

## Demographic Factors as Prognostics of Patients' Morbidity Following Wisdom Tooth Surgery

Abdurrahman A Al-Samman<sup>1,2\*</sup>, Bashar Adil Al-Mashhadani<sup>3</sup> and Ammar M. Rajab<sup>1</sup>

### Abstract

**Background:** Surgical removal of impacted mandibular third molars is a common procedure in oral and maxillofacial surgical practice with undesirable consequences such as pain and swelling that have a major concern for most patients. This study aimed to investigate the impact of age and gender on postoperative intensity of pain and swelling experienced by patients following mandibular third molar surgery (M<sub>3</sub>MS).

**Material and Methods:** The study involved 46 patients underwent surgical extraction of mandibular third molar under local anesthesia. The visual analogue scale measured pain and swelling for seven consecutive days after surgery.

**Results:** After M<sub>3</sub>MS, patients experienced the most pain severity in the day of surgery, while facial swelling reaching a maximum in the first postoperative day. It was found that the influence of age and gender on the intensity of pain and degree of swelling was insignificant.

**Conclusion:** Pain and swelling after M<sub>3</sub>MS peaked on the day of surgery and the day after respectively with mild to moderate intensity, it subsided gradually to minimal levels on day 7. Short-term outcomes of M<sub>3</sub>MS with respect to degrees of pain and swelling were found to be similar, and it seems to be independent of both' age and gender.

**Keywords:** Pain; Swelling; Morbidity; Oral surgery; Wisdom tooth surgery.

### Introduction

Surgical removal of impacted mandibular third molars (M<sub>3</sub>M) is a common procedure

in oral and maxillofacial surgical practice [1]. However, it is uncomfortable for patients because of postoperative undesirable consequences such as pain and

<sup>1</sup>Department of Oral Surgery/The Left Specialized Dental Center, Ninawah Health Directorate, Ministry of Health, Mosul, Iraq

<sup>2</sup>Lecturer, Department of Dentistry, Al-Noor University College, Mosul, Iraq

<sup>3</sup>Department of Oral Surgery/The Left Specialized Dental Center, Ninawah Health Directorate, Ministry of Health, Mosul, Iraq

\*Corresponding Author: Abdurrahman A Al-Samman, BDS, MFDS-RCPSG, MSc (Oral and Maxillofacial Surgery), Department of Oral Surgery/The Left Specialized Dental Center, Ninawah Health Directorate, Ministry of Health, Mosul, Iraq.

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swelling that have a major concern for most patients [2,3]. Oral surgeons should be able to predict the anticipated degree of postoperative discomfort [4], and to follow strategies of managing these drawbacks when they arise. Postoperative complications are directly related to surgical difficulty, which could be predicted preoperatively by classical difficulty scoring scales that based on radiographic variables only [5,6]. However, the recent ones involved additional demographic and clinical variables [7,8]. The degree of pain and swelling following M<sub>3</sub>M surgery were reported though out many studies [3,9-14]. Researchers reported that the highest pain intensity following M<sub>3</sub>M surgery is within few hours [14-16] or on the day after surgery [11,12]. In contrast, when postoperative swelling is concerned, Studies found it to be in maximum degree in day two [11-13] or three [14,16,17] after surgery.

The aim of this study was to assess the degree of pain and swelling following M<sub>3</sub>M throughout the immediate postoperative period, and to investigate the impact of patients' age and gender on these complications.

## Material and methods

This study is apart from a previously conducted research [18]. Surgical removal of impacted M<sub>3</sub>M were executed in forty-six dental patients who presented to the Department of the oral surgery/The Left specialized dental center, Mosul city, Iraq. The local ethics committee approved the study. All participants were healthy individuals (American Society of Anesthesiologists grade I) with no systemic diseases, and they signed informed consent.

Medically compromised patients, female patients using oral contraceptives or those

aged below 18years were excluded from the study. In addition, those with cognitive or mental disability, and patients who refuse to participate were also excluded. Operations were conducted following the standard protocols under local anesthesia by two expert oral surgeons (A.A., G.M). Postoperatively, amoxicillin 500mg (or alternatives in amoxicillin-allergic patients) and ibuprofen 200mg TID for 5 days were prescribed to all patients. In addition to verbal and written postoperative instructions were given by the operators.

Recording of pain and swelling after surgery: At night of the day of surgery and for 6 consecutive days, participants asked to record the intensity of their pain using the visual analog scale (VAS); which is a horizontal line of 100mm in length with two limits 'No pain' and 'Worst imaginable pain' placed at each end of the line. Similarly, swelling recorded on another VAS with the ends 'No swelling' and 'Worst imaginable swelling'. Scores of pain and swelling were compiled from patients one week later, when they came for suture removal and for evaluation of the surgical site.

Statistical analysis (IBM SPSS Statistic 23): Paired-samples T test, independent sample T test, and Chi-square test used in data analysis. A probability value (P) of less than 0.05 was considered significant.

## Results

Among the forty-six patients who expressed an interest to participate in this study, three patients did not return for suture removal. Another three patients (6.52%) were excluded from the study; one did not know how to use rating scale, and two did not complete their rating of pain and/or swelling throughout the postoperative study period. The included patients were 22

male (55%) and 18 females (45%) aged 18-37 years (mean age of 25.8±6.3 years). Right

(n=23) and left (n=17) mandibular wisdom teeth were extracted (Table 1).

No. of patients	Age range (Mean/SD)	Site of M3M		Age group		Sig.	Gender		Sig.
		Right	left	<26	≥ 26		Male	Female	
40	18-37 (25.8/6.3)	15	25	20	20	1	22	18	0.527

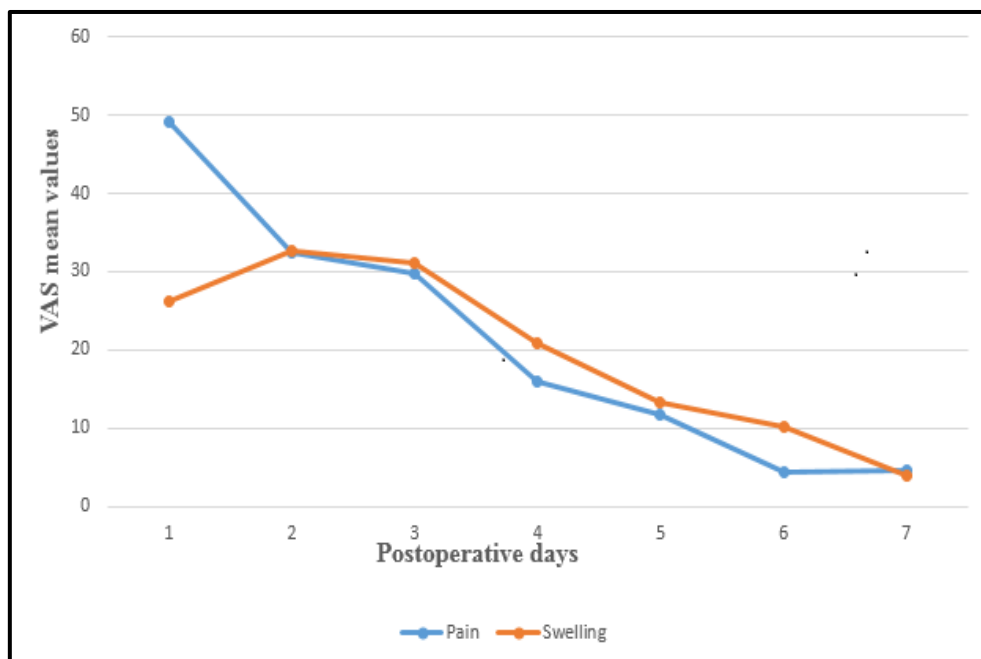
**Table 1:** Number of patients concerning their age and gender. SD=Standard deviation, M3M: Mandibular third molar, Significant at the 0.05 level (Chi-square test).

By pooling all patients, the mean value of pain reached a maximum at the night of the day of surgery (Day 1); it was moderate and subsided gradually to almost no pain on day 6 (Table 2, Figure 1). In day 1, most of patients (65%) reported moderate severity

of pain. However, two patients (5%) reported no pain and eight patients (20%) reported severe pain (Table 3). There was a statistically significant difference in the VAS scores for pain in day 1 compared with day 2, 3, and 4 ( $P<0.028$ ).

Postoperative period	Pain (Mean/SD)	Swelling (Mean/SD)
Day 1	49.2 (29.2)	26.2 (22.1)
Day 2	32.4 (24.4)	32.6 (23.4)
Day 3	29.7 (28)	31.1 (22.3)
Day 4	15.9 (18.2)	20.9 (16)
Day 5	11.8 (16.1)	13.3 (16.3)
Day 6	4.3 (11.3)	10.2 (13.9)
Day 7	4.5 (13.4)	4 (12.5)

**Table 2:** Postoperative pain and swelling mean values (VAS).



**Figure 1:** Postoperative pain and swelling values after M3MS.

Postoperative complain	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
No pain	5	7.5	35	50	57.5	77.5	77.5
Mild pain	10	62.5	35	47.5	40	20	20
Moderate pain	65	30	27.5	0	2.5	2.5	0
Severe pain	20	0	2.5	2.5	0	0	2.5
No swelling	12.5	7.5	7.5	7.5	42.5	57.5	70
Mild swelling	57.5	62.5	60	90	55	40	27.5
Moderate swelling	30	30	30	0	2.5	2.5	0
Severe swelling	0	0	2.5	2.5	0	0	2.5

**Table 3:** Percent (%) of patients with postoperative pain and swelling.

Majority of patients (87.5%) recorded mild to moderate facial swelling in the day of surgery (Table 3). The maximum mean of VAS scores was in the first postoperative day (Table 2) which is significantly different from the following postoperative days ( $P < 0.018$ ). Swelling subsided gradually though out the following postoperative days, and about 70% of patients had no swelling on the sixth post-operative day

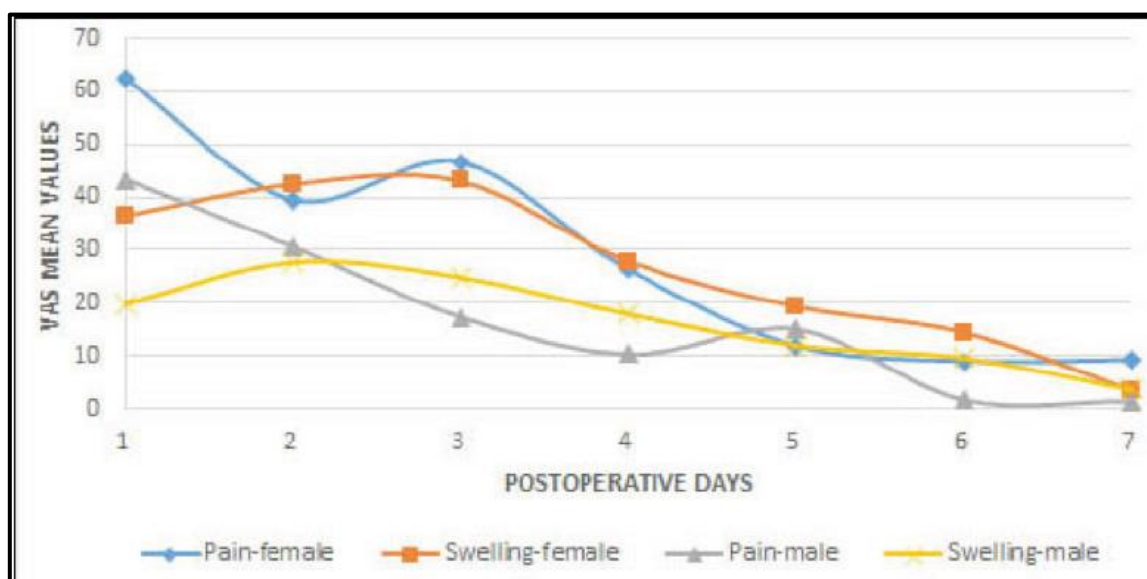
(Table 2, Figure 1). Female patients reported more postoperative pain and swelling than males did. However, there were no significant differences between the two groups (Table 4, Figure 2).

Similarly, no significant difference was reported between young and old patients with respect to postoperative pain and swelling (Table 4, Figure 3).

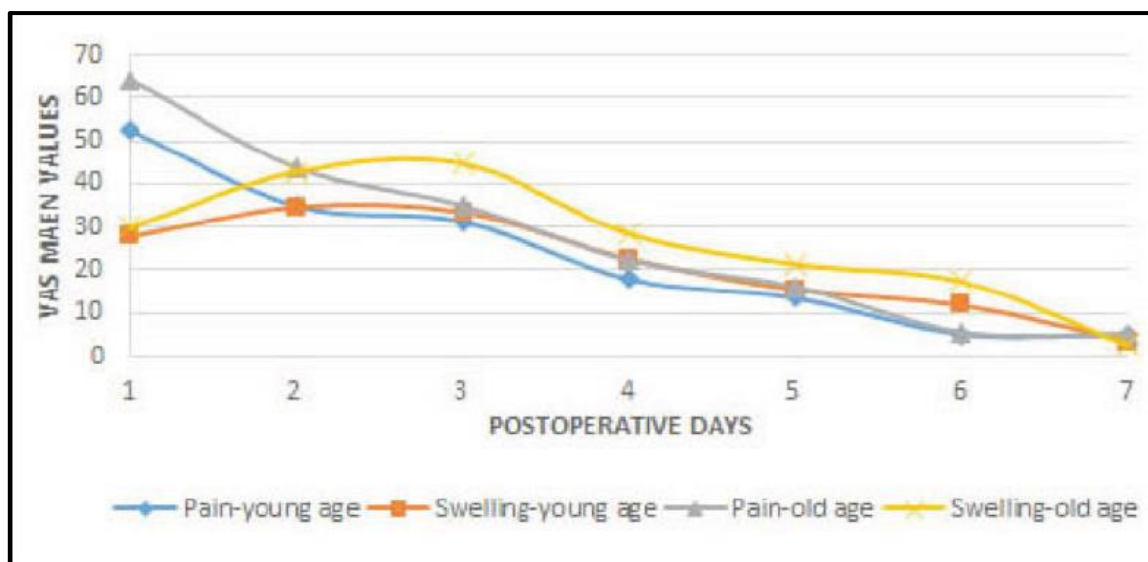
Pain		Swelling	
Young vs. old	Male vs. female	Young vs. old	Male vs. female
0.673	0.239	0.462	0.143

**Table 4:** Statistical significance\* in age and gender concerning postoperative pain and swelling.

\*Significant at the 0.05 level (Independent sample T test).



**Figure 2:** Gender-related postoperative pain and swelling values following M<sub>3</sub>MS.



**Figure 3:** Age-related postoperative pain and swelling values following M3MS.

## Discussion

Concerning M3M surgeries, the impact of patients' age and gender on postoperative morbidity is somewhat conflicting. Some studies showed no effect of age [19-22] or gender [21,23]. On the contrary, others found that age [19,24-26] and gender [19,24, 27,28] are prognostic factors of postoperative patients' discomfort. In this study, VAS used to evaluate pain and swelling. It is one of the most frequently used subjective method to assess these parameters [3,14].

Although it is an effective and reliable tool [2,29], however, it requires the patient's concentration [30] and be ability to equate the amount of experienced discomfort with the length of line on the scale [31]. For that reason, only patients aged 18 years or over were included in our study. In spite of that, some of our participants found VAS difficult to use.

Different cut points on the VAS have been considered to categorize discomfort [32]:

1. (0-4mm): No pain/swelling

2. (5-44mm): Mild pain/swelling
3. (45-74mm): Moderate pain/swelling.
4. (75-100mm): Severe pain/swelling.

Patients rated their experienced pain and swelling in this study for seven consecutive days, starting on the day of surgery to give detailed data related to the immediate postoperative discomfort, this was in conjunction with the work done by another researchers [13,14,33,34].

Researchers found difficulty in securing patient collaboration when conducting clinical trials [35,36]. In the present study, 13% of the patients failed to use and/or complete the VAS for pain and swelling for the whole period of study. M3M surgeries involves trauma to the soft and hard tissues that results in inflammatory response manifested as various complications like pain and swelling [37]. In the present study, the maximum pain intensity was on the day of surgery, which was in agreement with other studies [14-16]. Two patients (5%) reported no pain on day 1, and one remained pain free throughout the period of the study, which may be attributed to a high

pain threshold or an under estimation of pain intensity.

The distribution of patients' VAS scores for pain was skewed to the right: 25% of patients scored 0-46; 50% scored 0-54; and 75% scored 0-70. The mean VAS score was 49 over 100 indicating that the pain intensity perceived by patients on day 1 after M3M surgery is moderate giving a good correlation with the previous studies with regards to pain intensity, where VAS scores of 4, 4.8, and 5 over 10 have been reported [1,11,12]. Most of patients suffered from swelling that reached the maximum on the first and second postoperative days; this was consistent with other studies [10,11,13,14]. In the first postoperative day, the mean of VAS scores of swelling was 32 over 100, about 92.5% of participants had mild to moderate swelling. One patient reported severe swelling (VAS score was 100 over 100), an over estimation of swelling may be attributed to such an extreme value. In other studies, comparable values (36 over 100; and 2.6 over 10) have been reported [38,39] indicating that a mild to moderate

intensity of swelling could be perceived by patients following M3M surgeries. With the line of other studies [21,22], patient's age had a limited impact on postoperative intensity of pain and swelling. This could be related to the narrow range of patient ages that may hide the debilitating effect of age, since third molar extraction is mostly performed in young and middle-aged patients [40]. Also, consistent with our findings, researchers found no correlation between gender and the intensity of postoperative pain and swelling [21,23]. This study tells that the values of pain and swelling after M3M surgeries peaked on days 1 and 2 respectively with mild to moderate intensity, then subsided gradually to minimal values on day 7. However, the small sample size of this study along with degree of surgical difficulties of executed cases put difficulties to have a clear conclusion concerning the effect of patients' age and gender; therefore, more studies are recommended. Moreover, careful consideration should be given to other factors like patient's anxiety from dental procedures, oral hygiene and drug use.

## References

1. Nageshwar. Comma Incision for Impacted Mandibular Third Molars. *J Oral Maxillofac Surg.* 2002;60(12):1506-9. [PubMed](#) | [CrossRef](#)
2. Al-Samman AA, Al-Nuaime OS, Othman HA. Validity and Reliability of Full Cup Test in Pain Evaluation after Dental Surgery: A Comparison with Four Pain-Rating Scales in a Sample of Iraqi Patients. *JODR.* 2016;1:2-8. [CrossRef](#)
3. Danda AK, Krishna Tatiparthi M, Narayanan V, Siddareddi A. Influence of Primary and Secondary Closure of Surgical Wound After Impacted Mandibular Third Molar Removal on Postoperative Pain and Swelling-A Comparative and Split Mouth Study. *J Oral Maxillofac Surg.* 2010;68(2):309-12. [PubMed](#) | [CrossRef](#)
4. Christiansen R, Kirkevang LL, Hørsted-Bindslev P, Wenzel A. Patient Discomfort Following Periapical Surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2008;105(2):245-50. [PubMed](#) | [CrossRef](#)
5. Winter GB. Principles of Exodontia as Applied to the Impacted Third Molar. American Medical Books, St Louis. 1926.
6. Pell GJ. Impacted Mandibular Third Molars: Classification and Modified Techniques for Removal. *Dent Digest.* 1933;39:330-8.
7. Susarla SM, Dodson TB. Risk Factors for Third Molar Extraction Difficulty. *J Oral Maxillofac Surg.* 2004 Nov;62(11):1363-71. [PubMed](#) | [CrossRef](#)
8. Gbotolorun OM, Arotiba GT, Ladeinde AL. Assessment of Factors Associated with Surgical Difficulty in Impacted Mandibular Third Molar Extraction. *J Oral Maxillofac Surg.* 2007;65(10):1977-83. [PubMed](#) | [CrossRef](#)

9. Dolanmaz D, Esen A, Isik K, Candirli C. Effect Of 2 Flap Designs on Postoperative Pain and Swelling after Impacted Third Molar Surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2013;116(4):e244-6. [PubMed](#) | [CrossRef](#)
10. Hashemi HM, Beshkar M, Aghajani R. The Effect of Sutureless Wound Closure on Postoperative Pain and Swelling after Impacted Mandibular Third Molar Surgery. *Br J Oral Maxillofac Surg.* 2012;50(3):256-8. [PubMed](#) | [CrossRef](#)
11. Osunde OD, Adebola RA, Saheeb BD. A Comparative Study of the Effect of Suture-Less and Multiple Suture Techniques on Inflammatory Complications Following Third Molar Surgery. *Int J Oral Maxillofac Surg.* 2012;41(10):1275-9. [PubMed](#) | [CrossRef](#)
12. Osunde OD, Saheeb BD, Adebola RA. Comparative Study of Effect of Single and Multiple Suture Techniques on Inflammatory Complications after Third Molar Surgery. *J Oral Maxillofac Surg.* 2011;69(4):971-6. [PubMed](#) | [CrossRef](#)
13. Bello SA, Olaitan AA, Ladeinde AL. A Randomized Comparison of the Effect of Partial and Total Wound Closure Techniques on Postoperative Morbidity after Mandibular Third Molar Surgery. *J Oral Maxillofac Surg.* 2011;69(6):e24-30. [PubMed](#) | [CrossRef](#)
14. Pasqualini D, Cocero N, Castella A, Mela L, Bracco P. Primary and Secondary Closure of the Surgical Wound After Removal of Impacted Mandibular Third Molars: A Comparative Study. *Int J Oral Maxillofac Surg.* 2005;34(1):52-7. [PubMed](#) | [CrossRef](#)
15. Sanchis Bielsa JM, Hernández-Bazán S, Peñarrocha Diago M. Flap Repositioning Versus Conventional Suturing in Third Molar Surgery. *Med Oral Patol Oral Cir Bucal.* 2008;13(2):E138-42. [PubMed](#)
16. Kareem JJ. A Comparison Between Primary and Secondary Wound Closure After Surgical Removal of Lower Third Molars According to Pain and Swelling. *MDJ.* 2008;5:410-417. [CrossRef](#)
17. Hashemi HM, Beshkar M, Aghajani R. The Effect of Sutureless Wound Closure on Postoperative Pain and Swelling after Impacted Mandibular Third Molar Surgery. *Br J Oral Maxillofac Surg.* 2012;50(3):256-8. [PubMed](#) | [CrossRef](#)
18. Al-Samman AA. Pattern of Pain and Swelling after Periapical and Wisdom Tooth Surgery: Are age and Gender Predictive Factors?. *IDJ.* 2017;52-8. [CrossRef](#)
19. de Santana-Santos T, de Souza-Santos aA, Martins-Filho PR, da Silva LC, de Oliveira E Silva ED, Gomes AC. Prediction of Postoperative Facial Swelling, Pain and Trismus Following Third Molar Surgery Based on Preoperative Variables. *Med Oral Patol Oral Cir Bucal.* 2013;18(1):e65-70. [PubMed](#) | [CrossRef](#)
20. Adeyemo WL, Ogunlewe MO, Ladeinde AL, Hassan OO, Taiwo OA. A Comparative Study of Surgical Morbidity Associated with Mandibular Third-Molar Surgery in Young and Aging Populations. *J Contemp Dent Pract.* 2010;11(4):E001-8. [PubMed](#) | [CrossRef](#)
21. Baqain ZH, Karaky AA, Sawair F, Khraisat A, Duaibis R, Rajab LD. Frequency Estimates and Risk Factors for Postoperative Morbidity after Third Molar Removal: A Prospective Cohort Study. *J Oral Maxillofac Surg.* 2008;66(11):2276-83. [PubMed](#) | [CrossRef](#)
22. Bui CH, Seldin EB, Dodson TB. Types, Frequencies, and Risk Factors for Complications after Third Molar Extraction. *J Oral Maxillofac Surg.* 2003;61(12):1379-89. [PubMed](#) | [CrossRef](#)
23. Akadiri OA, Okoje VN, Arotiba JT. Identification of Risk Factors for Short-Term Morbidity in Third Molar Surgery. *Odontostomatol Trop.* 2008;31(124):5-10. [PubMed](#)
24. Bienstock DA, Dodson TB, Perrott DH, Chuang SK. Prognostic Factors Affecting the Duration of Disability After Third Molar Removal. *J Oral Maxillofac Surg.* 2011;69(5):1272-7. [PubMed](#) | [CrossRef](#)
25. Kim JC, Choi SS, Wang SJ, Kim SG. Minor Complications after Mandibular Third Molar Surgery: Type, Incidence, And Possible Prevention. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006;102(2):e4-11. [PubMed](#) | [CrossRef](#)
26. Olmedo-Gaya MV, Vallecillo-Capilla M, Galvez-Mateos R. Relation of Patient and Surgical Variables To Postoperative Pain and Inflammation in the Extraction of Third Molars. *Med Oral.* 2002;7(5):360-9. [PubMed](#)
27. Benediktsdóttir IS, Wenzel A, Petersen JK, Hintze H. 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(4):438-46. [PubMed](#) | [CrossRef](#)
28. Capuzzi P, Montebugnoli L, Vaccaro MA. Extraction of Impacted Third Molars. A Longitudinal Prospective Study on Factors That Affect Postoperative Recovery. *Oral Surg Oral Med Oral Pathol.* 1994;77(4):341-3. [PubMed](#) | [CrossRef](#)
29. Berge TI. The Use of a Visual Analogue Scale in Observer Assessment of Postoperative Swelling Subsequent to Third-Molar Surgery. *Acta Odontol Scand.* 1989;47(3):167-74. [PubMed](#) | [CrossRef](#)

30. Briggs M, Closs JS. A Descriptive Study of the Use of Visual Analogue Scales and Verbal Rating Scales for the Assessment of Postoperative Pain in Orthopedic Patients. *J Pain Symptom Manage.* 1999;18(6):438-46. [PubMed](#) | [CrossRef](#)
31. Cook AK, Niven CA, Downs MG. Assessing the Pain of People with Cognitive Impairment. *Int J Geriatr Psychiatry.* 1999;14(6):421-5. [PubMed](#) | [CrossRef](#)
32. Jensen MP, Chen C, Brugger AM. Interpretation of Visual Analog Scale Ratings and Change Scores: A Reanalysis of Two Clinical Trials of Postoperative Pain. *J Pain.* 2003;4(7):407-14. [PubMed](#) | [CrossRef](#)
33. Peñarrocha-Diago M, Maestre-Ferrín L, Peñarrocha-Oltra D, Gay-Escoda C, von-Arx T, Peñarrocha-Diago M. Pain and Swelling after Periapical Surgery Related to the Hemostatic Agent Used: Anesthetic Solution with Vasoconstrictor or Aluminum Chloride. *Med Oral Patol Oral Cir Bucal.* 2012;17(4):e594-600. [PubMed](#) | [CrossRef](#)
34. Tsesis I, Shoshani Y, Givol N, Yahalom R, Fuss Z, Taicher S. Comparison of Quality of Life after Surgical Endodontic Treatment Using Two Techniques: A Prospective Study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2005;99(3):367-71. [PubMed](#) | [CrossRef](#)