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Immediate Removal of a Dislocated Dental Fragment from the Submandibular Space during Extraction of the Lower Third Molar: Case Report and Literature Review

Remoção Imediata de fragmento Radicular Deslocado Para o Espaço Submandibular Durante a Exodontia de Terceiro Molar Inferior. Relato de Caso e Revisão de Literatura

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Abstract

This paper aims to report a case of radicular displacement to the submandibular space and to review the literature seeking reports of dental displacements / fragments published in the period from 2007 to 2017 in PubMed evidencing risk factors, prevention and forms of treatment. In this article a case of displacement of dental fragments to the submandibular space with immediate removal is reported. The third molar or its roots displacement into facial spaces is a rare situation. The preoperative surgical planning is fundamental to avoid this type of complication. The association of (1) good surgical planning, (2) surgical technique utilization and adequate instruments, and (3) the surgeon experience are determining factors to avoid the occurrence of this complication.

Keywords: Molar, Third. Surgery, Oral. Intraoperative Complications.

Resumo

A extração de terceiros molares é o procedimento cirúrgico mais frequente nos consultórios odontológicos. Como qualquer cirurgia, existe a possibilidade de complicações trans e pós-operatórias. O deslocamento desses dentes ou fragmento dentário para espaços faciais é raro, com frequência extremamente baixa. Este trabalho tem como objetivo relatar um caso de deslocamento radicular para o espaço submandibular e revisar a literatura buscando relatos de deslocamentos dentários/fragmentos publicados no período de 2007 a 2017 no Pubmed evidenciando fatores de risco, prevenção e formas de tratamento. Nesse artigo nós relatamos um caso de deslocamento de um fragmento radicular para o espaço submandibular, sendo este removido imediatamente. O deslocamento do terceiro molar ou de fragmentos radiculares para os espaços faciais é raro. A avaliação pré-operatória é fundamental para evitar esse tipo de complicação. A associação entre (1) planejamento cirúrgico correto, (2) utilização de técnica e materiais corretos e (3) experiência do profissional, são fatores determinantes para evitar esse tipo de complicação.

Palavras-chave*: Dente Serotino. Cirurgia Bucal. Complicações Intraoperatórias.*

1 Introduction

The third molars extraction is one of the most common surgical procedures in the dental office. There are some complications like trismus, hemorrhage, nerve injury, mandibular fracture, fracture of the alveolar process, trauma to adjacent tissues and alveolitis[1-10]. In addition, there is of tooth or part of the tooth displacement into facial spaces during the surgery. Although uncommon, it occurs more frequently in extractions of unerupted tooth, lingual and / or near of the base of the mandible[9].

The displaced tooth or fragments may vary in size and location. The spaces for which these displacements most commonly occur are: (1) maxillary sinus[7,9]; (2) submandibular space [8,10-12]; (3) sublingual space[13]; (4) infratemporal fossa[3,4,6,14]; (5) pterygomandibular space[9]; e (6) lateral pharyngeal space[15,16]. Displacement to the submandibular region usually occurs in teeth with linguoversion, resulting in reduced bone thickness of the lingual wall, in this case, the excessive force or forces in the wrong direction, may explain the tooth displacement[9,13,16].

The probability of the removed teeth moves to the facial space, is related to its location. Sometimes it is possible to perform by palpation, however, the imaging exams is very important. In these cases, cone beam computed tomography (CBCT) is a very useful tool because it allows to determine the tooth position or fragment in the sagittal, axial and coronal plane[9,16].

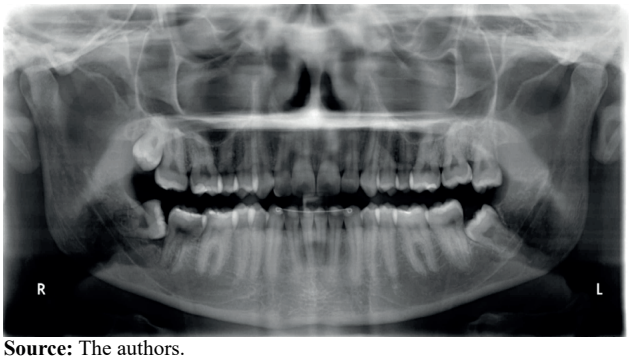
This paper aims to report a case of displacement of dental fragments to the submandibular space and review the literature on the causes, prevention and ways to treat this type of complication.

2 Case Description

Female patient, 28 years old, was referred to the Surgery Clinic of Bauru Dental School (FOB) for the third molars extractions. Panoramic radiography showed the presence of

upper and lower third molars, the left lower third molar was mesioangular, 2C according to the classification of Pell and Gregory (Figure 1).

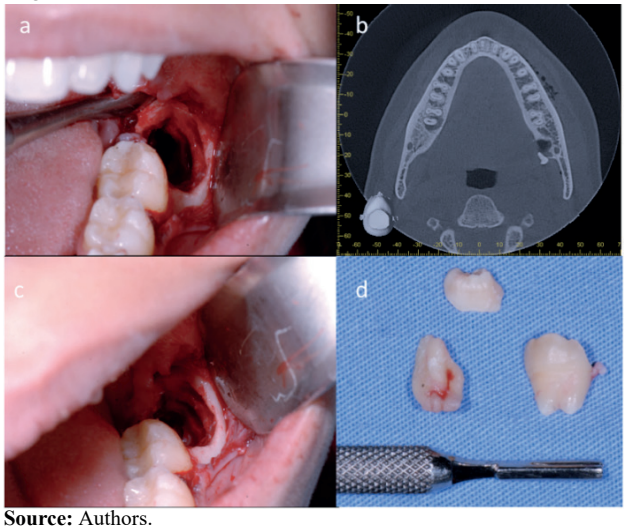
Figure 1- Preoperative panoramic radiographic



Source: The authors.

The surgery was performed under local anesthesia. Access to the lower left third molar was by sulcular incision and oblique incision in the mesial of the adjacent second molar. After osteotomy and odontosection, the crown was removed. This was followed by the mesial root removal. During luxation, the distal root was displaced from the alveolus, probably due excessive pressure during luxation. Immediately, a cone beam computed tomography was performed on Accuitomo 3D device® (J Morita, Japan, Inc). CBCT images allowed to observe the rupture of the lingual bone plate and the root displacement into the submandibular space, medially to the mandibular base and above the milo-hyoid muscle. In CBCT image it was observed the cortical lingual plate very thin in the region of the lower third molar, that may explain this accident (Figure 02).

Figure 2 - a) transoperative view, with empty alveolus after distal root was displaced; b) immediate CBCT demonstrates the root displacement into the submandibular space and the lingual wall dehiscence; c) transoperative view demonstrates the tooth after the upward pressure in the submandibular region; and d) the fragments of the removed tooth



Source: Authors.

Removal of the displaced fragment was performed by constant upward pressure in the submandibular region, being possible to push the fragment back into its alveolus and remove it, thereby avoiding the need for a second surgical procedure. In the postoperative control of 03 days, paraesthesia of the right inferior alveolar nerve was observed, absence of signs and symptoms of infection, good tissue repair and satisfactory mouth opening. In the 7-day postoperative evaluation, no other complications were observed and, after 03 weeks postoperatively, there was regression of paresthesia of the inferior alveolar nerve.

2.1 Discussion

The occurrence of complications during the lower third molars extraction varies from 2.66 to 30.9%[17] and the third molar or its roots displacement is extremely rare to occur in approximately 1% of cases[9,13,18,19].

A search was made for published works in the PubMed database, 2007 – 2017, using the following search strategy: ((third molar OR upper OR lower AND Molars, third molars) AND (Accidentally displacement OR accidentally displaced OR displacement OR displaced)), including only complete articles published in English. From this search resulted 90 studies, of which only 31 approached the subject of dental displacement related to the third molars extraction (Table 1). Of these, only 06 (20%) presented and discussed displacements to the submandibular space during the lower third molars extraction.

According to the literature, displacement of the third molar or root fragments may occur as a result of: incorrect diagnosis, inadequate surgical technique or inappropriate instruments[9,36,37], fracture or perforation of the lingual plate, which may or may not be associated to excessive force during the exodontia[13,19] and the position of the third molar[13]. From the anatomical point of view, the lingual cortical is thinner than the vestibular in the region of the lower third molars, and the vestibular is up to twice as thick[38]. Thus, the lower third molar or root rest displacement is more common in cases where the lingual wall is very thin, associated or not with the lingual plate puncture by drills, excessive or uncontrolled force and inadequate imaging evaluation[16]. This situation is observed in the study of Emes et al.[19], for the authors, after evaluating 32 CBCT of individuals with lower third molars, the authors found a mean distance between the root apex and the lingual cortical of 1.03 mm and a mean distance between the most lingual point of the root to lingual cortical of 0.65 mm. For the authors, the distance between the lingual wall and the roots of the lower third molars is very small, which facilitates the displacement of these structures to this region[19].

Table 1- Review of displacement cases of tooth / tooth fragments from 2007 to 2017

Space Involved	Commom Symptomatology	Time of Treatment	Treatment Options
Submandibular[8,10-12,20,21]	Pain, trismus, edema, discomfort when chewing, difficulty swallowing	*Immediate: &Late removal: 6	Local Anesthesia General Anesthesia + Extra-oral approach (submandibular) General Anesthesia _ intraoral approach Conservative (7days) + exodontia
Buccal[22,23]	Pain, fever, trismus	&Late: 2	Local anesthesia + intraoral approach General anesthesia + intra -oral access
Maxillary sinus[7,24-26]	nasal drainage, OAC,	*Immediate: 14 &Late: 11	Local anesthesia + intraoral approach (Caldwell-Luc Access) General anesthesia + endoscopic surgery
Pterygomandibular[9,26-28]	Trismus, infection	& Late: 2	Local anesthesia + Computer-Assisted Navigation Conservative + Exodontia (after 2weeks) Local anesthesia + intra-oral approach
Lateral pharyngeal[16,26,29,30]	Difficulty swallowing, fistula of the tonsillar pillar without purulent secretion, trismus, pain, fever, discomfort	&Late: 3 Conservative: 1	General anesthesia+ Computer-Assisted Navigation General anesthesia + intraoral approach
Infratemporal fossa[3,4,6,14,31-33]	Pain and trismus, absent, Trismus, pain, pain (temporal region)	*Immediate:1 &Late: 5	Local anesthesia + intraoral approach General anesthesia + endoscopic surgery General anestesia + intra-oral approach
Sublingual[1,5,13,28]	Pain, trismus, no symptoms,	*Immediate: 1 & Late: 2 Without removal: 4	Local anesthesia + intra-oral approach
Pterygopalatine fossa[34]	Trismus	&Late removal: 1	General anesthesia + intra-oral approach
Lateral to orbit[35]	Diplopia	&Late removal: 1	General anesthesia + endoscopic surgery

*Immediate removal: until 7 days; &Late removal: after 8 days; OAC: Bucosinus communication; ATB: Antibiotic therapy; and FISIO: Physiotherapy.

Source: Research data.

According to Emes et al.[19], other study assess the relationship between the third-molar angulation and lingual wall thickness, a study of 149 CBCT exams observed CBCTs which showed that bone tissue around horizontal and mesioangulated third molars was 3.6 times thinner in the region of the medial root than the cases of non-angulated teeth[39]. This observation explains the dislodged distal root in this article. In the author's opinion, this fact associated with the excessive pressure to lingual plate, during the surgery, may explain the complication discussed in this work, according to other works[40].

Regarding the surgical instruments suitable for root luxation and extraction of the lower third molars, it is suggested the use of Heidbrink type extractors, once their extremity are thinner and decreases the chances of applying apical directional forces on the roots and, consequently, this type of complication. Displacement can also be avoided, with the help of the index finger positioned in the region of the lingual cortex, especially for cases in which CBCT reveals the presence of a thin lingual wall[9,13].

When the displacement occurs, the location of the displaced fragment can be made by palpation[13] or, mainly, by CBCT, which allows its visualization in the axial, sagittal and coronal reconstruction[3,5,6,8,13,24]. The most appropriate moment for the removal of a displaced fragment into the facial spaces is controversial[6,13]. The third molar or its roots displacement can initially be treated conservatively, without immediate removal for 3 to 4 weeks[3,6,16]. During this period, a foreign body type reaction and the tooth encapsulation or tooth fragment should occur[6,13]. For the authors, every time that the displace tooth extraction can be performed in the same time of the surgery it is preferred. When it is not possible, the surgery must be performed as soon as possible.

The root or tooth displacement may be related to varied symptoms, depending on the space involved, trismus, pain and edema may occur. In most cases, the patients present complete absence of symptoms[13]. In cases with pain, trismus and edema, immediate root removal should be performed[13,18]. The symptomatology seems to be related to the size of the fragment, especially when bigger than 5mm[13], being this same fact observed in reports of displacements of whole teeth to facial spaces[3,5,6,8,16,34]. This can be confirmed by the report of Suer et al.[27], in which the displacement of a tooth to the pterygomandibular space was neglected for 2 years, resulting in trismus, pain and frequent infection episodes.

The literature relates late removal (> 24 hours), with an important increase in the inflammatory response, which may result in pain, edema, trismus[9,13], infection[6,9], or even tooth

migration to deeper spaces and infection[9,13,16,28]. In the study performed by Xavier et al.[20], the authors point to the possibility of spontaneous migration of a lower third molar displaced to the pterygomandibular region. After the second week, tooth migration was observed in the anterosuperior direction and after 07 weeks, part of the exteriorized crown was observed in the oral cavity, and then it was removed.

Removal of the displaced tooth or root into facial spaces may result in tissue damage, discomfort, and pain[28]. This procedure is commonly performed by intraoral access[9,40], extra-oral or the combination of both [9]. The treatment choice to be instituted should consider: size of the fragment, location and circumstances in which the displacement occurred[13]. The attempt to remove the displaced tooth or fragment should only be performed in cases where it can be clearly visualized, since this maneuver could move the fragment into even deeper spaces[9].

Aznar-Arasa et al.[13], published in 2012, a report with 06 cases of dental displacements to the submandibular space, emphasizing that the fragments smaller than 5 mm which were not removed, evolved without postoperative complications. Fragments with sizes between 7 and 10mm, removed late, caused pain and trismus. The work performed by Yeh[40] suggests the association of intra- and extra-oral access so that control and removal of the displaced fragment can be possible. Another option is intra-oral access guided by CBCT, as described by Guo et al.[28]. The conduct adopted in this case is in agreement with Guo et al.[28] who advocate the early removal by intra-oral access. In this case, the same access was used for the extraction of the lower third molar to remove the displaced root to the submandibular region.

3 Conclusion

The third molar or its roots displacement into facial spaces is a rare situation. In this article, the review of the literature, exhibited 31 articles of dental displacement related to the third molars extraction, but only 06 articles presented and discussed displacements to the submandibular space during the lower third molars extraction, resulting in 8 cases, 4 cases of immediate removal and 4 cases of late removal. The most common symptomatology of this situation is pain, trismus, edema, discomfort with chewing and difficulty swallowing. The mean time of the removed tooth/root fragment was 7 days to 2 years.

The preoperative surgical planning is fundamental to avoid this type of complication. The association of (1) good surgical planning, (2) surgical technique utilization and adequate instruments, and (3) the surgeon's experience are determining factors to avoid the occurrence of this complication. Because the risk of the teeth dislocation, during the exodontia, it is suggested the use of heidbrink extractor, to avoid this complication. The preoperative CBCT, is essential to determine the lingual plate thickness, and alert the surgeon to the possible risk of root/teeth dislodged to the anatomical spaces.

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