

# Effect of Abdominal Massage on Abdominal Distension, Pain, Comfort, and Patient Satisfaction After Colonoscopy: A Randomized Controlled Trial

Dilek Öztürk<sup>1</sup> , Aysel Gürkan<sup>2</sup> 

<sup>1</sup> Marmara University, Institute of Health Science, Department of Nursing, İstanbul, Türkiye.

<sup>2</sup> Marmara University, Faculty of Health Sciences, Department of Nursing, Retired Faculty Member, İstanbul, Türkiye.

**Correspondence Author:** Dilek Öztürk

**E-mail:** dilekozturk20@hotmail.com

**Received:** July 05, 2025

**Accepted:** September 11, 2025

## ABSTRACT

**Objective:** This study aimed to determine the effect of abdominal massage on post-colonoscopy abdominal distension, pain, comfort, and patient satisfaction.

**Methods:** The randomized controlled study was conducted with 166 patients who underwent colonoscopy without sedation. No intervention was applied to the control group (n= 83). The experimental group (n= 83) received an abdominal massage for 15 minutes on the day of colonoscopy (day 0), after the procedure, in the evening on day 0, and in the morning and evening on day 1. Abdominal distension, pain, comfort and satisfaction were assessed with Visual Analogue Scale.

**Results:** In the experimental group, abdominal distension and pain level decreased and comfort level increased after abdominal massage compared to the pre-massage level ( $p<.01$ ). In addition, compared to the control group, the abdominal distension and pain level of the patients in the experimental group were substantially lower, and their abdominal comfort level and satisfaction with the procedure were substantially higher ( $p<.01$ ).

**Conclusion:** Abdominal massage after colonoscopy reduced abdominal distension and pain, increased abdominal comfort and patient satisfaction with the procedure.

**Keywords:** Colonoscopy, abdominal pain, patient satisfaction, randomised controlled trial, nursing

## 1. INTRODUCTION

Abdominal pain, abdominal discomfort, and bloating are problems that patients frequently experience after colonoscopy (1,2). These problems may be caused by factors such as the experience of the endoscopist, distension caused by air insufflation, the technical difficulty level of the procedure, and the duration of the procedure. These problems, observed in approximately 60% of patients, may persist for several days after the procedure (2,3). A study revealed that 23% of patients experienced these side effects during a one-month follow-up following colonoscopy, and 6% were not able to continue working as a result (1). These minor side effects may lead to mental and physical stress and require the close follow-up of patients after the procedure (1,3). This increases patients' care requirements and observation time,

resulting in higher health costs (2,4). Furthermore, patients' satisfaction with the colonoscopy procedure can influence their willingness to adhere to recommended screening programs. Therefore, the acceptance of colonoscopy for colorectal cancer screening can be increased by reducing abdominal distension and pain after colonoscopy and improving abdominal comfort and patient satisfaction with the procedure (2).

Studies conducted to reduce abdominal symptoms after colonoscopy and increase abdominal comfort and patient satisfaction with the procedure have reported varying outcomes. For example, while one study determined that rectal tube application after colonoscopy did not

**How to cite this article:** Öztürk D, Gürkan A. Effect of Abdominal Massage on Abdominal Distension, Pain, Comfort, and Patient Satisfaction After Colonoscopy: A Randomized Controlled Trial. Clin Exp Health Sci 2025; 15: 695-704. <https://doi.org/10.33808/clinexphealthsci.1735355>

Copyright © 2025 Marmara University Press



Content of this journal is licensed under a Creative Commons  
Attribution-NonCommercial 4.0 International License.

affect patients' abdominal distension, pain, comfort, and satisfaction after the procedure and 24 hours after the procedure (5). Another study found that rectal aspiration applied immediately after colonoscopy was more effective in reducing abdominal symptoms than rectal tube placement after the procedure (2). Another study in which total colonic decompression was performed by repeating caecal intubation following colonoscopy revealed an 86.1% decrease in the abdominal pain of the patients and a significant difference in abdominal pain 24-48 hours after the procedure between the patients who did and did not receive the intervention (6). In contrast, there are also researchers indicating no significant difference in pain intensity between the group in which air aspiration was performed from the flexion points of the colon and the group in which it was performed from the rectum alone (4).

The literature reports that massage applied to the abdominal region relaxes the muscles and stimulates bowel movements, thereby promoting elimination (7). Furthermore, it is noted that it provides relief by reducing discomfort and pain in healthy/ill individuals with abdominal pain associated with cramps or flatulence, thereby improving quality of life (8). Abdominal massage is a non-invasive, non-pharmacological, safe method with no known side effects. Furthermore, it does not require any cost (7) and is defined as an intervention that individuals can perform themselves with training (9). Although many invasive (2,3), and non-invasive (10,11) methods have been tried to reduce abdominal symptoms experienced after colonoscopy and to increase comfort and patient satisfaction, there is a scarcity of studies assessing the effect of abdominal massage on colonoscopy-related abdominal symptoms (11). In this context, this study was conducted to evaluate the effect of abdominal massage, one of the independent nursing interventions after colonoscopy, on distension, pain, comfort, and patient satisfaction with the procedure.

## 2. METHODS

### 2.1. Study Design

This study was designed as a two-group, randomised, controlled study. The study was conducted from November 2020 to May 2021 at the endoscopy unit of a tertiary public hospital located in Istanbul, Türkiye.

### 2.2. Sampling

The number of individuals required to be included in the study was calculated by power analysis using G\*Power (v3.1.7) software. The power of the study was expressed as  $1-\beta$  ( $\beta$  = probability of type II error). It is generally accepted that studies should have a power of at least 80%. According to Cohen's effect size coefficients (12), the calculation made assuming that the evaluations between two independent groups would have a medium effect size ( $d = 0.50$ ) revealed

that the minimum number of participants should be 134 (67 in each group) to obtain 80% power at the  $\alpha = 0.05$  level. Considering possible data loss, 90 individuals were included in each group.

Patients who were planned to undergo outpatient colonoscopy without sedation for diagnostic and screening purposes, aged 18 years or older, with a body mass index (BMI) < 30 were included in the study. Individuals who had undergone bowel resection and those who underwent colonoscopy for therapeutic purposes were excluded from this study. Furthermore, individuals who underwent colonoscopy under sedation were also excluded because abdominal distension, pain, and comfort could not be objectively assessed due to the effects of sedation (13). In addition, patients whose colonoscopy procedure could not be completed due to insufficient bowel cleansing, those who withdrew from the study, and those who did not comply with the study process and requirements were excluded from the sample.

Patients who met the study inclusion criteria were randomized into experimental and control groups using a random number generator (14). Seven patients in the experimental group (four patients whose colonoscopy procedure was incomplete, one patient at risk of bleeding, and two patients who did not submit the forms) and seven patients in the control group (five patients whose colonoscopy procedure was incomplete and two patients who did not submit the forms) were excluded from the study. A power analysis was performed and the study was completed with 166 patients (83 in each group). Figure 1 presents the CONSORT flow diagram of the study.

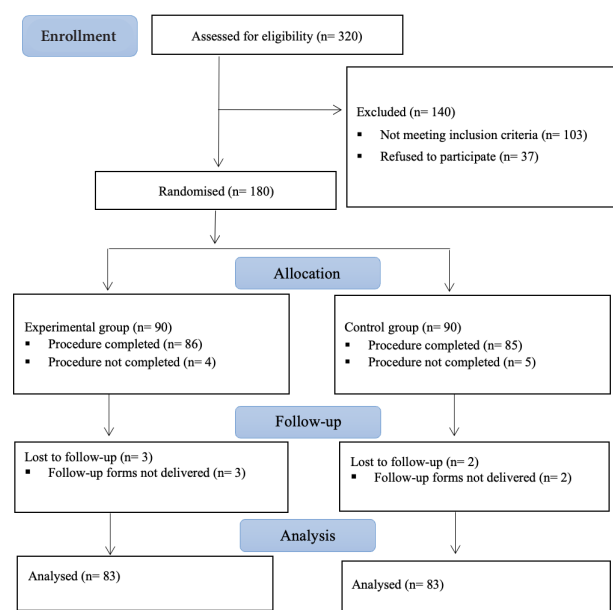


Figure 1. Flow chart of the study design

### 2.3. Blinding

Due to the feasibility and nature of the study, blinding could not be applied to the principal investigator and patients during the allocation process; however, blinding of the evaluator to the groups was ensured.

### 2.4. Instruments

#### 2.4.1. Descriptive and Clinical Characteristics Form

This form, prepared in accordance with the literature, consists of 26 items. The form included patients' demographic characteristics (gender, age, BMI, marital and educational status) and colonoscopy-related characteristics (colonoscopy history and indication, pre-procedure information status, colonoscopy start and end times, and procedure duration), as well as telephone numbers for communication (2,5).

#### 2.4.2. Visual Analogue Scale (VAS)

The VAS consists of a 10-cm line drawn vertically or horizontally. At either end of this line are the two extreme descriptive words of the subjective category (0= "no feeling at all" and 10= "worst feeling ever experienced"). The patient is instructed to indicate the intensity of their emotion by putting a cross on the line (15).

#### 2.4.3. Follow-up Forms

In the experimental group, abdominal symptoms and comfort levels were recorded on the form after colonoscopy (day 0) both in the unit and at home, as well as before and after abdominal massage on the morning and evening of day 1. In the control group, abdominal symptoms and comfort levels were recorded on the form after colonoscopy (day 0) both in the unit and at home, and in the morning and evening of day 1. In addition, at the end of day 1, the level of satisfaction with the procedure was also recorded for both groups.

### 2.5. Pre-Implementation

In order to determine the comprehensibility and usability of the forms, a pre-implementation was conducted between 4 November 2020 and 6 November 2020 at the Endoscopy Unit of the hospital where the research was conducted with 18 patients (experimental group: 9, control group: 9) who met the inclusion criteria for the study. No issues were identified in the operation of the data collection forms during this process. The patients included in the pre-application were not included in the study.

### 2.6. Intervention

The experimental group received an abdominal massage for 15 minutes on the day of colonoscopy (day 0), after the procedure, in the evening on day 0, and in the morning and evening on day 1. Abdominal massage was performed

in accordance with the instructions "Abdominal Massage Application Directive" developed by Uysal, Eşer, and Akpınar in Türkiye (16). Massage movements included three basic manoeuvres: effleurage, petrissage, and vibration (17). The incidence of abdominal distension and pain is highest within the first 24–48 hours following colonoscopy (18). Therefore, patients were monitored for two days (the day of the procedure and the day after the procedure) in this study.

#### 2.6.1. Experimental group

The first face-to-face interview with the experimental group was undertaken one hour before the colonoscopy procedure by the researcher, who is the first author. During this interview, the descriptive and clinical characteristics form was completed, and abdominal massage training was given. In addition, the patients and/or their relatives were informed about the use of the VAS and the follow-up forms.

The second face-to-face consultation with the patient and/or their relative was conducted in the observation room immediately after the colonoscopy. During this consultation, patients' abdominal distension, pain, and comfort levels were assessed using the VAS and recorded on the patient follow-up form. The first abdominal massage was performed by the researcher. In order to benefit sufficiently from the decompression effect of abdominal massage, 30 minutes after the massage was completed (19), the patients' abdominal distension, pain and comfort levels were assessed using the VAS and recorded. Additionally, the 'Abdominal Massage Education Form', 'VAS', and 'Patient Follow-up Form' were provided to the patient and/or their relative prior to discharge from the unit. The second abdominal massage was performed by the patient and/or their relative at home on the evening of the day the colonoscopy was performed (day 0). The third and fourth massages were performed by the patient and/or their relative on the morning and evening of the first day after colonoscopy. Before each application and 30 minutes after the application, the patient's abdominal distension, pain, and comfort levels, as well as their satisfaction levels at the end of the first day, were marked on the VAS by the patient and/or their relative. On the evening of day 0 after colonoscopy, telephone contact was made with the patient and/or their relative to support the massage training and to collect the forms given on the evening of day 1. The forms were collected on the evening of day 1. The markings made on the VAS by the patient and/or their relative were evaluated by the first author of this study.

#### 2.6.2. Control group

The first face-to-face interview with the control group was held one hour before the colonoscopy. During this meeting, the descriptive and clinical characteristics form was completed, and the patients and/or their relatives were informed about the use of VAS and the patient follow-up forms.

**Table 1.** Descriptive and clinical characteristics of the groups (N=166)

Variable		Control Group (n = 83)	Experimental Group (n = 83)	Test Statistic	p value
Gender	Female	41 (49.4)	40 (48.2)	$\chi^2$ : 0.024 <sup>a</sup>	.877
	Male	42 (50.6)	43 (51.8)		
Age (years)	Mean $\pm$ SD	49.55 $\pm$ 13.09	50.45 $\pm$ 11.28	Z: -0.373 <sup>c</sup>	.709
	Median (min-max)	50 (18-69)	53 (19-68)		
	Median (min-max)	78 (46-100)	75 (50-100)		
Body mass index BMI (kg/m <sup>2</sup> )	Mean $\pm$ SD	26.68 $\pm$ 2.64	26.48 $\pm$ 2.54	Z: -0.835 <sup>c</sup>	.404
	Median (min-max)	27.4 (19.4-29.7)	27.2 (19-29.8)		
Marital status	Married	73 (88.0)	71 (85.5)	$\chi^2$ : 0.210 <sup>a</sup>	.647
	Single	10 (12.0)	12 (14.5)		
Education level	Primary school	45 (54.2)	49 (59)	$\chi^2$ : 2.924 <sup>b</sup>	.579
	Middle school	11 (13.3)	10 (12.1)		
	High school	14 (16.9)	17 (20.5)		
	University	13 (15.7)	7 (8.4)		
History of colonoscopy	Absent	58 (69.9)	61 (73.5)	$\chi^2$ : 0.382 <sup>b</sup>	.930
	Present	25 (30.1)	22 (26.5)		
	Once	19 (22.9)	16 (19.3)		
	Twice or more	6 (7.2)	6 (7.2)		
Information about colonoscopy before procedure	Uninformed	4 (4.8)	4 (4.8)	$\chi^2$ : 0.000 <sup>e</sup>	1.000
	Informed	79 (95.2)	79 (95.2)		
Colonoscopy indication	Rectal bleeding	23 (27.7)	16 (19.3)	$\chi^2$ : 3.943 <sup>b</sup>	.737
	Change in bowel habits	15 (18.1)	19 (22.9)		
	Anaemia	15 (18.1)	15 (18.1)		
	Abdominal pain	12 (14.5)	10 (12.0)		
	Weight loss	10 (12.0)	14 (16.9)		
	FOB positivity	8 (9.6)	9 (10.8)		
Purpose of colonoscopy	Diagnosis	74 (89.2)	72 (86.7)	$\chi^2$ : 0.227 <sup>a</sup>	.633
	Control	9 (10.8)	11 (13.3)		
Caecal intubation time (minute)	Mean $\pm$ SD	9.24 $\pm$ 2.74	9.02 $\pm$ 2.82	t: -0.503 <sup>d</sup>	.616
	Median (min-max)	4 (2-15)	4 (2-10)		
Colonoscope exit time (minute)	Mean $\pm$ SD	4.34 $\pm$ 2.13	4.29 $\pm$ 1.53	Z: -0.413 <sup>c</sup>	.680
	Median (min-max)	4 (2-15)	4 (2-10)		
Total procedure time (minute)	Mean $\pm$ SD	13.58 $\pm$ 3.19	13.31 $\pm$ 3	t: -0.552 <sup>d</sup>	.582
	Median (min-max)	13 (8-22)	13 (7-22)		

<sup>a</sup>Chi-square test, <sup>b</sup>Fisher-Freeman-Halton test, <sup>c</sup>Mann-Whitney U test, <sup>d</sup>Student t-test, <sup>e</sup>Fisher's exact test

SD: standard deviation, min: minimum, max: maximum, BMI: body mass index; FOB: faecal occult blood

The second face-to-face interview with patients was conducted in the observation room after colonoscopy. During this interview, the abdominal distension, pain and comfort levels of the experimental group patients were assessed using the VAS 45 minutes after colonoscopy, simultaneously with the control group (15 minutes of massage and 30 minutes of massage effect duration). Before discharge from the unit, patients were given the 'VAS' and 'Patient Follow-up Form' and any questions they had regarding their use were explained. On the evening of the colonoscopy day (day 0) and on the morning and evening of the first day after colonoscopy, abdominal distension, pain and comfort levels were marked on the VAS by the patient and/or their relative, and satisfaction levels were marked at the end of the first day. Patients were contacted by telephone on the evening

of day 0 after colonoscopy to provide support and on the evening of day 1 to collect the patient follow-up forms. The forms were collected on the evening of day 1. The markings made on the VAS by the patient and/or their relative were evaluated by the first author of this study.

## 2.7. Ethical Considerations

Approval for the study was obtained from the Clinical Research Ethics Committee of the Marmara University Faculty of Medicine (date: 24.07.2020, protocol number: 09.2020.885) and the hospital management where the study was conducted (date: 13.07.2020). Informed verbal and written consent were received from the patients participating in the study. The study was conducted by

**Table 2.** Abdominal distension scores of the groups (N=166)

Evaluation time	Abdominal Distension				Test Statistic	p value
	Control Group (n = 83)		Experimental Group (n = 83)			
	Mean ± SD	Median (Min-max)	Mean ± SD	Median (Min-max)		
Day 0 (45 minutes after colonoscopy)	3.31 ± 1.17	3.1 (1-7.2)	1.87 ± 0.72	1.8 (0.5-4)	Z: 8.267 <sup>c</sup>	.001**
Day 0 evening	1.85 ± 0.81	1.8 (0.5-4.4)	0.79 ± 0.48	0.8 (0-2)	Z: 8.371 <sup>c</sup>	.001**
Day 1 morning	1.02 ± 0.53	1 (0-2.7)	0.35 ± 0.24	0.4 (0-1)	Z: 8.706 <sup>c</sup>	.001**
Day 1 evening	0.43 ± 0.31	0.4 (0-1.5)	0.08 ± 0.14	0 (0-0.6)	Z: 8.282 <sup>c</sup>	.001**

<sup>c</sup>Mann-Whitney U test, \*\*p<.01

SD: standard deviation, min: minimum, max: maximum

adhering to the principles of the Declaration of Helsinki and the Medical Research Involving Human Subjects Act. The study was registered at ClinicalTrials.gov (ClinicalTrials.gov ID NCT04979351), and no modifications were made to the study protocol after its initiation.

## 2.8. Statistical Analysis

The Number Cruncher Statistical System (NCSS) 2007 program was used for the statistical analysis of the data collected in the study. Descriptive statistics, independent-samples Student t-test, Mann-Whitney U test, Wilcoxon signed-rank test, Pearson chi-square, Fisher's exact, and Fisher-Freeman-Halton exact tests were used in the analysis of the data. Statistical significance was accepted as p<.05.

## 3. RESULTS

### 3.1. Participants

The experimental and control groups were similar in terms of descriptive and clinical characteristics (p>.05) (Table 1).

### 3.2. Abdominal Distension

In the experimental group, the mean abdominal distension score evaluated by the VAS was 3.6 $\pm$ 0.97 after colonoscopy and 1.87 $\pm$ 0.72 after the first abdominal massage (p=.001). It was observed that the mean abdominal distension score decreased by 0.61 units after the massage applied in the

evening of day 0 (0.79 $\pm$ 0.48) compared to the pre-massage score (1.4 $\pm$ 0.69) (p=.001). In the same group, the mean abdominal distension score decreased significantly after massage compared to before massage in the morning of day 1 following colonoscopy (0.84 $\pm$ 0.39 before massage vs. 0.35 $\pm$ 0.24 after massage) and in the evening of day 1 following colonoscopy (0.49 $\pm$ 0.28 before massage vs. 0.08 $\pm$ 0.14 after massage) (p=.001).

The comparison of the mean abdominal distension scores between the experimental and control groups revealed that the mean abdominal distension scores obtained 45 minutes after colonoscopy, in the evening of day 0, and in the morning and evening of day 1 were significantly lower in the experimental group (p<.001) (Table 2).

### 3.3. Abdominal Pain

In the experimental group, the mean pain intensity score of the patients evaluated by the VAS was 3.99 $\pm$ 1.14 after colonoscopy, decreasing to 1.95 $\pm$ 0.69 after the first abdominal massage (p=.001). The mean pain intensity score of this group was also significantly lower after the abdominal massage applied in the evening of day 0 (0.63 $\pm$ 0.35) compared to the pre-massage score (1.19 $\pm$ 0.43) (p=.001). Similarly, the group's mean pain intensity scores decreased significantly after the massage application compared to before massage in the morning (0.56 $\pm$ 0.28 before massage and 0.19 $\pm$ 0.22 after massage) and evening (0.2 $\pm$ 0.22 before

**Table 3.** Pain intensity scores of the groups (N=166)

	Pain Intensity					
	Control Group (n = 83)		Experimental Group (n = 83)		Test Statistic	p value
	Mean ± SD	Median (Min-max)	Mean ± SD	Median (Min-max)		
Evaluation time						
Day 0 (45 minutes after colonoscopy)	3.54 ± 1.09	3.4 (1.9-6.7)	1.95 ± 0.69	1.9 (0.7-5.0)	Z: − 9.133 <sup>c</sup>	.001**
Day 0 evening	1.85 ± 0.69	1.8 (0.4-5)	0.63 ± 0.35	0.6 (0-1.4)	Z: 10.125 <sup>c</sup>	.001**
Day 1 morning	0.9 ± 0.43	0.8 (0-2.1)	0.19 ± 0.22	0.2 (0-1.3)	Z: 9.965 <sup>c</sup>	.001**
Day 1 evening	0.29 ± 0.28	0.3 (0-1.3)	0.01 ± 0.04	0 (0-0.3)	Z: 8.514 <sup>c</sup>	.047*

<sup>c</sup>Mann-Whitney U test, \*p<.05, \*\*p<.01

SD: standard deviation, min: minimum, max: maximum



massage and  $0.01 \pm 0.04$  after massage) on day 1 following colonoscopy ( $p = .001$ ).

The abdominal pain intensity scores of the experimental group were significantly lower than in the control group at all evaluation times (45 min after colonoscopy, evening of day 0, and morning and evening of day 1) ( $p < .05$ ) (Table 3).

### 3.4. Abdominal Comfort

In the experimental group, the mean abdominal comfort score evaluated by VAS was  $5.84 \pm 0.96$  after colonoscopy, which significantly increased after the first abdominal massage ( $7.11 \pm 0.63$ ) ( $p = .001$ ). Similarly, the group's mean abdominal comfort scores increased significantly after the massage application compared to before massage in the evening on the day of colonoscopy ( $7.27 \pm 0.76$  and  $7.8 \pm 0.7$ ), in the morning on the first day following

colonoscopy ( $8 \pm 0.71$  and  $8.48 \pm 0.67$ ), and in the evening on the first day following colonoscopy ( $8.62 \pm 0.72$  and  $9.28 \pm 0.52$ ) ( $p = .001$ ).

The abdominal comfort scores of the experimental group were significantly higher than those of the control group at all evaluation times ( $p < .001$ ) (Table 4).

### 3.5. Satisfaction

When the satisfaction of the groups with the procedure obtained by VAS was investigated in the evening on the first day following colonoscopy, it was determined that the satisfaction level of the experimental group patients ( $9.10 \pm 0.59$ ) was significantly higher than that of the control group patients ( $8.06 \pm 0.74$ ) ( $p < .001$ ) (Table 5).

**Table 4.** Abdominal comfort scores of the groups ( $N = 166$ )

Evaluation time	Abdominal Comfort				Test Statistic	p value
	Control Group (n = 83)		Experimental Group (n = 83)			
	Mean ± SD	Median (Min-max)	Mean ± SD	Median (Min-max)		
Day 0 (45 minutes after colonoscopy)	5.65 ± 1.21	5.8 (1.2-8.7)	7.11 ± 0.63	7 (5.9-9.1)	Z: − 8.848 <sup>c</sup>	.001**
Day 0 evening	6.93 ± 0.94	6.7 (4.4-10)	7.8 ± 0.74	7.8 (6-10)	Z: − 6.374 <sup>c</sup>	.001**
Day 1 morning	7.52 ± 0.98	7.5 (6-10)	8.48 ± 0.67	8.5 (7-10)	Z: − 6.725 <sup>c</sup>	.001**
Day 1 evening	8.14 ± 0.77	8 (7-10)	9.28 ± 0.52	9.4 (8-10)	Z: − 8.161 <sup>c</sup>	.001**

<sup>c</sup>Mann-Whitney U test, \*\* $p < .01$

SD: standard deviation, min: minimum, max: maximum

**Table 5.** Group satisfaction level scores ( $N = 166$ )

Evaluation time	Satisfaction				Test Statistic	p value
	Control Group (n=83)		Experimental Group (n=83)			
	Mean ± SD	Median (Min-max)	Mean ± SD	Median (Min-max)		
Day 1 evening	8.06±0.74	8 (5.8-10)	9.10±0.59	9 (7.8-10)	Z:-8.137 <sup>c</sup>	.001**

<sup>c</sup>Mann Whitney U Test

\*\* $p < .01$

## 4. DISCUSSION

Findings of our study showed that abdominal massage applied to the patients in the experimental group immediately after colonoscopy, in the evening on the day of the procedure, and in the morning and evening on the first day following the procedure significantly reduced their abdominal distension levels. In addition, the abdominal distension levels of the experimental group were significantly lower than those of the control group 45 minutes after colonoscopy, in the evening on the day of the procedure, and in the morning and evening on the first day following the procedure. These findings provide evidence for the efficacy of abdominal

massage applied after colonoscopy in reducing abdominal distension. Consistent with our findings, previous studies have reported that abdominal massage reduces abdominal distension. For example, abdominal massage has been reported to minimise abdominal distension in patients who underwent colonoscopy (11), intensive care patients who are enterally fed (8), patients staying in neurology/neurosurgery units who are intermittently fed enterally (20), and those fed with a nasogastric tube (21). In a systematic review and meta-analysis study examining the effect of abdominal massage on enteral nutrition complications in

adult patients receiving intensive care, it was reported that abdominal massage was effective in relieving abdominal symptoms and that there was a significant difference between the massage and non-massage groups in terms of abdominal distension levels (22). The positive effect of abdominal massage in reducing distension has also been shown by studies evaluating elderly patients who complained of constipation (23) and individuals receiving treatment for opioid-induced constipation (24). A meta-analysis study examining the efficacy of abdominal massage in relieving constipation stated that abdominal massage improved pain and distension by increasing the frequency of defecation, improved the quality of life of patients (25), and effectively diminished abdominal distension caused by the accumulation of malignant acid in terminally ill oncology patients (26). In the literature, it is emphasised that abdominal massage increases blood flow, stimulates the absorption of nutrients, and reduces abdominal distension by accelerating evacuation (20). Abdominal massage enhances intestinal peristalsis by altering the intra-abdominal pressure through its mechanical and reflexive effects. By employing this specific mechanism, it accelerates the passage of colon contents through the digestive tract and reduces abdominal distension (8,20,21). Accordingly, it is considered that in the current study, abdominal massage stimulated bowel movements and facilitated the release of air introduced during colonoscopy, thus contributing to the reduction of abdominal distension.

It is known that abdominal massage reduces abdominal distension and associated pain by improving digestive function and bowel movements (8,27). Consistent with the findings of the current study, previous research has demonstrated the efficacy of abdominal massage in reducing pain resulting from abdominal cramps caused by distension. For example, Mutlu et al. (2024) reported that abdominal massage after colonoscopy reduced the distension caused by the introduction of air during the procedure and lowered abdominal pain associated with distension. Randomised controlled studies conducted with individuals with constipation have found that abdominal massage reduces abdominal pain and constipation-related distension and thus improves the quality of life of patients (28,29). Abdominal massage has been shown to be an effective treatment for abdominal distension and gastrointestinal issues, such as abdominal pain, in patients with neurogenic bowel dysfunction resulting from multiple sclerosis (30) and spinal cord injury (27). The findings of the current study revealed that abdominal massage applied at different times after colonoscopy reduced abdominal pain. In addition, the observation that the pain intensity of the patients who received abdominal massage was significantly lower than that of the control group provided evidence for the efficacy of abdominal massage applied after colonoscopy in reducing abdominal pain. This may be a result of the abdominal massage applied after colonoscopy, which increases bowel movements and ensures the release of air introduced to the intestines during the procedure,

thus reducing abdominal distension and pain due to distension.

Our findings showed that abdominal massage applied at different times after colonoscopy also significantly increased abdominal comfort. This finding provides evidence for the efficacy of abdominal massage in improving abdominal comfort. This is related to the effects of abdominal massage on relieving abdominal distension and decreasing pain intensity in patients. Similarly, studies conducted with different massage techniques and different patient groups have reported that massage applications increase patient comfort (31,32). For example, it has been determined that back massage reduces pain intensity and increases the comfort level of patients with congestive heart failure (33) and liver transplant patients, which has been attributed to this method increasing patient comfort by relieving pain through the relaxation of muscles and reduction of oedema (31). In addition, preoperative hand massage applied to elderly people living in nursing homes (32) and those scheduled to undergo cataract surgery (34) has been shown to reduce patients' anxiety, positively affect their vital signs, and increase their comfort levels. It has been emphasised that hand massage accelerates blood circulation by reducing the tension in muscles and providing relaxation and increases patient comfort by diminishing pain perception and transmission in the neuromatrix, i.e., brain regions responsible for pain sensation (31,32). Ensuring patient comfort is an important component of the quality of colonoscopy services and significantly contributes to the overall satisfaction of patients after the colonoscopy procedure (35,36). It also reflects the endoscopist's technique and the quality of the procedure. Patient comfort after colonoscopy is related to abdominal pain and distension. As pain and distension decrease, patient comfort increases (35).

In the current study, the patients who received abdominal massage were significantly more satisfied with the procedure than the controls. This provides evidence of the efficacy of abdominal massage applied after colonoscopy in increasing patients' satisfaction with the procedure. Post-colonoscopy abdominal massage increases the abdominal comfort of patients by reducing abdominal distension and pain. Consistent with our findings, previous studies have also shown that various massage treatments increase patient satisfaction. For instance, applying massage therapy to the hand and arm area of orthopaedic patients after surgery (37) or applying massage therapy to the back, shoulder, neck, hand, foot, or leg of patients after cardiac surgery can effectively provide relaxation by reducing pain, anxiety, and muscle tension, thereby enhancing patient satisfaction (38). It has also been reported that hand massage reduces anxiety levels and increase satisfaction levels among outpatients (39). In contrast, there is also a study reporting that despite the significant difference in pain and anxiety levels between the group that received foot massage after open heart surgery and the group that did not receive this intervention, there was no difference in patient satisfaction. Nevertheless, the authors suggested that any interaction

between patients and healthcare professionals for any reason could increase patient satisfaction; therefore, the positive effects of massage on patients should still be acknowledged (40).

Massage creates a physiological and psychological effect on the organism through systematic manipulation by stimulating soft tissues. It allows patients to relax during application and increases physical activity by relieving muscle spasm and pain. In addition, it helps patients relax by redirecting their focus (31,41,42). By means of tactile stimulation, it facilitates the enhancement of positive relationships with patients and improves behaviours and moods (31,41). For these reasons, massage is widely recognised as a practice that increases patient satisfaction by promoting courage, awareness, support, and participation (43).

#### 4.1. Limitations of the Study

This study has certain limitations. The first limitation is that only patients who undergo outpatient colonoscopy without sedation were included in the study, and the effect of abdominal massage on abdominal distension, pain, comfort, and satisfaction with the procedure in patients who underwent colonoscopy under sedation was not investigated. Another limitation of the study is that, although patients and/or their relatives were instructed on abdominal massage before colonoscopy and were asked to perform the second, third, and fourth massage applications during discharge with standardised guidelines, it was not possible to observe whether the applications were performed correctly and on time. A further limitation of the study is that the data were obtained based on participants' self-reports using the VAS.

## 5. CONCLUSION

The findings of this study showed that abdominal massage applied after outpatient unsedated colonoscopy reduced abdominal distension and pain levels, and increased abdominal comfort and patient satisfaction. In this context, abdominal massage can be incorporated into the nursing care process and used to manage abdominal symptoms developing after colonoscopy. Furthermore, nurses can provide abdominal massage training to patients and their relatives, enabling them to participate in their own care.

**Acknowledgements:** The authors are grateful to all the study participants for their cooperation in this study. This study was submitted as a Ph.D. thesis to Marmara University, Institute of Health Sciences.

**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Conflicts of interest:** The authors declare that they have no conflict of interest.

**Ethics Committee Approval:** This study was approved by Ethics Committee of Marmara University, Noninvasive Clinic Ethics Committee (Approval date: 24.07.2020; Number: 09.2020.885)

**Trial registration:** ClinicalTrials.gov ID NCT04979351

**Peer-review:** Externally peer-reviewed.

#### Author Contributions:

*Research idea:* DÖ, AG

*Design of the study:* DÖ, AG

*Acquisition of data for the study:* DÖ, AG

*Analysis of data for the study:* DÖ, AG

*Interpretation of data for the study:* DÖ, AG

*Drafting the manuscript:* DÖ, AG

*Revising it critically for important intellectual content:* DÖ, AG

*Final approval of the version to be published:* DÖ, AG

## REFERENCES

- [1] Steffenssen MW, Al-Najami I, Zimmermann-Nielsen E, Baatrup G. Patient-reported complications related to colonoscopy: A prospective feasibility study of an email-based survey. *Acta Oncol.* 2019;58(1):65-70. <https://doi.org/10.1080/0284186X.2018.153.5188>
- [2] Liu TT, Yi CH, Lei WY, Yu HC, Hung JS, Chen CL. Comparison of rectal suction versus rectal tube insertion for reducing abdominal symptoms immediately after unsedated colonoscopy. *Endosc Int Open.* 2016;4(6):725-729. <https://doi.org/10.1055/s-0034.139.2223>
- [3] Yi CH, Liu TT, Lei WY, Hung JS, Chen CL. Influence of rectal decompression on abdominal symptoms and anorectal physiology following colonoscopy in healthy adults. *Gastroenterology Research and Practice.* 2016:4101248. <https://doi.org/10.1155/2016/4101248>
- [4] Özkan N, Kayaoğlu HA, Ersoy ÖF, Çelik A. The effect of desufflation points on the pain cause by insufflated air during colonoscopy. *Turkey Clinical J Med Sci.* 2007;27:672-676. (Turkish)
- [5] Hilzenrat N, Fich A, Odes HS, Krugliak P, Eidelman L, Gaspar N, Weisberg G, Rosenthal A, Delgado JL, Ginat R, Sperber AD. Does insertion of a rectal tube after colonoscopy reduce patient discomfort and improve satisfaction? *Gastrointest Endosc.* 2003;57(1):54-57. <https://doi.org/10.1067/mge.2003.47>
- [6] Park SW, Jeon WJ, Kim JD, Lee SJ, Choi AR, Lee BS. Total colonic decompression after colonoscopy decreases postcolonoscopy abdominal pain: A randomized double-blind controlled trial. *Journal of Clinical Gastroenterology.* 2016;50(1):59-65. <https://doi.org/10.1097/MCG.000.000.0000000329>
- [7] Turan N, Aşti TA. The importance of abdominal massage in constipation management. *Anatolian Journal of Nursing and Health Sciences* 2015;18(2):148-154. (Turkish)
- [8] Dehghan M, Fatehi Poor A, Mehdipoor R, Ahmadinejad M. Does abdominal massage improve gastrointestinal functions of intensive care patients with an endotracheal tube?: A randomized clinical trial. *Complementary Therapies in Clinical Practice.* 2018;30:122-128. <https://doi.org/10.1016/j.ctcp.2017.12.018>
- [9] Sekerci YG, Hisar F. The relationship of constipation and abdominal massage: Current literature data. *International Journal of Caring Sciences.* 2024;17(1), 620-628.
- [10] Tanrıverdi S, Parlar Kılıç S. The effect of progressive muscle relaxation on abdominal pain and distension in colonoscopy patients. *Journal of Perianesthesia Nursing.* 2023;38(2):224-231. <https://doi.org/10.1016/j.jopan.2022.04.013>
- [11] Mutlu S, Yılmaz E, Şahin ST. The effect of position change and abdominal massage on anxiety, pain and distension after colonoscopy: A randomized clinical trial. *Explore (NY).* 2024;20(1):89-94. <https://doi.org/10.1016/j.explore.2023.06.007>



- [12] Cohen J. A power primer. *Psychological Bulletin*. 1992; 112(1):155–9. <https://doi.org/10.1037//0033-2909.112.1.155>
- [13] Lee YC, Wang HP, Chiu HM, Lin CP, Huang SP, Lai YP, Wu MS, Chen MF, Lin JT. Factors determining post-colonoscopy abdominal pain: prospective study of screening colonoscopy in 1000 subjects. *J Gastroenterol Hepatol*. 2006;21(10):1575–1580. <https://doi.org/10.1111/j.1440-1746.2006.04145.x>
- [14] Random.Org. (2020). Retrieved March 1, 2020, from <https://www.random.org/lists/>
- [15] Aydın A, Araz A, Asan A. Görsel analog ölçeği ve duygu kafesi: kültürümüze uyarlama çalışması. *Türk Psikoloji Yazıları*. 2011;14 (27):1-13. (Turkish)
- [16] Öztürk D, Gürkan A. The effect of post colonoscopy abdominal massage on abdominal pain, distension, discomfort and patient satisfaction: A randomized controlled study protocol. *International Journal of Clinical Trials*. 2021;8(4):301-307. <https://dx.doi.org/10.18203/2349-3259.ijct20214109>
- [17] Uysal N, Eşer İ, Akpınar H. The effect of abdominal massage on gastric residual volume: A randomized controlled trial. *astroenterology Nursing*. 2012;35(2):117-123. <https://doi.org/10.1097/SGA.0b013e31824c235a>
- [18] Marquez Azalgara V, Sewitch MJ, Joseph L, Barkun AN. Rates of minor adverse events and health resource utilization postcolonoscopy. *Canadian Journal of Gastroenterology & Hepatology*. 2014;28(11):595-599. <https://doi.org/10.1155/2014/750587>
- [19] Fritz S. *Mosby's Fundamentals of therapeutic massage*. Sixth edition. Elsevier. 2017;295-509.
- [20] Uysal N. The effect of abdominal massage administered by caregivers on gastric complications occurring in patients intermittent enteral feeding – A randomized controlled trial. *European Journal of Integrative Medicine*. 2017;10:75–81. <https://doi.org/10.1016/j.eujim.2017.01.014>
- [21] Çetinkaya O, Ovayolu Ö, Ovayolu N. The effect of abdominal massage on enteral complications in geriatric patients. *SAGE Open Nurs*. 2020;6:1-11. <https://doi.org/10.1177/237.796.0820963772>
- [22] Wang X, Sun J, Li Z, Luo H, Zhao M, Li Z, Li Q. Impact of abdominal massage on enteral nutrition complications in adult critically ill patients: A systematic review and meta-analysis. *Complementary Therapies in Medicine*. 2022;64:1-7. <https://doi.org/10.1016/j.ctim.2021.102796>
- [23] Hasanshahi N, Mirzaei T, Ravari A. Comparative study of the effect of acupressure and abdominal massage on constipation in elderly women: A clinical trial study. *Gastroenterol Nursing*. 2022;45(3):159-166. <https://doi.org/10.1097/SGA.000.000.0000000660>
- [24] Yıldırım D, Can G, Köknel Talu G. The efficacy of abdominal massage in managing opioid-induced constipation. *European Journal of Oncology Nursing*. 2019;41:110-119. <https://doi.org/10.1016/j.ejon.2019.05.013>
- [25] Gu X, Zhang L, Yuan H, Zhang M. Analysis of the efficacy of abdominal massage on functional constipation: A meta-analysis. *Heliyon*. 2023;9(7):1-14. <https://doi.org/10.1016/j.heliyon.2023.e18098>
- [26] Wang TJ, Wang HM, Yang TS, Jane SW, Huang TH, Wang CH, Lin YH. The effect of abdominal massage in reducing malignant ascites symptoms. *Research in Nursing & Health*. 2015;38(1):51-59. <https://doi.org/10.1002/nur.21637>
- [27] Ozisler Z, Koklu K, Ozels, Unsal-Delialioglu S. Outcomes of bowel program in spinal cord injury patients with neurogenic bowel dysfunction. *Neural Regeneration Research*. 2015;10(7):1153-1158. <https://doi.org/10.4103/1673-5374.160112>
- [28] Birimoglu Okuyan C, Bilgili N. Effect of abdominal massage on constipation and quality of life in older adults: A randomized controlled trial. *Complementary Therapies in Medicine*. 2019;47:1-6. <https://doi.org/10.1016/j.ctim.2019.102219>
- [29] Wang QS, Liu Y, Zou XN, Ma YL, Liu GL. Evaluating the efficacy of massage intervention for the treatment of poststroke constipation: A meta-analysis. *Evid Based Complement Alternat Med*. 2020;2020:1-8. <https://doi.org/10.1155/2020/8934751>
- [30] McClurg D, Goodman K, Hagen S, Harris F, Treweek S, Emmanuel A, Norton C, Coggrave M, Doran S, Norrie J, Donnan P, Mason H, Manoukian S. Abdominal massage for neurogenic bowel dysfunction in people with multiple sclerosis (AMBER – Abdominal Massage for Bowel Dysfunction Effectiveness Research): study protocol for a randomised controlled trial. *Trials*. 2017;18(1):150. <https://doi.org/10.1186/s13063.017.1890-y>
- [31] Demir B, Saritas S. Effects of massage on vital signs, pain and comfort levels in liver transplant patients. *Explore (NY)*. 2020;16(3):178-184. <https://doi.org/10.1016/j.explore.2019.10.004>
- [32] Yücel ŞÇ, Arslan GG, Bağcı H. Effects of hand massage and therapeutic touch on comfort and anxiety living in a nursing home in Turkey: A randomized controlled trial. *Journal of Religion and Health*. 2020;59(1):351-364. <https://doi.org/10.1007/s10943.019.00813-x>
- [33] Chen WL, Liu GJ, Yeh SH, Chiang MC, Fu MY, Hsieh YK. Effect of back massage intervention on anxiety, comfort, and physiologic responses in patients with congestive heart failure. *Journal of Alternative and Complementary Medicine*. 2013;19(5):464-470. <https://doi.org/10.1089/acm.2011.0873>
- [34] Çavdar AU, Yılmaz E, Baydur H. The effect of hand massage before cataract surgery on patient anxiety and comfort: A randomized controlled study. *Journal of Perianesthesia Nursing*. 2020;35(1):54-59. <https://doi.org/10.1016/j.jopan.2019.06.012>
- [35] Chan BPH, Hussey A, Rubinger N, Hookey LC. Patient comfort scores do not affect endoscopist behavior during colonoscopy, while trainee involvement has negative effects on patient comfort. *Endoscopy International Open*. 2017;5(12):1259-1267. <https://doi.org/10.1055/s-0043-120828>
- [36] Naumann DN, Potter-Concannon S, Karandikar S. Interobserver variability in comfort scores for screening colonoscopy. *Frontline Gastroenterol*. 2019;10(4):372-378. <https://doi.org/10.1136/flgastro-2018-101161>
- [37] Miller J, Dunion A, Dunn N, Fitzmaurice C, Gamboa M, Myers S, Novak P, Poole J, Rice K, Riley C, Sandberg R, Taylor D, Gilmore L. Effect of a brief massage on pain, anxiety, and satisfaction with pain management in postoperative orthopaedic patients. *Orthopedic Nursing*. 2015;34(4):227-234. <https://doi.org/10.1097/NOR.000.000.0000000163>
- [38] Braun LA, Stanguts C, Casanelia L, Spitzer O, Paul E, Vardaxis NJ, Rosenfeldt F. Massage therapy for cardiac surgery patients—a randomized trial. *The Journal of Thoracic and Cardiovascular Surgery*. 2012;144(6):1453-1459. <https://doi.org/10.1016/j.jtcvs.2012.04.027>
- [39] Li Z, Bauer B, Aaberg M, Pool S, Van Rooy K, Schroeder D, Finney R. Benefits of hand massage on anxiety in preoperative outpatient: A quasi-experimental study with pre – and

- post-tests. *Explore* (NY). 2021;17(5):410-416. <https://doi.org/10.1016/j.explore.2020.08.016>
- [40] Uzun Şahin C, Çilingir D. The effects of foot reflexology upon pain, anxiety, and patient satisfaction among patients having undergone open-heart surgery. *J Journal of Experimental and Clinical Medicine*. 2022;39(1):17-23. DOI: 10.52142/omujecm.39.1.4
- [41] Baykal D, Yıldırım D, Can G. Nörolojik hastalıklarda uygulanan abdominal masajın etkinliğini değerlendiren çalışmaların incelenmesi. *Florence Nightingale Hemşirelik Dergisi*. 2018;26(1):45-53. <https://doi.org/10.26650/FNJN.38720> (Turkish)
- [42] Brosseau L, Wells G. A, Tugwell P, Casimiro L, Novikov M, Loew L, Sredic D, Clément S, Gravelle A, Hua K, Kresic D, Lakic A, Ménard G, Côté P, Leblanc G, Sonier M, Cloutier A, McEwan J, Poitras S, Furlan A, ... Cohoon C. Ottawa Panel evidence-based clinical practice guidelines on therapeutic massage for neck pain. *Journal of Bodywork and Movement Therapies*. 2012;16(3):300-325. <https://doi.org/10.1016/j.jbmt.2012.04.001>
- [43] Unalmis Erdogan S, Yanikkerem E, Goker A. Effects of low back massage on perceived birth pain and satisfaction. *Complementary Therapies in Clinical Practice*. 2017;28:169-175. <https://doi.org/10.1016/j.ctcp.2017.05.016>