emphasize that treatment should address the denture biofilm and modifiable behavioral and prosthetic factors rather than relying exclusively on antifungal medication.^{8,9}

These considerations are particularly important in patients with neurological impairment. Individuals with traumatic brain injury may require individualized oral-care instructions, assistance from caregivers, and regular professional follow-up.² In this setting, the combination of impaired oral self-care, extensive plaque accumulation, removable denture use, and prolonged denture contact with the mucosa may create an environment favorable for *Candida*-associated disease. We present the case of a 43-year-old man with a history of severe traumatic brain injury who developed oral mucosal findings clinically consistent with oral candidiasis in the setting of

markedly compromised oral hygiene, continuous denture wearing, substantial plaque accumulation, and a plaque-retentive tongue ring. The case emphasizes the importance of recognizing and addressing modifiable local factors in patients with neurological impairment rather than attributing oral candidiasis directly to TBI.

2. CASE REPORT

A 43-year-old man presented to the dental clinic in 2025 for comprehensive oral rehabilitation. His medical history was significant for a motorcycle accident in 2019 that resulted in a left complex depressed comminuted skull fracture with an associated parietal epidural hematoma. The patient underwent craniotomy for evacuation of the intracranial hematoma and surgical elevation of the depressed skull fracture (Figure 1). His acute injuries were further complicated by traumatic subarachnoid hemorrhage, oropharyngeal dysphagia, acute blood loss anemia, multiple rib fractures, and pulmonary contusion.

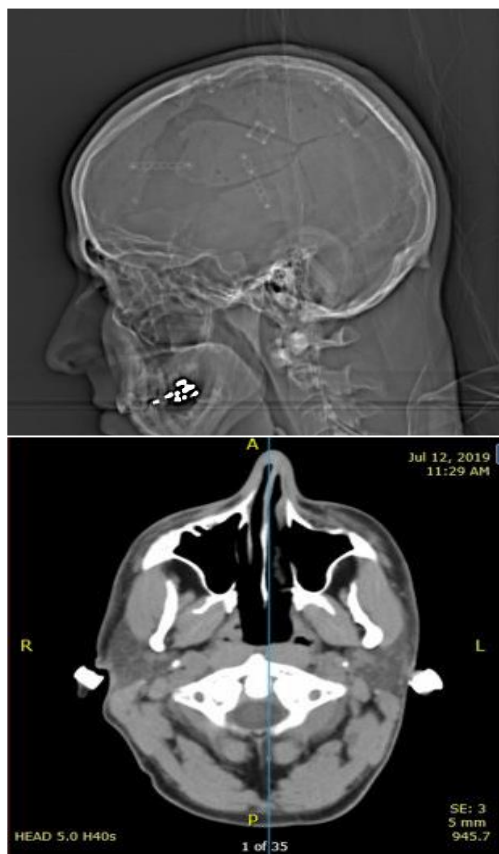


Figure 1. CT of head without contrast post-surgery showing multifocal comminuted left-sided calvarial fractures and postsurgical changes from left partial craniotomy with minimal residual subdural hematoma.

Several months after the traumatic event, the patient was diagnosed with a mood disorder secondary to

traumatic brain injury with loss of consciousness. Between 2020 and 2022, he required four psychiatric hospitalizations because of episodes of violent behavior and suicidal statements. Following the most recent hospitalization, his psychiatric condition remained clinically stable under prescribed psychotropic medication. At the time of dental presentation, no acute medical complications related to the previous traumatic brain injury were reported.

Upon comprehensive dental examination in 2025, all remaining teeth were considered to have a poor prognosis and were deemed non-restorable because of extensive carious destruction and/or advanced mobility (Figure 2). Because preservation of the remaining dentition was not considered feasible, full-mouth extraction was performed under sedation. Immediate maxillary and mandibular complete dentures were subsequently delivered. The immediate postoperative course was uneventful, and no surgical complications were documented.



Figure 2. Panoramic radiograph showing non-restorable teeth. The patient also has a tongue ring.

At a subsequent follow-up visit, clinical examination revealed yellowish crusting involving the lower lip and multiple small ulcerative lesions affecting the maxillary and mandibular edentulous ridges (Figure 3). The patient reported routinely wearing the dentures while sleeping. Clinical examination also identified a tongue ring with visible plaque accumulation.

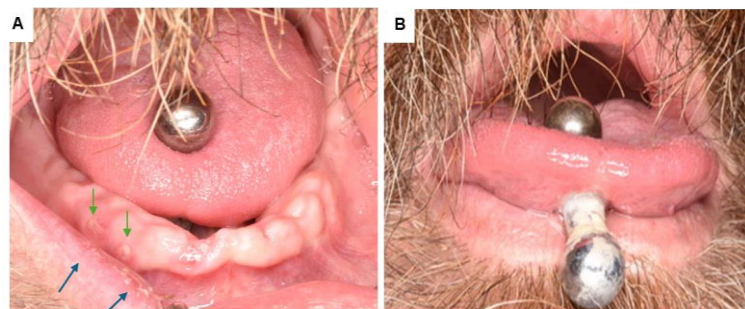


Figure 3. A. Intraoral examination reveals signs of oral candidiasis with yellowish crusting of the lower lip (blue arrows) and traumatic ulcers of the edentulous ridge (green arrows), and B. Tongue ring with plaque accumulation.

Given the appearance of the oral mucosal lesions and the presence of several local predisposing factors, including continuous denture wearing and inadequate denture hygiene,

the clinical working diagnosis was oral candidiasis associated with denture use, accompanied by traumatic ulceration of the edentulous ridges. Because no microbiological confirmation of *Candida* infection was obtained, the diagnosis was based on the clinical presentation and was not considered microbiologically confirmed.

Fluconazole 100 mg was prescribed for treatment of the clinically suspected oral candidiasis. The patient was instructed to remove both dentures during sleep and to improve daily denture hygiene. As an adjunctive measure, the dentures were immersed in a nystatin solution overnight for the first two nights. This intervention was used as part of the denture-hygiene management strategy in this individual case rather than as a universal treatment protocol.

The tongue ring was removed at the patient's request because of the substantial plaque accumulation observed around the appliance. In addition, the intaglio surfaces of both dentures were adjusted and smoothed to reduce local mechanical irritation and minimize further trauma to the edentulous ridges.

At follow-up after completion of antifungal treatment, the previously observed clinical findings consistent with oral candidiasis had resolved, and no persistent candidal lesions were evident on clinical examination. The traumatic ulcerations of the edentulous ridges also improved following adjustment of the denture surfaces and discontinuation of overnight denture wearing.

The clinical course supported the importance of addressing both the suspected fungal component and the local factors that may have contributed to the persistence of the lesions, particularly denture hygiene, continuous denture use, plaque accumulation, and mechanical irritation.

3. DISCUSSION

Oral candidiasis is a common fungal infection of the oral cavity, most often associated with *Candida albicans*.^{4,5} *Candida* species may also exist as part of the normal oral microbiota without producing clinical disease. Therefore, the presence of *Candida* does not by itself establish active infection. Clinical disease generally develops when local or systemic conditions disturb the balance between the microorganism and the host, promoting increased colonization, adhesion, and biofilm formation.⁴⁻⁶

The present case is clinically relevant because several predisposing factors were present simultaneously. The patient had a history of severe traumatic brain injury, impaired oral self-care, extensive plaque accumulation, continuous denture use, inadequate denture hygiene, and

a plaque-retentive tongue ring. These factors should not be considered independently. Rather, they formed a clinical environment in which oral hygiene was difficult to maintain and *Candida*-associated disease could develop.

The association between brain injury and oral-health problems has been described previously. Kothari et al., in a systematic review of oral health in patients with acquired brain injury, identified substantial oral-health problems in this population and emphasized the need for greater attention to oral hygiene and dental care.¹ Similarly, Zasler et al. demonstrated that an individualized oral-hygiene program could improve plaque control in patients following traumatic brain injury.² These findings support the importance of considering oral care as part of long-term rehabilitation rather than as a separate issue addressed only when dental disease becomes severe.

Dysphagia may further complicate oral health in patients with acquired brain injury. Odgaard and Kothari reported an association between oral candidiasis and dysphagia in this population.³ Although dysphagia alone cannot be considered a direct cause of candidiasis, it may occur together with other functional limitations that make oral hygiene more difficult. In the present patient, a history of oropharyngeal dysphagia was one component of a broader pattern of functional impairment.

The patient's extensive plaque accumulation is also important. Dental plaque and denture plaque can provide a suitable environment for *Candida* colonization and biofilm formation. Studies in denture wearers have demonstrated relationships between prosthetic hygiene, *Candida* carriage, and denture stomatitis.^{5,6} *Candida* biofilms have also been directly demonstrated on denture acrylic obtained from patients with denture stomatitis, indicating that the prosthesis can serve as a persistent reservoir for fungal biofilm.⁷

Denture use was another major factor in the present case. The patient reported wearing his dentures while sleeping. Continuous denture wearing has been associated with increased *Candida* counts, and Compagnoni et al. demonstrated a significant relationship between continuous denture use and *Candida*.¹⁰ The importance of nocturnal denture removal is also emphasized in contemporary reviews of denture stomatitis, which identify full-time denture wearing and inadequate prosthesis hygiene among the important modifiable factors associated with disease.^{8,9}

The clinical significance of the dentures in this patient was therefore not limited to their role as prosthetic replacements. The dentures also represented surfaces capable of accumulating plaque and supporting microbial biofilm. In a patient with limited capacity for independent oral hygiene, failure to remove and clean the prostheses regularly may allow this biofilm to persist for prolonged periods. The tongue ring was another notable finding. The appliance

had visible plaque accumulation and therefore represented an additional surface that could retain microorganisms. However, the present case does not provide microbiological evidence demonstrating *Candida* colonization of the tongue ring. It would therefore be inappropriate to describe the tongue ring as the cause of the candidiasis. Its role is better understood as a potential local, plaque-retentive factor within a much broader clinical context.

The distinction between colonization and infection is particularly important in this case. *Candida* may be present in the oral cavity without causing disease, and microbiological detection alone does not necessarily indicate clinically significant candidiasis.⁴⁻⁶ In the present patient, no culture or other microbiological testing was performed. Accordingly, the diagnosis was based on the clinical findings and their subsequent response to treatment and modification of local risk factors. The outcome should therefore be described as clinical resolution rather than microbiologically confirmed eradication of *Candida*. Management addressed both the suspected fungal disease and the local factors that could maintain the condition. Fluconazole was prescribed as antifungal therapy, while the patient was instructed to remove the dentures during sleep and improve denture hygiene. The dentures were also immersed in nystatin solution during the first two nights as an adjunctive denture-hygiene measure. Current Infectious Diseases Society of America guidance supports attention to denture disinfection in patients with denture-associated candidiasis in addition to appropriate antifungal treatment.¹²

The denture adjustment was also important because not all of the observed mucosal lesions were necessarily caused by candidiasis. The multiple ulcerative lesions along the edentulous ridges suggested a traumatic component related to mechanical irritation from the immediate dentures. The intaglio surfaces were therefore adjusted and smoothed to reduce local trauma. This distinction is clinically important because antifungal therapy alone would not correct a traumatic prosthetic lesion. The improvement of the mucosal lesions after treatment and modification of the local factors supports the clinical management approach used in this individual case. Nevertheless, the absence of microbiological testing means that the specific *Candida* species cannot be identified and microbiological clearance cannot be demonstrated. The favorable response should therefore be interpreted cautiously.

This case also demonstrates that oral candidiasis in patients with TBI should not be viewed simply as a consequence of the neurological injury. Rather, the neurological injury may create functional and behavioral limitations that indirectly increase the risk of oral disease. In this patient, impaired oral self-care, plaque

accumulation, continuous denture use, inadequate denture hygiene, and mechanical irritation occurred together.

For patients with neurological impairment, preventive dental care should therefore include assessment of the individual's ability to perform oral hygiene independently, evaluation of denture hygiene practices, monitoring of mucosal health, and consideration of caregiver assistance when necessary. Individualized oral-hygiene programs have demonstrated benefit in patients following TBI, supporting their incorporation into long-term rehabilitation.²

The present case further emphasizes that treatment of denture-associated candidiasis should not rely exclusively on antifungal medication. Cleaning and disinfection of the prosthesis, removal of dentures during sleep when appropriate, correction of traumatic denture surfaces, and regular professional follow-up are important parts of long-term management.^{8, 9, 12}

Finally, this case highlights the need for careful clinical interpretation when several oral lesions occur simultaneously. The patient had findings compatible with oral candidiasis as well as traumatic ulcerations. Recognizing the possibility of more than one process is important because treatment must address each contributing factor. In this patient, improvement occurred after both antifungal therapy and correction of the local prosthetic and hygiene-related factors.

4. CONCLUSION

This case illustrates the multifactorial nature of oral candidiasis in a patient with a history of traumatic brain injury. The patient developed oral mucosal findings clinically consistent with candidiasis in the presence of impaired oral self-care, extensive plaque accumulation, inadequate denture hygiene, continuous denture wearing, and a plaque-retentive tongue ring. Traumatic brain injury should not be considered a direct cause of oral candidiasis. Instead, its functional consequences may indirectly increase susceptibility to oral disease by making effective oral and prosthetic hygiene more difficult. In patients with neurological impairment, these limitations may interact with denture use and other local factors to create conditions favorable for *Candida*-associated disease. Successful management requires attention to both the suspected fungal infection and the local factors that may promote persistence or recurrence. Antifungal therapy, regular denture cleaning, avoidance of overnight denture wearing when appropriate, correction of traumatic prosthetic surfaces, and individualized oral-hygiene support should be considered complementary components of care. For patients with TBI who have limited capacity for independent oral self-care, regular dental assessment and individualized preventive strategies may be particularly important. Early recognition of plaque accumulation, denture-related mucosal changes, and other local risk factors may help prevent progression to more extensive oral disease.

Ethical Approval

The study was conducted in accordance with the principles of the Declaration of Helsinki for research involving human subjects.

Consent

Written informed consent was obtained from the patient for publication of the case report and accompanying clinical images. All identifying information was removed or de-identified to protect patient confidentiality.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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