

Characteristics of Preoperative and Postoperative Anxiety in Adults Undergoing Surgical Extraction of Impacted Third Molars

SUMMARY

Background/Aim: Surgical removal of impacted third molars is associated with possible complications that are primarily comprehended as expected. Increase in incidence and severity of complications is directly related to the depth of impaction, and to the age of the patient as well. The aim of this research was to investigate the possible influence of the treatment duration relating to age and gender of the patients, the occurrence of pain, and the existence of previous anxiety experience connected with surgical wisdom tooth removal. **Material and Methods.** The study included adults of both gender indicated for surgical removal of impacted third molars. The existence of previous wisdom tooth removal experience was determined during the first examination, and the subjects' anxiety and pain levels were determined pre-, and postoperatively. **Results:** There were no differences concerning the place of treatment (dental office/operating room) and the duration of surgery. Younger participants showed the lowest levels of preoperative anxiety and the highest levels of postoperative anxiety, and frequently reported postoperative pain. Female participants showed higher levels of preoperative and postoperative anxiety, and also frequently reported postoperative pain. **Conclusions:** Anxiety and pain scores were lower when there was a previous experience with removal of impacted wisdom teeth.

Keywords: Anxiety, Impacted Teeth, Extraction; Post-Extraction Pain

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Introduction

Surgical removal of impacted third molars is associated with possible complications that are primarily comprehended as expected. In addition to pain, these also include inflammation, swelling, and trismus. Besides the expected ones, there are also more serious and permanent complications, such as fractures of the alveolar crest of the jaws, paresthesia of the trigeminal nerve, etc.¹⁻⁵.

Pain is one of the most frequently described postoperative complications after surgical removal of impacted third molars⁶. The knowledge itself of the existence of postoperative complications and possible pain does not meet the same attitude among patients who expect an oral surgery, and it can be the reason for the development of preoperative and postoperative

anxiety to a greater or lesser extent, due to the expected adverse experiences. Anxiety is a negative emotional state characterized by concern, tension, and an increase in physiological arousal due to the perception of danger that threatens the organism and its integrity⁷. In dentistry, just experienced and assumed pain is considered the most significant reason for the appearance of anxiety, as the most common negative emotional experience in adults to possible stress in the dental office.

According to some studies, the increase in the incidence and the severity of complications can be most directly related to the depth of impaction, and to the age of the patient as well⁸. However, after a period of several days, improvement follows, which is most pronounced in terms of the reduction and elimination of pain and inflammation).

The occurrence of pain and other complications during and after surgical removal of impacted third molars could depend on the skill of the operator and the patient's trust in him, the place of the operation (operating room environment, or the dental office conditions), the duration of surgery itself, the way of wound closure, flap design, oral hygiene of the patient, etc.¹⁰⁻¹².

Based on the above, the goal of the research was to investigate preoperative and postoperative anxiety of the participants according the possible influence of oral surgery environment, the intervention length, patients' age and gender, localization of the extracted wisdom tooth, occurrence of pain, and the existence of previous experience with surgical removal of impacted third molars.

Material and Methods

This prospective study included adult patients indicated for surgical removal of impacted third molars in mesioangular position with its completed root development. Participants with the presence of preoperative symptoms (pain, swelling and trismus) could not enter the study, as well as those whose general state of health would increase the risk of treatment, or the appearance of operative complications. The same operative approach was applied to all participants under local anesthesia (4 ccm 2% lidocaine with adrenaline 1:80,000), with standard surgical instruments. The operation was performed randomly in two different places, in the outpatient dental office and the operating room of the oral surgery department of the Zenica Health Center.

The study was approved by the Ethics Committee of the Faculty of Medicine of the University of Zenica (Bosnia and Herzegovina) and was conducted according to the principles of the Declaration of Helsinki¹³. The purpose of the research was explained to the participants prior to the research, and they signed the informed consent to participate in the study.

All subjects were assessed for the presence of anxiety and pain related to the performed oral surgery by filling out the offered measuring scales. The presence of anxiety was measured preoperatively and postoperatively. Preoperatively, on the day of the examination, the presence of dental anxiety (DA) was measured using the revised Corah Dental Anxiety Scale (DASR)¹⁴, and general anxiety using the Spielberger State-Trait Anxiety Inventory (STAI)¹⁵. General anxiety was measured preoperatively, immediately before the procedure itself, and postoperatively on the day after the treatment. The level of pain was assessed postoperatively the day after the treatment using a visual analog scale (VAS)¹⁶. DASR is a scale for assessing the presence of DA in adults. There are

4 questions with answers that are ranked on a Likert scale from 1-5, with a total score of up to 20. Based on the scores achieved on the DASR scale, participants were divided into those with low, moderate, high, and very high DA¹⁴.

The STAI consisted of two forms, X1 for assessing generalized anxiety and X2 form for assessing the presence of situational anxiety. Both forms had 20 questions with answers ranked on a Likert scale¹⁵ from 1-4, with total scores up to 80. Based on the scores achieved on the STAI scale, participants were divided into those with very low, low, moderate, high, and very high general or situational anxiety¹⁷.

The VAS is a one-dimensional pain assessment instrument that consists of a line drawn on paper divided into 10 equal parts, with responses from 0-10. The assessment of the presence of pain was carried out by selecting the specific VAS value, with higher values corresponding to higher intensities of experienced post-operative pain¹⁶.

During the first examination of the subject, the existence of previous experience with surgical removal of third molars with similar clinical characteristics was also determined, which was specifically recorded in the participants' study records.

Statistical analysis of differences in independent samples were determined using a t-test and ANOVA with Bonferroni post hoc test. All analyzes were performed at a significance level of $p \leq 0.05$ with IBM SPSS v. 23 statistical software for the Windows operating system.

Results

A total of 500 patients participated in the study, of which 209 were males and 291 were females. The mean age of the participants in the sample was 25.60 years ($SD \pm 7.88$ years; 18-45 years of age). All the participants were grouped according to age, as shown in Table 1.

Table 1. Distribution of respondents according to age groups according to Gedik et al. (18)

age group	f	%
< 20 years	139	27.8
21-29 years	264	52.8
30-39 years	46	9.2
40-49 years	51	10.2
Total	500	100.0

312 patients had their third molars extracted in the operating room and 188 in the dental office of the Zenica Health Center. The duration of the surgery, location of the extracted teeth, and the presence of the previous experience of the similar procedure were presented in Table 2.

Table 2. Distribution of participants according to the duration of the procedure, location of the teeth, and previous experience with third molar surgery

procedure duration (minutes)	f	%	tooth location	f	%	previous experience	f	%
21	108	21.6	upper right	109	21.8	YES	234	46.8
22	125	25.0	upper left	116	23.2			
23	174	34.8	lower left	139	27.8	NO	266	53.2
24	93	18.6	lower right	136	27.2			
total	500	100.0	total	501	100.0	total	500	100.0

Table 3a. Mean values of variables concerning patient gender, place of treatment and previous experience of third molar surgery

measurements	variables	gender	mean	place of treatment	mean	previous experience	mean	
preoperatively	1 st day of measurement	DASR	males	12.9522	dental office	YES	11.9060	
			females	15.3127	operating room	NO	16.4549	
	X1		males	44.2967	dental office	YES	40.7650	
			females	49.0275	operating room	NO	52.5789	
	X2		males	48.0287	dental office	YES	44.7009	
			females	53.1409	operating room	NO	56.5489	
postoperatively	2 nd day of measurement	X1	males	43.3397	dental office	YES	40.7949	
			females	48.1787	operating room	NO	50.8722	
	X2		males	46.9617	dental office	YES	44.6966	
			females	52.3952	operating room	NO	54.8985	
	3 rd day of measurement	X1		males	35.6603	dental office	YES	36.4274
				females	41.4399	operating room	NO	41.3083
X2			males	38.2871	dental office	YES	39.1197	
			females	44.5258	operating room	NO	44.3797	
pain		males	4.4067	dental office	YES	5.2735		
		females	6.6323	operating room	NO	6.0789		

Descriptive values of the scores of preoperative and postoperative dental, general, and situational anxiety achieved on the DASR and STAI scales, the reported pain of the participants concerning their age, gender, place of intervention, and the duration of the operation and localization of the extracted impacted wisdom tooth as well, were shown in Tables 3a and 3b.

Statistical analyzes using the t-test and ANOVA for independent samples did not determine the existence of differences concerning place of the treatment and duration of surgery. The DA, general, and situational anxiety scores in the youngest group of patients (<20 years old) were statistically significantly lowest preoperatively at the first examination (ANOVA, $p<0.001$, $p<0.001$, and $p<0.001$, respectively), and before the procedure itself (ANOVA, $p=0.018$, and $p=0.017$, respectively), while they were statistically significantly highest postoperatively (ANOVA, $p=0.016$, and $p=0.010$, respectively), with statistically significantly highest reported postoperative pain (ANOVA, $p=0.002$). Female patients had statistically significantly higher scores of

general and situational anxiety preoperatively (t-test, $p=0.003$, and $p=0.001$, respectively), and postoperatively (t-test, $p=0.008$, and $p=0.002$, respectively), as well as more postoperative pain scores the day after treatment compared to the male patients (t-test, $p<0.001$). Finally, in all measurements, patients had statistically significantly higher scores of preoperative DA (ANOVA, $p=0.020$), general and situational anxiety at the first (ANOVA, $p=0.014$ and $p=0.015$, respectively) and second preoperative examination (ANOVA, $p=0.001$ and $p=0.002$, respectively), as well as postoperative general and situational anxiety and expressed pain (ANOVA, $p<0.001$, $p<0.001$ and $p<0.001$, respectively). Also, scores of preoperative general and situational anxiety at first (t-test, $p<0.001$ and $p<0.001$, respectively) and second preoperative examination (t-test, $p<0.001$ and $p<0.001$, respectively), as well as postoperative general and situational anxiety and reported pain (t-test, $p<0.001$, $p<0.001$ and $p<0.001$, respectively) were statistically significantly higher in those patients who had no previous experience of surgical removal of impacted third molars.

Table 3b. Mean values of variables concerning age of the patients, duration of surgery, and location of the third molar

measurements	variables	age	mean	duration of surgery	mean	tooth localization	mean
preoperatively	DASR	< 20 years	13.2158	21 minutes	14.6111	upper right	15.0000
		21-29 years	14.5720	22 minutes	14.2480	upper left	14.8103
		30-39 years	16.1957	23 minutes	14.6034	lower left	14.1439
		40-49 years	14.3922	24 minutes	13.5806	lower right	13.5588
	X1	< 20 years	45.0432	21 minutes	47.5741	upper right	48.8991
		21-29 years	47.0833	22 minutes	46.4960	upper left	48.1293
		30-39 years	52.1739	23 minutes	48.1379	lower left	46.5468
		40-49 years	47.7255	24 minutes	45.1505	lower right	45.1618
	X2	< 20 years	48.9065	21 minutes	51.5833	upper right	52.8807
		21-29 years	51.0720	22 minutes	50.4800	upper left	52.0517
		30-39 years	55.9565	23 minutes	52.0747	lower left	50.5324
		40-49 years	51.9020	24 minutes	49.0323	lower right	49.0882
2 nd day of measurement	X1	< 20 years	44.8921	21 minutes	46.5556	upper right	48.3211
		21-29 years	46.2879	22 minutes	45.4000	upper left	47.3879
		30-39 years	49.9565	23 minutes	46.9770	lower left	45.5899
		40-49 years	45.4902	24 minutes	45.1720	lower right	43.9485
	X2	< 20 years	48.6547	21 minutes	50.6574	upper right	52.2569
		21-29 years	50.3561	22 minutes	49.2640	upper left	51.3966
		30-39 years	53.8913	23 minutes	50.9885	lower left	49.5971
		40-49 years	49.5294	24 minutes	49.0430	lower right	47.8676
postoperatively	X1	< 20 years	40.0647	21 minutes	37.9167	upper right	41.7064
		21-29 years	39.1818	22 minutes	37.5920	upper left	40.7155
		30-39 years	39.4348	23 minutes	39.9368	lower left	37.8129
		40-49 years	35.0000	24 minutes	40.5269	lower right	36.6691
	X2	< 20 years	43.2086	21 minutes	40.7778	upper right	44.8440
		21-29 years	42.0303	22 minutes	40.4000	upper left	43.8103
		30-39 years	42.2174	23 minutes	42.8908	lower left	40.5612
		40-49 years	37.5490	24 minutes	43.4624	lower right	39.3456
	pain	do 20 years	5.9424	21 minutes	5.4537	upper right	6.2385
		21-29 years	5.8220	22 minutes	5.4720	upper left	6.0517
	30-39 years	5.4348	23 minutes	5.8563	lower left	5.4604	
	40-49 years	4.6667	24 minutes	6.0108	lower right	5.2206	

Discussion

An increase in the frequency of patients with unpleasant experiences is the subject of observation by a large number of oral surgeons and psychologists¹⁹. Intensity of the unpleasant experience can be influenced by several factors, from the feeling of discomfort that most patients experience entering the operating room due to the visual and auditory effects created by the operating room inventory. It has been shown that the appearance of anxiety is most strongly caused by the impacted third molar surgery at the secondary level of health care, compared to outpatient interventions at the primary level of care^{20,21}. In our research, we did not find that differences existed depending on place of treatment (dental office/operating room).

The results of many studies suggest that most people avoid third molar surgery due to fear of pain. Pain is an expected post-surgical complication after the removal of impacted third molars²². Postoperative pain begins when the effect of the local anesthetic decreases and reaches its maximum intensity during the next 12 postoperative hours²³. The description of pain is always subjective²⁴. Measurement of the intensity of painful sensations is made possible by unidimensional and multidimensional scales for determining the intensity of pain. The VAS scale is the most commonly used²⁵.

Modern techniques of oral surgery and the current therapeutic approach to pain control make painless oral surgery to be a real practice. Nevertheless, a large number of patients still expect that an unpleasant experience during oral surgery is a strong enough to cause severe anxiety²⁶. As already mentioned, in our study, the

occurrence of postoperative pain associated with anxiety was evident, with no difference concerning the site or type of impacted teeth.

In the recent literature, there are conflicting opinions about the influence of age and gender of the patients and the duration of surgery on values of anxiety and pain. The results of individual studies did not establish statistically significant differences in the level of anxiety between the group of younger and older patients, while the scores are generally higher in females²⁷⁻²⁹. In our research, we also did not establish a statistically significant relationship between age and duration of surgery, and the occurrence of anxiety. However, some studies have found this connection in such a way that surgical interventions in a group of older patients lasted longer on average than in a group of younger patients, affecting the anxiety levels^{30,31}. In our research, it was determined that anxiety levels were higher in older patients preoperatively, and then increased and were highest in younger subjects postoperatively. Such findings can speak in favor of ways of coping with stress over time, where the appearance of anxiety in the elderly is linked to the concrete presence and exposure to a specific stressor. Young patients possibly retain feeling of anxiety for longer duration due to the lack of experience, even though the exposure to the stressor itself has ended^{32,33}.

Speaking of postoperative complications and anxiety concerning the location of the impacted tooth, they were more strongly expressed in lower molars³⁴. However, in our research, preoperative and postoperative anxiety and reported pain were more expressed in patients who had their impacted upper third molars removed.

The limitations of this study were mostly related to the age of the participants. Elderly patients in need of the extraction of impacted third molars were usually rarely examined by a dentist, who indicates this kind of oral surgical intervention. Considering the constant advancement of diagnostic procedures in dental medicine, and the trend for the removal of third molars as early as possible in life to prevent possible complications that their persistence can cause, most patients with an indication for the extraction of the third molar have carried it out at a younger age. Hence the values of the monitored parameters would likely be different in an older population.

Conclusions

There were no differences in anxiety regarding place of the treatment and the duration of surgery. Younger patients showed the lowest levels of dental, general, and situational preoperative anxiety and the highest levels of postoperative general and situational anxiety, reporting stronger postoperative pain. Female

patients showed higher levels of preoperative and postoperative general and situational anxiety, as well as reported postoperative pain. Dental, general, and situational preoperative and postoperative anxiety and reported postoperative pain were higher in patients undergoing removal of upper impacted third molars. Anxiety and pain scores were lower when there was a previous experience of removal of impacted third molars.

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