Case Report

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Complete Embedment of a Stainless-Steel Crown in the Alveolar Soft Tissue: The First Case Report

Hamed Mortazavi[1], Parham Hazrati[2]* and Shahrzad Askari[3]

1. Department of Oral Medicine, School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Department of Periodontics and Oral Medicine, University of Michigan School of Dentistry, Ann Arbor, MI, USA
3. School of Medicine and Dentistry, Sapienza Università di Roma, Rome, Italy

*** Corresponding author**
Parham Hazrati, DDS
Department of Periodontics and Oral Medicine, School of Dentistry, University of Michigan, Ann Arbor, MI, USA
Tel: +1 73 4763 6933
Email: hazrati@umich.edu

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Abstract

Background: Reports of foreign bodies in oral tissues are available in the literature; however, this is the first report of complete embedment of a Stainless-Steel Crown (SSC) in the alveolar soft tissue.

Case Report: Upon radiographic evaluation of a 19-year-old male patient seeking orthodontic treatment with several missing teeth, an SSC of the primary right mandibular second molar entirely encompassed by soft tissue was observed. The patient had no pain or discomfort in the region. The overlying mucosa had no sign of inflammation except for a slight pallor, and adjacent teeth had tilted into the space of the corresponding absent tooth. The crown was removed with a crestal incision under the local anesthesia.

Conclusion: Infraocclusion of deciduous teeth, especially those covered with SSCs, should be strictly monitored clinically and radiographically as they can embed in soft tissue, cause severe bone defects, and complicate future treatments.

Keywords: Foreign bodies, Inflammation, Pallor, Stainless steel, Tooth deciduous, Tooth loss

Introduction

A foreign body is a subject not native to the human body (1). It may be inserted, ingested, aspirated, or deposited into the body traumatically, iatrogenically, inadvertently, or self-inflicted (2). This phenomenon is relatively infrequently documented in the oral cavity, since it is usually asymptomatic, and the patients themselves, particularly adults, easily remove the foreign body (3). Impaction of a foreign body is more common in children due to their habits of placing foreign body subjects in the oral cavity (3). In addition, children often do not report this injury to their parents due to the fear of punishment (3,4). Various types of foreign bodies, including bullet fragments, fish bones, needles, wooden objects, plastic objects, toothbrush bristles, pencil tips, crayons, stapler pins, metal screws, beads, brads, tomato seeds, glass pieces, coins, small toys, straws, bamboo splinters, fragments of smoking pipe, marble, pieces of impression materials, amalgam pieces, and fractured teeth, have been reported to impact in the oral and maxillofacial tissues in the literature (1-8). The most frequently affected site by the foreign bodies in the oral cavity is the buccal mucosa, followed by the floor of the mouth and periodontium, especially the gingiva (4). Ankylosis may cause infraocclusion of deciduous teeth, especially second molars (9). Infraocclusion could be as slight as a vertical discrepancy between marginal ridges of a deciduous tooth and its adjacent teeth or as severe as complete embedment in soft tissue (10). Although Stainless Steel Crown (SSC) restorations are frequently employed in pediatric dentistry, as far as we know, there is no report of a complete embedment of a tooth covered by SSC in oral soft tissues.

Impaction of foreign bodies in the oral cavity can be asymptomatic or symptomatic. It is demonstrated that about one-third of foreign bodies are missed during the initial examination. In some cases, the foreign bodies may remain dormant in the soft tissues for several years without any significant complication (5). On the other hand, they could provoke inflammation, abscess formation, septicemia, severe hemorrhage, peripheral nerve damage, pseudoaneurysms, synovitis, and in a prolonged course of time, granuloma and fistula formation. They can also undergo distant embolization (1,5,7). A radiographic evaluation can be of diagnostic significance, especially for radiopaque foreign bodies. In this regard, the suggested radiographic methods include parallax view, vertex occlusal view, triangulation technique, stereo radiography, and tomography (11). Timely removal of impacted foreign bodies should be considered to prevent ensuing acute and chronic complications. The aim of this paper was to introduce the first case of an SSC being embedded in the soft tissue covering the mandibular alveolar ridge in a 19-year-old male patient. This case report was prepared following the CARE guidelines, and the complete CARE guideline checklist is presented in supplementary material (12).

Case Presentation

A 19-year-old, non-smoker, Persian male patient with no systematic disease was referred for orthodontic treatment. The patient's chief complaint was misalignment and absence of his teeth. Concerning the patient's chronological age, several permanent teeth were absent, including teeth 1, 4, 7, 10, 12, 13, and 16 in the maxillary arch and teeth 20 and 29 in the mandibular arch. Anterior crossbite and Angle's class III molar relationship classification were observed. The patient's oral health was unfavorable, resulting in multiple incipient and cavitated carious lesions. The left primary second molars were infraoccluded and retained in both the maxilla and mandible; additionally, spacing between maxillary incisors and tilting of teeth 28 and 30 into the space of the absent right mandibular second premolar were observed (Figure 1). After initial clinical examinations, the patient was prescribed routine photographic and radiographic evaluations. In the panoramic (Figure 2), lateral cephalometric (Figure 3), and periapical radiographic cliches (Figure 4), missing of all the absent teeth was confirmed; also, impaction of an SSC was detected at the site of the right mandibular second premolar, though no sign of an embedded object was evident in the clinical evaluation. The patient reported no pain or discomfort in the region. The embedment of the SSC had caused severe bone loss in the area. Even though the left infraoccluded primary molars were not entirely encompassed by soft tissue, they have also caused a great deal of bone loss (Figure 2).

The patient was referred to an oral and maxillofacial

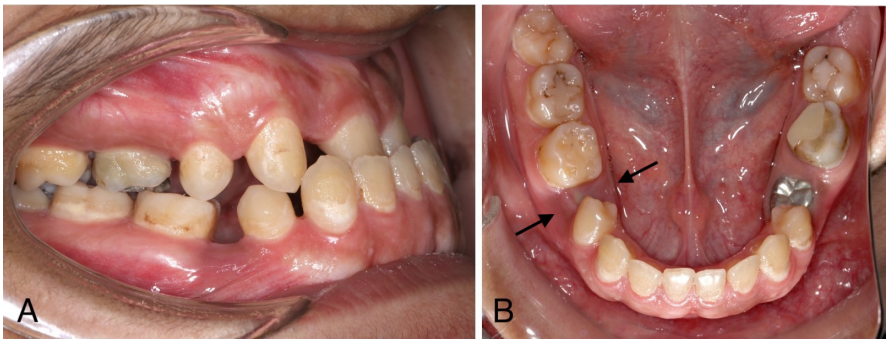

Figure 1. The width and height ratio of this picture is manipulated in a way that resulted in unappealing and distorted appearance. We kindly request to replace this picture with the original one that will be attached to the proof-reading approval email.

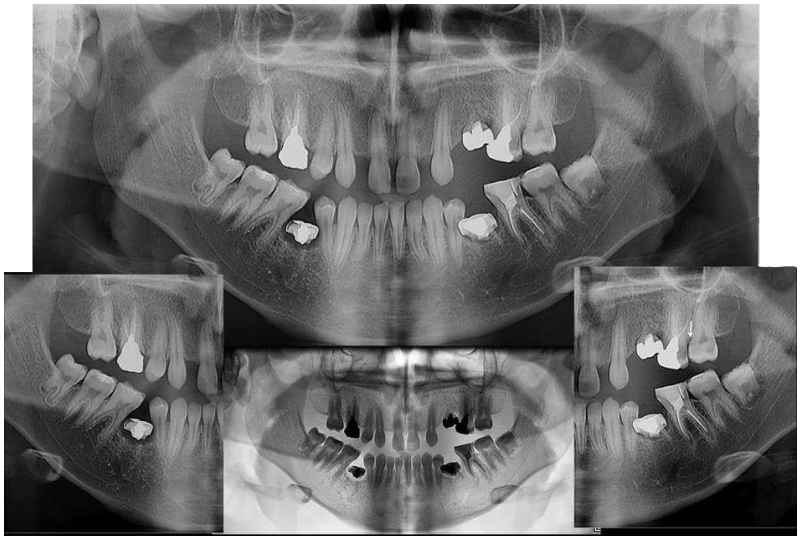

Figure 2. The panoramic radiograph depicts the submerged right primary second mandibular molar. Also, infraoccluded left primary molars and missing teeth are shown.

Figure 3. The submerged stainless-steel crown is evident in the lateral cephalometric radiograph.

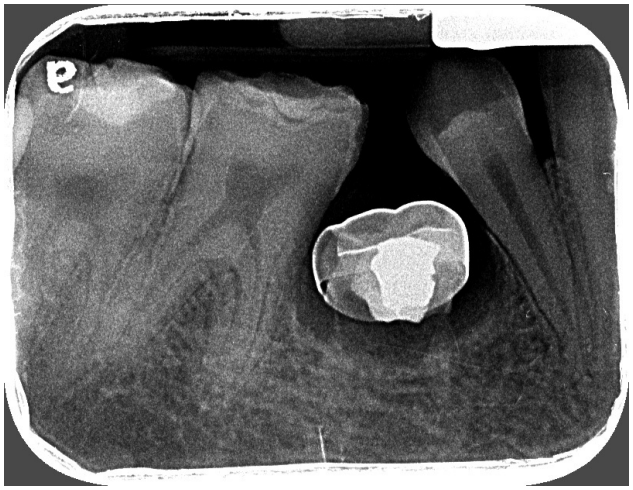

Figure 4. The periapical radiograph demonstrates the submerged stainless-steel crown.

surgeon to remove the retained and embedded SSC from the alveolar ridge. The crown was extracted under local anesthesia with 2% lidocaine with an epinephrine concentration of 1:80,000 (Persocaine-E; Darou Pakhsh Pharmaceutical Manufacturing Co., Tehran, Iran). A crestal incision was utilized to achieve access, and the releasing incisions were avoided due to the proximity of the neurovascular bundle exiting the mental foramen. After removal of the foreign body, the wound was primarily closed with a 4.0 polyglycolic acid suture (SUPABON; SUPA Medical Devices, Tehran, Iran). The other two submerged primary molars that were clinically visible were non-surgically extracted in order to prevent further bone loss and future complications. According to the oral and maxillofacial surgeon's idea, the defect caused by the retained and embedded crown might complicate future implant rehabilitation, necessitating bone graft and reconstruction. After uneventful healing of the surgical sites, the patient returned to the orthodontist to initiate orthodontic treatment.

Discussion

In most cases, it is challenging to detect impacted foreign bodies clinically; therefore, radiographs have been reported to be efficient methods in this regard (4,8). The success rate of plain radiographs in detecting metallic foreign bodies, glass pieces, and organic material such as wood is 69-90%, 71-77%, and 0-15%, respectively (5). In this case report, the SSC was diagnosed via plain radiographs due to its relatively large size and high radiodensity; however, radiodensity of the foreign object and surrounding tissue and radiographical superimpositions may dictate the use of more advanced imaging techniques (1). For instance, ultrasonography is an acceptable diagnostic modality in the detection of wooden foreign bodies in the maxillofacial regions with a sensitivity of 87% and a specificity of 97% (5,13). Computed Tomography (CT) scan is also recommended to detect the location, anatomic proximation, and accurate diagnosis of smaller metallic objects; furthermore, CT scan has a sensitivity of 68% and a specificity of 98% for detecting all types of foreign bodies (13). Magnetic Resonance Imaging (MRI) is the most appropriate modality for impacted organic materials, but it should be avoided in patients with metallic foreign bodies because of its ability to move metallic structures due to the magnetic field (5,13). In this case report, diagnosing the impacted foreign body was straightforward due to its distinct radiopacity, shape, location, and the patient's history. However, in some instances, foreign bodies can mimic anatomical or pathological structures, making diagnosis more challenging (1).

Infraocclusion, also known as a submerged or ankylosed tooth, refers to the condition where the occlusal surface of a tooth is below its adjacent teeth (14). This condition is more common in boys and deciduous mandibular second molars (9). Genetics, trauma, and missing succedent permanent tooth are possible etiologies of ankylosis, the fusion of cementum to alveolar bone, which hinders adaptive vertical growth of the tooth (10,15). Even in case of missing permanent succedent and not worrying about impaction or damage to them, infraoccluded primary teeth can lead to serious occlusal disturbances such as supra-eruption of antagonists, reducing interocclusal space, and tilting of adjacent teeth, which reduces the arch space (10,16). SSCs are routinely employed to restore severely destructed or endodontically-treated deciduous posterior teeth. Although there are some reports of primary molars totally embedded in soft tissue (17,18), as far as we know, there is no report of complete submersion and embedment of an SSC in the soft tissue. Any discrepancy between the occlusal surface of primary teeth and their adjacent teeth should be closely monitored. Early diagnosis and

treatment are cornerstones of managing this condition (19).

Foreign bodies can cause acute or chronic complications (1,4). Timely treatment should be considered in these cases. Removing foreign bodies is usually challenging, and retrieving the impacted materials depends on their size and site. Foreign body removal may be achieved by simply picking, endoscopy, and open surgical procedures (3). When foreign bodies cause abscess formation, it is common for no foreign body to be found during drainage and debridement. However, it is crucial to closely monitor the surrounding area, as failing to remove the foreign body can lead to recurrent symptoms (1,13). Surgery can be done under local or general anesthesia, and it is suggested to prescribe antibiotic coverage as well as tetanus prophylaxis (5). In conclusion, diagnosis of this entity should be based on history taking and good clinical examination with imaging of the suspected area and, finally, timely treatment.

Conclusion

Stainless steel crowns covering submerged deciduous teeth might become fully embedded as a foreign body in soft tissue. Any sign of infraocclusion should be monitored. Radiographic evaluation and surgical removal of embedded objects should be performed as soon as possible to minimize short-term, such as infection and inflammation, and long-term complications in the area.

Availability of the data and materials

The data used and presented in this report are available upon request from the corresponding author.

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None.

Ethical approval

Ethical approval was not required.

Informed consent

Written informed consent was obtained from the patient to publish this case report anonymously, including their data, photographs, and radiographs.

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Conflict of Interest

The authors have no conflicts of interest to declare.

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