

Multidisciplinary treatment of an impacted tooth in the chin: case report

Higor Venâncio de MELO¹; Anna Júlia Caetano de CARVALHO²; Danielly Ribeiro SANTOS³; Jullyene Kamilla Rodrigues da SILVA⁴; Gileade Pereira FREITAS⁵ 

1 - MSc student, Postgraduate Program in Dentistry, School of Dentistry, Federal University of Goiás, Goiania, Brazil; **2** - Undergraduate student, School of Dentistry, Federal University of Goiás, Goiania, Brazil; **3** - Undergraduate student, School of Dentistry, Federal University of Goiás, Goiania, Brazil; **4** - Undergraduate student, School of Dentistry, Federal University of Goiás, Goiania, Brazil; **5** - Assistant professor, Postgraduate Program in Dentistry, School of Dentistry, Federal University of Goiás, Goiania, Brazil.

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Abstract

Dental inclusion of the mandibular canine element is uncommon, and treatment of these cases may include preservation, extraction, removal of impaction, or use of orthodontic appliances. In this context, this study aims to report the treatment of a dental element included in the chin region present in a 14-year-old patient. During a consultation for orthodontic purposes, the presence of an impacted tooth in the mental region was diagnosed through a panoramic x-ray. The patient was then referred for treatment with the Oral and Maxillofacial Surgery team at the School of Dentistry of the Federal University of Goiás. A cone beam computed tomography was performed, and a dental element (tooth 33) included in the mental region was identified. Due to the patient presenting a high degree of fear and anxiety and being under medical monitoring for cardiac arrhythmia, the treatment chosen was tooth extraction performed under sedation with nitrous oxide, followed by postoperative photobiomodulation therapy to reduce edema and discomfort. During postoperative follow-up, the patient reported positive points regarding conscious sedation and did not report pain or discomfort, in addition to not presenting paresthesia or exacerbated edema in the region. Therefore, multidisciplinary planning and treatment for complex surgical cases benefited the patient.

KEYWORDS: Dental inclusion; Impacted canine; Surgical treatment; Nitrous oxide; Photobiomodulation.



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CORRESPONDING AUTHOR

Gileade Pereira Freitas (ORCID: 0000-0002-1674-4667)

Oral and Maxillofacial Surgery Department
School of Dentistry, Federal University of Goiás
Address: Av. Universitaria, s/n - Setor Leste Universitario, Goiania - GO, 74605-020, Brazil.
E-mail: gileade@ufg.br

Introduction

An impacted tooth is defined as a tooth that remains in an intraosseous position and can be an ectopic inclusion (when a tooth is impacted and in an abnormal position but close to its usual position) or a heterotopic inclusion (when a tooth is in an abnormal position far from its normal location)¹.

Canines are frequently malpositioned teeth, but mandibular canine eruption failure is uncommon, with maxillary canines being more frequently impacted². Although the pathogenesis of impacted canines is not entirely understood, several causes, such as complex eruption path, trauma to deciduous tooth germs, premature tooth loss, reduced arch length, genetic factors, ankylosis, root enlargement, and pathological lesions, are cited³.

Impacted canines usually occur unilaterally but can also be bilateral, with third molars being more dominant, followed by maxillary canines and premolars⁴. Among the various problems caused by these abnormalities, the inclusion of canine teeth can affect the resorption of adjacent teeth. Studies have reported this resorption as a physical effect during eruption due to contact between the impacted canine and adjacent teeth due to active pressure⁵. Studies have shown that approximately 12% of adjacent incisors are resorbed by ectopic canines, with a prevalence four times higher in girls than boys. However, this resorption can sometimes occur even when the canine eruption is normal⁶.

It is not very common to see an impacted canine in the mandible. It has been observed that maxillary canine impaction occurs in 2.0% of the population compared to 0.02% for mandibular canines⁷. Additionally, a study by Rohrer showed that the incidence of impacted mandibular canines in the population is 0.35 to 0.44% compared to the maxilla⁸. In most cases, mandibular canine impaction is asymptomatic, meaning it does not cause clinical symptoms such as pain or discomfort⁹. In most cases, the clinical examination can detect the increased volume of the vestibular or lingual mucosa¹⁰.

According to Escoda *et al.*¹ (2004), treatment options for impacted teeth depend on several factors:

1. Patient motivation is considered an essential factor because close patient cooperation is an essential requirement. Therefore, oral hygiene is crucial for treatment success, and patients should be guided on effective preventive brushing.
2. If orthodontic treatment is chosen, the patient should be informed about the prolonged treatment time.
3. The patient's social situation and cultural factors also influence and restrict the implementation of long-term treatment.

According to Newman *et al.*¹¹ (2018), the patient's age plays a crucial role in determining the quality of periodontal tissue, cellular activity, and physiological healing possibilities. They state that younger patients tend to have more favorable conditions for periodontal regeneration. However, it is essential to note that age should not be considered the sole determinant in choosing the type of treatment.

The following factors are considered determinants:

1. Situation and fixation position related to the possibility of damage to neighboring structures during surgery or the installation of fixation methods¹²;
2. Patients with a canine inclination greater than 5 degrees tend to have more difficult recovery¹³;
3. Condition of the periodontal ligament due to ankylosis and associated mobilization difficulties¹⁴;
4. The condition of the tooth apexes: the need to check for the presence of internal or external resorption and their anatomy in connection with the diagnosis so that the mobilization of immature apexes and teeth with anatomical curvature is more favorable¹⁵;
5. The state of the pericoronal sac due to the possibility of tumor-related complications¹⁶.

Based on the above, this study aims to report the treatment of an impacted tooth in the chin region (tooth 33), followed by a discussion on sedation therapy during surgery and the benefits of photobiomodulation in the postoperative period.

Case report

Patient G. H. F. M, a 14-year-old male, during a consultation for orthodontic purposes, the presence of an impacted tooth in the mental region was diagnosed through a panoramic x-ray. The patient was then referred for treatment with the Oral and Maxillofacial Surgery team at the School of Dentistry of the Federal University of Goias. The patient's medical history revealed that both he and his mother have cardiac arrhythmia, for which a cardiologist monitors them. Additionally, the patient had a history of tachycardia when administered intravenous dipyrone but showed no reaction to oral administration. The patient also expressed significant fear and anxiety about undergoing the treatment.

The mucous membranes appeared normal during the extraoral and intraoral examination, with no signs of caries, periodontal disease, or poor hygiene. A cone beam computed tomography (CBCT) scan was requested for case planning. The CBCT result indicated the presence of the retained tooth in the anterior mandibular region (tooth 33), which was in a transalveolar position (Figure 1).

After evaluating the complementary exams, three treatment options were proposed: moderate sedation with benzodiazepines, moderate sedation with nitrous oxide, or general anesthesia. The decision was made to proceed with the extraction of tooth 33 under mild sedation with nitrous oxide. The patient's guardian was informed about the risks, benefits, and possible complications of the procedure and consented to the surgery by signing the consent form.

Preoperative preparation included intraoral antiseptics with 0.12% Chlorhexidine Digluconate solution for 1 minute and extraoral antiseptics with a 2% Chlorhexidine Digluconate-based scrub. After titrating 50% nitrous oxide, local anesthesia was administered using four cartridges of 2% lidocaine with 1:100.000 epinephrine to block the right and left mental nerve and supplement with an infiltration technique targeting the branches of the right and left lingual nerve.

A scalpel #15 was used to perform an incision. An intraoral incision for genioplasty was made, and the flap was elevated to expose the bone structures (Figure 2).

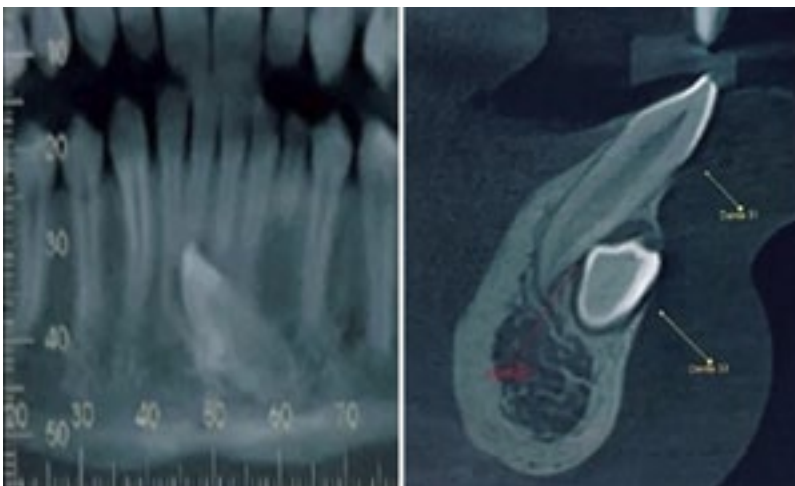


FIGURE 2 · Intraoral incision for genioplasty.

FIGURE 1 · Cone Beam Computed Tomography (CBCT) panoramic and coronal view of the retained tooth in the anterior mandibular region (tooth 33).

To adequately expose the tooth, osteotomy of the vestibular bone plate was performed using a high-speed handpiece and a #702 surgical bur with abundant irrigation of 0.9% saline solution. The tooth's crown was sectioned to separate it from the root at the cemento-enamel junction, and both the crown and root were extracted using elevators (Figure 3).

The area was irrigated with saline solution to remove any remaining debris from the osteotomy and tooth sectioning. Sutures were placed at the muscle level with 4.0 polyglycolic acid absorbable sutures and at the mucosa level with 4.0 Nylon sutures (Figure 4).

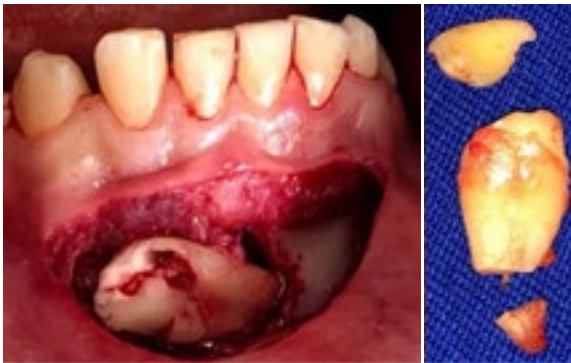


FIGURE 3 - The tooth's crown was sectioned to separate it from the root at the cementoamel junction.

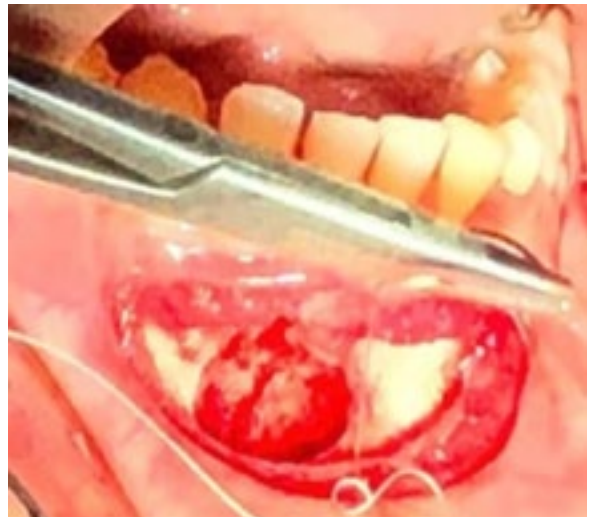


FIGURE 4 - Muscle suture and mucosa suture, respectively.



FIGURE 5 - Photobiomodulation session.

A session of photobiomodulation was performed with a DMC laser device at two intraoral points over the suture using an infrared laser at doses of 2 J. For extraoral care, lymphatic drainage was applied using an infrared laser at two points per lymph node chain (preauricular, jugulodigastric, submandibular, and submental), with energy doses of 2 J per point (Figure 5).

It was prescribed to the patient 600 mg Ibuprofen (one tablet every 8 hours for three days), 500 mg Dipyrone (Metamizole Sodium Salt) (one tablet every 6 hours as needed for pain for up to 3 days), and 0.12% Chlorhexidine Digluconate (10 ml rinse two times a day for seven days). Postoperative care instructions were provided.

At the 10-day follow-up, the patient reported no pain or fever, with the surgical wound healing normally and no signs of paresthesia or significant edema. Sutures were removed 20 days post-surgery, with the patient showing no complaints and adequate healing observed. The patient was advised to attend pre-scheduled follow-up appointments for clinical and radiographic monitoring of adjacent teeth.

Discussion

Nitrous oxide acts on the nervous system, but its mechanism of action is still unclear. It causes slight inhibition of the cerebral cortex, unlike benzodiazepines, which act on the vital center (medulla) and do not inhibit central respiration. Nitrous oxide only maintains respiratory function and the laryngeal reflex¹⁷. Due to its low lipid affinity, absorption is rapid, making the transport rate across biological membranes significant. This results in a practical, comprehensive, and specific effect on the central nervous system, with rapid onset and low toxicity, contributing to a low rate of complications during treatment¹⁸. Based on this, the choice of nitrous oxide use was scientifically grounded to ensure the best approach for the patient. Given the patient's young age and the rapid effects of nitrous oxide,

it was the preferred choice due to its low toxicity and minimal complications, eliminating the need for long-term postoperative follow-up.

The impacted canine was located buccally and near the mandibular base in this case report. According to Medeiros¹⁹ (2003), for impacted teeth located apically to the roots where exposing the alveolar process region is unnecessary, a vestibular flap is a suitable alternative to a flap with two relaxing incisions. This flap is created through a horizontal incision in the vestibular depth, reducing surgical time. As detailed, an incision for genioplasty was made, and the full-thickness flap was elevated to expose the bone structure. An osteotomy of the buccal bone plate can be performed to expose the tooth adequately²⁰. No motor or sensory damage or surgical complications were observed.

Possible accidents include tooth fractures, lacerations, flap tears, and more severe incidents such as oroantral communication, breakage of internal instruments, mandibular fractures, and injury to critical structures^{21,22}. Therefore, surgery on impacted teeth requires knowledge of the risks and complications, such as injury to adjacent structures, mental nerve section potentially causing lower lip and chin paresthesia, mental artery section, and even mandibular fracture.

Postoperative edema is a common reaction, influenced by factors such as extensive dissection, prolonged surgeries, and lack of postoperative care. Ice packs, preoperative steroidal anti-inflammatories, and photobiomodulation can reduce edema, ensuring a more comfortable recovery¹⁹. Photobiomodulation promotes collagen and elastin production, enhancing wound healing, increasing phagocytosis, and activating lymphocytes, leading to quicker wound healing²³. The irradiation points in our technique cover not only the damaged area but also adjacent tissues, preventing complications such as inflammation and new wound formation.

The rupture of the periodontal ligament of adjacent teeth during surgery can damage cementoblasts and the remaining Malassez epithelium, potentially leading to inflammatory resorption, alveolar ankylosis, and root resorption by replacement. Additionally, rupturing the vascular bundle can cause aseptic pulp necrosis and calcified pulp deformation²⁴. Consequently, surgical removal of an unerupted canine can result in outcomes similar to dental trauma, possibly affecting the vitality of adjacent teeth. Therefore, it is essential to monitor and evaluate the pulp of teeth in contact with the extracted tooth²⁵.

Conclusion

The multidisciplinary planning and treatment for complex surgical cases proved beneficial for the patient and the team involved in the treatment.

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Tratamento multidisciplinar de um dente incluído no mento: relato de caso

Resumo

A inclusão dentária do elemento canino mandibular é incomum e o tratamento desses casos pode incluir a preservação, extração, remoção da impaction ou uso de aparelhos ortodônticos. Nesse contexto, o objetivo deste estudo é relatar o tratamento de um elemento dentário incluído na região do mento, presente em um paciente com 14 anos de idade. Durante uma consulta com finalidade ortodôntica, foi diagnosticado a presença de um dente incluído na região mental através de uma radiografia panorâmica. Em seguida, o paciente foi encaminhado para tratamento com a equipe de Cirurgia Buco-Maxilo-Facial da Faculdade de Odontologia da Universidade Federal de Goiás. Uma tomografia computadorizada de feixe cônico foi realizada e identificado um elemento dentário (dente 33) incluído na região mental. Devido o paciente apresentar alto grau de medo e ansiedade e estar em acompanhamento médico para arritmia cardíaca, o tratamento escolhido foi extração dentária realizada sob sedação com óxido nitroso, seguido de terapia de fotobiomodulação pós-operatória com a finalidade de reduzir edema e desconforto. Durante o acompanhamento pós-operatório, o paciente relatou pontos positivos a respeito da sedação consciente e não referiu dor ou desconforto, além de não apresentar parestesia e edema exacerbado na região. Portanto, o planejamento e tratamento multiprofissional para casos cirúrgicos complexos mostrou-se benéfico para o paciente.

PALAVRAS-CHAVE: Dente não-erupcionado; Canino incluído; Tratamento cirúrgico; Óxido nitroso; Fotobiomodulação.

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