



# The efficacy of abdominal massage in managing opioid-induced constipation

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## ABSTRACT

**Purpose:** This study was conducted to determine the effects of abdominal massage in managing opioid-induced constipation.

**Methods:** Designed as a randomized controlled trial, this study was conducted between February 2017 and January 2018 with the participation of 204 patients who had complaints of opioid-induced constipation. The experimental and control group, each of which included 102 patients, were randomised using a previously prepared randomization checklist. Patients in the experimental group were given a 15-min video-guided abdominal massage training by the researcher, and the patients in this group were asked to perform abdominal massage for 4 weeks, twice a day, 30 min after breakfast and dinner. In the control group, the standard approach of the clinic was applied. A patient data form, the Defecation Diary, Visual Analogue Scale, and Patient Assessment of Constipation Quality of Life Questionnaire were used to the study.

**Results:** The data from the study showed that abdominal massage decreased the severity of constipation, the feeling of incomplete bowel emptying, the severity of straining, the severity of anal pain, and bloating ( $p < 0.05$ ), provided better stool consistency ( $p < 0.05$ ) and increased the number of defecations as well as quality of life scores ( $p < 0.05$ ).

**Conclusion:** The abdominal massage application increased the number of defecations by 13% and was an effective approach for managing opioid-induced constipation symptoms.

## 1. Introduction

Opioids are the main treatment for cancer-related pain and other types of pain. A well-known and common side effect of opioid use is bowel dysfunction, which can lead to constipation (Turan and Aştı, 2016; LoCasale et al., 2016). The frequency of opioid-induced constipation (OIC) ranges between 17 and 88% in both non-cancer and cancer patients (McClurg et al., 2011; LoCasale et al., 2016).

OIC may lead to opioid dose reduction, non-adherence, and treatment discontinuation, all of which can result in inadequate analgesia. In addition, persistent constipation may lead to serious medical conditions, such as bowel obstruction and fecal impaction, and consequently to increased use of healthcare services, decreased work productivity, and diminished quality of life (Kalso et al., 2004; LoCasale et al., 2016; Olufade et al., 2017; Søndergaard et al., 2017).

While the use of laxatives and stool softeners and lifestyle management, like the introduction of a fiber-rich diet, increase in water intake, and physical exercise, are recommended for patients with OIC

(National Institute for Health and Care Excellence, 2012), the literature fails to indicate definitive effective management protocols for this problem (Turan and Aştı, 2016; Hanai et al., 2016; McClurg et al., 2016; Farmer et al., 2019).

In many studies performed with different patient groups, it has been reported that abdominal massage, applied 1–2 times a day, 3–7 days a week, for 1–8 weeks, may be an effective approach in managing constipation (Ayaş et al., 2006; Lamas et al., 2009; McClurg et al., 2011, 2016; Kassolik et al., 2015; Özişler et al., 2015; Turan and Aştı, 2016; Hanai et al., 2016). Abdominal massage, as an adjunct to the management of constipation, is inexpensive, non-invasive, free from harmful side effects and may be performed by the patient or by a caretaker, and several studies have reported the benefits it provides to patients (Emly, 2007; McClurg et al., 2011, 2016; Coggrave et al., 2014).

There are many studies showing that abdominal massage is effective in cases of altered abdominal muscle tone due to chronic constipation and in cases of abdominal pain due to cramps or flatulence (Emly, 2007;

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Lamas et al., 2009; Sinclair, 2010; Turan and Aşti, 2016). However, the effect of abdominal massage on bowel function in these patients has not been examined. The aim of this study, therefore, is to investigate the effect of abdominal massage on managing opioid-induced constipation.

### 1.1. Study hypothesis

$H_1$ : Abdominal massage improves gastrointestinal functions (amount of feces, stool consistency, straining condition, the feeling of incomplete bowel emptying, number of defecations, gas / bloating condition) in patients with opioid-induced constipation.

## 2. Sample and methods

### 2.1. Study design – setting

This randomized controlled trial was conducted between February 2017 and January 2018 at the Pain Clinic of the Istanbul University Faculty of Medicine Hospital located in Istanbul, Turkey. The inclusion criteria for participation in the study were that the patients had to be at least 18-years-old, not have any communicative, cognitive, affective, verbal problems that would prevent them from effectively participating in the study; not have a psychiatric disease, abdominal hernia, inflammatory bowel disease, irritable bowel syndrome, bowel cancer, intraabdominal infection or a history of abdominal surgery; be able to be fed orally, have been treated with opioids for 2 weeks, had a diagnosis of constipation by a medical doctor, have bowel excretion less than 3 times a week following the beginning of opioid treatment, have at least one of the congestion problems associated with opioid use, such as the feeling of incomplete bowel emptying, gas/bloating, the feeling of defecation/pressure in anus (Webster et al., 2014; Nelson and Camilleri, 2016; Boland and Boland, 2017).

### 2.2. Sample size

The sample size for the study was calculated based on the pre-study mean defecation diary scores of 30 patients. The acceptable value for  $\alpha$  and  $\beta$  was set as 0.05 and 0.20, respectively. The sample size was determined to be at least 148 persons for the fecal amount component (Experimental (E) =  $0.96 \pm 0.16$ , Control (C) =  $1.03 \pm 0.14$ ), (G \* Power 3.1.9.2). Considering the possibility that there would be missing data, it was decided that approximately 200 (E = 100, C = 100) patients should be involved in the study. This figure was determined by adding 30% to the sample size (148 people in total, at least 74 people in each group).

### 2.3. Procedures

A total of 204 patients participated in the study. Patients were assigned to the experimental group (n = 102) or the control group (n = 102) by using a computer-generated randomization list prepared by the researcher.

Firstly socio-demographic characteristics, disease characteristics, nutrition and fluid intake status, constipation status and quality of life related to constipation of all patients were assessed using a patient information form and the Patient Assessment of Constipation Quality of Life Questionnaire (PACQLQ). All patients were monitored by the researcher in the first week. The patients were assessed on the basis of the Defecation Diary, Bristol Stool Scale and the Visual Analogue Scale (VAS) for 7 days whenever defecation occurred, and they were then evaluated at the clinic after the 7th day (Fig. 1).

At the beginning of the second week, the patients in the experimental group underwent a 15-min video-guided abdominal massage training session that was administered by the researchers. To standardize and to calibrate the process, the first author instructed and trained

the patients or patients carer the in the abdominal massage movement pattern. The participants could apply massage at home, at work, or at the clinic. Following the training, the patients in this group were instructed to perform a 15-min abdominal massage twice a day, one 30 min before having breakfast and one 30 min before having dinner, for four weeks. The video included the abdominal massage techniques specified in the “Abdominal Massage Application Guideline” developed by Uysal et al. (2012). In the control group, the standard approach of the clinic was applied. In standard approach, all patients were not routinely prescribed a laxative at the point of opioid prescription but during the study, when the physician deemed necessary, the patients were started on medication consistent with routine clinical treatment, such as laxative suppository and enema. Patients were asked to complete the Defecation Diary, Bristol Stool Scale, and VAS on a weekly basis over a course of four weeks. Assessments lasting 15–20 min were held with the patients once a week, either face to face if they came to the clinic or via telephone. Each patient was assessed at least 5 times during the study period. During these assessments, the patients were asked to report and bring to the clinic the results of the evaluation forms requested to be completed at home. As part of the study, all patients were started on medication consistent with routine clinical treatment, such as a laxative suppository or an enema. Furthermore, all patients were asked to record in their dietary diary everything they ate during the study period. The patients’ amount of fiber intake was determined from their dietary diaries. Finally, the activity status of all the patients was evaluated using the Eastern Cooperative Oncology Group (ECOG) Scale of Performance.

### 2.4. Data collection tools

#### 2.4.1. Patient information form

This form included 25 questions to identify the patients’ socio-demographic characteristics, diagnosis, drugs used, laxative consumption, fluid intake, exercising, opioid use, weekly nutrition, movement/activity level, amount of fiber they consumed (gr/day), and information on defecation properties.

#### 2.4.2. Defecation diary

The Defecation Diary, developed by Pamuk et al. (2003), is a weekly record used to evaluate the symptoms of constipation, such as stool amount, stool consistency, straining during defecation, the feeling of incomplete evacuation following defecation, and the number of defecations per day. With this diary, the patients in the present study described their bowel movements every time they defecated over a course of 5 weeks. For each patient, the number of weekly defecation was calculated from the diary, and for each symptom, the total score in one week was divided into the number of defecations in one week, the results of which provided the mean score for each symptom for each defecation.

#### 2.4.3. Bristol stool scale

The Bristol Stool Scale was used to evaluate stool forms and to learn about the changes in bowel habits, as well as for diagnosis of pathologic states in bowels. This scale is designed to classify an individual’s bowel movements under seven different stool categories (Lewis and Heaton, 1997). In the Bristol Stool Scale, Type 1 and Type 2 indicate constipation, Type 3 and Type 4 indicate normal defecation, and Type 5, Type 6 and Type 7 indicate diarrhea. It is accepted that there is a direct relationship between the stool shape and the duration of time the stool remains in the colon. This form was used to carry out the 5-week evaluation of the patients’ defecation type (Lewis and Heaton, 1997).

#### 2.4.4. Visual analogue scale

In the questionnaire developed by Pamuk et al. (2003), there are 6 questions about the severity of constipation symptoms (constipation severity, straining, incomplete evacuation, feeling of fullness in rectum,

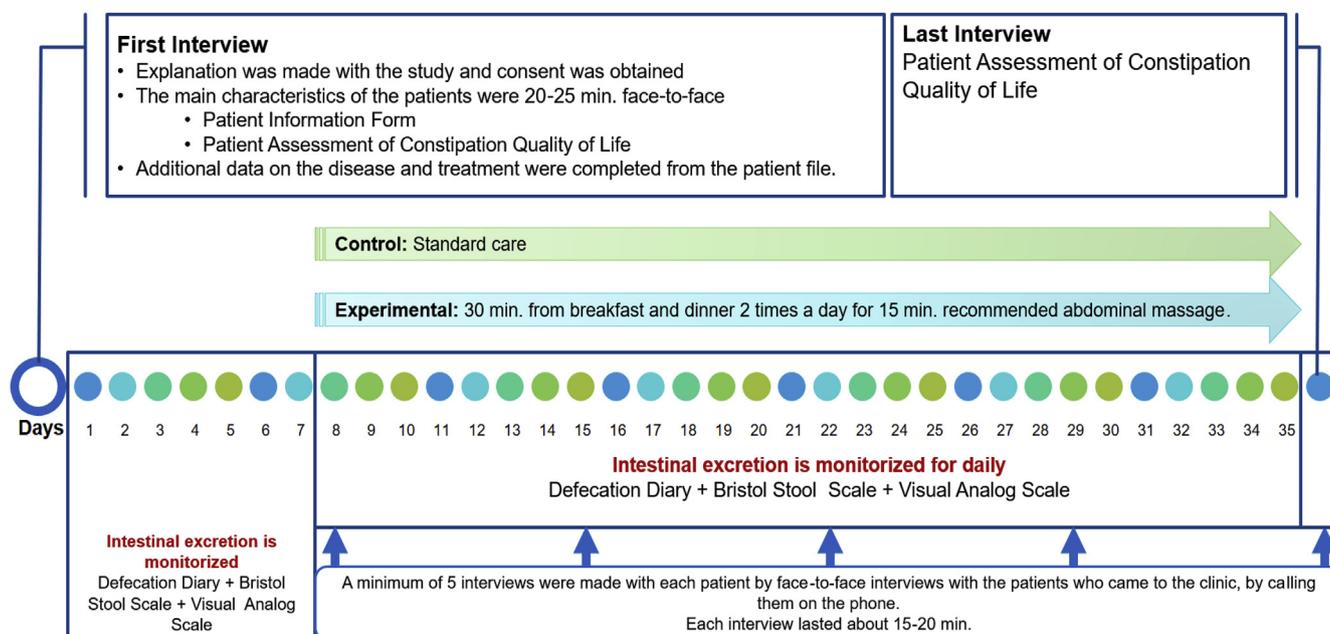


Fig. 1. Research Flow chart.

pain in anus and gas) experienced by patients. The VAS is a 10 cm horizontal line marked with 0 at one end and 10 at the other end. The patient is asked to mark the intensity of each of the constipation symptoms on the horizontal line by giving a score between 0 and 10. Scoring more than one item with 3 or more indicates that the complaint of constipation increases. The patients performed this assessment on a daily basis, and a one-week total score was obtained for each item.

#### 2.4.5. Patient assessment of constipation quality of life scale

Developed by Marquis et al. (2005) to determine the effect of constipation on the quality of life, the Patient Assessment of Constipation Quality of Life scale (PACQLQ) has established validity and reliability by Bengi et al. (2015) in Turkish. The higher the score obtained on the scale, the lower the quality of life. The scale consists of four dimensions: “anxiety,” “physical discomfort,” “psychosocial discomfort,” and “satisfaction.” As the scores from the scale increase, it is assumed that the quality of life is low.

#### 2.5. Abdominal massage application

The abdominal massage was applied in a clockwise direction over the intestines on the abdominal wall. Four basic strokes are typically used in abdominal massage: stroking, effleurage, kneading, and vibration. In this study, stroking was applied over the dermatome of the vagus nerve, iliac crests, and down both sides of the pelvis toward the groin. This was repeated several times before being followed by effleurage. Effleurage strokes followed the direction of the ascending colon, across the transverse colon and down the descending colon, while kneading was applied down the descending colon, up the ascending colon, and down the descending colon. The massage concluded with vibration over the abdominal wall (Uysal et al., 2012; Turan and Aşti, 2016). In accord with the “Abdominal Massage Application Guideline” developed by Uysal et al. (2012), abdominal massage was applied to the experimental group patients for 15 min twice a day for 4 weeks. It is recommended that the massage be done for 15 min daily (McClurg et al., 2016; Turan and Aşti, 2016). Liquid baby oil is used by the masseuse during the application to facilitate easy movement of the hands on the skin of the patient and to not cause them any disturbance. During the massage application, the subject is placed in a supine position with the head-of-bed angle elevated to 30°–45° (Emly, 2007;

Uysal et al., 2012; Turan and Aşti, 2016).

#### 2.6. Control group

Data from the patients in the control group were collected in the same way as done in the experimental group. All patients were not routinely prescribed a laxative at the point of opioid prescription but during the study, when the physician deemed necessary, the patients were started on medication consistent with routine clinical treatment, such as laxative suppository and enema (Fig. 1).

#### 2.7. Ethical considerations

The study protocol was approved by the Medical Faculty of Istanbul University's Clinical Research Ethics Committee and the Pain Clinic Department. After providing the necessary information about the research and explaining the purpose of the study, written and verbal consent to participate was obtained from each patient.

#### 2.8. Data analysis

The data were analyzed using the SPSS (Statistical Package for Social Sciences) 23 program. Descriptive statistics were calculated for all variables. For categorical variables, Pearson chi-square was used, while for numerical variables, *t*-test and Mann Whitney *U* test were used to compare the descriptive characteristics of the two study groups on the basis of the normal distribution characteristics of the data. Furthermore, the *t*-test and Mann Whitney *U* test were used to compare the difference between the Defecation Diary, VAS and PACQLQ scores of the two study groups on the basis of the normal distribution characteristics of the data. Mean intra-group scores for the dependent group were compared by using the *t*-test and the Wilcoxon Signed rank test. For the independent group, the comparison of the mean scores taken from the defecation diary according to independent variables, the *t*-test, the Mann Whitney *U* test, the one-way ANOVA analysis (and Tukey as for post-hoc analysis) and the Kruskal Wallis test (Whitney *U* test as for post-hoc analysis) were used in accordance with the number of the groups, the sample sizes of the groups and the normality of the data. The normality of the data was determined using the Skewness and Kurtosis values and the Kolmogorov-Smirnov test. Significance level

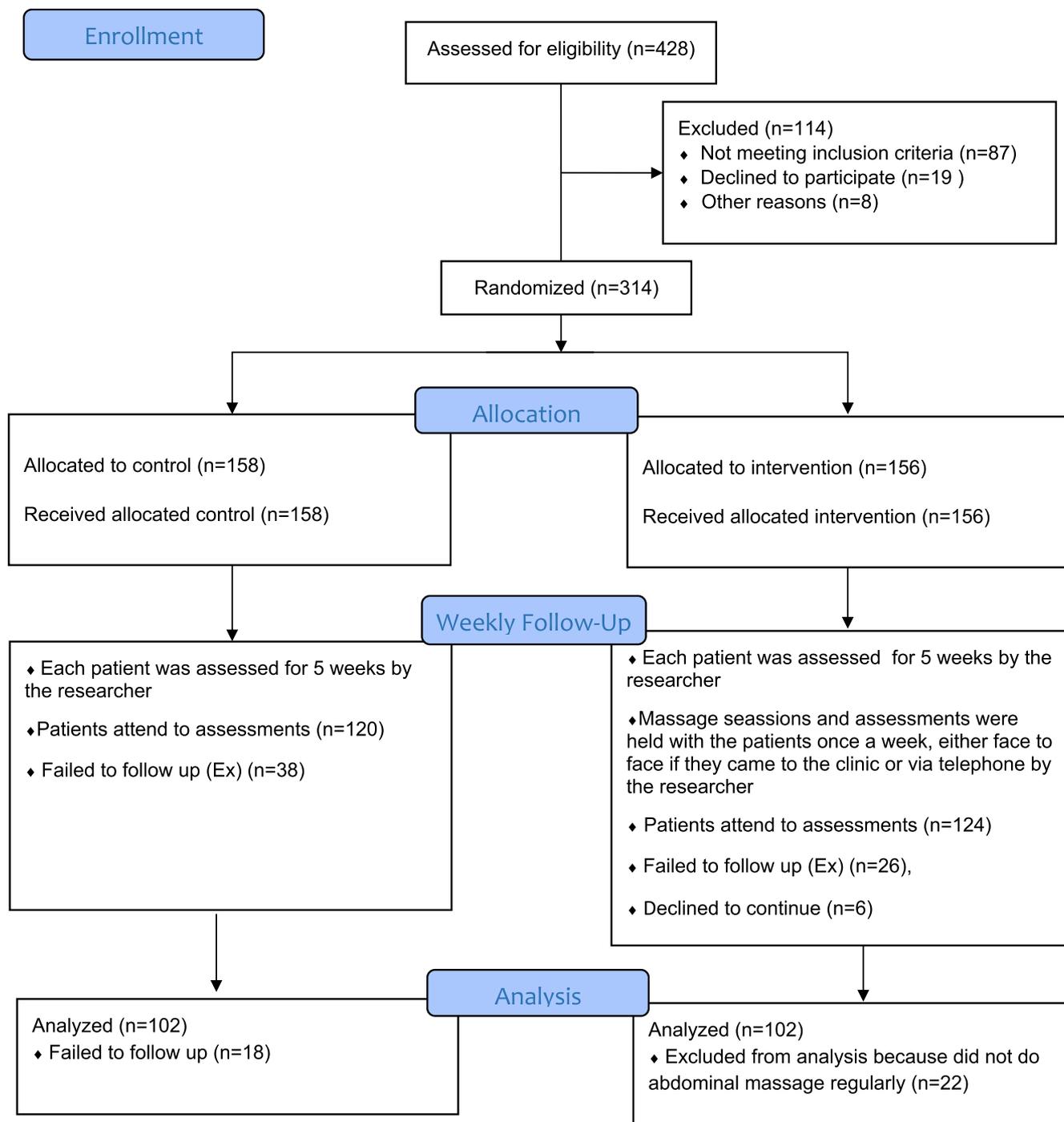


Fig. 2. Consort flow diagram.

was accepted as  $p < 0.05$ .

### 3. Results

A total of 428 patients were assessed, but due to various reasons (died during the treatment period, discontinued the intervention, did not do abdominal massage regularly), data from 204 patients were included in the final analysis (see Fig. 2 for Consort follow diagram).

#### 3.1. Sociodemographic and clinical characteristics

The personal characteristics of the patients in the study were similar. The majority of the study group was male, married and primary

school graduates, with average age of  $61 \pm 14$ . Most of the patients had inadequate income levels to meet their expenses and were unemployed (Table 1).

The majority of the patients had last defecated within the past 2 days from reporting. The groups were similar in terms of these characteristics. In the experimental group, the rate of those who did not defecate daily was significantly lower than that of the control group, while the rate of defecating one or more times a day for those in the experimental group was higher than that of those in the control group ( $p < 0.05$ ). In the experimental group, the rate of patients who did not defecate as well as the rate of those who defecated 1–2 times in a week were found to be significantly higher than those in the control group, while the rate of those from the control group who defecated three or

**Table 1**  
Sociodemographic and clinical characteristics of the sample.

	Experimental (n = 102)		Control (n = 102)		test	p
	Min.-Max. n	$\bar{x} \pm Sd$ %	Min.-Max. n	$\bar{x} \pm Sd$ %		
<b>Age</b>	18–90	60.50 ± 14.57	21–90	61.16 ± 13.21	t: 0.33	0.73
<b>Gender</b>					$\chi^2$	P
Female	35	34.3	45	44.1	2.05	0.15
Male	67	65.7	57	55.9		
<b>Marital Status</b>					0.51	0.47
Single	21	20.6	17	16.7		
Married	81	79.4	85	83.3		
<b>Education</b>					6.15	0.29
Primary school	50	49.0	48	47.1		
Secondary school	17	16.7	13	12.7		
<b>Working status</b>					0.20	0.65
Employed	10	9.8	12	11.8		
Unemployed	92	90.2	90	88.2		
<b>Weekly defecation frequency</b>					17.40	0.002
None	7	6.9	3	2.9		
1 time	19	18.6	5	4.9		
2 times	24	23.5	15	14.7		
3 times	35	34.3	53	52.0		
4 times and above	17	16.7	26	25.5		
<b>Last day of defecation</b>					4.70	.31
Day 0 (Same day)	18	17.6	24	23.5		
1 day ago	29	28.4	22	21.6		
2 days ago	35	34.3	42	41.2		
3 days ago	9	8.8	9	8.8		
8–10 days ago	11	10.9	5	4.9		
<b>Medical Diagnosis Cancer</b>						
Lung cancer		34	33.3	28		27.4
Genitourinary System Cancers		13	12.7	14		13.7
Breast Cancer		4	3.9	6		5.9
Bone Cancer		5	4.9	1		0.9
Hematological Cancers		3	2.9	7		6.9
The sarcoma of soft tissue		6	5.9	1		0.9
Head and Neck Cancers		2	1.9	4		3.9
Brain Tumor		–	–	4		3.9
<b>Non-Cancer</b>		35	34.3	37		36.2

**Table 2**  
Mean daily opioid dose in the study groups.

Opioids		Experimental	Control	Z	p
		$\bar{x} \pm Sd$	$\bar{x} \pm Sd$		
<b>Codeine (mg/day)</b>	1st week	143.7 ± 42.48	157.46 ± 43.81	–1.689	0.091
	2nd week	145.47 ± 41.14	156.36 ± 44.91	–1.167	0.243
	3rd week	145.42 ± 41.82	159.54 ± 42.81	–1.735	0.083
	4th week	146.34 ± 41.93	157.04 ± 42.77	–1.181	0.238
	5th week	145.07 ± 41.54	158.51 ± 43.00	–1.652	0.099
<b>Tramadol (mg/day)</b>	1st week	224.44 ± 110.05	214.78 ± 89.53	–0.223	0.823
	2nd week	228.19 ± 107.31	212.72 ± 89.8	–0.587	0.557
	3rd week	231.19 ± 113.12	216.16 ± 88.56	–0.478	0.633
	4th week	222.24 ± 110.07	225.64 ± 95.96	–0.359	0.720
	5th week	227.88 ± 111.68	218.48 ± 92.41	–0.237	0.813
<b>Morphine (mg/day)</b>	1st week	44.62 ± 25.63	47.89 ± 28.44	–0.908	0.364
	2nd week	44.25 ± 25.41	47.05 ± 28.56	–0.742	0.458
	3rd week	43.9 ± 25.19	46.38 ± 28.64	–0.728	0.466
	4th week	45.71 ± 27.51	49.25 ± 30.12	–0.933	0.351
	5th week	51.14 ± 32.72	46.59 ± 27.76	–0.068	0.946
<b>Transdermal Fentanyl (mcg/24 st)</b>	1st week	24.56 ± 15.52	23.92 ± 13.13	–0.095	0.925
	2nd week	25.84 ± 15.85	23.88 ± 13.25	–0.288	0.773
	3rd week	26.49 ± 15.91	24.63 ± 12.94	–0.211	0.833
	4th week	27.83 ± 16.61	25.28 ± 13.1	–0.405	0.685
	5th week	29.25 ± 16.77	26.08 ± 13.53	–0.667	0.504

Sd:Standard deviation, p value is obtained Mann Whitney U test.

more times a week was lower than that of those in the experimental group ( $p < 0.05$ ) (Table 1). The means opioid doses of the experimental group and the control group were similar (Table 2).

Regarding their nutritional habits, half of the patients had adequate

nourishment, most did not have a diet restriction, and most did not consume fibrous food. Moreover, a majority of the patients consumed 6–9 L of liquid per day and were of normal weight. Regarding their physical activities, the majority of the patients led sedentary lives and

**Table 3**  
Nutrition and activity habits of experimental and control group.

Characteristics	Experimental (n = 102)		Control (n = 102)		$\chi^2$	p
	n	%	n	%		
<b>Nutrition Status</b>						
3 main/3 main and snacks (Sufficient)	52	51.0	45	44.1	.963	.326
1–2 main and snacks (Insufficient)	50	49.0	57	55.9		
<b>Diet restriction</b>						
Yes	27	26.5	34	33.3	1.146	.284
No	75	73.5	68	66.7		
<b>Fibrous food intake</b>						
Yes	33	32.4	27	26.5	.850	.357
No	69	67.6	75	73.5		
<b>Daily fluid consumption</b>						
10 glasses and over	35	34.3	37	36.3		
6–9 glasses	46	45.1	46	45.1	.156	.925
≤ 5 glasses	21	20.6	19	18.6		
<b>Body Mass Index</b>						
Underweight	8	7.8	5	4.9		
Normal (healthy)	48	47.1	46	45.1		
Overweight	25	24.5	31	30.4	2.727	.604
Obese	17	16.7	12	11.8		
Severely obese	4	3.9	2	2.0		
<b>General lifestyle</b>						
Active	8	7.8	5	4.9	.739	.390
Sedentary	94	92.2	97	95.1		
<b>Regularly play sports/exercise</b>						
Yes	5	4.9	3	2.9		.721 <sup>F</sup>
No	97	95.1	99	97.1		
<b>Performance Status (ECOG)</b>						
Fully active	6	5.9	2	2.0		
Restricted in physically strenuous activity	8	7.8	11	10.8	5.358	.252
Up and about more than 50% of waking hours	17	16.7	27	26.5		
Confined to bed or chair more than 50% of waking hours	57	55.9	50	49.0		
Completely disabled	14	13.7	12	11.8		

$\chi^2$ : Pearson Chi-Square test; Fisher's Exact Test applied because F: expected number is < 1. t: t-test for independent groups, \*n = 198.

did not exercise regularly, spending more than half of their waking time in bed or seated in a chair. The nutritional and sports habits of the patients in the experimental and control groups were similar (Table 3).

**3.2. Effect of abdominal massage on constipation according to Bristol Stool Scale**

According to the Bristol Stool Scale, the incidence of constipation was statistically significantly higher in the experimental group patients in the first and second weeks than that of the control group during the same two weeks ( $p < 0.05$ ); however, in the other weeks, the incidence of constipation was statistically significantly lower in the experimental group than that of the control group ( $p < 0.001$ ). In examining the difference in constipation rates in the first and fifth weeks for each study group separately it was found that the rate of constipation decreased significantly in the fifth week ( $p < 0.001$ ).

**3.3. Effect of abdominal massage on mean defecation diary score**

Comparing the mean defecation diary scores between the groups and within each group for the 1st (before the massage) and the 5th (after the massage) weeks, it was observed that in the 5th week, stool consistency ( $2.19 \pm 0.49$  vs  $1.38 \pm 0.60$ ), ( $p = 0.001$ ) (Fig. 3), straining ( $2.08 \pm 0.78$  vs  $3.00 \pm 1.02$ ), ( $p = 0.001$ ) (Fig. 4), incomplete evacuation ( $0.38 \pm 0.31$  vs  $0.62 \pm 0.42$ ), ( $p = 0.001$ ) (Fig. 5), and increase in the number of defecations ( $0.66 \pm 0.22$  vs  $0.47 \pm 0.29$ ), ( $p = 0.001$ ) (Fig. 6) all improved to a greater degree in the experimental than the control group. However, there was no statistically significant difference in stool amount between the experimental and control groups ( $0.93 \pm 0.19$  vs  $0.95 \pm 0.20$ ), ( $p = 0.23$ ) (Fig. 7).

**3.4. Effect of abdominal massage on mean VAS score**

The VAS scores between the groups were compared by each week. In addition, the mean VAS scores were compared within each study group in the first and fifth weeks. There was a greater decrease in constipation severity ( $5.61 \pm 1.85$  vs  $7.26 \pm 2.07$ ), ( $p < 0.001$ ), straining severity ( $5.09 \pm 1.89$  vs  $6.79 \pm 2.34$ ), ( $p < 0.001$ ), pain severity ( $3.36 \pm 1.98$  vs  $4.96 \pm 2.91$ ), ( $p < 0.001$ ), the feeling of fullness in the rectum ( $3.62 \pm 1.84$  vs  $4.18 \pm 2.13$ ), ( $p = 0.046$ ) and gas severity in the experimental group in the fifth week compared to the control group, but regarding incomplete evacuation severity ( $4.31 \pm 1.90$  vs  $4.75 \pm 2.41$ ), there was no statistically significant difference seen ( $p = 0.15$ ) (Fig. 8).

**3.5. Effect of abdominal massage on quality of life**

In examining the mean pre-test and post-test PACQLQ scores, it was found that the experimental group had a better quality of life than that of the control group ( $60.75 \pm 10.99$  vs  $79.01 \pm 12.86$ ), ( $p = 0.001$ ). In addition, when the pre-test results of the experimental group were compared with their final-test results, the quality of life was found to be

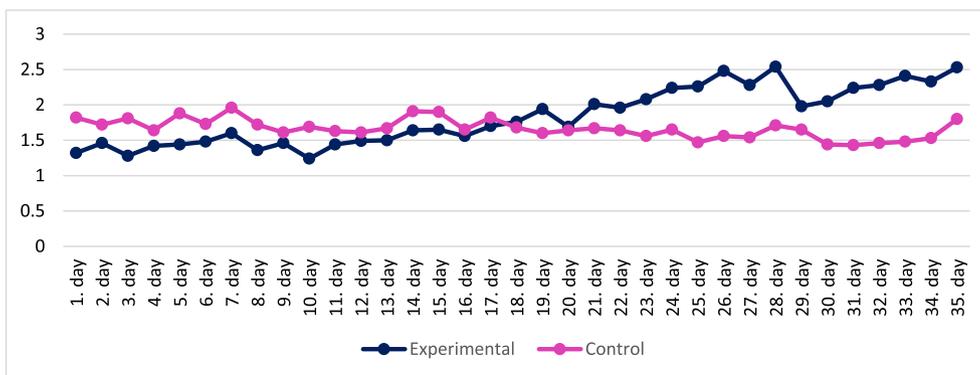


Fig. 3. Defecation diary stool consistency.

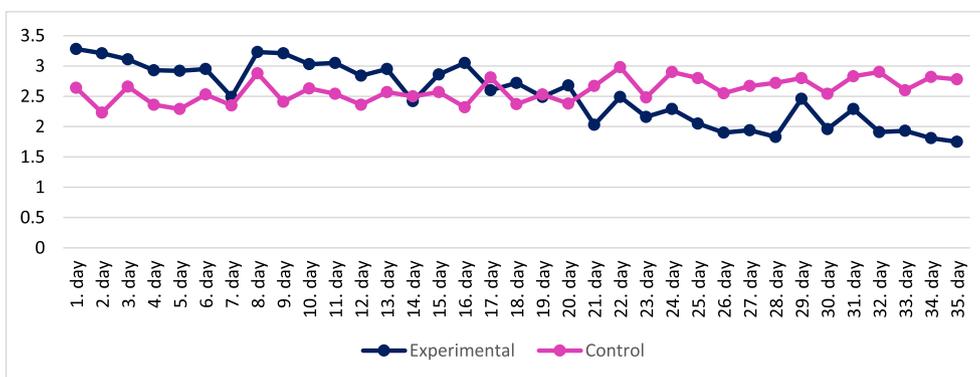


Fig. 4. Defecation diary straining.

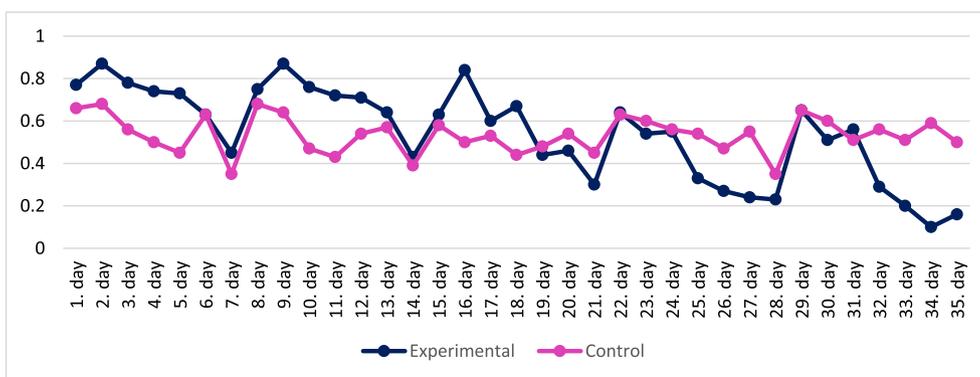


Fig. 5. Defecation diary incomplete evacuation.

higher, but this was not the case with the control group, whose quality of life was found to be lower. The experimental group had better scores on all subscales than those of the control group (Table 4).

#### 4. Discussion

To the best of the researchers' knowledge, this is the first randomized controlled trial to explore the effectiveness of abdominal massage in the management of OIC and was carried out with the largest sample group in many studies performed with different patient groups. This study hypothesized that the abdominal massage would reduce constipation symptoms and improve quality of life.

In this study, the evaluation of the weekly defecation diary kept by the patients who were on opioids showed that in the experimental group, the abdominal massage resulted in significant improvements in stool consistency, straining during defecation, the feeling of incomplete emptying after defecation, and the number of defecations, but the

massage proved to have no effect on stool amount. Furthermore, according to the five weeks (35 days) of observation using the VAS, there was a significant decrease in the severity of constipation, straining severity, the feeling of fullness in the rectum, the severity of pain and the severity of gas. The findings from the weekly defecation diary and the VAS were similar. This is affirmed by literature, where the studies conducted on patient groups different from those in the present study support these findings.

The abdominal massage application, performed twice a day for 15 min, once in the morning and once in the evening, on the 4th, 5th and 6th days post-operation, was shown to reduce constipation symptoms and to shorten the time to first defecation after operation (Turan and Aşti, 2016). Ayaş et al. (2006) reported that a 15-min abdominal massage application for 3 weeks decreased the frequency of defecation and reduced fecal incontinence and abdominal distension in an experimental study involving 24 patients with spinal cord injury. In another study of patients with spinal cord injury (n = 55), it was reported

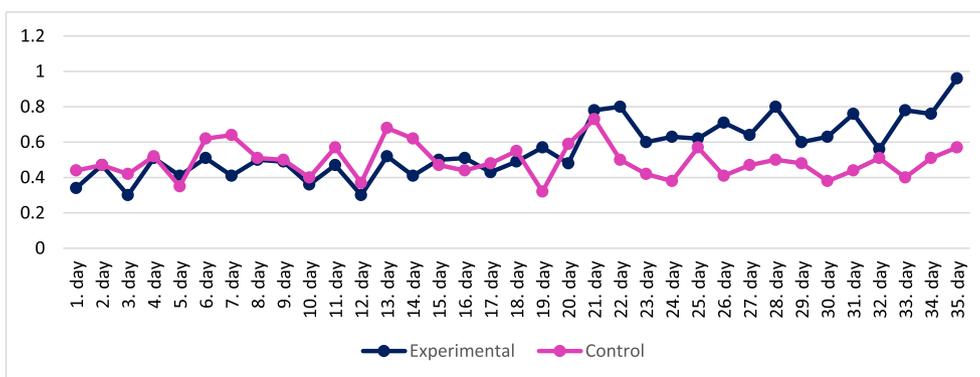


Fig. 6. Defecation diary number of defecation.

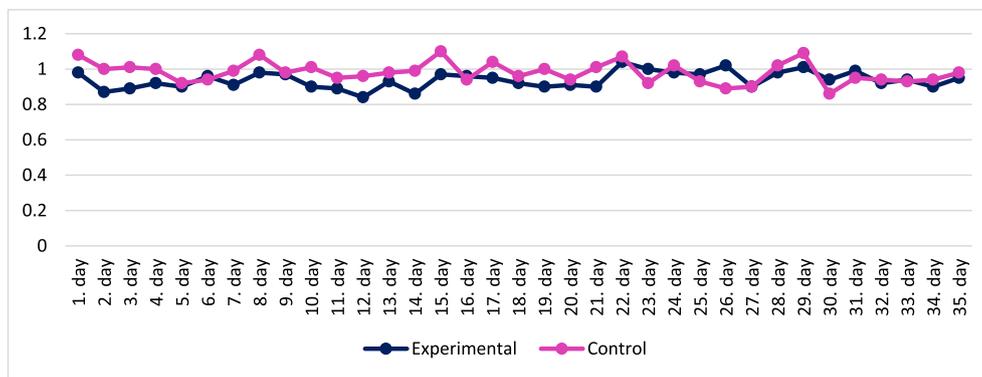


Fig. 7. Defecation diary stool amount.

that abdominal massage significantly reduced constipation severity, bowel emptying difficulty and abdominal distension/pain (Özişler et al., 2015). Hanai et al. (2016) conducted a study to investigate the effect of a self-management program (10 min of medium abdominal massage, abdominal exercise and appropriate defecation position) that was applied for constipation caused by antiemetic in breast cancer patients. It was reported in that study that constipation severity decreased significantly, and that stool consistency improved. In a randomized controlled study conducted by Lamas et al. (2009) that involved self-referred patients, the massage group (n = 30) received 8 weeks of abdominal massage administered by a clinician, while the control group (n = 30) received no additional intervention or contact time. The results showed an increase in frequency of defecation in the massage group but no change in laxative use. McClurg et al. (2011) conducted a randomized controlled trial to investigate the effect of abdominal massage on constipation symptoms in patients with multiple sclerosis (MS), where it was found that abdominal massage applied for 15 min daily for four weeks increased the number of defecations, improved stool consistency, and decreased defecation time and constipation severity. In a randomized controlled pilot study aimed to evaluate the

effect of aroma massage in managing constipation in advanced stage cancer patients, Lai et al. (2011) reported that a 15–20 min aroma massage applied 5 consecutive days was effective on constipation symptoms. Jeon and Jung (2005) conducted a randomized controlled trial to investigate the effect of abdominal massage on constipation symptoms and reported increased frequency of defecation and reduced severity of constipation.

Anecdotally, participants also found the abdominal massage to be relaxing, and it was interesting that the majority of the participants were keen to undertake the massage themselves, as it provided a means of self-help and empowerment. Most participants also found the video demonstrating the massage to be very useful. Furthermore, it was noteworthy that many of the participants found the bowel diary and nutrition diary to be a useful tool, both for monitoring frequency of defecation and as an aid to remembering to take their medications and to drink water, in the case of laxative use.

In the literature, there are studies conducted with different patient groups reporting negative results that do not support those found in the present study. McClurg et al. (2016), for example, in a randomized controlled trial to evaluate the feasibility and effect of abdominal

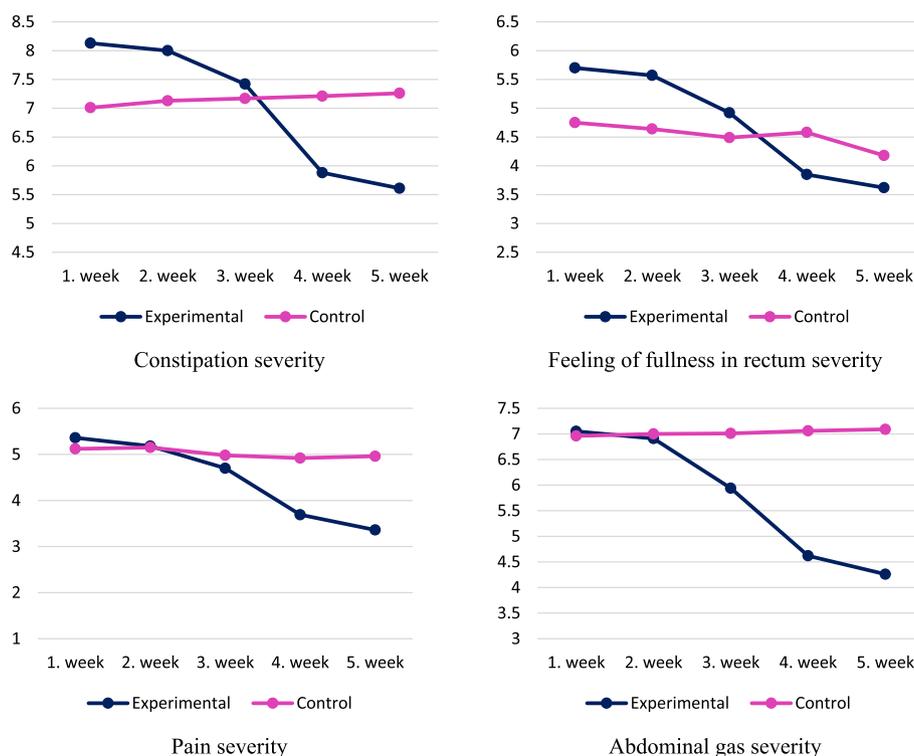


Fig. 8. Mean VAS score.

**Table 4**  
Mean PACQLQ scores between the experimental and control group.

PACQLQ Subscales		Groups	Pre-test	Post-test	t*	p
			$\bar{x} \pm Sd$	$\bar{x} \pm Sd$		
The Patient Assessment of Constipation Quality of Life (PACQLQ)		Experimental	75.69 ± 11.32	60.75 ± 10.99	21.04	.0001
		Control	71.70 ± 13.55	79.01 ± 12.86	14.63	.0001
		t**	2.29	14.44		
		p	.02	.0001		
Subscales	Physical Discomfort	Experimental	11.93 ± 2.21	8.99 ± 2.28	21.56	.0001
		Control	10.93 ± 2.33	12.34 ± 2.02	10.66	.0001
		t**	3.14	11.12		
		p	.002	.0001		
		Experimental	21.27 ± 4.99	16.00 ± 4.72	20.52	.0001
		Control	20.38 ± 4.94	24.27 ± 4.59	17.09	.0001
		t**	1.28	12.69		
		p	.20	.0001		
		Experimental	29.69 ± 5.70	21.97 ± 5.32	18.92	.0001
		Control	27.49 ± 6.46	31.28 ± 6.12	16.68	.0001
		t**	2.57	11.60		
		p	.01	.0001		
		Experimental	12.79 ± 3.58	9.87 ± 2.90	4.89	.0001
		Control	12.89 ± 2.98	13.52 ± 2.98	1.31	.19
		t**	.21	8.85		
		p	.83	.0001		

t \*: t-test in dependent groups; t \*\*: t -test in independent groups.

massage for constipation symptoms in 32 patients with Parkinson's disease, recommended 6 weeks of daily abdominal massage application and gave lifestyle advice, such as increasing liquid and fiber consumption, increasing physical activity, using correct defecation position, to the experimental group, while the control group was only given lifestyle advice. Patients were taught the technique at the clinic and used it at home. It was also suggested to the experiment group participants that the abdominal massage be carried out daily by themselves or by their carer. Although there was no significant difference between the two groups, constipation symptoms did improve for both groups.

In the present study, the results of the comparison between the mean pre-test and post-test scores on the PACQLQ of the individuals in the experimental and control groups showed that the quality of life of the experimental group was significantly higher than that of the control group.

Constipation is a condition that affects an individual's emotional, psychological and social aspects, decreases their comfort and has a negative effect on their quality of life (Lai et al., 2011; Kassolik et al., 2015; McClurg et al., 2016). In a randomized controlled study conducted by Turan and Aştı (2016), it was reported that the quality of life of the patients who underwent orthopedics surgery improved with abdominal massage, applied 2 times a day for 15 min in the morning and for 15 min in the evening on the 4th, 5th, and 6th days post-surgery. In a quantitative study by Faleiros-Castro and Paula (2013) involving patients with cerebral palsy, it was reported that abdominal massage improved sleep quality, increased appetite, decreased irritability, and improved quality of life. Lai et al. (2011) reported in their randomized controlled study that 15–20 min of abdominal massage applied 5 consecutive days of the week reduced physical discomfort and improved quality of life scores. Furthermore, Lamas et al. (2009) observed in their randomized controlled study that abdominal massage, applied for 8 weeks, 5 days a week, for 15 min a day, increased the quality of life. The results derived from the present study were similar to those reported in the literature insofar as they conclusively showed that abdominal massage increases the quality of life.

There were several limitations to this study. Abdominal massage requires a certain period of time to influence constipation. In the present study, the duration of the massage (4 weeks) was short compared to other studies; for example, Lamas et al. (2009), in their study, only found significant differences in 8th week. The effect may have continued to increase in the present study if the duration of intervention

had been longer. Another limitation was the potential positive effect of the voluntary nature of this study, which was not controlled for. Abdominal massage can be quite tiring for some patients. The participants in this study, however, were recruited on a voluntary basis and therefore probably had a positive attitude toward massage, a factor which negatively impacts the ability to generalize the results. Willingness is always an important matter to consider when offering any kind of massage. This is especially important when offering massage on an intimate body zone, such as the abdomen.

The use of abdominal massage can be recommended, provided that adequate training is given to the clinician, patient or caregiver, as a potential part of a treatment program to help alleviate constipation in the management of OIC.

## 5. Conclusions

In conclusion, similar to the results from other studies, abdominal massage was found to decrease constipation symptoms. In the post-hoc analysis, it was observed that the number of defecations increased by 13%. Hypothesis developed for the present study were confirmed. The massage application, was observed to improve stool consistency, decrease straining and ease the feeling of incomplete bowel emptying.

In the management of constipation, the role of education, as opposed to the role of nursing, stands out as a key factor. Knowing the approaches that can be recommended for the management of constipation in patients receiving opioid therapy can be beneficial in preventing problems that may occur due to the severity of constipation. The results from this study show that abdominal massage is an effective approach in the management of constipation and can improve the quality of life of patients receiving opioid medication.

## Conflicts of interest

The authors declare no conflict of interest.

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