

Study of the Complications and Post-Operative Consequences of Surgical Extractions of Mandibular Wisdom Teeth

Wahid OH^{1*}, Boujoual I² and Haitami S³

¹Resident, Unit of Fixed prosthodontics, Hospital University Ibn Rochd, Faculty of Dentistry, University Hassan II Casablanca, Morocco.

²Professor, department of fixed prosthodontics, Faculty of Dentistry, University Hassan II Casablanca, Morocco.

³Professor, Surgery department, Faculty of Dentistry, University Hassan II Casablanca, Morocco.

*Correspondence:

Wahid OH, Resident, Unit of Fixed prosthodontics, Hospital University Ibn Rochd, Faculty of Dentistry, University Hassan II Casablanca, Morocco.

Received: 27 Mar 2023; Accepted: 23 Apr 2023; Published: 27 Apr 2023

Citation: Wahid OH, Boujoual I, Haitami S. Study of the Complications and Post-Operative Consequences of Surgical Extractions of Mandibular Wisdom Teeth. Oral Health Dental Sci. 2023; 7(2); 1-5.

ABSTRACT

Introduction: Extraction of the mandibular third molar is one of the most common surgical procedures in dentistry. This act is associated with considerable postoperative complications, which have a biological and social impact.

Objective: To study the factors associated with the occurrence of complications related to the extraction of the lower wisdom tooth.

Methods: This is a descriptive and analytical study targeting all the patients consulting for the extraction of the mandibular third molar, we used an anonymous closed-ended questionnaire. Data were entered into a spreadsheet Excel. With the use of a statistical software Jamovi version current, descriptive statistics were calculated for all the variables of the study. A value of $P < 0.05$ was accepted as statistically significant.

Results: All of the patients enrolled and present for postoperative appointments suffered from postoperative consequences and 10.9% from complications. The postoperative follow-up rate was 100%, on the third postoperative day 95.7% of patients had pain, 84.8% dysphagia, 76.1% insomnia, 94.6% trismus, 88% a reduction in their daily activity and 98.9% swelling. On the seventh day, 75% of patients presented with pain, 26.1% with dysphagia, 19.6% with insomnia, 94.6% with trismus, 28.3% with a reduction in their daily activity and 37% with swelling.

Keywords

Extraction wisdom mandibular tooth, Complications, Pain, Trismus, Extraction of third mandibular molar, Postoperative complications, Oral surgery.

Introduction

The extraction of the mandibular third molar is one of the most common surgical procedures in dental practice. A recent study found that an annual cost of over 3 billion USD \$ was spent for the extraction of third molars in the United States and over 5 million £ was spent on such extractions in England and Wales [1].

Surgical extraction of the mandibular third molar is associated with possible postoperative complications that can reach a rate of 30% [2,3]. It is generally associated with considerable postoperative complications, which have a biological and social impact. These complications include dysesthesia, infection, fracture, pain, swelling, trismus, hemorrhage, and damage to adjacent teeth. Factors that may affect the occurrence of complications after third molar extraction include age, gender, medical history, smoking, use of oral contraceptives, poor oral hygiene, presence of infection, the relationship between the third molar and the inferior alveolar nerve, the position of the tooth, the experience of the surgeon, the operating time, the surgical technique [4-6].

Postoperative complications after surgical extraction of a lower third molar remain an important factor in patient comfort and recovery. Knowledge of different methods of reducing morbidity after third molar surgery would help both the surgeon and the patients in the management of lower third molars [7,8]. Therefore, clinicians would benefit from knowing the risk factors associated with postoperative follow-up after mandibular third molar surgery. This, in turn, will allow them to avoid subjecting patients to such risks when performing lower third molar surgery. Thus, the purpose of this study is to evaluate the various risk factors that may be the cause of the postoperative consequences of surgical extractions of mandibular wisdom teeth.

Patients and Methods

This is a descriptive and analytical study targeting 100 patients consulting at the Surgical Odontology department of the Casablanca Dental Consultation and Treatment Center (DCTC) for the surgical extraction of the mandibular third molar from February 25 to February 25, July 2018.

The patients included in the study are patients with an indication for surgical extraction of the mandibular third molar. Patients not presenting an indication for surgical extraction, patients cared for by members of the investigation team. (The supervising professors, the specialist responsible for the statistical part, a third-year resident, and two second-year interns) were excluded from the study. The support of the survey is an individual, anonymous questionnaire, it includes 53 questions, the majority of which are closed-ended.

The questionnaire contains four main sections: A section of data related to the patient, a section relating to the surgical site, a section of data related to the attitude of the practitioner, and a section concerning postoperative complications. The questionnaires thus established were distributed among the four investigators, who were calibrated. During the initial visit and the follow-up on the third and seventh postoperative day, the information was recorded by the investigators: the surgeons who had operated on the patients had not been involved in the preoperative, intra-operative, or post-operative evaluation. The variables were divided into 3 groups pre, intra, and postoperative.

The descriptive part was devoted to the description of the demographic data of the patient, habits of life, the general state of health, the radio-anatomical variations of the teeth, the experience and the attitude of the practitioner, the application of post-operative advice, the frequency of intra-operative and post-operative complications. Data were entered into a spreadsheet (Excel; Microsoft, Inc., Redmond, WA) during the study. With the use of Jamovi statistical software, descriptive and analytic statistics were calculated for all study variables.

Results

Among the 100 patients who underwent 100 surgical extractions of mandibular wisdom teeth, 92 patients presented for postoperative

check-up appointments on D3 and D7. The 8 other patients are lost to view and therefore excluded from the study.

A total of 92 patients were followed, with a female predominance (67.4% women) of different age groups (19-30 years [63%]) of which 44.6% are academics, the percentage of patients who smoke was 14.1% and that of patients with general health problems was 6.5% (Table 1).

Concerning the extracted teeth 37% of the extracted wisdom teeth present cavities, followed by 25%, which were extracted within the context of orthodontic care, we noted that 42.4% of the teeth are wedged of which 56.4 % present a class II impaction, 87% of the extracted teeth presented an oblique axis and 44.6% are close to the inferior alveolar nerve. The rate of teeth in the total inclusion position is 15.2% (Table 2).

We found that 64.1% of the surgeons who performed the procedures were women, and in 80.4% of cases, they were residents with experience varying between 1 and 4 years. Mostly the extractions were performed by osteotomy and root separation in 67.4% of cases (Table 3). The median duration of surgery was 30 min. The different techniques used are osteotomy alone (15.2%), osteotomy associated with root separation (7.6%), osteotomy associated with coronal separation (67.4%), root separation (2.2%), and osteotomy associated with coronal-radicular separation (7.6%). In 12% of surgeries, we witnessed intraoperative complications, 69.2% are emphysemas, and 23.1% were fractures of the external bone table. All of the patients who participated in the study and who showed up for post-operative appointments suffered from post-operative follow-up and 10.9% from post-operative complications. The postoperative follow-up rate was 100%, on the third postoperative day 98.9% of patients presented with swelling, 95.7% of patients presented with pain, 94.6% with trismus, 88% with a reduction in daily activity, 84.8% with dysphagia and 76.1% insomnia. On the seventh postoperative day, 94.6% of patients presented with trismus, 75% pain, 37% swelling, 28.3% a reduction in their daily activity, 26.1% dysphagia, and 19.6% insomnia (Table 4).

Table 1: Demographic characteristics of the patients studied.

Variable	N	(%)
Gender: Female		
Age	60	(67,4)
12 – 18	4	(4,3)
19 – 30	58	-63
31- 40 Over 40	13	(14,1)
Education level		
Illiterate	17	(18,5)
Primary	15	(16,3)
Secondary	16	(17,4)
University	20	(21,7)
Lifestyle		
Smoking	41	(44,6)
0 to 10 cigarettes per day	13	(14,1)
No general pathology:	86	(93,5)

Table 2: Characteristics related to the tooth.

IAN: Inferior alveolar nerves

Variable	N	(%)
Indications:		
Cavities	34	(37)
Pericoronitis suppurativa	5	(5,4)
Serous pericoronitis	13	(14,1)
Suppurative cellulitis	7	(7,6)
Cyst	3	(3,3)
Nervous orthodontic Prosthetic	2	(2,2)
Radio-anatomical variations:		
<i>X-Ray Used:</i>		
Panoramic	5	(5,4)
Beam Cone	100	(100)
<i>Tooth situation:</i>		
Total inclusion	14	(15,2)
Partial inclusion	18	(19,6)
Disinclusion	5	(5,4)
Landlocked On the arch <i>Tooth axis</i>	39	(42,4)
Vertical horizontal	16	(17,4)
Oblique	4	(4,3)
<i>Proximity to IAN:</i>		
Yes	80	(87)
<i>Degree of isolation:</i>		
Class I	15	(38,5)
Class II	22	(56,4)
Class III	2	(5,1)

Table 3: Practitioner and Surgical Technique Data.

Variable	N	(%)
Gender:		
Female Grade:	59	(64,1)
Resident	79	(80,4)
Specialiste	13	(14,1)
Professor Interne	3	(3,2)
Surgical technique:		
Osteotomy alone	1	-1
Osteotomy + Coronoradicular separation	14	(15,2)
(CRS)	62	(67,4)
Osteotomy + root separation (SR) Root Separation (SR)	7	(7,6)
Osteotomy +	2	(2,2)
(SCR)+ (SR)	7	(7,6)

Table 4: Variation of tris, mus and pain (in D3 and D7) according to the factors: sexe, anxiety and smoking

	Tris		mus		Pain	
	D3.	D7.	D3.	D7.	D3.	D7.
Sexe	92 (p=0,03)	48,2 (<0,01)	52,4 (<0,01).	0,06(p=1)		
Anxiety	92 (p=0,59)	1,1 (<0,01)	13,1 (<0,01)	92 (p=0,05)		
Smocking	92 (p=1)	50 (<0,01)	73 (<0,01)	92 (p=0,03)		

For our sample and given the disparity of the arms (only 10.9% of postoperative complications.) it was impossible to make a study of the association by regression of the various risk factors with the occurrence of postoperative complications we, therefore, opted for McNemar's test to compare percentages.

Regarding pain on D3, we found that pain on D3 is more frequent in smoking patients compared to non-smoking patients with

a statistically significant difference ($p < 0.001$) more frequent in women compared to men ($p < 0.001$) especially those taking contraceptives ($p < 0.001$), more frequent in patients with general pathologies ($p < 0.001$), finally it was also important in anxious patients with ($p < .001$). On the other hand, no statistically significant difference was noted concerning pain in relation to compliance with the prescription of antibiotics ($p = 1$) and with compliance with dietary advice $p = 0.371$.

Regarding trismus, trismus in smokers was greater than in non-smokers with a $p < 0.001$, women are more prone to trismus than men ($p < 0.001$), and general pathologies significantly increase the risk of occurrence of trismus with an odds ratio=4.41 and one ($p < 0.001$), anxious patients are almost twice as likely to have trismus after mandibular wisdom tooth extraction compared to non-anxious patients ($p < 0.001$). Contrary to compliance with dietary advice which has no significant effect on the occurrence of trismus $p = 0.219$.

Discussion

This is the first study in Morocco describing the complications and post-operative consequences related to the extraction of the mandibular wisdom tooth. All of the patients who participated in the study and who showed up for post-operative appointments suffered from post-operative follow-up and 10.9% from postoperative complications. On the third postoperative day 98.9% of patients presented swelling, 95.7% of patients presented pain, 94.6% trismus, 88% a reduction in their daily activity, 84.8% dysphagia, and 76.1% of insomnia.

On the seventh postoperative day, 94.6% of patients presented with trismus, 75% pain, 37% swelling, 28.3% a reduction in their daily activity, 26.1% dysphagia, and 19.6% insomnia. This fairly high rate of postoperative complications could be explained by the difficulty of the surgery (Osteotomy + Corono-radicular separation (CRS) in two-thirds of cases), the presence of infectious and/or inflammatory processes (suppurative pericoronitis was present at 5.4% and Inflammatory Pericoronitis at 14.1%) and by the situation of the tooth since in our study 42.4% of the extracted wisdom teeth were embedded in the bone, which further complicates their extractions.

Grossi et al. [9-11] found that smoking affects pain perception, which is consistent with our study. However, Haraji and Rakhshan [12,13] assessed the effect of smoking on pain. In their analysis, smoking had no significant effect on postoperative pain on the first or third postoperative day, or overall.

Regarding gender, Chiu and Cheung [14,15] found no significant difference between mean pain scores in men and women, unlike Benediktsdottir, Yuasa, and Sagiura [15-17] who reported a higher postoperative pain score in men and that of Colorado-Bonnin et al. [15,18] who similarly to our study found that men had lower VAS pain scores than women.

Concerning women using oral contraceptives, the study conducted by Almeida et al. 2016 [19], concluded that their use increased by 3.5 times the risk of developing osteitis following the extraction of the mandibular third molar, which corroborates the results of our study where we found a statistically significant difference concerning postoperative pain, trismus, and swelling, between the group of women taking only oral contraceptives and those not taking them. ($p < 0.001$).

Okawa et al. [20,21] reported that patients felt more pain if the state of anxiety was higher in the therapeutic environment. Van Wijk and Lindeboom [20,22] showed that anxiety control measures were strongly related to anticipated pain and pain experienced within a week of extraction. Both of these studies demonstrated that anxiety has a potential pain-increasing effect. This corroborates the results of our study where anxious patients were more likely to feel pain after extraction of the mandibular third molar ($p < .001$).

In addition, trismus is one of the common complications that occur after the extraction of impacted mandibular third molars. It usually happens due to infection, repeated muscle stimulation, and other causes. This symptom is usually relieved after 1 to 2 weeks; however, it may persist > 1 month postoperatively in very rare cases. In our study between D3 and D7, the severity of complications decreased considerably for all variables except for trismus which remained the same, this is because muscle contracture is a phenomenon that takes time to disappear (can last several weeks) this is in agreement with Zhang et al. [23].

Indeed, it is very common to have postoperative inflammatory symptoms such as pain, swelling, and trismus after surgery, which are transient and resolve spontaneously within two weeks. However, some postoperative complications are more serious and the symptoms do not go away without further management. For example, prolonged temporomandibular joint symptoms after surgery may occur in some patients, even though the swellings have resolved. This is usually due to too many lateral forces being executed during the extraction, causing disc displacement or traumatic inflammation around the joint complex.

Several factors can contribute to the development of lockjaw. For example, when extracting the mandibular third molar from the vestibular side, the muscle-tendon may be severed; this painful stimulus causes muscle protection, which results in trismus [23,24]. In addition, during lower alveolar nerve block anesthesia, spasms of the masticatory muscles can be caused by incomplete disinfection and infection. Brooke [23,25] reported that multiple needle injections during anesthesia can cause inflammation in this area while stretching of intraoral muscles and muscle spasms can be caused by the use of narcotics. However, the symptoms of progressive trismus in the patient presented here were not greatly affected by the above factors. Undoubtedly, it is important to consider the impact of surgical third molar extraction on the patient's quality of life, not only to improve quality of life and obtain better-informed consent but also to assess the indications and the benefit/risk ratio of this type of surgery.

The management of intraoperative anxiety remains a major challenge in oral and maxillofacial surgery. This is independent of technical, pharmacological, and surgical advances. The development of stress-reducing and anxiolytic intraoperative techniques is of considerable importance to patients and surgeons. Our study showed that there was a lack of information communicated to the patient and/or information was not provided effectively when patients were referred for surgery. Atchison and colleagues [20,26] found gaps in patients' understanding of postoperative care and suggested the need for improved postoperative instructions. Stress-related to surgery can impair patients' ability to retain oral information.

In addition, in our study, we found a lack of compliance with the understanding, assimilation, and application of post-operative advice and instructions, given the level of education of the population studied 55.4% have a level of education not exceeding secondary school.

In our study, the experience of the practitioner was a limitation because 80.4% of the practitioners were residents with an experience that varies between 1 and 4 years, which remains insufficient, thus explaining longer durations of intervention that may be at risk. Origin of post-operative consequences and complications. While in a study published in 2010, [27] residents reported a higher incidence of trismus, nerve paresthesia, alveolar osteitis, and infection, while hemorrhage was the only complication with a higher incidence in the hands of specialists.

Working on a sample of 67.4% of women represented a limit because according to Seward et al. [15] the women had more pain and swelling after the procedure. Gender is an important risk indicator for pain and the development of dry sockets. A woman was three times more likely to report postoperative pain than a man. In another study, men reported more postoperative pain than women, but the pain is a subjective phenomenon and its perception may be related to demographic and cultural differences [28,29].

Conclusion

Not all wisdom tooth extractions are complex, in some cases, the extraction is simple and in many other cases, the procedure involves the lifting of a flap, an osteotomy, and possibly a section of the tooth. Therefore, the risks of surgical complications must be weighed against the benefits of extraction, especially when it comes to asymptomatic wisdom teeth.

This study assessed the incidence of postoperative complications associated with the extraction of mandibular third molars. The rate of postoperative complications and the risk of permanent sequelae increase with the patient's anxiety. In our study, we found a lack of compliance concerning the understanding, assimilation, and application of post-operative advice and instructions, given the level of education of the population studied, therefore it is necessary to put in place all the necessary means to ensure the assimilation and understanding of post-operative advice to improve the quality of life of patients.

References

1. Costa MG, Pazzini CA, Pantuzo MC, et al. Is there justification for prophylactic extraction of third molars? A systematic review. *Braz Oral Res.* 2013; 27: 183-188.
2. Calhoun NR. Dry socket and other postoperative complications. *Dent Clin North Am.* 1971; 15: 337-348.
3. Osborn TP, Frederickson G Jr, Small I, et al. A prospective study of complications related to mandibular third molar surgery. *J Oral Maxillofac Surg.* 1985; 43: 767-769.
4. <http://www.head-face-med.com/content/7/1/8>
5. Bui Chi H, Seldin EB, Dodson TB. Types, frequencies and risk factors for complications after third molar extraction. *J Oral Maxillofac Surg.* 2003; 61: 1379-1389.
6. Reuton T, Smeeton N, Mcurk M. Factors predictive of difficulty of mandibular third molar surgery. *Br Dent J.* 2001; 90: 607-610.
7. Chukwunke F, Onyejiaka N. Management of postoperative morbidity after third molar surgery: a review of the literature. *Niger J Med.* 2007; 16: 107-112.
8. Malkawi Z, Al-Omiri M.K, Khraisat A. Risk Indicators after Lower Third Molar Extraction. *Med Princ Pract.* 2011; 20: 321-325.
9. Bergstrom J, Preber H. Tobacco use as a risk factor. *J Periodontol.* 1994; 65: 545.
10. Giovanni Battista Grossi, Carlo Maiorana, Rocco Alberto Garramone, et al. Assessing Discomfort After Third Molar Surgery. *J Oral Maxillofac Surg.* 2007; 65: 901-917.
11. Sweet JB, Butler DP. Increased incidence of postoperative localized osteitis in mandibular third molar surgery associated with patients using oral contraceptives. *Am J Obstet Gynecol.* 1977; 127: 518-519.
12. Haraji A, Rakhshan V. Chlorhexidine gel and less difficult surgeries might reduce post-operative pain, controlling for dry socket, infection and analgesic consumption: a split-mouth controlled randomised clinical trial. *J Oral Rehabil.* 2015; 42: 209-219.
13. Vahid Rakhshan. Common risk factors for postoperative pain following the extraction of wisdom teeth. *J Korean Assoc Oral Maxillofac Surg.* 2015; 41: 59-65.
14. Chiu WK, Cheung LK. Efficacy of preoperative oral rofecoxib in pain control for third molar surgery. *Oral Surg Oral Med Oral Pathol Oral Endod.* 2005; 99: e47-e53.
15. Otasowie D, Osunde Birch D, Saheeb. Effect of Age, Sex and Level of Surgical Difficulty on Inflammatory Complications After Third Molar Surgery. *J. Maxillofac. Oral Surg.* 2015; 14: 7-12 .
16. Benediktsdottir IE, Wenzel A, Petersen JK, et al. Mandibular third molar removal: risk indicators for extended operation time, post operative pain and complications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2004; 79: 434-446.
17. Yuasa H, Sugiura M. Clinical postoperative findings after removal of impacted mandibular third molars: prediction of operative facial swelling and pain based on preoperative variables. *Br J Oral Maxillofac Surg.* 2004; 42: 209-214.
18. Colorado-Bonnin M, Valmaseda-Castellon E, Berini-Aytes L, et al. Quality of life following lower third molar removal. *Int J Oral Maxillofac Surg.* 2006; 35: 343-347.
19. Almeida L.E, Pierce S, Klar K, et al. Effects of oral contraceptives on the prevalence of alveolar osteitis after mandibular third molar surgery: a retrospective study. *Int. J. Oral Maxillofac. Surg.* 2016; 45: 1299-1302.
20. Bernardo Ferreira Brasileiro, Rafaella Mariana Fontes de Bragança, Joseph Edward Van Sickels. An Evaluation of Patients' Knowledge About Perioperative Information for Third Molar Removal. *J Oral Maxillofac Surg.* 2012; 70: 12-18.
21. Okawa K, Ichinohe T, Kaneko Y. Anxiety may enhance pain during dental treatment. *Bull Tokyo Dent Coll.* 2005; 46: 51-58.
22. Van Wijk A, Lindeboom J. The effect of a separate consultation on anxiety levels before third molar surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2008; 105: 303-307
23. Zhang Y, Zhuang P, Jia B, et al. Persistent trismus following mandibular third molar extraction and its management: A case report and literature review. *World Acad Sci J.* 2021; 3: 2.
24. Balakrishnan G, Narendar R, Kavin T, et al. Incidence of trismus in transalveolar extraction of lower third molar. *J Pharm Bioallied Sci.* 2017; 9: S222-S227.
25. Brooke RI. Postinjection trismus due to formation of fibrous band. *Oral Surg Oral Med Oral Pathol.* 1979; 47: 424-426.
26. Atchison KA, Black EE, Leathers R, et al. A qualitative report of patient problems and postoperative instructions. *J Oral Maxillofac Surg.* 2005; 63: 449-456.
27. Jerjes W, Upile T, Nhembe F. Experience in third molar surgery: an update. *British Dental Journal.* 2010; 209: E1.
28. Chiapasco M, Crescentini M, Romanoni G. Germectomy or delayed removal of mandibular impacted third molars: the relationship between age and incidence of complications. *J Oral Maxillofac Surg.* 1995; 53: 418-422.
29. Ingibjorg S Benediktsdottir, Ann Wenzel, Jens K Petersen, et al. Mandibular third molar removal: Risk indicators for extended operation time, postoperative pain, and complications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2004; 97: 438-446.