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The Effects of Massage Therapy in Decreasing Pain and Anxiety in Post-Surgical Patients With Breast Cancer: A Systematic Review and Meta-Analysis

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Abstract

Background: Massage therapy is an effective non-pharmacological intervention in treating pain and anxiety of patients with cancer. Prior studies have reviewed the benefits of massage therapy in patients with breast cancer undergoing chemotherapy, radiation, and other patient-specific cancer treatments. What has yet to be examined is the effects of massage therapy on the pain and anxiety of patients with breast cancer after surgery.
Objective: : The purpose of this systematic review and meta-analysis was to examine the effect of massage therapy on post-surgical pain and anxiety in patients with breast cancer.
Methods: Systematic searches were performed using databases PubMed, CINAHL, and Medline (EBSCO), with no date constraint through September 30, 2023, to identify randomized control trials, randomized pilot, and quasi-experimental studies. The database searches retrieved 1205 titles, and after screening, 7 studies were chosen for full analysis using Cohen's d, 95% Confidence Interval (CI), and effect size. The heterogeneity of the studies was calculated in the meta-analysis using Cochran's Q equation.
Results: Massage therapy techniques reported were massage therapy, classic massage, reflexology, myofascial release, and myofascial therapy, and were performed at day 0 up to 16 weeks post-surgery. Massage therapy decreased pain and anxiety for patients in the massage group. Analyses showed a positive effect size using massage therapy as an intervention for pain and anxiety in women with breast cancer post-surgery. Overall effect size for pain was 1.057 with a *P*-value of <.0001, and overall effect size for anxiety was .673 with a *P*-value of <.0001.
Conclusion: The current evidence in this study reflects that massage therapy is effective as a non-pharmacological tool in decreasing post-surgical pain and anxiety in women with breast cancer.

Keywords

massage therapy, manual therapy, breast cancer, pain, anxiety

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Introduction

Women with breast cancer experience persistent post-surgical pain and anxiety at a rate of 42% and 49%, respectively.[1,2] While the main goal of clinical treatment is to eradicate cancer, little focus is placed on addressing other symptom management[2] and therefore pain and anxiety in women with breast cancer often gets under-, un- or misdiagnosed.[3] Additionally, women experiencing increased levels of anxiety before breast cancer surgery, frequently receive more aggressive procedures than surgically recommended.[4] Health care providers most likely know that their patients are dealing with persistent pain and anxiety post-surgery, yet may not have the time or knowledge of effective treatments to offer help and support.[3]

The use of pharmaceuticals and opioids for symptom management in patients with cancer does not always yield the desired analgesic outcomes and can lead to unwanted side-effects.[5] In addition, there remains concern for addiction, even though the risk for dependency is low.[6] A patient's ability to recover from breast cancer after surgery includes access to tools that address pain and anxiety as well as stress.[7] High levels of pain and anxiety in women with breast cancer can lead to prolonged recovery and a decreased quality of life.[8,9] Therefore, there is a need for non-pharmacological interventions to treat pain and anxiety in patients with breast cancer after surgery.

Massage therapy has been shown to be a viable non-pharmacological intervention for symptom management of pain and anxiety in patients with cancer.[10-12] In women with breast cancer, massage is effective in reducing pain in patients acute care, pre- and post-operative. Massage therapy is also beneficial in treating generalized anxiety disorder and anxiety in the hospital setting.[13,14] In patients with breast cancer, quality of life increases with massage therapy interventions.[15-17] However, effectiveness and efficacy of massage therapy for the reduction of pain and anxiety,[18,19] in patients with breast cancer after surgery specifically, has yet to be determined. The objective of this systematic review and meta-analysis is to examine massage therapy's effects as a non-pharmacological intervention on post-surgical pain and anxiety in women with breast cancer.

Methods

This systematic review and meta-analyses followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA-P),[20] but was not registered.

Criteria for Considering Studies for this Review

Evaluation of articles reviewed included patients with breast cancer, with no previous diagnosis of breast cancer, ages 18-75 years, who received either a mastectomy, lumpectomy, and/or breast reconstruction, 0-5 years post-operative. Further adjuvant treatment of chemotherapy and radiation was included, as these treatments often accompany surgical strategies to eradicate breast cancer and often cause pain and anxiety. The eligibility of the articles was identified by 2 authors (JSC, ADO) using specific inclusion and exclusion criteria for the systematic search.

Randomized control trials (RCTs), quasi-experimental studies, and randomized pilot studies were included in the search strategy and eligibility criteria and had to be published in a peer-reviewed journal. Studies were excluded if they were not in English, case studies, systematic reviews, or meta-analysis, below a Level of Evidence of 3, or if they included patients with cancer other than breast cancer.

Search Strategy

Using databases PubMed, CINAHL, and Medline (EBSCO), a systematic search was performed with no date constraint through September 30, 2023. MESH terms of "massage therapy, manual therapy, breast cancer, anxiety, pain" were accompanied by the Boolean term of "and" to reconcile the search and eligibility criteria. Further filters of the terms "full text" and "clinical trials" and "randomized control trials" were used (Addendum 1).

Outcome Measures

Across studies, researchers used a variety of outcome measures. Pain data were assessed using the, Short-Form McGill Pain Questionnaire (SF-MPQ), the Self-Leeds Assessment of Neuropathic Symptoms and signs (S-LANNS) and the Visual Analog Scale (VAS).[21,22] Data on anxiety were assessed using the VAS and the Quality-of-Life Form (QOL).[23]

Data Collection

Data collection process for the studies selected in the systematic review was adopted from Pinheiro de Silva, et al[24] and is represented in Tables 2 and 3. Table 2 includes data collected from each study and the instruments used to measure the outcomes to assess pain of patients with breast cancer, post-surgery. Table 3, assessing anxiety in post-surgical breast cancer patients, includes the author/year, sample size, interventions used by both the experimental and control groups, and the protocols performed. The constructed Boolean phrase, systematic search, and hand search were conducted by 1 investigator (JSC) and an academic medical center librarian.

Analysis Plan

Data on pain and anxiety were collected for each article, pre/post massage therapy intervention, and placed in a spreadsheet for meta-analysis. Effect size was calculated using Cohen's d, 95% Confidence Interval (CI), mean, sample size, and standard

deviation of the massage group and control group for each study (Tables 2 and 3; Figures 2 and 3). Analysis and forest plots were generated by the software *Comprehensive Meta-Analysis Version 3*. A random-effects method meta-analysis was implemented on all 7 studies identified from this search, using standard deviation of the means, standard error, variance, upper and lower limits, z/*P*-values, and a 95% confidence interval. The heterogeneity of the studies was measured in the meta-analysis using Cochran's Q.

Quality Assessment

Of the 7 articles chosen for review there were 4 RCTs, 2 randomized pilot studies, and 1 quasi-experimental study. Each article was assessed for quality using the PEDro scale,[25] the CONSORT scale,[26] and the Downs and Black Scale,[27] as appropriate and reported in Table 4. Each critical appraisal tool checked for bias, randomization, blinding of assessors and subjects, criteria eligibility, and concealment of allocation. Two reviewers (JSC, ADO) completed independent reviews of the data including study design, inclusion/exclusion criteria, study quality, participant characteristics, intervention procedures, clinician information, statistical analysis techniques, outcomes, and appropriate methodological limitations. Any discrepancies of interpretation were resolved by discussion until consensus was reached. If consensus could not be reached, a third reviewer (EED) was planned, but not needed.

Results

Study Selection and Characteristics

From the database searches, 1204 titles were retrieved. Once duplicates were removed, and screening eligibility was completed by title and abstract, 21 full text articles were fully read and assessed, and 10 articles were eliminated because the outcomes did not meet our inclusion criteria. Overall, 4 studies examined post-surgical patients with breast cancer in the outpatient setting and 3 studies examined post-surgical patients with breast cancer in the inpatient setting.[28-34] The massage therapy interventions used in the 7 studies, included myofascial release,[28,32] massage therapy,[29,30,34] reflexology,[33] classic massage[31] and myofascial therapy.[32]

Ultimately, 7 studies were included in this systematic review and meta-analysis (see Figure 1 for the Prisma Flow Diagram). Combined, this resulted in a sample size of 235 women who received massage therapy in the massage group, and 191 women who did not receive massage therapy in the control group. The most common form of surgery for the women in the 7 studies was mastectomy, followed by lumpectomy and reconstruction. The range of time from surgery to the massage therapy intervention ranged from zero hours to 16 weeks (Table 1). Using the Strength of Recommendation Taxonomy (SORT)[35] model, a Level 1 Study Quality was determined in all 4 RCTs, and a Level 2 study quality was determined in both the randomized pilot and quasi-experimental studies (Table 1). The Downs and Black checklist was used for the quasi-experimental study, which scored the lowest level of evidence with a total of 17/26 possible points due to lack of randomization and blinding.[27] Overall, all studies had some degree of bias ranging from low to high bias.

Summary of Findings for Pain Outcomes

Of the 7 articles reviewed, 3 included pain as well as anxiety as outcomes,[28-30] with one study assessing anxiety only.[33] Six studies showed a decrease in pain, post-massage in the massage group, in comparison to the control group (Table 2). Pain data were represented by forest plots and massage therapy showed a positive effect for decreasing pain (effect size of 1.057, Figure 2) with all studies favoring massage. The Q-statistic examining the heterogeneity among the studies was 36.125 (P = .000) for pain, indicating variability in effect size.

Summary of Findings for Anxiety Outcomes

Performance from the massage therapy data for anxiety were represented by forest plots (Figure 3). There were four studies that assessed anxiety in post-surgical patients with breast cancer.[31,32,34] One study in particular, revealed a significant decrease, post treatment, in comparison to control. Specifically, anxiety was significantly decreased with massage (effect size of .673, Figure 3, Table 3), with 3 out of the 4 studies favoring massage. The Q-statistic examining the heterogeneity among the studies was 33.276 (P = .000) for anxiety, indicating variability in effect size.

Methodological Quality

Of the 121 possible pooled items represented on the critical appraisal tools measured, the reviewers agreed on 114 (see Table 4). From the PEDro checklist, all 4 RCTs received a score of 6 or higher and were considered good quality. The CONSORT checklists also indicated good quality for the randomized pilot studies, scoring a 21 and 22/25.

Discussion

Results from this systematic review supported our hypothesis that massage therapy is a viable tool as a non-pharmacological intervention in addressing post-surgical pain and anxiety in women with breast cancer. This is particularly of interest since the studies utilized various forms of

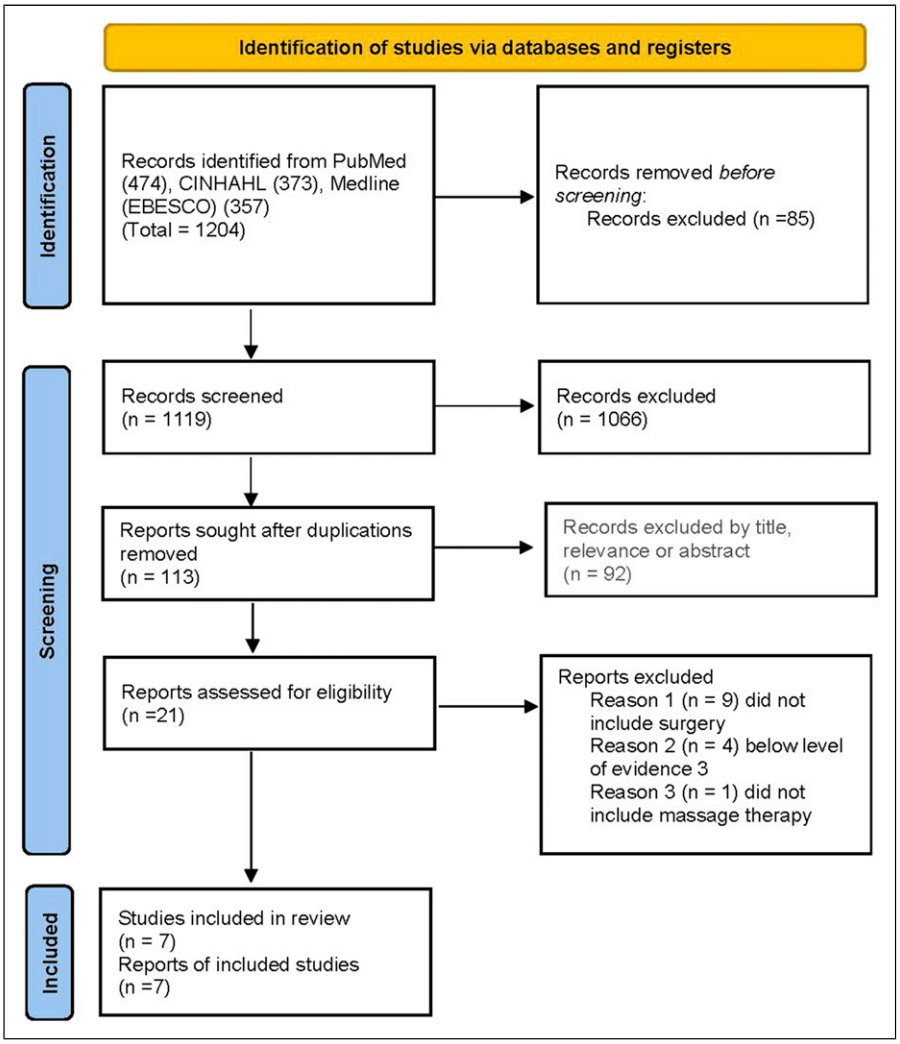

Figure 1. Prisma flow diagram for study eligibility.
• Databases PubMed, CINAHL, and Medline (EBSCO), were used in the systematic search for eligible studies. The search was performed with no date constraint through September 30, 2023.
• MESH terms used in the search were "massage", "manual therapy", "breast cancer", "pain", "anxiety".
• The Boolean term of "AND" was also used to reconcile the search.
• Filters of "full text", "clinical trials" and "randomized control trials" were utilized.
• 1204 titles were retrieved from the database searches.
• 21 full texts were fully read and assessed after the removal of duplicates; 10 articles then removed for not meeting inclusion criteria.
• 7 articles were chosen for the systematic review and meta-analysis.

oncology massage interventions such as foot massage, classic massage, reflexology, myofascial release, and myofascial therapy with the affected limb. Also, all studies focused on the effects of massage therapy during a short-term post-operative time frame and included inpatient as well as out-patient settings. Despite the variability in settings and form of oncology massage administered, positive outcomes of decreased pain and anxiety are evident for patients with breast cancer, post-surgery.

Prior massage therapy research showed a reduction in pain and anxiety following massage therapy in patients with cancer[10,36,37]; indeed, massage was shown to decrease pain levels in patients with breast cancer receiving chemotherapy, and improve quality of life and symptom burden.[38,39] Seminal research from Boyd[40,41] thoroughly assessed massage therapy's efficacy in treating cancer and surgical-related pain. Therefore, systematic reviews dedicated to examining how massage affects pain and quality of life, perception of patients with cancer have contributed to understanding the importance of massage therapy in healthcare.[1,12,42] Our findings are consistent with studies that have examined the effects of massage therapy on pain and anxiety in patients with orthopedic surgeries.[43-45] Patients receiving massage

Table 1. Summary of Studies.

Author, Year & Study Design	Sample Size	Participant Characteristics (Age, Race, Surgery Type)	Massage GroupProtocol	Control GroupProtocol
De Groef, et al, 2018 Randomized control trial	MG = 25 CG = 25	Female, no prior breast cancer dx, mastectomy/lumpectomy intervention, mean age, 54.2 0-5 yrs. post-op; surgeries to remove breast cancer and reconstruction; chemo/radiation; no available data on race	MG = 12 weeks PT + 12 weeks of MFR	CG = 12 weeks PT + 12 weeks placebo MFR-light hand holds
Dilaveri, et al, 2020 Randomized pilot study	MG = 21 CG = 19	Female, no prior breast cancer dx Reconstruction immediate or delayed post mastectomy/lumpectomy, mean age 50.15, white = 34, black = 1, American Indian = 1, Asian Korean = 1, did not disclose = 1	MG = 20 minutes massage, 0-3 days post-op	CG = 20 minutes of massage & acupuncture, 0-3 days post-op
Dion, et al, 2016 Randomized pilot study	MG = 19 CG = 19	Female, no prior breast cancer dx Reconstruction immediate or delayed post mastectomy/lumpectomy, mean age 47.7, no available data on race	MG = 20 minutes massage, 0-3 days post-op	CG = 20 minutes of massage & meditation, 0-3 days post-op
Izgu, et al, 2019 Randomized control trial	MG = 20 CG = 20	Female, no prior breast cancer dx, mastectomy/lumpectomy, mean age Intervention = 44.5+-10.7 Control = 47.0+-9.6, no available data on race	MG = 20 minutes of weekly massage, 16 weeks post-op	CG = standard of care, no massage
Serra-Ano, et al, 2019 Randomized control trial	MG = 13 CG = 11	Female, no prior breast cancer dx, mastectomy/lumpectomy mean age 53.71, no available data on race	MG = 10 minutes MFR, 4 weeks	CG = 10 minutes of placebo MFR, light holds, 4 weeks
Sharp, et al, 2010 Randomized control trial	MG1 = 60 MG2 = 61 CG = 62	Female, no prior breast cancer dx, CIPN Wide local incision = 144 Quadrantectomy = 1 Mastectomy = 26 Mast = reconstruction = 12 mean age 58.8, white = 183	MG1 = reflexology, 1 hour/week/8 weeks MG2 = massage 1-hour week/8 weeks	CG = standard of care, no massage therapy
Ucuzal & Kanan, 2012 Quasi-experimental	MG = 35 CG = 35	Female, no prior breast cancer dx, mastectomy/lumpectomy sentinel lymph node biopsy mean age 52.4, no available data on race	MG = 20-minute foot massage, immediately post-op	CG = Analgesics only, immediately post-op

Abbreviations: CG, control group; CIPN, chemotherapy-induced peripheral neuropathy; MG, massage group; MFR, myofascial release/myofascial therapy; MT, classic massage therapy.

Table 2. Summary of Findings for Pain Outcomes.

Author/Year	Outcome Measure	MG Result (Mean (SD))	CG Result (Mean (SD))
De Groef, et al, 2018	Pain (VAS 0-100)	Baseline: 67 (15) 3 months: 23 (30) 6 months: 31 (31) 12 months: 33 (30)	Baseline: 64 (16) 3 months: 40 (36) 6 months: 34 (30) 12 months:43 (28)
Dilaveri, et al, 2020	Pain (VAS 0-10)	Primary Baseline Pre:4.14 (3.14) Visit 1 Pre: −1.24 (3.49) Visit 2 Pre: −1.33 (2.99) Visits 3 Pre: −1.60 (3.23) Baseline Post:4.14 (3.14) Visit 1 Post: −3.29 (3.15) Visit 2 Post: −3.19 (3.04) Visit 3 Post: −2.50 (2.98) Secondary Baseline Pre:1.71 (2.39) Visit 1 Pre: +3.09 (2.46) Visit 2 Pre: +2.43 (3.20) Visits 3 Pre: +1.75 (2.22) Baseline Post:1.71 (2.39) Visit 1 Post: +1.14 (2.29) Visit 2 Post: +.81 (3.52) Visits 3 Post: +.90 (2.59)	Primary Baseline Pre:3.74 (2.49) Visit 1 Pre-1.74 (2.56) Visit 2 Pre: −2.06 (2.53) Visits 3 Pre: −2.28 (2.47) Baseline Post: 3.74 (2.49) Visit 1 Post: −1.74 (2.56) Visit 2 Post: −2.06 (2.53) Visit 3 Post Secondary Baseline Pre:1.00 (1.33) Visit 1 Pre: +3.95 (1.68) Visit 2 Pre: +2.74 (2.13) Visits 3 Pre: +1.56 (2.04) Baseline Post:1.00 (1.33) Visit 1 Post: +1.63 (2.11) Visit 2 Post: +.72 (1.84) Visits 3 Post: +.06 (1.51)
Dion, et al, 2016	Pain (VAS 0-100)	Day 1 Pre:53.4 (17.67) Day 2 Pre:45.95 (10.52) Day 3 Pre:43.37 (5.11) Week 3 Pre:29.82 (10.23) Day 1 Post:35.06 (17.43) Day 2 Post:32.84 (11.83) Day 3 Post:30.26 (9.90) Week 3 Post: N/A	Day 1 Pre: 48.31 (11.07) Day 2 Pre:47.95 (10.22) Day 3 Pre:45.21 (9.25) Week 3 Pre:30.32 (10.17) Day 1 Post:33.07 (9.74) Day 2 Post:33.94 (10.88) Day 3 Post:30.84 (9.75) Week 3 Post: N/A
Izgu, et al, 2019	CIPN Pain (S-LANSS 0-10)	Baseline: 2.15 (5.12) Week 4: 1.94 (3.87) Week 8: 4.73 (4.44) Week 12:5.68 (6.41) Week 16: 4.33 (4.61)	Baseline:1.42 (3.09) Week 4: 4.38 (5.25) Week 8:8.45 (5.77) Week 12: 10.83 (7.51) Week 16: 7.00 (6.65)
Serra-Ano, et al, 2019	Pain (VAS 0-10)	Week 1: 6.48 (1.52) Week 2: 2.87 (1.99) Week 3: 3.62 (3.07)	Week 1:4.95 (2.09) Week 2: 3.77 (2.49) Week 3: 4.68 (1.61)
Ucuzal & Kanan, 2012	Pain (SF-MPQ 0-10)	Follow-up time 0 minutes:7.31 (1.60) 5 minutes: 4.26 (1.92) 30 minutes: 3.74 (1.58) 60 minutes: 3.03 (1.79) 90 minutes: 2.17 (1.79) 120 minutes: 1.71 (1.62)	Follow-up time 0 minutes: 6.69 (1.25) 5 minutes: 6.46 (1.38) 30 minutes: 6.09 (1.90) 60 minutes: 5.57 (1.96) 90 minutes: 5.03 (2.05) 120 minutes: 4.60 (2.20)

Abbreviations: CG, control group; CIPN, chemotherapy-induced peripheral neuropathy; MG, massage group; QOL, quality of life; SD, standard deviation, SF-MPQ, Short-Form McGill Pain Questionnaire; S-LANNS, Self-Leeds Assessment of Neuropathic Symptoms and Signs; VAS, Visual Analog Scale.

therapy after surgeries of tibial shaft fractures experienced less pain intensity and anxiety. [46] The novelty of our current study is that we show in a systemic fashion that patients with breast cancer after surgery experience a reduction of pain and anxiety.

These findings indicate that massage therapy has an important role in the treatment of patients with breast cancer to improve their quality of life. Massage therapy is therefore a very safe and efficacious treatment option.[47-49] The risks involved to the patients receiving massage therapy are very low if an appropriately trained massage therapist is used who understands both the physical, pathophysiology, mental, and emotional considerations of working with patients with breast cancer. While no

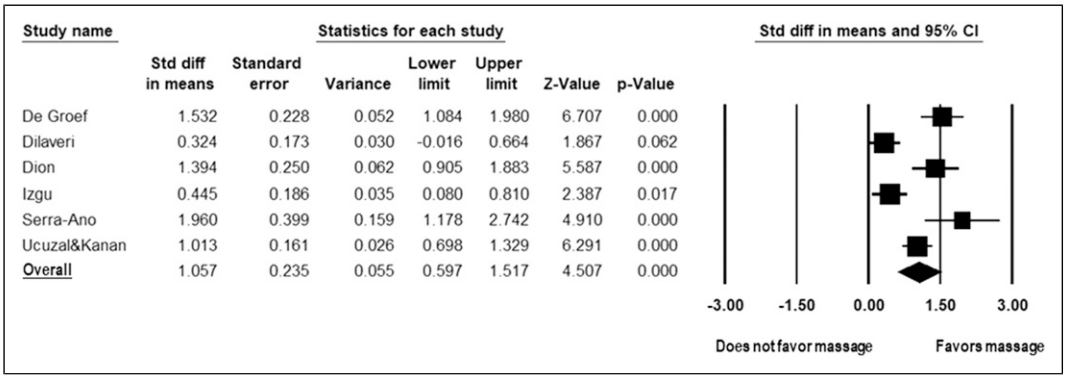

Figure 2. Forest plots for pain with massage therapy intervention for patients with breast cancer.
- Data on pain were collected from each article, pre/post massage.
- Effect size was calculated using Cohen's d, 95% Confidence Interval (CI), mean, sample size, and standard deviation of massage and control groups.
- Forest Plots and analysis were generated by using *Comprehensive Analysis Software Version 3*.
- Random effects method meta-analysis was implemented using standard deviation and error, variance, upper and lower limits, z/*P*-values, and 95% CI.
- Heterogeneity was measured using Cochran's Q.
- Effect size for pain was 1.057, with all studies favoring massage.
- Q-Statistic was 36.125 (P = .000).

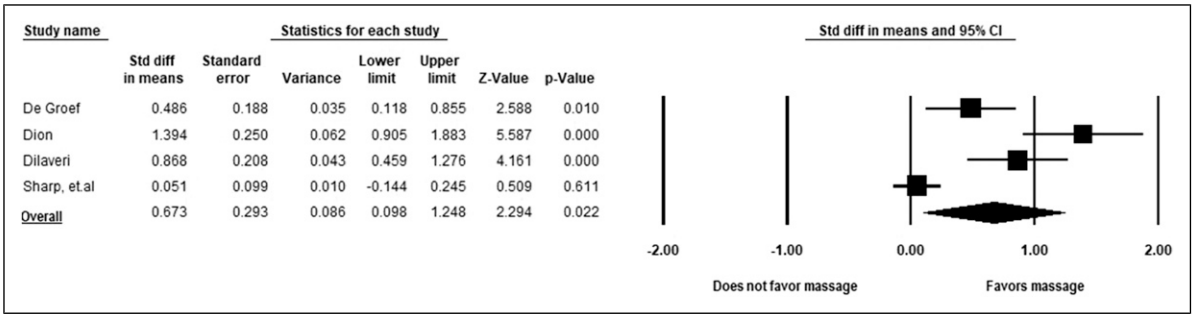

Figure 3. Forest plots for anxiety with massage therapy intervention for patients with breast cancer.
- Data on anxiety were collected from each article, pre/post massage.
- Effect size was calculated using Cohen's d, 95% Confidence Interval (CI), mean, sample size, and standard deviation of massage and control groups.
- Forest Plots and analysis were generated by using *Comprehensive Analysis Software Version 3*.
- Random effects method meta-analysis was implemented using standard deviation and error, variance, upper and lower limits, z/*P*-values, and 95% CI.
- Heterogeneity was measured using Cochran's Q.
- Effect size for anxiety was .673, with all studies favoring massage.
- Q-Statistic was 33.276 (P = .000).

adverse effects of massage therapy were reported in the previously cited studies, understanding proper dosing of massage therapy, and its role in interdisciplinary cancer care, were concerns of future research in the field. By attenuating the physical and emotional burden that patients with breast cancer often experience after surgery, massage therapy can provide a bridge to healing through the comfort of educated touch.

This study is important for three reasons. First, the review demonstrated that similar effects from massage therapy were observed in women with breast cancer post-surgery as well as those observed in patients with other forms of cancer or orthopedic surgeries.[46,50,51] Second, this review validates the use of massage therapy in a variety of post-operative settings, since patients received different operative care. Third, this study suggests potential clinical applications and significance of massage therapy, as a non-pharmacological treatment of pain and anxiety in women with breast cancer after surgery. The findings provide clinicians with alternative, evidence-based treatment options for patients with breast cancer that experience pain and anxiety after surgery. It is important to have non-pharmacological pain management options available to patients in the hospital setting, as a compliance mandate from the Joint Commission.[52]

This systematic review is not without limitations, which are important to consider when interpreting the results. The first limitation is the small sample size of the studies, apart from the Sharp study,[33] restricting the effect sizes. Another limitation of the study is selection bias, as

Table 3. Summary of Findings for Anxiety Outcomes.

Author/Year	Outcome Measure	MG Result (Mean (SD))	CG Result (Mean (SD))
De Groef, et al, 2018	Anxiety QOL (0-100)	Baseline: 67 (15) 3 months: 23(30) 6 months:31 (31) 12 months: 33 (30)	Baseline: 64 (16) 3 months: 40 (36) 6 months:34 (30) 12 months:43 (28)
Dilaveri, et al, 2020	Anxiety (VAS 0-10)	Primary Baseline Pre:4.14 (3.14) Visit 1 Pre: −1.24 (3.49) Visit 2 Pre: −1.33 (2.99) Visits 3 Pre: −1.60 (3.23) Baseline Post:4.14 (3.14) Visit 1 Post: −3.29 (3.15) Visit 2 Post: −3.19 (3.04) Visit 3 Post: −2.50 (2.98) Secondary Baseline Pre:1.71 (2.39) Visit 1 Pre: +3.09 (2.46) Visit 2 Pre: +2.43 (3.20) Visits 3 Pre: +1.75 (2.22) Baseline Post:1.71 (2.39) Visit 1 Post: +1.14 (2.29) Visit 2 Post: +.81 (3.52) Visits 3 Post: +.90 (2.59)	Primary Baseline Pre:3.74 (2.49) Visit 1 Pre-1.74 (2.56) Visit 2 Pre: −2.06 (2.53) Visits 3 Pre: −2.28 (2.47) Baseline Post: 3.74 (2.49) Visit 1 Post: −1.74 (2.56) Visit 2 Post: −2.06 (2.53) Visit 3 Post Secondary Baseline Pre:1.00 (1.33) Visit 1 Pre: +3.95 (1.68) Visit 2 Pre: +2.74 (2.13) Visits 3 Pre: +1.56 (2.04) Baseline Post:1.00 (1.33) Visit 1 Post: +1.63 (2.11) Visit 2 Post: +.72 (1.84) Visits 3 Post: +.06 (1.51)
Dion, et al, 2016	Anxiety (VAS 0-100)	Day 1 Pre:53.4 (17.67) Day 2 Pre:45.95 (10.52) Day 3 Pre:43.37 (5.11) Week 3 Pre:29.82 (10.23) Day 1 Post:35.06 (17.43) Day 2 Post:32.84 (11.83) Day 3 Post:30.26 (9.90) Week 3 Post: N/A	Day 1 Pre: 48.31 (11.07) Day 2 Pre:47.95 (10.22) Day 3 Pre:45.21 (9.25) Week 3 Pre:30.32 (10.17) Day 1 Post:33.07 (9.74) Day 2 Post:33.94 (10.88) Day 3 Post:30.84 (9.75) Week 3 Post: N/A
Sharp, et al, 2010	Anxiety (VAS 0-10)	MG 1 Week 18: 2.24 (2.11-2.38, 95% CI) Week 24:2.14(1.98-2.30, 95% CI) MG 2 Week 18: 2.22 (2.09-2.35, 95% CI) Week 24: 2.2(2.05-2.36, 95% CI)	Week 18:2.39 (2.25-2.52, 95% CI) Week 24: 2.36(2.20-2.52, 95% CI)

Abbreviations: CG, control group; CI, confidence interval; MG, massage group; QOL, quality of life; SD, standard deviation, VAS, Visual Analog Scale.

Table 4. The Critical Appraisal Table Used to Assess the Quality of Articles.

Study	Study Design	CAT	CAT Results	Level of Evidence
De Groef, et al, 2018	RCT	PEDro	9/11	1b
Dilaveri, et al, 2020	Randomized Pilot study	CONSORT	22/25	2b
Dion, et al, 2016	Randomized Pilot study	CONSORT	22/25	2b
Izgu, et al, 2019	RCT	PEDro	8/11	1b
Serra-Ano, et al, 2019	RCT	PEDro	9/11	1b
Sharp, et al, 2010	RCT	PEDro	8/11	1b
Ucuzal & Kanan, 2012	Quasi-experimental	Downs & Black	17/26	2b

Abbreviations: CAT, critical appraisal tool; CONSORT, Consolidated Standards of Reporting Trials; PEDro, Physiotherapy Evidence Database; RCT, randomize control trials.

many of the participants were randomly selected at a specific cancer center or were picked from a convenience sample. The training and experience level of massage therapists that performed post-surgery massage for patients with breast cancer was not explained in all studies. Massage therapy education, specialization, and experience in the studies reflect varying levels of massage application in the different studies. Lastly, dosing and the

"Massage Therapy"
AND
"Massage Therapy"
AND
"Breast Cancer"
AND
"Pain"
AND
"Anxiety"

variability in the kind of intervention of massage therapy is not the same across studies, which is likely why the effect size was heterogeneous between the studies. To further enhance the efficacy of massage therapy, more research needs to be conducted on dosing, type of massage therapy application, and duration of treatment.

Conclusion

This review sought to systematically evaluate whether massage therapy can be established as a clinical approach to treating pain and anxiety in response to surgical interventions for breast cancer.[12] We showed that a non-pharmacological intervention in the form of massage can be implemented postoperatively, from day zero to 16 weeks post-surgery, to decrease pain and anxiety. This suggests that early massage therapy intervention has an important role for better recovery of pain and anxiety in patients with breast cancer, post-surgery.

Practical Implications

- Massage therapy is a viable non-pharmacological tool to treat postoperative pain and anxiety in patients with breast cancer.
- Massage therapy may be used for application in multiple clinical and non-clinical settings.

Massage therapy intervention provided for patients with breast cancer at day zero up to 16 weeks postoperatively leads to favorable outcomes for those experiencing pain and anxiety.

Addendum 1. The Search Strategy (Pub Med).

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

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