



The Effects of Abdominal Massage on the Management of Constipation: A Systematic Review of Randomised Controlled Trials

Konstipasyonun Yönetiminde Abdominal Masajın Etkisi: Randomize Kontrollü Çalışmaların Sistematiik Derlemesi

Emel Emine KAYIKÇI¹, Vildan KOCATEPE², Ferda AKYÜZ³, Gülbeyaz CAN³

¹İstanbul Medeniyet University Faculty of Health Sciences, Division of Nursing, İstanbul, Turkey

²Acıbadem Mehmet Ali Aydınlar University, Division of Nursing, İstanbul, Turkey

³İstanbul University Cerrahpaşa Florence Nightingale Faculty of Nursing, Department of Internal Medicine Nursing, İstanbul, Turkey

ABSTRACT

This study aimed to assess the effectiveness of abdominal massage in the management of constipation.

We conducted this systematic review by scanning Pubmed, CINAHL, EBSCOhost, ScienceDirect, Ovi, ProQuest, Web of Science and ULAKBİM National Databases without any time restriction. To search the literature, we used the following keywords: “constipation”, “constipation management” and “abdominal massage”. We included into the systematic review randomised controlled trials on constipation management whose full texts were available both in English and Turkish, while studies without the full text and/or ongoing studies were excluded. A total of 31 articles were found; however, only 9 of these studies met the inclusion criteria.

The effects of abdominal massage on constipation management have been assessed in different randomised controlled trials, with the participation of cancer, parkinson, multiple sclerosis and orthopedics and traumatology patients. The abdominal massage was applied to the patients in the supine position and in the direction of the colon, with different techniques of circular movements (kneading, vibration, effleurage, superficial or deep stroking techniques) for different periods (10-40 minutes) and at different frequencies (1 to 2 times in a day or week). In six trials, abdominal massage and laxatives were applied to the experimental group,

ÖZ

Çalışmanın amacı konstipasyonun yönetiminde abdominal masajın etkinliğini değerlendirmektir. Sistematiik derleme nitelikte olan bu çalışma, yıl sınırlaması olmaksızın, Pubmed, CINAHL, EBSCOhost, ScienceDirect, Ovi, ProQuest, Web of Science, ULAKBİM Ulusal Veri Tabanları taranarak gerçekleştirildi. Literatür taraması “konstipasyon”, “konstipasyon yönetimi”, “abdominal masaj” anahtar kelimeleri kullanılarak gerçekleştirildi. Çalışmaya konstipasyonun yönetiminde İngilizce ya da Türkçe tam metnine ulaşılabilen randomize kontrollü araştırmalar dahil edildi, tam metin olmayan ve/veya devam eden çalışmalar kapsam dışı bırakıldı. Toplam 31 araştırma makalesine ulaşıldı, bu çalışmaların sadece 9 tanesi araştırmaya dahil edilme kriterlerine uygun olduğu belirlendi. Konstipasyonun yönetiminde abdominal masajının etkisi kanser, parkinson, multiple skleroz ve ortopedi ve travmatoloji hastalarının katılımı ile gerçekleştirilen farklı randomize kontrollü çalışmalarda değerlendirilmiştir. Bu hastalara karın masajı, hasta supine pozisyonunda iken, kolon yönünde dairesel hareketler ile farklı teknikler (yoğurma, vibrasyon, effloraj, yüzeysel veya derin vuruş) kullanılarak, farklı sürelerde (10-40 dk), farklı sıklıkta (günlük veya haftada 1-2 kez) yapılmıştır. Altı çalışmada deney grubuna abdominal masaj ve laksatif, kontrol grubuna ise kliniğin standart protokolü (laksatif ve/veya yaşam

Address for Correspondence: Emine Emel KAYIKÇI, İstanbul Medeniyet University Faculty of Health Science, Division of Nursing, İstanbul, Turkey

E-mail: emel.ozdemir@medeniyet.edu.tr **ORCID ID:** orcid.org/0000-0002-1511-0830

Cite this article as: Kayıkçı EE, Kocatepe V, Akyüz F, Can G. The Effects of Abdominal Massage on the Management of Constipation: A Systematic Review of Randomised Controlled Trials. Bezmialem Science 2020;8(3):311-7.

©Copyright 2020 by the Bezmialem Vakıf University
Bezmialem Science published by Galenos Publishing House.

Received: 05.10.2018

Accepted: 02.02.2020

whereas the standard clinical protocol (laxative and/or change in the lifestyle) was applied to the control group. In a study, massage based on the tensegrity principle (balance the tension of muscles, fasciae and ligaments that are structurally associated) was applied to the control group. In another study, the classical abdominal massage was applied to one group, the aroma massage was applied to the second group and only laxatives were administered to the third group. To assess constipation, the Gastrointestinal Symptom Rating scale, Constipation Severity index, Bristol Visual Stool scale, Constipation Quality of Life Questionnaire and Neurogenic Bowel Dysfunction or bowel diary were used in these studies.

Our results showed that abdominal massages were effective in reducing constipation-related symptoms, increasing the frequency of defaecation and enhancing the quality of life of patients.

Keywords: Constipation, constipation management, abdominal massage

şekli değişikliği) uygulanmıştır. Bir çalışmada, kontrol grubuna tensegrity ilkesine dayalı masaj (yapısal olarak bağlantılı kas, fasya ve bağların gerginliğini dengeleme) uygulanmıştır. Diğer bir çalışmada ise bir gruba klasik karın masajı, bir gruba aroma masajı, üçüncü gruba ise laksatif uygulanmıştır. Konstipasyonun değerlendirilmesinde ise çalışmalarda Gastrointestinal Semptom Derecelendirme ölçeği, Konstipasyon Şiddeti ölçeği, Bristol Görsel Dışkı ölçeği, Konstipasyon Yaşam Kalitesi ölçeği, Nörojenik Barsak Disfonksiyonu ya da barsak günlüğü kullanılmıştır. Çalışmadan elde edilen sonuçlar, abdominal masajın konstipasyon ilişkili semptomları azaltmada, defekasyon sıklığını arttırmada ve yaşam kalitesini iyileştirmede etkili olduğunu göstermiştir.

Anahtar Sözcükler: Konstipasyon, konstipasyon yönetimi, abdominal masaj

Introduction

Constipation is currently one of the most common symptoms related to the digestive system. It does not only negatively affect the quality of life, well-being, social life and daily life activities of individuals, but also causes economic losses. Constipation may be idiopathic, although neurogenic or non-neurogenic diseases like irritable bowel syndrome, hypothyroidism, hypocalcemia as well as drugs and pregnancy may play a role in its etiology (1). In addition, changes in the diet, patient exercises, acute emotional stress, abdominal surgery and the disease course are also among the causative factors of constipation (2,3).

In previous studies, the prevalence of constipation has been determined to be between 0.7%-79% across the world, with an average of 16% and a rate of 35% in elderly people. It is more frequent in women, elderly people, home care patients and terminal patients (4-6).

Today, pharmacological and non-pharmacological approaches are used in constipation management; however, the pharmacological methods are more frequently used. The most commonly used pharmacological approaches are laxatives, enema and suppositories (7), which leads to an increase in cost. Regarding the non-pharmacological approach, lifestyle changes like diet, fluid intake and increasing physical activity are applied (8). Apart from this, many other non-pharmacological approaches like abdominal massage, meditation, the use of probiotics, biofeedback, reflexology and acupuncture are used (9).

Abdominal massage is one of the non-pharmacological approaches used in the management of constipation. It is a cheap non-invasive method that has no side effects and can be easily applied by patients and their relatives (10). The use of abdominal massage in constipation management dates back before the 1870s. Abdominal massage is performed by placing the patient in a semi-Fowler or supine position, applying circular movements in the direction of colon and in the bowel region over the abdominal wall, using kneading, vibration, effleurage and superficial or deep stroking techniques. It has been reported in the literature

that abdominal massage increases parasympathetic stimulation, muscle motility, and the release of digestive secretions (10,11). It has also been reported that abdominal massage exerts mechanical and reflexive effects on digestive system organs by enabling the relaxation of the sphincters in the gastrointestinal system. Based on these effects, abdominal massage provides a bowel purge by accelerating gastric emptying and bowel peristalsis (12). There is no review that has evaluated the effectiveness of abdominal massage on constipation management. Therefore, the purpose of this study was to systematically examine scientific evidences regarding the effectiveness of abdominal massage on constipation management.

Method

This study was a systematic review examining randomised controlled trials that were conducted to determine the efficacy of abdominal massage on constipation management. Two researchers conducted the literature search in Turkish and English by scanning Pubmed, CINAHL, EBSCOhost, ScienceDirect, Ovi, ProQuest, Web of Science and ULAKBIM National Databases, without any time restrictions. The following keywords were used: "constipation", "constipation management", "abdominal massage" and their Turkish translations.

Inclusion and Exclusion Criteria

Studies on constipation management whose full texts were available both in English and Turkish were included into the systematic review. There was no randomised controlled trial in Turkish that had been conducted on this subject.

Studies without the full texts, ongoing studies, studies conducted in languages other than Turkish and English, qualitative, quantitative, review and case studies were excluded from the systematic review.

Assessing the Quality of the Studies

The studies were assessed by a researcher in terms of the sample size, study groups, characteristics of the interventions applied, assessment scales and results. In addition, two researchers independently assessed each study using the Jadad scoring system.

The Jadad Scale is one of the scoring systems that is reported to have the best validity and reliability in the methodological assessment of the quality of randomised controlled trials and is frequently used. The trials were assessed as 0-5 points in the Jadad scale. This scale consists of a total of 5 questions and using this scale, randomisation, the existence of double-blinding, withdrawing from the study and the exclusion from the study are assessed as “0” and “1” points. In addition, the appropriateness of the randomisation scheme and an appropriate explanation of the double-blinding method are scored as “+1” and “-1”. Table 1 shows the Jadad scores of the studies in the present review (13).

Results

As a result of the search conducted using the aforementioned keywords, a total of 31 articles were found. Six of the 31

articles found were duplicates and were therefore excluded. The remaining 25 trials were screened according to the inclusion and exclusion criteria, after which 9 randomised controlled trials were retained for the systematic review. The included trials were conducted between 2009-2016 (Figure 1).

In the trials, the patients were classified according to the Rome II and Rome III criteria for constipation developing in cancer, Parkinson, multiple sclerosis, orthopaedics and traumatology patients. The abdominal massage was applied to the patients for constipation management in the supine position and in the direction of the colon, with different types of circular movements (kneading, vibration, effleurage and superficial or deep stroking techniques), for 10-40 minutes and 1 to 2 times a day or week. The abdominal massage was applied by the patients themselves or by healthcare professionals at home, work, or in the clinic

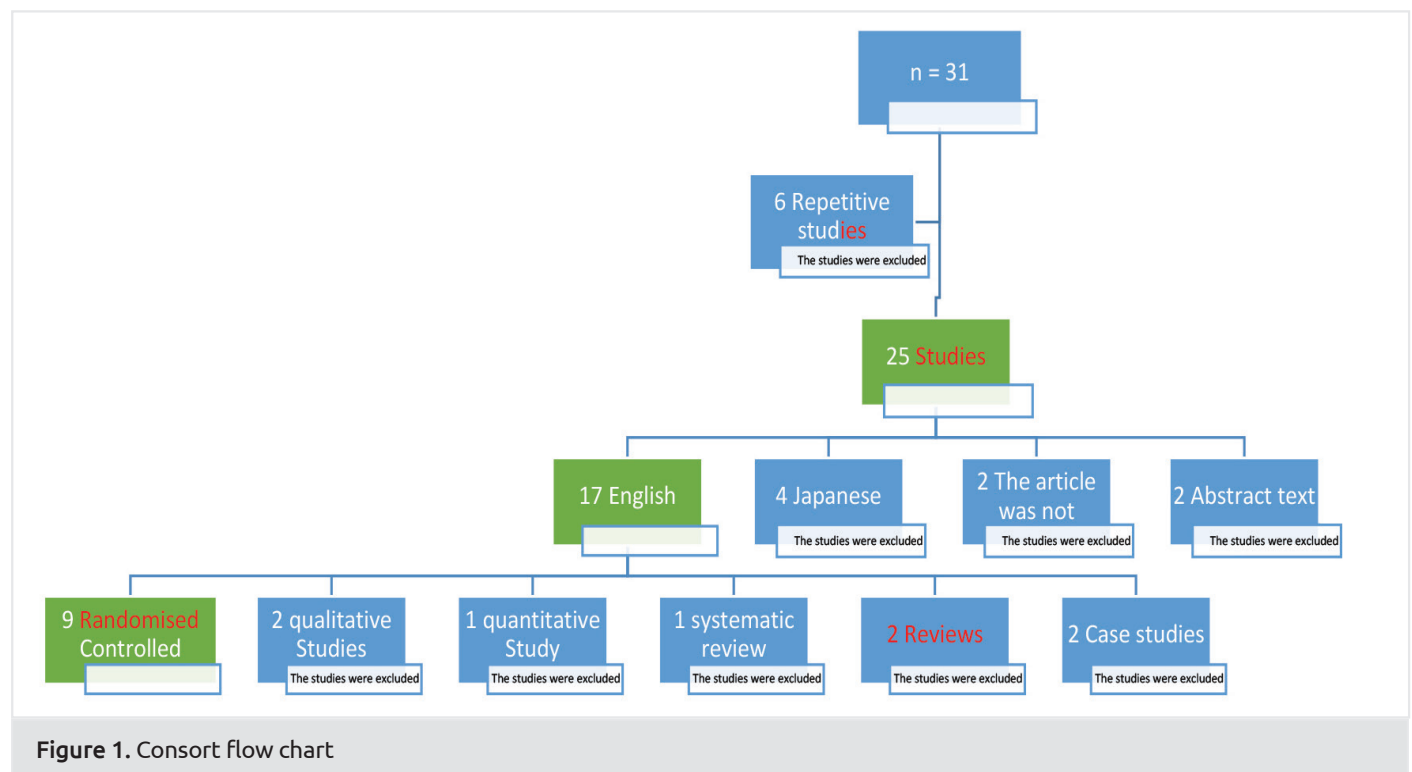


Figure 1. Consort flow chart

Table 1. Jadad Score Assessment-Scoring Criteria

The first author, year	Randomisation	Double-blinding	Was withdrawing from the study explained?	Was randomisation performed reliably?	Is the double-blinding study method appropriate?	Total score
Turan and Aşt (12)	1	0	1	+1	-1	2
Kassolik et al. (19)	1	1	1	+1	+1	5
McClurg et al. (10)	1	0	1	+1	-1	2
Silva and Motta (14)	1	0	1	+1	-1	2
Lai et al. (18)	1	0	1	+1	-1	2
Lămâs et al. (15)	1	0	1	+1	-1	2
McClurg et al. (10)	1	0	0	+1	-1	2
Lămâs et al. (16)	1	0	1	+1	-1	2
Lămâs et al. (15),	1	0	1	+1	-1	2

and the patients watched a video of the massage before the application.

In 6 randomised controlled trials, abdominal massage and laxatives were applied to the experimental groups while the standard clinical protocol [laxatives and/or lifestyle change (diet, activity, fluid intake, etc.)] was applied to the control groups. In one study, the tensegrity-based massage was applied to the

control group while the classical abdominal massage was applied to the experimental group. In another study, the classical abdominal massage was applied to a group, aroma massage was applied to another group while only laxatives were applied to the third group. Moreover, in another study, abdominal massage, breathing exercises and isometric abdominal muscle training were administered to the experimental group while only laxatives were applied to the control group (Tables 2, 3).

Table 2. The characteristics of the studies included in the systematic review

Study (first author, year)	Aim of the study	Study group	Applied intervention/ approach	Assessment	Conclusion	Jadad score (0-5)
Turan and Aşt (12)	To determine the effect of abdominal massage on constipation and the quality of life in the orthopaedics and traumatology patients	E=30	Postop 4 th day, 2 times a day for 3 days, 15-minute abdominal massage	- Gastrointestinal Symptom Rating scale, - Constipation Severity scale, - Bristol Visual Stool scale	It was determined that the abdominal massage applied to the patients diagnosed with postoperative constipation reduced the constipation symptoms, the time intervals between defaecations and enhanced the quality of life	2
		C=30	laxative use and lifestyle change	- The Patient Assessment of Constipation Quality of Life (PAC-QOL) scale, - European Quality of Life scale (EQ-5D)		
Kassolik et al. (19)	To compare the efficacy of tensegrity-based massage and the classical abdominal massage applied to constipated patients	E=15	Tensegrity massage for 20 minutes, 2 times a week, for 21 days	- Rome III questionnaire - Bowel diary	It was observed that the massage based on the tensegrity principle had a more positive effect on the quality and amount of bowel movements compared to the classical abdominal massage	5
		C=14	Abdominal massage for 10 minutes, 2 times a week, for 21 days			
McClurg et al. (10)	To reduce the constipation symptoms in Parkinson patients	E=16	abdominal massage every day for 6 weeks,	- Gastrointestinal Symptom Rating Scale - Constipation Severity Scale	An abdominal massage is an effective approach in Parkinson patients for the treatment of constipation	2
		C=16	Change of lifestyle	- Neurogenic Bowel Dysfunction - Bowel diary		
Silva and Motta (14)	To compare the muscle training-abdominal massage-diaphragm breathing and the medical treatment in patients with chronic functional constipation.	E=36	Twice a week for 6 weeks, 12-40 min (Abdominal Massage + breathing Exercise + isometric abdominal muscle training)	Frequency of defaecation and faecal incontinence	At the end of 6 weeks, together with the combined use of the isometric training of the abdominal muscles, breathing exercises and the abdominal massage, there was an increase in the defaecation frequency and no change was observed in the faecal incontinence	2
		C = 36	Laxatives			
Lai et al. (18)	To examine the effect of aroma massage on constipation in terminal cancer patients	Aroma M:13	Aroma M of 15–20 minutes for 5 days	- Constipation Rating scale - Quality of life scale for Hong Kong (MQoL-HK)	The aroma massage was found to reduce the constipation score in the terminal cancer patients and to enhance the quality of life.	2
		Classic M:11	Classic Abdominal M of 15-20 minutes for 5 days			
		C:8	laxative use and lifestyle change			

D: Experimental group, K: Control group, aromaa M: Aromaa massage, Classic M: Classic massage

In the assessment of constipation, the Gastrointestinal Symptom Rating scale, Constipation Severity index, Bristol Visual Stool scale, Constipation Quality of Life scale, Neurogenic Bowel Dysfunction and bowel diary were used.

It was observed by Turan and Aşt (12) that abdominal massage applied for postoperative constipation in orthopaedics and traumatology patients reduced the constipation symptoms and the time intervals between the defaecations, enhancing the quality of life (12).

Previous studies on constipation among parkinson and multiple sclerosis patients stated that abdominal massage was an effective approach (2,10).

On the other hand, among individuals with chronic functional constipation, the muscle training/abdominal massage/diaphragm breathing combination and medical treatment were compared. With the combined use of isometric training of the abdominal muscles, respiratory exercises and abdominal massage, an increase

was observed in the defaecation frequency, whereas no change in faecal incontinence was observed. Of note, the above-mentioned studies were of low quality (14).

In the studies conducted by Lămâs et al. (15), it was observed in different years that abdominal massage for constipation management reduced the severity of gastrointestinal symptoms, particularly increased bowel movements and reduced laxative intake. In addition, it was determined that abdominal massage was cost-effective in the long term (15-17).

In the study conducted by Lai et al. (18), to examine the effect of aroma massage on constipation in the terminal cancer patients, aroma massage was applied to a group, the classical massage was applied to another group and laxatives and lifestyle change were applied to the control group. It was shown that aroma massage may be used in terminal cancer patients.

In the study with the highest quality among the studies in the present systematic review, the classical abdominal and tensegrity-

Table 3. The characteristics of the studies included in the systematic review

Study (first author, year)	The aim of the study	The study group	Applied intervention/ approach	Assessment	Conclusion	Jadad score (0-5)
Lămâs et al. (16)	To determine the efficacy of abdominal massage on constipation treatment	E=30 C=30	abdominal massage for five days a week, once a day, 15 minutes, 8 weeks laxatives and Lifestyle change	*Bowel diary	The Abdominal massage reduced the use of laxatives and it was asserted that it may be used in the management of constipation.	2
McClurg et al. (10)	To assess the effect of abdominal massage on constipation management in MS patients	E=15 C=15	Abdominal massage for 15 min daily and 4 weeks Change of lifestyle	*Constipation scoring system *Neurogenic bowel dysfunction *Bowel diary	The abdominal massage was found to be effective in reducing constipation in MS patients	2
Lămâs et al. (16)	To examine the effect of abdominal massage applied for constipation on the cost	E=29 C=29	Abdominal massage + laxatives for 15 minutes 5 days a week and 8 weeks Laxatives and lifestyle change	*Gastrointestinal Symptom * Rating scale	In the management of constipation, abdominal massage may be cost-effective in the long term. An important point will be to determine the people who will benefit	2
Lămâs et al. (15)	The effect of abdominal massage on laxative use and gastrointestinal function in the constipated people.	E=30 C=30	Abdominal Massage for 15 minutes 5 days a week and 8 weeks Laxatives	*Gastrointestinal Symptom * Rating scale	It was found that abdominal massage reduced the severity of gastrointestinal symptoms, especially constipation and abdominal pain, and increased the bowel movements. No significant correlation was found between the massage and laxative use	2

E: Experimental group, C: Control Group, aromaa M: Aroma massage, Classic M: Classic massage

based massages were compared. It was observed that tensegrity-based massage had a more positive effect on the quality and amount of the bowel movements compared to the classical abdominal massage (19).

Discussion

Constipation is currently a very important gastrointestinal symptom that is frequently encountered due to several reasons. This systematic review is the first of its kind that focuses on abdominal massage techniques applied for constipation management. All of the randomised controlled trials investigating the efficacy of abdominal massage on constipation management, were included into the present study. The number of relevant studies was limited and the methodological quality of the studies varied

After examining the studies that were included in the systematic review, it was observed that they were heterogeneously distributed in terms of intervention, disease, assessment scales and the study results. All the studies revealed that the use of abdominal massage for constipation management was an effective approach. The studies showed that abdominal massage reduced the severity of gastrointestinal symptoms, increased bowel movements and the frequency of defaecation, reduced constipation symptoms and enhanced the quality of life of the patients (2,10,12,14,15,17,18). They also showed that it was a cost-effective method because it decreased the use of laxatives (16). No side effect was reported in the studies.

In most of the studies included in the review, abdominal massage was performed on the patients in the supine position with circular movements in the direction of the colon (12,14,15,19). There were differences in massage techniques in the studies and the most frequent techniques were kneading, vibration, effleurage and superficial or deep stroking (12,15,19). In the studies, the duration of the massage varied between 10-40 min. Additionally, the frequency of the massage was either daily (2,10,12,15-18) or 1 to 2 times a week (14,19).

The reviewed studies revealed that abdominal massage is usually effective in treating constipation. The study by Turan and Aşt (12) revealed that patients receiving abdominal massage twice a day on post-operative 4, 5 and 6 days for 15 minutes defaecated more frequently in the postoperative period than the control group patients and that there was a statistically significant difference between the groups. In addition, it was found that abdominal massage reduced constipation symptoms, decreased time intervals between defaecations and enhanced the quality of life. Similarly, in the study conducted by McClurg et al. (2); abdominal massage was applied to multiple sclerosis patients for constipation management for 15 min every day for 4 weeks and it was found to be more effective compared to the control group. Also, McClurg et al. (2), applied abdominal massage to Parkinson patients for constipation management every day for 6 weeks and a change of lifestyle was made in the control group. As a result of the study, it was observed that there was a

symptomatic recovery in both groups. However, there was no significant difference between the groups (10).

There are 3 different studies by Lämås et al. (15), evaluating the effect of abdominal massage on constipation management. The first study was conducted in 2009 and abdominal massage was applied to patients with constipation for 15 min once a day, for 5 days in a week, for 8 weeks. As a result of the study, it was reported that abdominal massage reduced gastrointestinal symptoms and increased bowel movements; however, it was determined that there was no significant correlation between massage and the use of laxatives (15). In their study which was conducted in 2010, the effect of self-massaging and massage by professionals on cost was evaluated for abdominal massage throughout 16 weeks. It was determined that self-massaging could be cost-effective for constipation management in the long term (16). In their third relevant study conducted in 2011, abdominal massage applied for constipation management reduced the use of laxatives and they stated that it could be an effective approach for constipation management (17).

On the other hand, in the study by Lai et al. (18), aroma massage, classic abdominal massage and laxative-lifestyle change were compared. It was reported that aroma massage reduced the constipation score and increased the quality of life compared to the control and classic abdominal massage (18). Similarly, in the study by Kassolik et al. (19), abdominal massage was compared with tensegrity-based massage and it was shown that tensegrity-based massage was more effective in improving the quality of bowel movements and amount of defaecation compared to the classic abdominal massage.

In the study by Silva et al. (14); the combined use of abdominal massage, isometric abdominal muscle training and diaphragm exercises was compared with the use of laxatives in patients with constipation and it was determined that there was an increase in the frequency of defaecation with the combined treatment; whereas, there was no change in faecal incontinence at the end of 6 weeks (14).

In all the studies, not only abdominal massage, but also laxatives were applied in the experimental group; whereas, laxatives and/or lifestyle change were applied in the control group. For constipation management, abdominal massage was used instead of laxatives and this reduced the number of laxatives used, although it is recommended to use both in combination (2,12,16). When the quality of the randomised controlled trials was assessed in the present review, it was observed that most of them were of low quality.

Study Limitations

The limitation of the study is that it assessed only articles published in English. We did not find any randomised controlled trial published in Turkish that evaluated the effect of abdominal massage on constipation. In addition, all the studies that were found had low quality data and the studies were conducted in different sample groups.

Conclusion

Abdominal massage is a cheap method without any side effects, which can easily be applied by the patients themselves, their relatives or other healthcare professionals in environments such as the home, workplace or hospital. The effect of abdominal massage on constipation was evaluated in different studies and it was found to be effective. In the light of these findings, it can be recommended that abdominal massage be regularly applied to patients with constipation. Particularly, patients who have a risk of constipation in the clinics can be taught on how to perform the abdominal massage, in order to prevent the patients from getting constipated and also to enhance their quality of life. In addition, the use of laxatives can be reduced and thus, cost-effective care can be provided.

When the Jadad scores of the studies were taken into consideration, it was observed that only one of the studies had a high Jadad score; therefore, it is considered that randomised controlled trials performed with a larger sample of patients including those having a similar diagnosis and receiving a similar treatment in order to determine the efficacy of abdominal massage in constipation management are required.

Ethics

Peer-review: Internally and externally peer reviewed.

Authorship Contributions

Concept: E.E.K., V.K., F.A., G.C., Design: E.E.K., V.K., F.A., G.C., Data Collection or Processing: E.E.K., V.K., G.C., Analysis or Interpretation: E.E.K., V.K., F.A., G.C., Literature Search: E.E.K., G.C., Writing: E.E.K., V.K., G.C.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

- Costilla VC, Foxx-Orenstein AE. Constipation. Understanding Mechanisms and Management. *Clin Geriatr Med* 2014;30:107-15.
- McClurg D, Hagen S, Hawkins S, Lowe-Strong A. Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. *Mult Scler* 2011;17:223-33.
- Sinclair M. The use of abdominal massage to treat chronic constipation. *J Bodyw Mov Ther* 2011;15:436-45.
- Higgins PDR, Johanson JF. Epidemiology of constipation in North America: a systematic review. *Am J Gastroenterol* 2004;99:750-9.
- Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. *Am J Gastroenterol* 2011;106:1582-92.
- Vazquez Roque M, Bouras EP. Epidemiology and management of chronic constipation in elderly patients. *Clin Interv Aging* 2015;10:919-30.
- Tramonte SM, Brand MB, Mulrow CD, Amato MG, O'Keefe ME, Ramirez G. The treatment of chronic constipation in adults. A systematic review. *J Gen Intern Med* 1997;12:15-24.
- Wisten A, Messner T. Fruit and fibre (Pajala porridge) in the prevention of constipation. *Scand J Caring Sci* 2005;19:71-6.
- Saygılı U, Bıçak D, Can G, Basibuyuk M, Ghrayeb I, Meron T, et al. Constipation. In: Can, G, editor. *Consensus 2017-Evidence-Based Palliative Care in a Cancer Patient*. Istanbul: Nobel Medical Bookstore; 2018.p.87-103.
- McClurg D, Hagen S, Jamieson K, Dickinson L, Paul L, Cunningham AL. Abdominal massage for the alleviation of symptoms of constipation in people with Parkinson's: a randomised controlled pilot study. *Age Ageing* 2016;45:299-303.
- Krassioukov A, Eng JJ, Claxton G, Sakakibara BM, Shum S. Neurogenic bowel management after spinal cord injury: a systematic review of the evidence. *Spinal Cord* 2010;48:718-33.
- Turan N, Aşt TA. The Effect of Abdominal Massage on Constipation and Quality of Life. *Gastroenterol Nurs* 2016;39:48-59.
- Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJM, Gavaghan DJ, et al. Assessing the quality of reports of randomized clinical trials: Is blinding necessary? *Control Clin Trials* 1996;17:1-12.
- Silva CAG, Motta MEFA. The use of abdominal muscle training, breathing exercises and abdominal massage to treat pediatric chronic functional constipation. *Colorectal Dis* 2013;15:250-5.
- Lâmås K, Lindholm L, Stenlund H, Engström B, Jacobsson C. Effects of abdominal massage in management of constipation--a randomized controlled trial. *Int J Nurs Stud* 2009;46:759-67.
- Lâmås K, Lindholm L, Engström B, Jacobsson C. Abdominal massage for people with constipation: a cost utility analysis. *J Adv Nurs* 2010;66:1719-29.
- Lâmås K. Using massage to ease constipation. *Nurs Times* 2011;107:26-7.
- Lai TKT, Cheung MC, Lo CK, Ng KL, Fung YH, Tong M, et al. Effectiveness of aroma massage on advanced cancer patients with constipation: a pilot study. *Complement Ther Clin Pract* 2011;17:37-43.
- Kassolik K, Andrzejewski W, Wilk I, Brzozowski M, Voyce K, Jaworska-Krawiecka E, et al. The effectiveness of massage based on the tensegrity Principle compared with classical abdominal massage performed on patients with constipation. *Arch Gerontol Geriatr* 2015;61:202-11.