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Case Report

Bilateral Germectomy in Pediatric Patient: Clinical Case Report

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Abstract

Germectomy is a surgical treatment that consists of the extraction of the tooth germ; indicated when there are morphostructural alterations, ectopic impactions or eruption not permitted due to dysplastic alterations of the tooth germ. It is a surgical procedure of choice that involves the extraction of a dental organ with all its embryonic attachments when it is in the early stages, the prevalence of impactions and pathologies of the mandibular third molar can be avoided with this surgical treatment.

Objective: To perform a careful cost-benefit evaluation to evaluate the indications of early third molar extraction.

Methods: An observational and descriptive study was carried out in the operating room of the dental clinics of the American University from September 2023 to November 2023. An 12-year-old patient was evaluated, surgically intervening on two tooth germs of mandibular third molars. Evaluating the position, location, and morphostructural change of the third molar germ; as well as trans and postoperative complications and the evolution.

Introduction

Tooth eruption is the process of migration of the crown from its place of development within the maxillary bone to its functional position in the oral cavity [1]. Likewise, as Gay Escoda states in his writing, the lower third molars, in addition to having a greater tendency to present barriers that prevent their eruptive process, also present great variations in terms of their arrangement, shape, and size. During the eruptive process, various events occur that interfere with the eruption, mainly affecting the third molars and presenting an average incidence of dental inclusion of 20% with a slight prevalence in the female sex [2]. Third molar extraction is a common procedure during oral surgery practice. One of its main indications is orthodontics to gain space in the arch or to resolve position anomalies of the second permanent molar. The extraction of a retained third molar is also recommended to prevent cysts and tumors since when a tooth is completely inside the alveolar process. On the other hand, we can find other patterns, such as morphological alterations of the germ, interference of the germ with the eruption process of the second molar, and odontogenic lesions associated with the germ.

Germectomy of the third molar is understood as the extraction of a tooth included in a stage of early formation when only the crown or the first third of the roots at most are formed [2]. The germectomy surgical procedure does not differ substantially from an extraction of a completely formed third molar [2], therefore, the planning of the intervention must be carried out with the same principles (incision, flap elevation, access osteotomy, odontosection, and extraction). Contraindications for the extraction of a tooth germ or an impacted third molar are mainly related to the physical condition of the patient, therefore the extraction of a vestigial tooth should be carried out unless there are specific contraindications, in addition to evaluating the risk-benefit relationship.

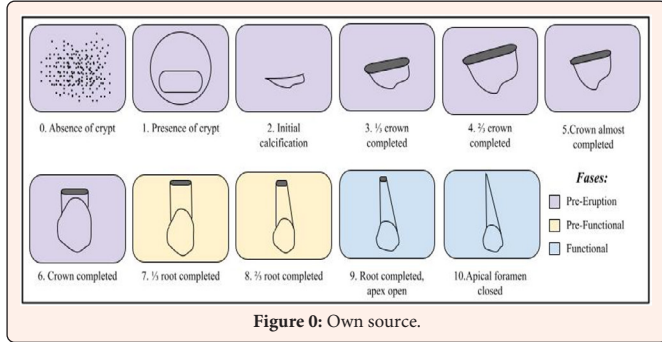
Early removal reduces postoperative morbidity and allows for better healing (Hubb et al. 2010). Young patients recover quickly and with fewer postoperative complications. The healing of soft tissues at an early age is more advantageous since a complete regeneration of the periodontal tissues occurs, as well as an easy surgical procedure due to the bone density that is lower than in a patient over 25 years of age and the dental root of the teeth are not fully formed. According to Chiapasco et al. [2], the choice of age to perform a germectomy will depend mainly on the patient's degree of collaboration. Chiapasco advises performing the surgical procedure of a germectomy between 9 and 12 years of age, this is due to the ease of the intervention and reduction of both trans and postoperative complications. Other authors indicate between 13 and 17 years, while others may report that the right time to perform the germectomy is in the last years of adolescence, between 16 and 20 years when the root of the germ is one-third formed.

In order to classify germectomy procedures, there is a classification according to the age of the patient provided in a study carried out by Gay Escoda et al. [3], where it shows the following:

- Very premature germectomy: It is addressed before the age of 12 or before the eruption of second molars; However, its practice is not recommended because the patient is younger and due to possible injuries to the germ of the second molar.
- Early germectomy: It is performed between 12 and 16 years of age. It is normally addressed by the orthodontist's instructions before pathological manifestations appear.
- Eclectic or rational germectomy: It is performed at approximately 16 years of age in women and 18 years of age in men where the eruptive outbreak is located, since at that time mineralization of the root third has already begun and the bone thickness that covers the germ is less.
- Late germectomy: Normally covers the ages between 20 and 22 years in which the crown is in a submucosal position and the root is almost completely formed.

Likewise, in 1960, Dr. Nolla came up with a method to study the development of permanent teeth, classifying the dental formation cycle into 10 stages that range from the beginning of crypt formation (stage 1) to apical closure (stage 10).); taking into consideration the calcification of the coronal and root structures. These stages can be visualized with imaging including panoramic radiographs, periapical radiographs, and computed axial tomography (CAT) scans (Figure 0).

Nolla Stages



Case Presentation

A female patient, 12 years and 8 months old, attends to the postgraduate dental clinics in Orthodontics and Maxillary Orthopedics of the American University, UAM; In the anamnesis, the patient does not report any systemic or functional pathological history that compromises her general health status. During the clinical inspection, an acceptable oral health was observed (Figure 1 & 2). After the clinical assessment, pertinent complementary examinations were indicated that included an orthopantomography; Through the imaging analysis, it was possible to observe the presence of the tooth germs of third molars (1, 16, 17, and 32), where the germ of the left mandibular third molar presented an anomaly in shape and size (Figure 3), which is why which the patient was referred to the Department of Oral and Maxillofacial Surgery of the said institutional center.

When performing a thorough intraoral examination of the area to the touch, there was no pain, no increase in volume, or redness. It should be noted that the patient did not report any history of pain or any type of symptoms related to the area in which the germ is located, from part 17.



Figure 1: Lateral intraoral photographs in occlusion A) right lateral, B) left lateral. Courtesy of Resident in Orthodontics and Maxillary Orthopedics Specialty.

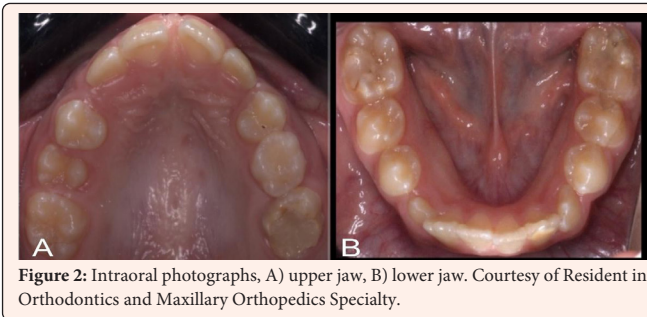


Figure 2: Intraoral photographs, A) upper jaw, B) lower jaw. Courtesy of Resident in Orthodontics and Maxillary Orthopedics Specialty.



Figure 3: Initial panoramic radiograph. The germ of tooth 17 is observed with apparent gemination and close proximity to the canal of the inferior alveolar nerve.

Subsequently, due to the alteration in shape and size of the left mandibular third molar (17), an imaging study was indicated through computed tomography with the cone beam system to know the extension, position and structures involved in the injury (Figure 4), assessed from the three planes offered by this study (axial, sagittal and coronal). In the imaging study, a radiolucency is observed that surrounds the forming crown of tooth 17, which corresponds to the dental follicle. In a longitudinal view, we can see that 2/3 of the crown is formed, with apparent dental gemination and a close relationship with the canal of the lower dental nerve. For piece 32, it is in a lower stage of development with the formation of 1/3 of the crown at a significant distance from the mandibular canal. Next, a cephalometric analysis was carried out (Figure 5) taking McNamara's analysis as a reference, to know the morphology and position of the structures of the facial skeleton, where it was determined that the mandibular length is decreased due to the extraction of the tooth germ from tooth 17 and 32 is indicated to gain space for future orthodontic treatment.

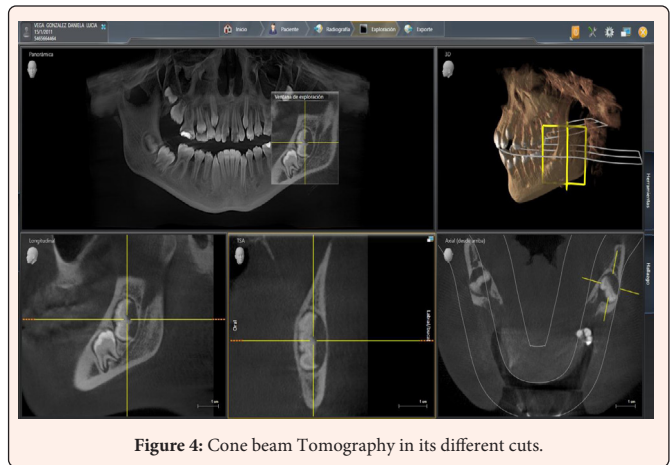


Figure 4: Cone beam Tomography in its different cuts.

In a panoramic view, the study of the extension in the coronal-apical and mesio-distal direction of the apparent gemination of the mandibular third molar (17) concerning the axial axis of the right mandibular second molar (18) is carried out, resulting in 21.55mm in apico-coronal direction and 12.48mm in mesio-distal direction (Figure 6, A and B). Similarly, the extension of tooth 32 was evaluated both in the apico-coronal and mesio-distal directions, resulting in 12.10 mm and 16.30 mm respectively (Figure 6, C and D).

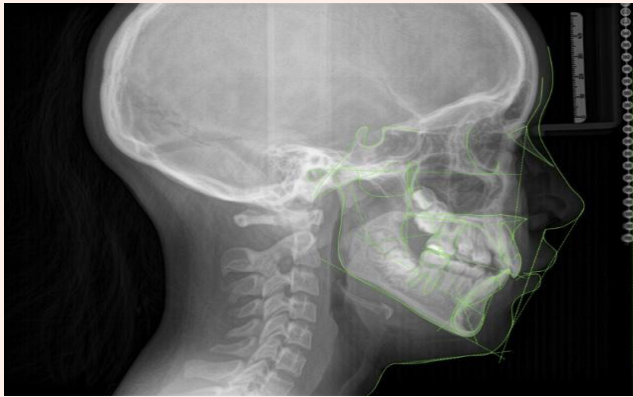


Figure 5: Cephalometric analysis, mandibular retrognathism. Courtesy of Resident in Orthodontics and Maxillary Orthopedics Specialty.

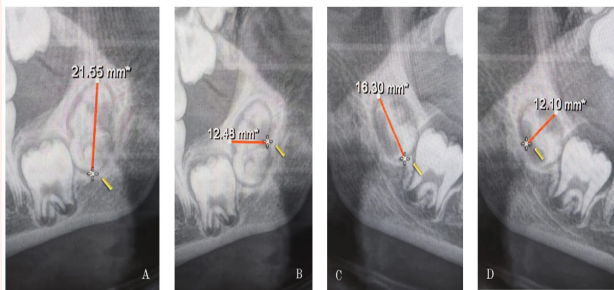


Figure 6: Panoramic view, coronal extension of the left mandibular third molar (A and B). Panoramic view, coronal extension of the right mandibular third molar (C and D).

Based on the analysis of the studies, the surgical planning corresponding to the excision of the tooth germ was carried out, where it was decided to implement the conscious sedation technique for adequate intraoperative management of the surgical act.

Surgical Procedure

It was performed under a conscious sedation protocol to control anxiety and provide comfort to the patient. The left upper limb was canalized on the first attempt with B#22G. Under type 1 spontaneous monitoring (PANI, EKG, SPO2, RR), (Figure 7). Midazolam 2 mg IV + fentanyl 100 mcg IV was administered, as well as oxygen via nasal cannula at 2 L. Boluses of 20 mg propofol are administered until an adequate level of sedation is achieved.

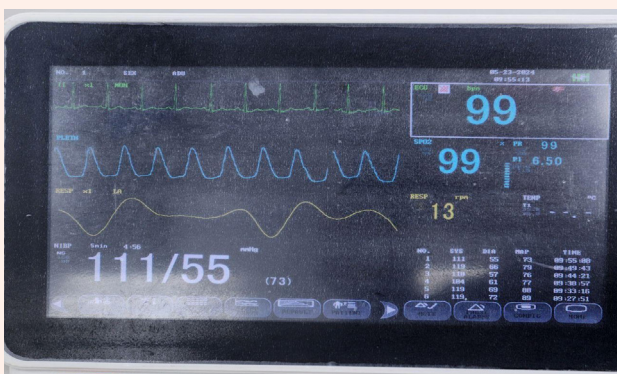


Figure 7: Spontaneous monitoring type 1. Appropriate values can be observed in the monitoring.

The principles of asepsis and antisepsis were applied extraorally with povidone-iodine and intraorally with 0.12% chlorhexidine rinse. After having obtained the desired level of sedation, an anesthetic technique was performed with lidocaine with 2% epinephrine, thus performing a regional block to the lower dental nerve (Figure 8 A). Subsequently, a linear incision was made, distal to the permanent mandibular first molar and sulcular mesially until reaching the distal zone of the second premolar, with a full-thickness wrap-around flap, with a number 15 scalpel (Figure 8 B), followed by a detachment of the flap (Figure 8 C) leaving the area to be intervened exposed. Subsequently, osteotomy was performed with a low-speed piece with a number 8 round bur, until the tooth germ was located.

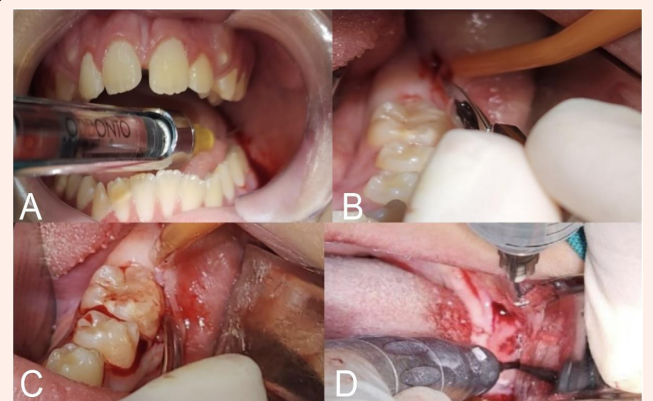


Figure 8: A) Anesthesia regional block of the inferior alveolar nerve B) Incision C) Flap peeling D) Osteotomy.

Once the developing crown of tooth 17 was exposed, the osteotomy was measured with an OMS periodontal, having an extension of 15mm in the mesio-distal direction and a depth of approximately 4mm (Figure 9A). Next, with a low-speed piece and a zekrya bur, the crown is divided into two halves and immediately with a 301 punch, the crown of the germ of said piece is fractured to facilitate its extraction (Figure 9B). Likewise, the amorphous tooth germ and its dental follicle were excised (Figure 9C), which was placed in an airtight container with 10% formalin to be sent for histological study to rule out any pathology. Then debridement, curettage of the area, and irrigation with 0.9% saline solution were performed, leaving a clean surgical site (Figure 9D). Subsequently, a collagen dressing was placed to promote rapid healing, concluding with the treatment of the cavity, the flap is consecutively repositioned with simple sutures (Vicryl 4-0) Figure 10 (A, B, C).

It should be noted that before to completing the surgical procedure, Enantyum 50 mg IV + Dexamethasone 8 mg IV + Tramadol 50 mg IV + Ranitidine 50 mg IV are administered. In this way, a state of post-surgical comfort was provided to the patient.

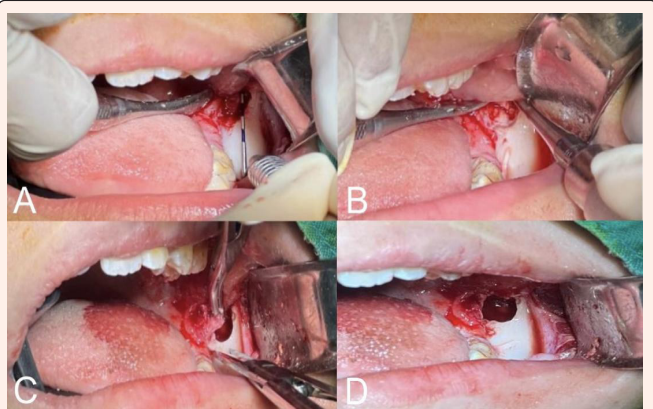


Figure 9: A) Tooth germ, B) Odontosection with 301 elevator, C) Placement of collagen dressing, D) Surgical site.

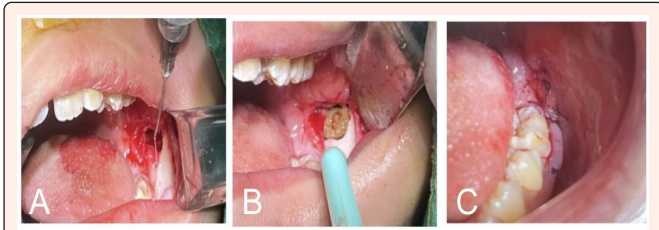


Figure 10: A) Irrigation with physiological saline B) Placement of dressing C) Suture.

Surgical procedure tooth germ 4.8

The extraction of the tooth germ of the right mandibular third molar follows the same surgical principles of sedation, asepsis and antisepsis, anesthetic technique, incision, flap type, osteotomy and odontosection (Figure 11 A & B). Although it's known that every surgical procedure has its risks and transoperative complications, so the operator must know, if not all, most of them and how to resolve them. During the odontosection of tooth 32, the fracture of the zekrya bur occurred, this was caused by the involvement of the bur. Of the strawberry with the germ follicle that surrounds the crown opposing resistance and causing it to break. The intraoperative management of the accident was done by separating the follicle from the crown to facilitate the extraction of the object (Figure 11 C & D) culminating with the extraction of the germ fragments without major complications, with minimally invasive management.

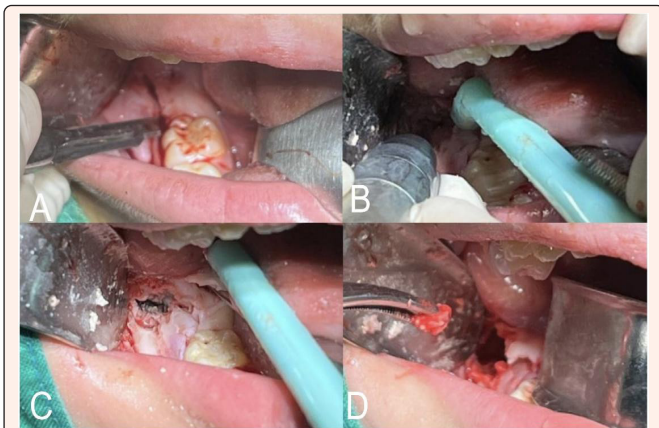


Figure 11: A) Incision B) Osteotomy C) Zekrya fracture D) Removal of pericoronal sac.

After handling this complication, the curettage is performed, ensuring that a clean cavity remains, free of foreign bodies and bone or dental fragments. It is irrigated with 20 cc of pressurized saline solution (Figure 12 A and B), a collagen dressing to promote rapid healing, concluding with the cavity treatment, consecutively the flap is repositioned with simple sutures (Vicryl 4-0) see (Figure 12 C and D), and (Figure 13).

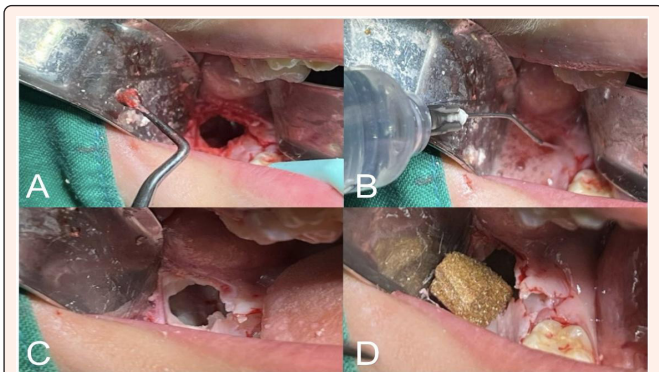


Figure 12: A) Curettage B) Irrigation with physiological saline C) Surgical site D) Placing dressing.

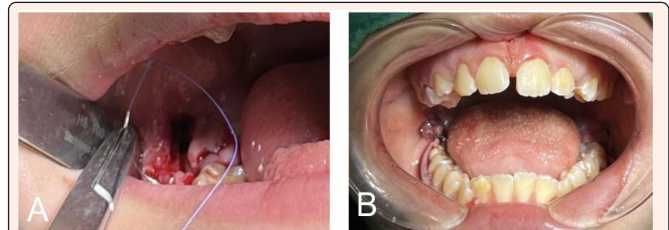


Figure 13: A) Suture B) Immediate Postoperative.

Note: A post-surgical control was carried out 7 days after the procedure to observe possible post-surgical complications such as trismus, edema, infection, bleeding or intense pain. In this control, the sutures were removed, oral hygiene was evaluated and the mouth opening, thus presenting a decrease in it; a common postsurgical complication known as trismus.



Figure 14: A) Post-surgical control carried out after 7 days, evaluation of mouth opening B) Removal of the right suture C) Removal of the left suture.

Histopathological report

Morphological findings in favor of an odontogenic myxoma, myxoid background, scattered spindle cells, without cytological atypia and surrounded by residual bone tissue.

Discussion

The present study shows the case of a 12-year-old female patient, referred by the Department of Orthodontics of the American University (UAM), due to the presence of a morphological alteration of the tooth germ 17, who underwent bilateral germectomy, early under conscious sedation. In the imaging study using Cone Beam tomography, it was determined that the size of the tooth germs 17 and 32 were larger in relation to the normal size of 10mm, as established by Raspall 2007, [4]. One of the causes that determines the decision to extract the third molars preventively is disorders in dental development, taking into account that the inclusion of the wisdom teeth is the most prevalent, due to dentomaxillary discrepancies and decreased anteroposterior growth of the jaw. Consequently, early Germectomy of third molars described by Cosme Gay Escoda is an outpatient surgical treatment that is performed between 12 and 16 years of age, before pathological manifestations appear. Likewise, Palacios Vivar et al. [5], states that germectomy of the mandibular third molar is indicated in situations of amorphous third molar, very large third molar or insufficient space, characteristics that are met by the patient in the clinical case.

After the intervention, the patient was referred to the pathologist for histological study, obtaining as a relevant manifestation of the case a benign neoplasia with morphological findings in favor of an odontogenic myxoma, myxoid background, scattered spindle cells, without cytological atypia and surrounded by residual bone tissue. In this way, the importance of early germectomy of lower third molars is manifested, as a procedure indicated when there is a morphological alteration and for the early diagnosis of tumor pathologies, as established by Navarro Vila C [6]. Likewise, what was established by Cosme Gay Escoda is reaffirmed, that benign and malignant neoplasms can form in the region of the lower wisdom tooth, which modify the subsequent behavior to be followed in these cases.



Conclusion

- i. Interdisciplinary management is important in patients with dentofacial alterations to guarantee an individualized treatment plan, based on a correct clinical and imaging evaluation and evaluating risks-benefits in the case of germenectomy.
- ii. Early germenectomy of the lower wisdom teeth is indicated when its shape or size predicts the possibility of altering the eruption of the second molar or preventing tumor pathology of odontogenic origin.
- iii. The establishment of early and timely diagnosis of mandibular odontogenic tumors, with low prevalence in pediatric patients, can be determined by histopathological study in patients who undergo germenectomy.

Appreciations

It is important to note the great contribution of David Alejandro Mendieta Rostrán, Oral and Maxillofacial Surgeon; professor of oral surgery clinic at the American University (UAM), who supported the surgical procedure. In the same way, it is important to thank the resident in the Orthodontics and Maxillary Orthopedics Specialty of the same educational institution, Diana Alejandra Román Tapia, who referred the patient to the oral surgery center of said center, providing initial intraoral photographs.

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