



Surgical Extraction of Mesiodens Using A Vestibular-Nasal Approach; A Case Series and A Discussion of the Technique - Clinical Case Report

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Abstract

Purpose: To outline a technique for the extraction of mesiodens through the nasal cavities and discuss its advantages and disadvantages, as well as specific recommendations and possible complications.

Patients and Methods: A retrospective study was conducted in which clinical records from March - December 2015 were screened for patients diagnosed with mesiodens. Patients were excluded if they presented disorders associated with increased prevalence of supernumerary teeth. To effectively compare the different treatment approaches used, a variety of data was collected with special emphasis on complications.

Results: Nine patients (four male, five female; average age 10.4 ± 1.7 years) fulfilled the described inclusion and exclusion criteria. Data analysis revealed that there were no intra-operative complications, nor were complications reported upon follow-up for any of the utilised (classical and vestibular-nasal) approaches.

Conclusion: When applied under the correct circumstances, the here presented nasal approach technique improves various aspects for mesiodens extraction, including better visibility and facilitates the technique.

Keywords: Mesiodens; Vestibular-Nasal Approach; Surgical Extraction

Introduction

Supernumerary teeth are those that are additional to the normal series. They may occur anywhere in the dental arch as a single tooth or as multiple teeth. Those supernumerary teeth located in the anterior maxilla region are referred to as mesiodens [1-5]. In some cases, gaining physical access to mesiodens is complicated by their close proximity to permanent teeth, or their location adjacent to important anatomical structures, such as nerves or blood vessels [6,7]. In these cases, 3D imaging techniques (computed tomography or cone beam computed tomography) can be of great help to define the exact position of these supernumerary teeth [4]. Conventionally, either buccal or palatal/lingual surgical approaches are used to gain access to the concerned tooth, as dictated by

the tooth's location. However, in some cases neither option is optimal due to the tooth's orientation and distance from the point of access. One such case is when the tooth is inverted, complicating the mechanics of the extraction process [8]. The objective of this report is to present and discuss a different surgical approach for specific supernumerary cases, in which the concerned mesiodens is inverted and in close proximity to the nasal cavities. In these specific cases, the conventional buccal or palatal approaches are not recommended as they involve greater risk of damaging adjacent structures. In these particular cases, the conventional techniques implicate substantial bone loss due to the required osteotomy and therefore increase the probability of damaging adjacent structures, including the apices of permanent teeth.

Materials and Methods

A retrospective study was performed on cases diagnosed with mesiodens from the period of March to December 2015, in the private practice of the authors. Patients diagnosed with disorders associated with increased prevalence of mesiodens were excluded. Data on gender, age, surgical approach used, surgical complications, medication used, and complications at follow-up were collected. This study followed the declaration of Helsinki on medical protocol and ethics.

Description of the technique

The procedure is performed in an operating theatre under general anaesthesia, with prophylactic antibiotics (1 g IV Cefalozin), with anti-inflammatory therapy (4 mg IV Betamethasone), under aseptic conditions. Surgical access is gained through a mucoperiosteal flap linear to the base of the upper vestibule. Subsequently, a subperiosteal dissection of the nasal mucosa is performed to expose the supernumerary tooth. This is followed by a peripheral osteotomy around the crown of the tooth, to reduce its hold. Once liberated, a notch is made in the crown of the supernumerary tooth to create a traction point from which to displace it towards the nasal cavity. The extraction of the tooth is performed by inserting a

curved elevator in the abraded area. Immediately after, the surgical wound bed is irrigated and profusely cleaned using saline solution. The pericoronal sack is also eliminated. The procedure is finalised by first placing a alar base cinch suture with ethibond 2 - 0 before repositioning the flap by suturing the mucosa with Catgut 3 - 0 [9]. Post-operative instructions are given, as is an antibiotic therapy of either amoxicillin, or azithromycin for those patients allergic to penicillin, and analgesics. A post-operative follow-up is performed seven days following surgery.

Results

Nine patients were included in the study, of which four were males and five females. The mean age was 10.4 ± 1.7 years. Of these, three patients underwent the vestibular-nasal approach, whilst five patients were treated using the conventional buccal approach and one via the conventional palatal approach. No differences were found between the different surgical approaches in terms surgical and post-operative complications. No complicating infections arose. One patient did not attend the follow-up, wherefore it was considered that no complications at control had arisen. Data are presented in table 1.

Patient	Sex	Age (Years)	Approach	Intraoperative Complications	Antibiotics	Analgesics	Follow-Up
1	Female	8	Nasal	None	Amoxicilin	Ketorolac	Good condition
2	Female	12	Nasal	None	Amoxicilin	Ketoprofen + Paracetamol	Good condition
3	Female	9	Buccal	None	Amoxicilin	Ketoprofen	Did not attend
4	Female	13	Buccal	None	Amoxicilin	Ketoprofen	Good condition
5	Male	10	Buccal	None	Azithromycin	Ketoprofen	Good condition
6	Female	12	Palatal	None	Amoxicilin	Ketoprofen	Good condition
7	Male	9	Buccal	None	Amoxicilin	Ketoprofen	Good condition
8	Male	10	Buccal	None	Amoxicilin	Ketoprofen	Good condition
9	Male	11	Nasal	None	Amoxicilin	Ibuprofen + Paracetamol	Good condition

Table 1: Patients Data.

Discussion

The prevalence of supernumerary teeth positioned towards the nasal cavity floor is very low, affecting 0.1 - 1% of the general population [10]. As usually the evolution of supernumerary teeth is asymptomatic, cases are generally diagnosed radiographically. However, symptoms do become apparent in cases associated with maxillary cyst formation [11], or with mesiodens eruption into the

nasal cavity. The latter causes the concomitant tearing of the nasal mucosa, and subsequent epistaxis, nasal obstruction and the sensation of a foreign object in the airway [10-12]. Here, extraction of mesiodens is advised due to these potential complications, as well as their possible interference in the development of permanent teeth and the orthodontic movement of adjacent teeth [7]. Various procedures have been described for mesiodens avulsion, including

the conventional buccal and palatal approaches⁶. However, these classical approaches often entail considerable bone removal, and thus come at a great biological expense. Accordingly, this leads to higher incidence of postoperative complications. Furthermore, the palatal approach is associated with a risk of developing a palatine haematoma, so that in some instances the use of a palatine plaque is warranted.

A less invasive, endoscopic procedure to extract mesiodens has also been described¹⁰. However, it is not applicable in cases in which the mesiodens are enclosed by bone tissue, and has the additional drawback of being a more complex technique that entails a steep learning curve.

The here described technique offers various advantages. First, using a mucoperiosteal flap allows for a better visibility of the tooth to be extracted, as can be appreciated in figure 3. Additionally, this technique reduces post-operative complications by avoiding tooth sectioning and therefore reducing the amount of bone removal required for the extraction of the tooth. This is owed to the fact that by approaching from the crown, the area that presents the greatest volume can be utilised so that less physical obstruction of the tooth itself is experienced. Finally, this procedure reduces the treatment cost as it does not require the use of any post-operative devices, such as a palatine plaque.

In the here presented cases, the potential impact on the viability of permanent teeth and their orthodontic movements was of utmost importance when selecting the most appropriate intervention. Key to this presented procedure is that the continuity of the osseous tissue of both the buccal and palatal bone plates is maintained as this greatly influences subsequent orthodontic treatment. Since less osseous tissue is affected and must therefore be repaired, the likelihood of damaging permanent teeth or other anatomical structures, including nerves and blood vessels, is also reduced. Figure 1 to 6 clearly illustrates the close proximity of the mesiodens root with tooth 2.1, specifically the nasopalatine canal and its associated neurovascular structures. In the here presented cases, both conventional approaches would have implicated certain risks, which were circumvented using the here described approach.

A critical element of this approach is to perform an optimal alar base cinch suture that will reform the nasal base by repositioning the musculature adjacent to the nasal ala. This is fundamental to maintain the width of the alar base and mitigate the impact on the original nasal morphology.

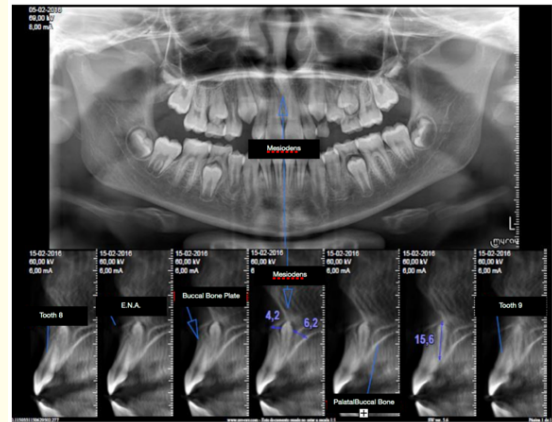


Figure 1: Sagittal sections showing the position of the mesiodens in the superior maxilla.

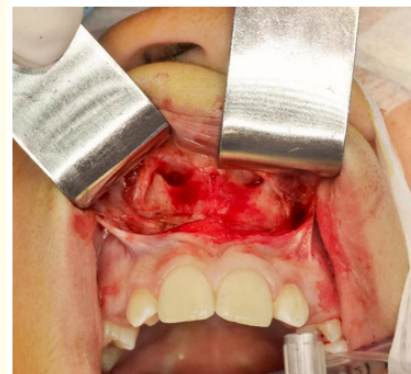


Figure 2: Vestibular approach and subperiosteal dissection of anterior maxilla to reach the nasal cavities.

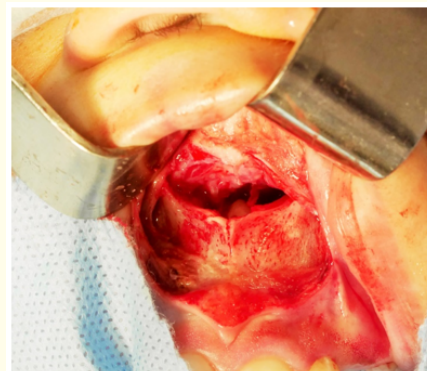


Figure 3: Submucosal dissection of nasal cavity and stripping of the nasal floor mucosa.

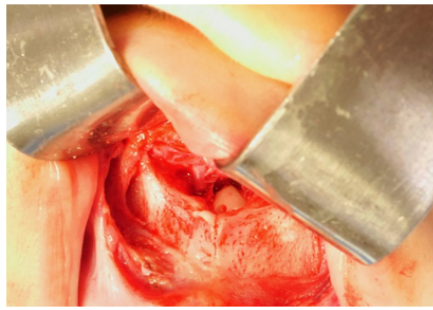


Figure 4: Peripheral osteotomy and release of the mesiodens.

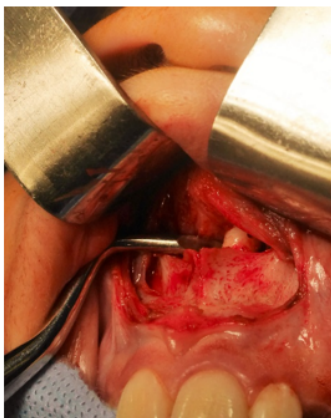


Figure 5: Avulsion of the mesiodens.



Figure 6: Extracted tooth

Conclusion

In certain circumstances, the described technique presents various advantages over others. This technique allows for a good and direct view of the operating field, involves minimal osteotomy and risk to neighbouring structures, especially when the mesiodens is inverted (crown pointing towards the nasal cavities) and in close proximity to the nasal cavity floor.

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