

THE INFLUENCE OF SURGICAL EXPERIENCE, TYPE OF INSTRUCTIONS GIVEN TO PATIENTS AND PATIENT SEX ON POSTOPERATIVE PAIN INTENSITY FOLLOWING LOWER WISDOM TOOTH SURGERY

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SUMMARY – The aim of this study was to determine the extent to which the intensity of postoperative pain in the first seven days after lower wisdom tooth extraction is affected by operator experience, patient level of information and patient sex. Postoperative pain intensity after lower wisdom tooth extraction was assessed in 108 patients. Depending on the type of information given to each patient individually, the patients were divided into two groups: test group in which patients were provided with detailed standard written and verbal instructions and control group where patients only received detailed standard written instructions about treatment after surgery. Each of these two groups was divided into three subgroups depending on operator experience. Results of this study showed that the type of information irrespective of being given verbally or not had no effects on postoperative pain intensity, whereas operator experience and patient sex influenced postoperative pain intensity.

Key words: *Postoperative pain; Wisdom teeth; Operator experience; Verbal instructions; Patient sex*

Introduction

Extraction of impacted lower wisdom teeth is a common procedure in oral and maxillofacial surgery and most people require this surgery at some point in their lives^{1,2}. The reasons for extracting these teeth include acute or chronic pericoronitis, presence of cysts or a tumor, periodontal problems, and presence of a carious lesion on the second or third mandibular molar¹. In some cases, extraction is performed in preparation for orthodontic treatment or orthognathic

surgery. In North America, extraction of impacted mandibular third molars is often intended to prevent future complications³.

Pain after operative measures is a subjective reaction that is influenced by several factors, including individual pain threshold, psychological assessment, general health, and pain perception^{4,5}. Before any such procedure, the patient must be informed on the reason for the surgery and the associated risks. Also, after surgical removal of lower wisdom teeth, the patient should be provided with postoperative instructions which should facilitate the postoperative period that is often accompanied by symptoms that significantly impair patients' quality of life.

The factors that increase the risk of postoperative discomfort are traumatic extraction⁶⁻⁸, preop-

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erative infection^{8,9}, chronic periodontitis¹⁰, osteonecrosis of the jaws¹¹, cigarette smoking⁹, sex¹², site of extraction¹³, use of oral contraceptives¹⁴, use of local anesthetic with a vasoconstrictor¹⁵, inadequate postoperative irrigation¹⁶, and inexperienced surgeon^{6,17}. Several complications are associated with extraction of impacted mandibular third molars, the most common being alveolitis, infection, and paresthesia of the inferior alveolar nerve¹⁸⁻²⁰. Hemorrhage during or after surgery and paresthesia of the lingual nerve are relatively rare^{18,21,22}; surgical technique seems to play a major role in the occurrence of the latter problem²¹. Citations indicate that many clinicians rank pain as a significant postoperative complication²⁴⁻²⁶.

The aim of this study was to determine whether surgical experience and type of instructions to the patients influence postoperative pain after lower third molar surgery, and to assess whether patient sex influences pain severity estimated with the visual analog scale (VAS) score during the period of seven postoperative days.

Patients and Methods

The present study included patients undergoing lower third molar extraction at Department of Maxillofacial Surgery, Osijek University Hospital Center in Osijek, Croatia. The patients that agreed to participate in the study signed an informed consent. Patient identity was protected in such a way that the patient's identification number was used instead of full name. The study involved 108 adults randomly chosen and

divided into two groups, test group and control group. Test group patients received detailed verbal and standard written instructions for treatment after surgery, while control group patients received only detailed standard written instructions. Each of these two groups was divided into three subgroups depending on the experience of the operator performing the surgery. First subgroup of patients was operated by an experienced operator with more than 10 years of working experience, second subgroup by an operator with more than 5 and less than 10 years of working experience, and third subgroup by an operator with less than 5 years of working experience. In all patients, surgical procedure was the same regardless of the operators' experience and was performed by elevation of a mucoperiosteal flap with or without bone removal. After signing the informed consent for participation in the study, basic information was determined on each individual patient.

The study included 108 patients, female 60.19% and male 39.81%. The average age of patients was 32 years, 33 in test group and 31 in control group. Table 1 presents detailed survey of the level of education and employment of the study patients. Most patients (81.48%) completed high school, both in the test and control groups. Control group included 51.85% of patients with high school, while their percentage was slightly higher in test group (64.81%). College and university degree had 14.82% of patients, 16.67% in test group and 12.96% in control group. The lowest percentage (3.70%) of patients had finished elementary school but were currently high school students. There were 23.15% of university students.

Table 1. Socioeconomic indicators of study patients

Indicator	Test group	Control group	Total
Age (yrs) (mean ± SD)	33±11	31±12	32±11
Female	27 (50.00%)	38 (70.37%)	65 (60.19%)
Male	27 (50.00%)	16 (29.63%)	43 (39.81%)
Elementary school	1 (1.85%)	3 (5.56%)	4 (3.70%)
High school	44 (81.48%)	44 (81.48%)	88 (81.48%)
High school student	1 (1.85%)	3 (5.56%)	4 (3.70%)
University student	9 (16.67%)	16 (29.63%)	25 (23.15%)
High school degree	35 (64.81%)	28 (51.85%)	63 (58.33%)
University degree	9 (16.67%)	7 (12.96%)	16 (14.82%)

SD = standard deviation

After surgery, all subjects received VAS to assess the postoperative pain intensity during the first seven days after surgery. Pain severity was recorded daily in a specially prepared table with instructions determining the severity of pain. All patients were recommended paracetamol (3x500 mg) for use in the postoperative period as a sole analgesic. The data collected were stored in a database using Microsoft Excel 2010 and processed by a computer using the Statistica, version 10 statistical software. For both study groups, descriptive statistics was calculated to show whether operator experience, provision of detailed verbal instructions and patient sex had influence on the intensity of pain following removal of lower wisdom teeth.

Results and Discussion

In this study, we examined the influence of surgical experience, level of patient information and patient sex on the intensity of postoperative pain after surgical removal of lower wisdom teeth in 108 patients.

Influence of operator's surgical experience on postoperative pain intensity

In Figure 1, the box and whisker diagrams show that the median of postoperative pain intensity was lowest (2.57) in patients operated by the operator with more than 10 years of experience. For the operator with experience of 5 to 10 years, it was 2.64, and for the operator with experience of less than 5 years it was 3.07. It is also evident that the patients operated by the operator with more than 10 years of experience also had the lowest maximum value of postoperative pain intensity of 7.14 and the lowest interquartile range of 2.28; the respective value for the operator with experience between 5 and 10 years was 3.07, and for the operator with experience of less than 5 years it was highest, i.e. 3.29.

The results suggested that there were differences in postoperative pain intensity measured over seven days between the groups of patients operated by the operators with different periods of work experience. These differences were determined by comparing the median and interquartile range of postoperative pain intensity and were calculated for each group of patients operated by the individual operator. The lowest median value of postoperative pain intensity was observed in

the group of patients operated by the operator with more than 10 years of surgical experience. It was also noted that in the same group of patients, their individual postoperative pain intensity values varied in a smaller range, in contrast to the group of patients operated by the operator with experience of 5 to 10 years and patients operated by the operator with experience of less than 5 years. The lowest maximum intensity of postoperative pain was recorded in the most experienced operator. Results of previous studies showed the level of recorded pain to be higher in the group of patients operated by doctors of dental medicine compared with the group operated by oral surgeons, which was not associated with the experience of the operator, but with the chosen pain control after treatment²⁷. A number of studies demonstrated the impact of surgical experience on the higher rate of postoperative complications^{18,20,22,28,29}. Jerjes *et al.*²⁸ report on a higher rate of postoperative complications in the group of patients operated by doctors of dental medicine and indicate that it may be associated with improvements in surgical skills on wisdom tooth removal and with operators experienced in the procedure. Blondeau and Daniel³ suggest that the lack of operator experience may be a major factor in the occurrence of postoperative complications following removal of lower wisdom teeth. In their study report, Jerjes *et al.*³⁰ point to a

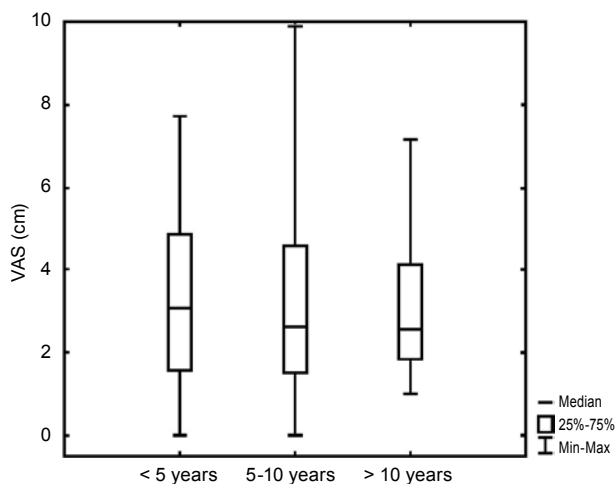


Fig. 1. Box and whisker plots of postoperative pain intensity according to operator experience; VAS (cm) = visual analog scale in centimeters; median = measure of central tendency; 25% = lower quartile; 75% = upper quartile; min = lowest score; max = high score.

connection between the experience of the surgeon and the incidence of postoperative complications after removal of impacted third molars.

Influence of patient information on postoperative pain intensity

In Figure 2, the box and whisker diagrams show that the median values of postoperative pain intensity are equal (about 2.85) regardless of the level of information provided to patients. Furthermore, it is evident that a higher maximum value of postoperative pain intensity of up to 9.86 and higher interquartile range of 3.29 were recorded in patients who did not receive detailed verbal instructions. The maximum value of postoperative pain intensity in patients who received detailed verbal instructions was 6.86 and interquartile range was 2.28.

The present study revealed significant differences in postoperative pain intensity between the two patient groups according to the level of information offered to patients. Both groups showed comparable median values, whereas individual values of postoperative pain intensity varied in a larger range in control

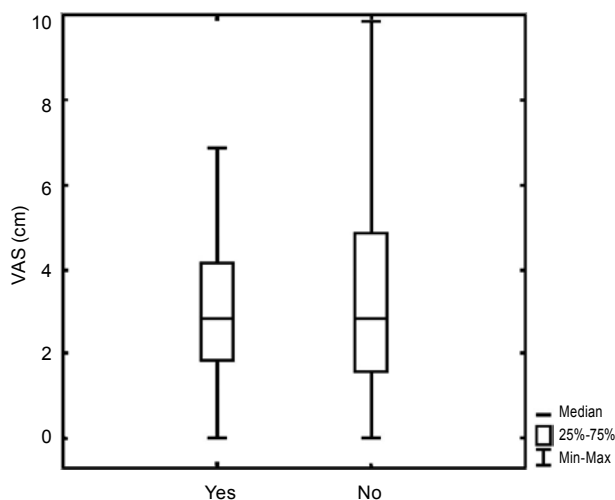


Fig. 2. Box and whisker plots of postoperative pain intensity according to patient level of information: Yes = patients having received detailed verbal instructions (test group); No = patients having not received detailed verbal instructions (control group); VAS (cm) = visual analog scale in centimeters; median = measure of central tendency; 25% = lower quartile; 75% = upper quartile; min = lowest score; max = high score.

group of patients that did not receive detailed verbal instructions. Higher maximum values of postoperative pain intensity were also recorded in control group. Some previous studies have reported similar results in terms of patient informing and emphasize the importance of providing detailed information to patients, whereby treatment plan should always be provided in written form³¹⁻³³. Furthermore, Naidoo and Doyal³⁴ state the importance of clear communication between the operator and the patient, especially when things go wrong. Literature also points to situations where too detailed information represents a burden for patients, causing stress intensification^{35,36}, and situations where patients cannot remember important information they received before signing the informed consent³⁷.

Patient sex and postoperative pain intensity

In Figure 3, the box and whisker diagrams show that the median of postoperative pain intensity was higher in female (3.43) compared to male patients (2.43). It is also evident that female patients reported higher pain intensity maximum value compared to male patients (9.86 *vs.* 6.86). Interquartile range of postoperative pain intensity was similar (2.43 in women and 2.55 in men).

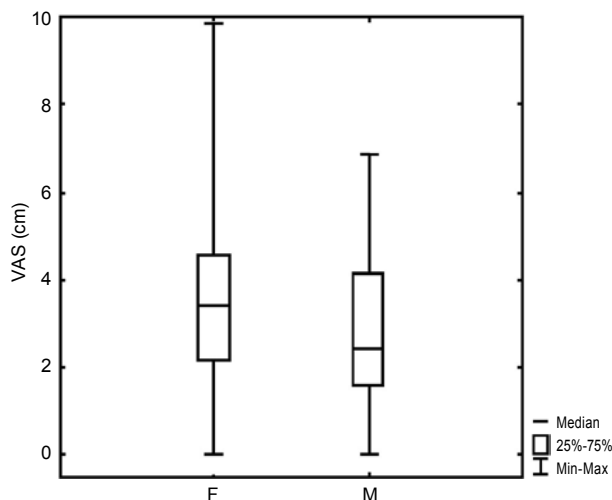


Fig. 3. Box and whisker plots of postoperative pain intensity according to patient sex; F = female; M = male; VAS (cm) = visual analog scale in centimeters; median = measure of central tendency; 25% = lower quartile; 75% = upper quartile; min = lowest score; max = high score.

Analyzing the results in terms of postoperative pain intensity according to patient sex, there were differences in the intensity within the study groups. The differences were determined by comparing the median and interquartile range of postoperative pain intensity, which were calculated for each sex in separate. A higher median value of postoperative pain intensity and the highest maximum value of postoperative pain intensity were recorded in female patient groups. Contrary to different median values, the individual values of postoperative pain intensity varied in much the same range. Overview of previous research in terms of postoperative pain intensity according to sex has yielded similar results, along with the fact that female sex is more pain-sensitive and has a lower threshold of pain tolerance^{32,38-44}.

References

1. CHIAPASCO M, De CICCIO L, MARRONE G. Side effects and complications associated with third molar surgery. *Oral Surg Oral Med Oral Pathol* 1993;76:412-20.
2. SLADE GD, SHUGARS DA, WHITE RP Jr. The impact of third molar symptoms, pain and swelling on oral health-related quality of life. *J Oral Maxillofac Surg* 2004;62:1118-24.
3. BLONDEAU F, DANIEL NG. Extraction of impacted mandibular third molars: postoperative complications and their risk factors. *J Can Dent Assoc* 2007;73(4):325a-325e.
4. SCYMOUR RA, WALTON G. Pain control after third molar surgery. *Int J Oral Surg* 1984;13:457-81.
5. FEINMANN C, ONG M, HARVEY W, HARRIS M. Physiological factors influencing postoperative pain and analgesic consumption. *Br J Oral Maxillofac Surg* 1987;25:285-92.
6. ALEXANDER RE. Dental extraction wound management: a case against medicating post extraction sockets. *J Oral Maxillofac Surg* 2000;58:538-51.
7. BIRN H. Etiology and pathogenesis of fibrinolytic alveolitis ('dry socket'). *Int J Oral Surg* 1973;2:215-36.
8. AI-KHATEEB TL, EI-MARSAFI AI, BUTLER NP. The relationship between the indications for the surgical removal of impacted third molars and the incidence of alveolar osteitis. *J Oral Maxillofac Surg* 1991;49:141-5.
9. SWEET JB, BUTLER DP. The relationship of smoking to localized osteitis. *J Oral Surg* 1979;37:732-5.
10. PEJČIĆ A, KESIĆ Lj, PEŠIĆ Z, MIRKOVIĆ D, STOJANOVIĆ M. White blood cell count in different stages of chronic periodontitis. *Acta Clin Croat* 2011;50:159-67.
11. PECHALOVA P, BAKARDJIEV A, ZAPRIANOV Z, VLADIMIROV B, PORIAZOVA E, ZHELEVA A, HADJIGEORGIEV G, GORANOVA-MARINOVA V, GORANOV S. Bisphosphonate-associated osteonecrosis of the jaws – report of three cases in Bulgaria and review of the literature. *Acta Clin Croat* 2011;50:273-9.
12. MacGREGOR AJ. Etiology of dry socket: a clinical investigation. *Br J Oral Surg* 1968;6:49-58.
13. FIELD EA, SPEECHLEY JA, ROTTER E, SCOTT J. Dry socket incidence compared after a 12-year interval. *J Oral Maxillofac Surg* 1985;23:419-27.
14. CATELLANI JE, HARVEY S, ERICKSON SH, CHERKINK D. Effect of oral contraceptive cycle on dry socket (localized alveolar osteitis). *J Am Dent Assoc* 1980;101:777-80.
15. MEECHAN JG, VENCHARD GR, ROGERS SN, HOBSON RS, PRIOR I, TAVARES C, MELNICENKO S. Local anesthesia and dry socket: a clinical investigation of single extractions in male patients. *Int J Oral Maxillofac Surg* 1987;16:279-84.
16. BUTLER DP, SWEET JB. Effect of lavage on the incidence of localized osteitis in mandibular third molar extraction sites. *Oral Surg Oral Med Oral Pathol* 1977;44:14-20.
17. OGinni FO, FATUSI OA, ALAGBE AO. A clinical evaluation of dry socket in a Nigerian teaching hospital. *J Oral Maxillofac Surg* 2003;61:871-6.
18. SISK AL, HAMMER WB, SHELTON DW, JOY ED Jr. Complications following removal of impacted third molars: the role of the experience of the surgeon. *J Oral Maxillofac Surg* 1986;44:855-9.
19. PRECIOUS DS, MERCIER P, PAYETTE F. Risques et bénéfices de l'ablation des troisièmes molaires incluses: revue critique de la littérature – Partie 2. *J Can Dent Assoc* 1992;58:845-52.
20. BUI CH, SELDIN EB, DODSON TB. Types, frequencies, and risk factors for complications after third molar extraction. *J Oral Maxillofac Surg* 2003;61:1379-89.
21. MUHONEN A, VENTA I, YLIPAAVALNIEMI P. Factors predisposing to postoperative complications related to wisdom tooth surgery among university students. *J Am Coll Health* 1997;46:39-42.
22. LOPES V, MUMENYA R, FEINMANN C, HARRIS M. Third molar surgery: an audit of the indications for surgery, postoperative complaints and patient satisfaction. *Br J Oral Maxillofac Surg* 1995;33:33-5.
23. BRANN CR, BRICKLEY MR, SHEPHERD JP. Factors influencing nerve damage during lower third molar surgery. *Br Dent J* 1999;186:514-6.
24. SAVIN J, OGDEN GR. Third molar surgery – a preliminary report on aspects affecting quality of life in the early postoperative period. *Br J Oral Maxillofac Surg* 1997;35:246-53.
25. OGDEN GR, BISSIAS E, RUTA DA, OGDEN S. Quality of life following third molar removal: a patient *versus* professional perspective. *Br Dent* 1998;185:407-10.

26. van WIJK A, KIEFFER JM, LINDEBOOM JH. Effect of third molar surgery on oral health-related quality of life in the first postoperative week using Dutch version of Oral Health Impact Profile-14. *J Oral Maxillofac Surg* 2009;67:1026-31.
27. HANDELMAN SL, BLACK PM, DESJARDINS P, GATLIN L, SIMMONS L. Removal of impacted third molars by oral/maxillofacial surgery and general dentistry residents. *Spec Care Dentist* 1993;13:122-6.
28. JERJES W, EI-MAAYTAH M, SWINSON B, BANU B, UPILE T, D'SA S, AI-KHAWALDE M, CHAIB B, HOPPER C. Experience *versus* complication rate in third molar surgery. *Head Face Med* 2006;2:14.
29. JERJES W, UPILE T, KAFAS P, ABBAS S, ROB J, McCARTHY P, HOPPER C. Third molar surgery: the patient's and the clinician's perspective. *Int Arch Med* 2009;2:32.
30. JERJES W, UPILEE T, NHEMBE F, GUDKA D, SHAH P, ABBAS S, McCARTHY E, PATEL S, MAHIL J, HOPPER C. Experience in third molar surgery: an update. *Br Dent J* 2010;209:E1.
31. NAIDOO S. Dental Ethics Case 3: Informed consent: risk and benefits of treatment. *J Dent Assoc S Afr* 2010;65:270-1.
32. PHILLIPS C, GELESKO S, PROFFIT WR, WHITE RP Jr. Female and older adult patients (age ≥ 21 years) had slower recovery after third-molar surgery compared with males and younger adults in a US study. *J Evid Base Dent Pract* 2011;11:196-9.
33. BRASILEIRO BF, De BRAGANCA RM, van SICKELS JE. An evaluation of patient knowledge about perioperative information for third molar removal. *J Oral Maxillofac Surg* 2012;70:12-8.
34. NAIDOO S, DOYAL L. Dental Ethics Case 4: Good communication is key: how much do I tell a patient when things go wrong? *J Dent Assoc S Afr* 2010;65(7):328-9.
35. CASAP N, ALTERMAN M, SHARON G, SAMUNI Y. The effect of informed consent on stress levels associated with extraction of impacted mandibular third molars. *J Oral Maxillofac Surg* 2008;66:878-81.
36. BROSNAME T, PERRY M. "Informed" consent in adult patients: can we achieve a gold standard? *Br J Oral Maxillofac Surg* 2009;47:186-90.
37. FERRÚS-TORRES E, VALMASEDA-CASTELLÓN E, BERINI-AYTÉS L, GAY-ESCODA C. Informed consent in oral surgery: the value of written information. *J Oral Maxillofac Surg* 2011;69:54-8.
38. WIZEMAN TM, PARDUE ML. Exploring the biological contributions to human health: does sex matter? Washington, DC: National Academy Press, 2001.
39. SNYDER M, SHUGARS DA, WHITE RP, PHILLIS C. Pain medication as an indicator of interference with lifestyle and oral function during recovery after third molar surgery. *J Oral Maxillofac Surg* 2005;63:1130-7.
40. COLORADO-BONIN M, VALMASEDA-CASTELLÓN E, BERINI-AYTÉS L, GAY-ESCODA C. Quality of life following lower third molar removal. *Int J Oral Maxillofac Surg* 2006;35:343-7.
41. GROSSI GB, MAIORANA C, GARRAMONE RA, BORGONOVO A, CREMINELLI L, SANTORO F. Assessing postoperative discomfort after third molar surgery: a prospective study. *J Oral Maxillofac Surg* 2007;65:901-17.
42. PHILLIPS C, GELESKO S, PROFFIT WR, WHITE RP Jr. Recovery after third-molar surgery: the effects of age and sex. *Am J Orthod Dentofacial Orthop* 2010;138(6):700.e1-700.e8.
43. MALKAWI Z, AI-OMIRI MK, KHRAISAT A. Risk indicators of postoperative complications following surgical extraction of lower third molars. *Med Princ Pract* 2011;20:321-5.
44. CARVALHO RW, Do EGITO VASCONCELOST BC. Assessment of factors associated with surgical difficulty during removal of impacted lower third molars. *J Oral Maxillofac Surg* 2011;69:2714-21.

Sažetak

UTJECAJ ISKUSTVA OPERATERA, VRSTE UPUTA PACIJENTU I SPOLA PACIJENTA NA INTENZITET POSLIJEOPERACIJSKE BOLI NAKON KIRURŠKOG ODSTRANJENJA DONJEG UMNJAKA

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Cilj ovoga istraživanja bio je utvrditi utjecaj radnog iskustva operatera, informiranosti pacijenta i spola pacijenta na intenzitet poslijeoperacijske boli prvih sedam dana nakon odstranjenja donjeg umnjaka. Provedeno je istraživanje vezano za intenzitet poslijeoperacijske boli nakon odstranjenja donjeg umnjaka kod 108 pacijenata. Ovisno o tipu informacije dane svakom pacijentu posebice pacijenti su podijeljeni u dvije skupine: ispitnu u kojoj su pacijenti dobili detaljan standardni pismeni i usmeni naputak te kontrolnu skupinu u kojoj su dobili samo detaljan standardni pismeni naputak o postupanju nakon operacijskog zahvata. Svaka od ovih dviju skupina ispitanika podijeljena je u tri podskupine ovisno o iskustvu operatera. Rezultati studije su pokazali da na intenzitet poslijeoperacijske boli nije imao utjecaj tip informiranosti pacijenta, dok su iskustvo operatera i spol pacijenta utjecali na intenzitet poslijeoperacijske boli.

Ključne riječi: *Poslijeoperacijska bol; Donji umnjak; Iskustvo operatera; Usmeni naputak; Spol pacijenta*