

Analysis of the use of open technique in Erupted Third Molars**Análise do uso da técnica aberta em Terceiros Molares em Erupção**

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ABSTRACT

Purpose: To describe the clinical situations in which the open technique was used after the attempt to use the closed technique in surgical procedures for extraction of lower third molars of 1A classification. **Methodology:** Lower third molar extractions were performed at the University Department of Sobral Oral and Maxillofacial Surgery and Traumatology from September 2016 to May 2019. Seventy-three patients aged 18 to 38 years, ASA I and II, with indications for extraction of fully erupted vertical IA classification third molars were selected for research. **Results:** The sample consisted of 73 patients, in which 90 lower 1A vertical molar extractions were performed. Regarding the outline of the surgical technique, of the 90 surgeries performed, only 22 followed the previous planning. Of the 69 surgeries that had alterations in the technique, 64 had failures regarding dislocation and removal of the tooth via the socket and 4 presented trans-surgical accidents such as corono-radicular fractures, leading the surgeon to transalveolar extraction. **Conclusion:** Root anatomy, previously evaluated by imaging exams, may directly influence the type of technique to be recommended for removal of lower third molars of vertical IA classification, it is necessary to evaluate and question the classification of root types to assist in the preoperative planning of this type of tooth, optimizing the surgical time.

Keywords: Panoramic Radiography, Third Molar, Unerupted Tooth, Tooth Extraction.

RESUMO

Objetivo: Descrever as situações clínicas em que a técnica aberta foi utilizada após a tentativa de utilizar a técnica fechada em procedimentos cirúrgicos para extração de terceiros molares inferiores de classificação 1A. **Metodologia:** As extrações dos terceiros molares inferiores foram realizadas no Departamento Universitário de Cirurgia e Traumatologia Sobral Oral e Maxilofacial de setembro de 2016 a maio de 2019. Setenta e três pacientes de 18 a 38 anos de idade, ASA I e II, com indicações para extração de terceiros molares da classificação IA vertical totalmente irrompida, foram selecionados para pesquisa. **Resultados:** A amostra consistiu de 73 pacientes, nos quais foram realizadas 90 extrações de molares verticais 1A inferiores. Com relação ao esquema da técnica cirúrgica, das 90 cirurgias realizadas, apenas 22 seguiram o planejamento anterior. Das 69 cirurgias que tiveram alterações na técnica, 64 tiveram falhas em relação à luxação e remoção do dente via soquete e 4 apresentaram acidentes transcirúrgicos, como fraturas corono-radulares, levando o cirurgião à extração transalveolar. **Conclusão:** A anatomia radicular, previamente avaliada por exames de imagem, pode influenciar diretamente o tipo de técnica a ser recomendada para a remoção dos terceiros molares inferiores da classificação vertical IA, é necessário avaliar e questionar a classificação dos tipos radulares para auxiliar no planejamento pré-operatório deste tipo de dente, otimizando o tempo cirúrgico.

Palavras-chave: Radiografia Panorâmica, Terceiro Molar, Dente não irrompido, Extração de Dentes.

1 INTRODUCTION

Lower Third molar extraction is one of the most common oral surgery procedures; however, it may be complex due to the clinical conditions associated with this tooth, such as the intimate

relationship between its roots and the inferior alveolar nerve or compromising medical condition of the patient. Reported complication rates range from 3.5% to 14.8% for third molar extraction [1-4], ranging from worse complications comprising lower alveolar or lingual nerve injury and mandibular fracture[3,5,6]. Several classifications have been proposed to establish an accurate rate of surgical difficulty, and thus help to take better decision to treatment plan[3,5,6-9]. The Winter, Pell and Gregory classifications are some of the most commonly used in clinical practice, but none of them are completely accurate[10]. With respect to the Winter classification, the angle formed between the lines that correspond to the long axis of the second and third molars, and the impaction is described as vertical, mesio-rectangular, horizontal or distal-angular[7]]. According to the Pell & Gregory classification, molars can be divided into three classes - I, II and III - which are related to the space between the mandible branch and the distal side of the second molar. Class III position provides the greatest challenge for removal this kind of tooth. Still according to the classification of Pell & Gregory[10], the depth is classified in three positions, class A, in which the occlusal plane of third molar is level with that of the second molar, class B, in which the occlusal plane is between the occlusal plane of the second molar and its cervical line and class C, in which the occlusal plane of the impaction is below the cervical line of the second molar. Therefore, based on an analysis of relevant historical, clinical and imaging information, the patient's risks and benefits should be considered when deciding on the best surgical technique to perform. Therefore, based on an analysis of relevant historical, clinical and imaging information, the patient's risks and benefits should be considered when deciding on the best surgical technique to perform. In combination with surgical techniques, three fundamentals are required for good extraction: proper access and visualization of the surgical field, an unimpeded path for tooth removal, and the use of controlled force to dislocate and remove the tooth, as a good previous surgical procedure planning[11]. In general, a root that has suddenly invaded space can be extracted using one or two main techniques: closed or open. The closed technique is also known as the routine, often used and is the first consideration for erupted tooth extractions[1,4,6,8]. The open technique is known as the surgical technique or retail technique, being used when we want to avoid the use of excessive force[12]. The correct protocol for extraction should aim at atraumatic manipulation of the tissues and tooth to be removed; the wrong method usually results in an excessively traumatic and long extraction. Several common steps apply to the removal of all impacted teeth, such as the use of appropriate flaps for visibility, dental exposure through removal of overlapping bone, the dental section - if necessary - and its removal prior to the final suture [11]. The aim of the present study is to evaluate the clinical situations in which the open technique was used after the attempt to use the closed technique.

2 METHODOLOGY

Patients and methods

This study was a descriptive and retrospective, which evaluated medical records of patients undergoing lower third molar extractions in the Buccomaxillofacial Surgery and Traumatology department at University of Sobral from September 2016 to May 2019. Patient's records with aged between 18 and 38 years old, ASA I and II, with indications for lower third molar extraction that had a fully erupted vertical IA classification were selected. The exclusion criteria were patients with active periodontal disease, less than two thirds of root formation present or associated with any pathological lesion not included in the analysis, and only patients who agreed to sign the free and informed consent form, stating about possible complications and benefits of research. The retrospective study was conducted in accordance with the Helsinki statement and approved by the Ethics Committee of the Vale do Acaraú State University (No: 2,434, 518).

Surgical protocol

The included teeth were removed following the initial planning: after regional anesthesia, their initial extraction by the closed technique following the clinical principles: making an envelope mucoperiosteal flap, attempting alveolar dislocation with straight and triangular levers or forceps and case extracted, final alveolar suture. If the closed technique failed, the open or flap surgery method would be recommended: Making a triangular mucoperiosteal flap, using a high-rotation turbine coupled with surgical drill #6 for osteotomy and, if necessary, surgical drill #702 for section, followed by of tooth dislocation and removal by the use of levers / extractors. Analgesics and anti-inflammatory drugs were standardly prescribed in all surgeries performed.

Study design

The medical records analyzed for each patient were evaluated according to the technique used, considering the radiographic classification of the tooth position and the root classification. The reason for the failure or complication that led the surgeon to use one surgical protocol over the other indicated in the medical records was also used for study criteria.

Statistical analyses

The relationship between the techniques used and the type of root anatomy of the extracted teeth was compared by Fisher's exact test using the Microsoft SPSS® 2013 program.

3 RESULTS

From 221 medical records evaluated, only 73 were used by the inclusion criteria. The sample was 73 patients, in which 90 lower molar extractions with position 1A vertical were performed. Of these, 58 were female and 15 male. The study included patients aged 18 to 38 years. Regarding the third molars removed, tooth 48 was more prevalent ($n = 52$) followed by tooth 38 ($n = 38$). Regarding the outline of the surgical technique, of the 90 surgeries performed, only 22 followed the previous planning (**Table 1**). Of the 69 surgeries that had alterations in the technique, 64 presented failures regarding dislocation and removal of the tooth via the socket and 4 presented trans-surgical accidents such as corono-radicular fractures, leading the surgeon to transalveolar extraction (**Table 2**).

TABLE 1: Study specifications for frequency of use of open technique and closed technique.

Technique	N = 90
Open	68 (75%)
Close	22 (25%)

TABLE 2: Study Specifications When Changing Preoperative Planning.

Surgical planning	N= 90
Surgeries without changes in surgical planning	22(25%)
Alteration due to tooth dislocation and removal	64 (71,1%)
Alteration for trans-surgical coronoradicular fracture	4(3,9 %)

TABLE 3: Study specifications comparing root classification with the surgical technique used, with Fisher's exact test ($p < 0.000001$), $p < 0.01$.

N = 90	Regular anatomy	Root anomalies	Total (p value) Fisher's exact test
Open Technique	4	64	68
Close Technique	22	0	22
Total (p value)	26	64	90 $p < 0.000001$

4 DISCUSSION

Even in erupted third molar, their extractions have complex peculiarities when compared to the other teeth in the arch. Location, time of eruption (the last teeth to erupt) and, consequently, less physiological space for eruption and maintenance of third molar[13] are factors that may influence the surgical planning. Bone cortical density is an important factor to consider. When the patient is young, their bone density is lower and, therefore, easier to achieve tooth dislocation in tooth extractions[13,14,22]. Thus, a dental extraction procedure in patients over 35 years old, with higher bone density, will reflect a lower cortical expansion, which will result in lower tooth mobility and greater chance of using surgical drills to perform osteotomies. total tooth removal. The presence of anatomical structures - such as the external oblique line - in this region may affect the use of the closed

technique because the buccal cortical wall is thick and rigid compared to the lingual one, and the anterior border of the mandibular ramus is closely related to the distal face of the third molar, also having the narrowest periodontal ligament[16]. Due to the principles of closed extraction, buccal and lingual expansion is necessary for the tooth to be removed, however, the third molar is positioned in an area that is difficult to support for forceps, and straight and triangular levers are commonly used for dislocation in the distal and mesial directions of the socket, diverging from the standard closed technique. When analyzing the present study, the removal of vertical third 1A molars may present some variations in their root classification justified by the fact of the inconstant and irregular anatomy that this tooth can provide, which considerably alters its surgical planning. A fully erupted third molar may show, on radiographic examination: mesial, distal or both directions root dilution, larger root space diameter than crown diameter, hypercementosis, divergence, and extensive root length[10,17]. The most prevalent classification was third molars with two roots and anatomical variations present, justifying the presence of the majority of tooth extractions that failed when initially outlined by the closed technique[10,18]. The root anatomy of third molars becomes an important factor in the surgical technique employed during extraction, which may facilitate or hinder extraction during the surgery[7,10,18]. Thus, the most appropriate time to extract an impacted tooth is when the root is not fully formed: one to two thirds of its formation. In teeth with fully formed roots, may be more sensitive to coronary or root fractures during the procedure. On the other hand, if less than one third of the root is formed, extraction will be difficult, since the tooth may cause the rotation movement inside the socket due to the lack of apprehension and support that would exist if there was minimal root structure. In cases of divergent roots, the likelihood of osteotomy and dental removal for tooth removal will increase[19]. In the present study, the presence of 2 roots (n = 70) with root variations (n = 68) prevailed over the presence of 2 or 1 root with regular anatomy or anomalies (Table 3), justifying that the presence of anomalies may have influenced the change in surgical planning. In the current literature, cases of hypercementosis in third molars are uncommon, but once presenting this characteristic, it may make the surgical procedure difficult and prolong. Regarding the erupted third molars, depending on the root anatomy and the number of roots[10,18-21], it is justifiable need to begin surgical planning of erupted lower third molars 1A vertical with osteotomy and odonto-section for atraumatic and injury-free removal[10,21]. It can be stated, from the present study: with the failure of the closed technique, the use of the open technique should be a viable alternative to facilitate the extraction of the tooth (Fig. 1) and, in cases of evident root anomalies, open technique may be justified as the first option for removal of vertical third molars 1A. (Fig. 2A)

5 CONCLUSION

Root anatomy, previously evaluated by imaging tests, may directly influence the type of technique to be recommended for removal of lower third molars of vertical AI classification. Thus, it is necessary to evaluate and question the classification of root types, optimizing the surgical time of this procedure.

Figures

Figure 1: Extraction of tooth 48, classification IA, through the open technique



Figure 2: Dental elements 38 and 48 of different individuals with the same radiographic classification (IA) and different root anatomies, indicating different surgical protocols, tooth 38 (flap + ostectomy) and tooth 48 (flap + ostectomy + tooth section)



Compliance with Ethical Standards:

Funding: No funding received

Conflict of Interest: All the authors declare no conflict of interest.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: “Informed consent was obtained from all individual participants included in the study.

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