



Massage for Pain: An Evidence Map

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PREFACE

The VA Evidence-based Synthesis Program (ESP) was established in 2007 to provide timely and accurate syntheses of targeted healthcare topics of particular importance to clinicians, managers, and policymakers as they work to improve the health and healthcare of Veterans. QUERI provides funding for 4 ESP Centers, and each Center has an active University affiliation. Center Directors are recognized leaders in the field of evidence synthesis with close ties to the AHRQ Evidence-based Practice Centers. The ESP is governed by a Steering Committee comprised of participants from VHA Policy, Program, and Operations Offices, VISN leadership, field-based investigators, and others as designated appropriate by QUERI/HSR&D.

The ESP Centers generate evidence syntheses on important clinical practice topics. These reports help:

- Develop clinical policies informed by evidence;
- Implement effective services to improve patient outcomes and to support VA clinical practice guidelines and performance measures; and
- Set the direction for future research to address gaps in clinical knowledge.

The ESP disseminates these reports throughout VA and in the published literature; some evidence syntheses have informed the clinical guidelines of large professional organizations.

The ESP Coordinating Center (ESP CC), located in Portland, Oregon, was created in 2009 to expand the capacity of QUERI/HSR&D and is charged with oversight of national ESP program operations, program development and evaluation, and dissemination efforts. The ESP CC establishes standard operating procedures for the production of evidence synthesis reports; facilitates a national topic nomination, prioritization, and selection process; manages the research portfolio of each Center; facilitates editorial review processes; ensures methodological consistency and quality of products; produces “rapid response evidence briefs” at the request of VHA senior leadership; collaborates with HSR&D Center for Information Dissemination and Education Resources (CIDER) to develop a national dissemination strategy for all ESP products; and interfaces with stakeholders to effectively engage the program.

Comments on this evidence report are welcome and can be sent to Nicole Floyd, ESP CC Program Manager, at Nicole.Floyd@va.gov.

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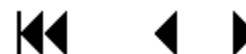
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ABSTRACT

INTRODUCTION

Given the widespread use of various massage therapies for pain, we conducted an evidence mapping process to determine the distribution of evidence available for various pain indications as well as different forms of massage therapy, identify gaps in evidence, and inform future research priorities. This mapping project provides a visual overview of the distribution of evidence for massage therapy for indications of pain, as well as an accompanying narrative that will help stakeholders interpret the state of evidence to inform policy and clinical decision-making.

METHODS

We searched PubMed, Embase, and Cochrane for systematic reviews reporting pain outcomes for massage therapy. Abstracted data included: number of studies included in the review that report massage as the intervention and pain as an outcome; total number of studies included in the review; descriptions of the massage style, provider, co-interventions, duration, and comparators; pain type; main findings relevant to massage for pain; and whether the systematic review focused solely on massage as the intervention or included a variety of interventions, of which massage was one. Quality of each systematic review was assessed using the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) criteria. We used a bubble plot to visually depict the number of included articles, pain indication, effect of massage for pain, and strength of findings for each included systematic review.

RESULTS

We identified 31 systematic reviews, of which 21 were considered high-quality. Systematic reviews varied in the amount of detail they collected in describing the massage therapy. Some common massage types included Swedish massage, myofascial therapies, Shiatsu, Chinese traditional massage, Thai massage, slow stroke massage, and more general descriptions of massage. The most common type of pain included in systematic reviews was neck pain (n=6). Findings from high-quality systematic reviews describe potential benefits of massage for pain indications including labor, shoulder, neck, back, cancer, fibromyalgia, and temporomandibular disorder. However, no findings were rated as moderate- or high-strength.

DISCUSSION

More research is needed to establish confidence in the effect of massage for pain. Primary studies often do not provide adequate details of the massage therapy provided, especially in the descriptions of provider type. Few primary studies of large samples with rigorous methods have been conducted, as noted by many of the systematic review authors included in this evidence map.

EVIDENCE REPORT

INTRODUCTION

Many Veterans desire complementary and integrative health or alternative medicine modalities, both for treatment and for the promotion of wellness. Given VA's desire to promote evidence-based practice, this evidence mapping project aims to help provide guidance to VA leadership about the distribution of evidence on massage therapy for pain to inform policy and clinical decision making.

The term "massage therapy" encompasses many techniques, and the type varies by a patient's needs and physical conditions.¹ Common types include Swedish massage, deep tissue massage, sports massage, and chair massage.^{2,3} In general, massage therapists treat patients by using touch to manipulate the muscles and other soft tissues of the body. Massage therapies aim to relieve pain, help heal injuries, improve circulation, relieve stress, increase relaxation, and aid in the general wellness of patients.⁴ Preliminary evidence suggests that massage may help with back pain and may improve the quality of life for people with cancer, depression, or HIV/AIDS.⁵⁻⁹ Massage therapy appears to have few risks if used appropriately and provided by a trained massage professional.^{10,11} Results from the 2012 National Health Interview Survey – a national survey conducted on a representative sample of adults in the United States – estimates that approximately 15.4 million adults (6.9%) used massage therapy in the past 12 months.¹² In the United States, 44 states and the District of Columbia regulate massage therapists or provide voluntary state certification. In states that do not regulate massage therapy, cities, counties, or other local governments also may regulate massage therapists. However, training standards and licensure requirements for massage therapists vary greatly by state and locality.¹³

While massage is thought to be an effective treatment for various types of pain, to date an evidence synthesis surveying the evidence for massage therapy across a broad spectrum of pain types has not been conducted. Given the widespread use of various massage therapies for pain, we conducted an evidence mapping process to determine the distribution of evidence available for various pain indications as well as different forms of massage therapy, identify different gaps in evidence, and inform future research priorities. An evidence map is an overview of a broad research field that describes the volume, nature, and characteristics of research in a particular field.¹⁴ The objective of this mapping project was to provide a visual overview of the distribution of evidence for massage therapy for indications of pain, as well as an accompanying narrative that will help stakeholders interpret the state of evidence to inform policy and clinical decision-making.

METHODS

TOPIC DEVELOPMENT

This topic was developed in response to a nomination by Stephen Ezeji-Okoye, MD, VA Integrative Health Coordinator, Patient Care Services and Laura Krejci, MSW, Associate Director, Office of Patient Centered Care and Cultural Transformation. The scope was further developed with input from the topic nominators, the ESP Coordinating Center, the review team, and the technical expert panel (TEP).

The scope of this report includes the following:

- An evidence map that provides a visual overview of the distribution of evidence (both what is known and where there is little or no evidence base) for massage therapy for indications of pain; and
- An accompanying narrative that helps stakeholders interpret the state of the evidence to inform policy and clinical decision making.

SEARCH STRATEGY

The searches for this study consisted of broad searches from database inception through February 17, 2016 using terms related to pain and massage in 3 databases: PubMed, Embase, and Cochrane (see Appendix A for full strategy). Searches were also conducted in the same time range in PubMed related to 3 key publications which identified articles similar to the key publications.¹⁵⁻¹⁷ We restricted our searches to English language publications.

STUDY SELECTION

Each title was screened independently by 2 authors for relevance; any article chosen by either reviewer was included in the abstract screen. When citations were ambiguous they were included for further review. Abstracts were then reviewed in duplicate with any discrepancies resolved by a third reviewer. In order to be included, abstracts or titles needed to be relevant to massage, mention pain or a pain-related condition (*eg*, headache), and discuss a systematic review.

For inclusion in the evidence map, each reference must have represented a unique systematic review that reported pain outcomes for at least one massage intervention. Reports and journal articles from the same study or updates to the same review were included but data were extracted and counted once in these instances. Systematic reviews were still eligible if they covered additional outcomes or other interventions if results for massage for pain were reported separately.

DATA ABSTRACTION

Each included systematic review had data abstracted by one reviewer and verified by a second reviewer. Abstracted data included: number of studies included in the review that had massage as the intervention and pain as an outcome; total number of studies included in the review; descriptions of the massage style, provider, co-interventions, duration, and comparators; pain type; main findings relevant to massage for pain; and whether the systematic review focused

solely on massage as the intervention or included a variety of interventions, of which massage is one.

QUALITY ASSESSMENT

Each systematic review was assessed using a modified version of the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) criteria.¹⁸ This 11-item tool was designed to assess the methodological quality of systematic reviews (see full modified tool in Appendix B). Four criteria were relaxed for the quality assessment in this project: (1) the search strategy was not required to have supplemental searches beyond the 2 or more sources being searched; (2) reviews were not required to provide a list of their excluded studies; (3) narrative publication bias discussions were acceptable for systematic reviews not using quantitative methods; and (4) documented sources of support were not required for the included individual studies.

While there is no agreed-upon threshold for AMSTAR criteria above which a systematic review would be considered “high quality,” we used a score of 9 or higher for our purposes. Thus, studies could miss a maximum of 2 criteria and still be considered “high quality.”

DATA SYNTHESIS

Our evidence mapping process resulted in a visual depiction of the evidence for massage for pain, as well as an accompanying narrative with ancillary figures and tables.

Evidence Map

The visual depiction uses a bubble plot format to display information on 4 dimensions: bubble size, bubble label, x-axis, and y-axis. This allowed us to provide 4 types of information about each included systematic review, as follows:

Number of articles in systematic review (bubble size): Each systematic review bubble’s size is directly proportional to the number of primary research studies included in that systematic review related to the effect of massage for pain.

Pain type (bubble label): Each bubble is labelled with the pain indication(s) discussed by that systematic review.

Effect of massage for pain (x-axis): We grouped systematic reviews into 5 categories of findings they reported on for massage for pain. Reviews that reported massage as more beneficial than the comparator were included in the “potentially better” group, those that reported massage as less beneficial than the comparator were included in the “potentially worse” group, those that suggested insufficient evidence to draw clear conclusions about the effectiveness of massage for pain were included in the “unclear” group, those that had findings that varied within the systematic review were included in the “mixed results” group, and those that were unable to detect differences between massage and the comparator for pain were included in the “no difference” group. Each systematic review had one overall finding included in the bubble plot; if a systematic review had multiple consistent findings it was added to that appropriate group, whereas reviews with multiple conflicting findings were included in the “mixed results” group.

Strength of findings (y-axis): Systematic reviews were grouped into 5 categories based on the strength of their findings, which fall along the y-axis. The first 4 categories came from the GRADE approach,¹⁹ which takes into account study design limitations, inconsistency, indirectness, and imprecision in primary study results to assess the body of evidence contributing to a particular finding. Findings from systematic reviews that received high quality scores (scores of 9 or higher) were categorized using the GRADE levels. In most cases, these findings were already described with levels of evidence in the original systematic reviews, but in the cases where this was not provided, our group assessed the GRADE score based on the description of findings provided in the systematic review.

Findings from systematic reviews with scores of 8 or lower were not classified using the GRADE criteria, and comprise the fifth and final group along the y-axis: “unable to determine.” The methodological issues with these systematic reviews makes interpretation of the reported findings difficult, as sources of bias may be affecting the results and conclusions drawn.

The findings from high-quality systematic reviews were classified as having one of the following levels for quality of evidence:

- **High:** We are very confident that the true effect lies close to that of the estimate of the effect. Further research is unlikely to change our confidence in the estimate of effect.
- **Moderate:** We are moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different. Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- **Low:** Our confidence in the effect estimate is limited. The true effect may be substantially different from the estimate of the effect. Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- **Very low:** We have very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect. Any estimate of effect is very uncertain.

The evidence map figure also allows the reader to visualize gaps in the literature base, where there is no or little evidence for particular pain indications.

Narrative Synthesis

The narrative synthesis expands upon the visual evidence map to provide more details from the included systematic reviews. These include descriptions of the findings, the features of massage therapy, and the types of pain.

TECHNICAL EXPERT PANEL

The technical expert panel (TEP) for the project included: Allison Mitchinson, MPH, Certified Massage Therapist, VA Ann Arbor Healthcare System; Baron Tang, PT, Physical Therapist, Postdoctoral Fellow in Training, Evidence In Motion, White River Junction VA Medical Center;

Stephen Ezeji-Okoye, MD, VA Integrative Health Coordinator, Patient Care Services, VA Palo Alto Health Care System; and Laura Krejci, MSW, Associate Director, Office of Patient Centered Care and Cultural Transformation, Department of Veterans Affairs, Washington, DC.

PEER REVIEW

A draft version of the report was reviewed by technical experts and clinical leadership. Reviewer comments and our response are documented in Appendix C.

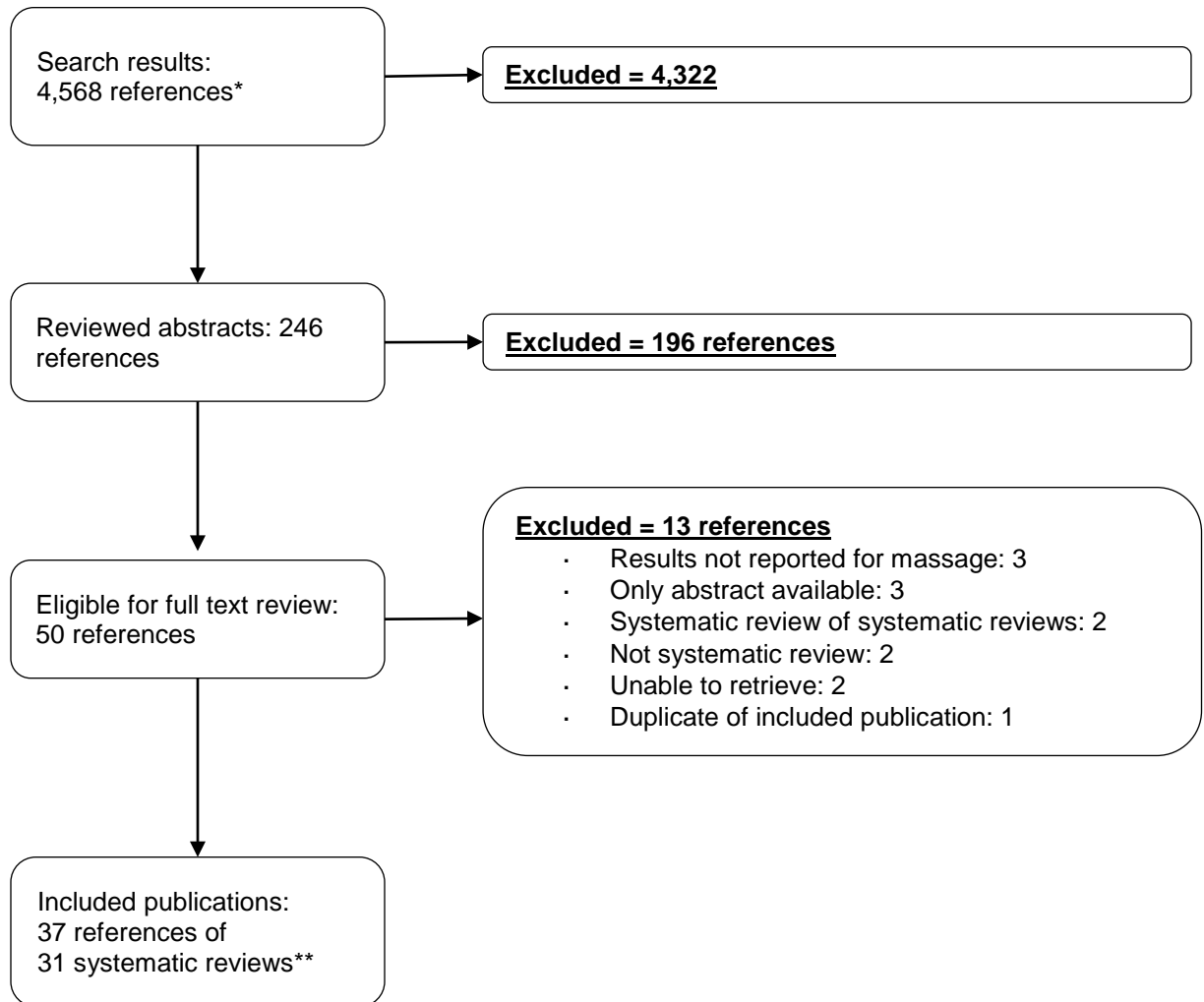
RESULTS

LITERATURE FLOW

Our searches identified 4,568 titles as potentially relevant for this evidence map. From these titles, 246 references were included for abstract review. Our screen of abstracts excluded 196 abstracts because they did not mention pain as an outcome, did not mention massage as an intervention, used a study design other than systematic review, or some combination of these factors. When reviewing full texts, there were 13 references that did not meet inclusion criteria upon further inspection. In 3 publications, the results for massage were not reported separately from other interventions, 3 publications were only available in abstract form, 2 were systematic reviews of systematic reviews, 2 were non-systematic reviews, 2 were not retrievable, and one was a duplicate of another included publication. See the Literature Flow in Figure 1.

From the 50 references included in the full-text review, we included 37 references that discuss 31 systematic reviews. Six references discussed systematic reviews that were duplicative of included systematic reviews.²⁰⁻²⁵ This includes older iterations of Cochrane systematic reviews, the updates for which had been included,^{20,21} as well as instances where multiple publications were produced from the same systematic review effort.²²⁻²⁵

Figure 1. Literature Flow Chart



* Results from searches described in Appendix A

** Manuscript reference list includes additional references cited for background and methods.

QUALITY OF INCLUDED SYSTEMATIC REVIEWS

Of the 31 systematic reviews included, 6 reviews met all 11 modified AMSTAR criteria (see Table 1). Seven reviews met 10 of the criteria, and 8 reviews met 9 of the criteria. These 21 systematic reviews were considered high quality and account for 67.7 percent of the included reviews. The other 10 systematic reviews were of lower quality, receiving credit for 8 criteria (n=3), 7 criteria (n=2), 6 criteria (n=3), 5 criteria (n=1), or 3 criteria (n=1) in the AMSTAR quality assessment. All 31 systematic reviews provided the characteristics of their included studies, which was the only criterion met by all included systematic reviews in this evidence map. The least often-met criterion was to provide an a priori design, with 11 systematic reviews meeting this criterion.

Table 1. Modified AMSTAR Scoring for Included Systematic Reviews

	A priori design provided	Duplicate review	Comprehensive search	Status of publication used	List of studies included	Included study characteristics	Assessed quality of includes	Quality used in conclusions	Synthesis methods appropriate	Publication bias assessed	Include conflict of interest	Total Score
Anthonissen 2016	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Piper 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	10
Furlan 2015	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Bervoets 2015	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	9
Calixtre 2015	?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	9
Keeratitanont 2015	No	?	Yes	No	Yes	Yes	Yes	Yes	N/A	No	Yes	6
Yuan 2015	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	8
Loew 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Chaibi 2014	No	No	Yes	Yes	Yes	Yes	Yes	Yes	?	?	Yes	7
Cheng 2014	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	No	8
Li 2014	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Kong 2013	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Patel 2012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	10
van den Dolder 2014	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	?	Yes	9
Smith 2012	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Terhorst 2011	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	9
Furlan 2010	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11

Ernst 2009	No	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	No	7
Wilkinson 2008	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Ezzo 2007	?	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes	?	Yes	8
Bardia 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Smith 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	?	Yes	9
Haraldsson 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Huntley 2004	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Cherkin 2003	?	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	Yes	Yes	9
Simkin 2002	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	9
Pan 2000	?	Yes	Yes	Yes	Yes	Yes	?	?	?	?	Yes	6
Richards 2000	No	?	Yes	Yes	Yes	Yes	Yes	?	?	?	No	5
Ernst 1999	?	?	Yes	Yes	Yes	Yes	?	No	Yes	Yes	No	6
Kong 2011	No	?	?	?	No	Yes	Yes	Yes	?	?	No	3
Lewis 2006	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	Yes	9

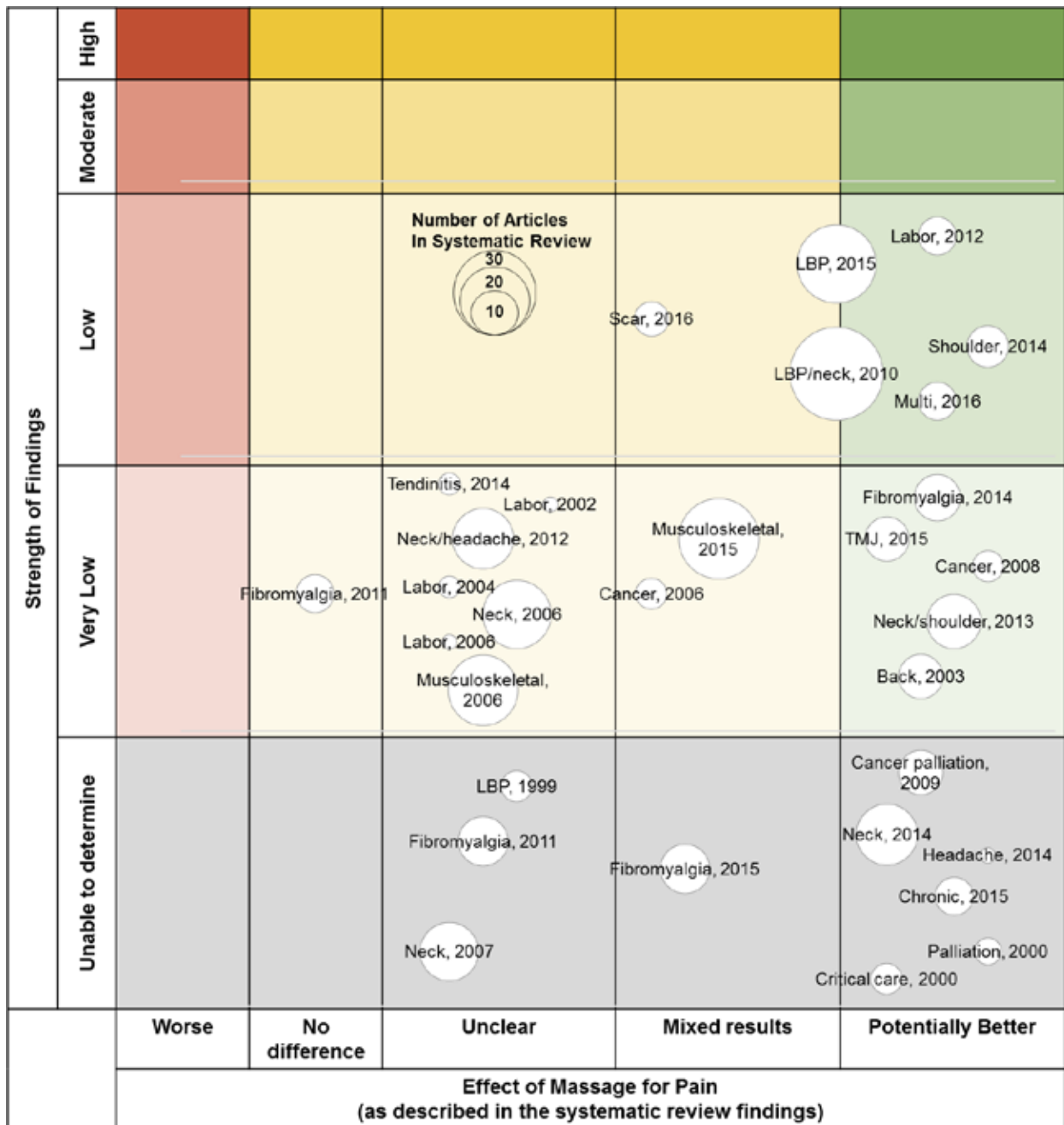
? = cannot determine based on description provided; N/A = not applicable in this publication; full criteria are described in Appendix B.



EVIDENCE MAP

The results of the evidence mapping process are depicted visually in the evidence map (Figure 2), as well as described narratively. The evidence map displays each of the 31 included systematic reviews as bubbles. The bubble label represents the pain indication described in that review. The bubble size denotes the number of primary studies included in that review specifically related to massage for pain. Primary studies may be included in multiple systematic reviews. Each of these bubbles is plotted according to the strength of the findings for massage for pain (y-axis), as well as by the effect massage was found to have for pain (x-axis). The evidence tables provide details of included systematic reviews (Appendix D).

Figure 2. Evidence Map of Systematic Reviews Describing the Effect of Massage for Pain



LBP = low back pain, TMJ = temporomandibular disorder; Multi = multiple conditions described

FINDINGS FROM SYSTEMATIC REVIEWS IN THE EVIDENCE MAP

Findings from High-quality Systematic Reviews

The findings from the 21 high-quality systematic reviews were categorized according to strength of findings, with no systematic reviews describing moderate- or high- strength findings. No systematic reviews found massage to be worse than the comparator.

Of the 6 systematic reviews describing low-strength findings, 3 reviews found that massage was potentially better than the comparator. The first systematic review included 6 trials, all of which were describing the use of massage for pain during labor. This Cochrane review found that compared to usual care, massage during the first stage of labor was associated with less pain in the pooled results from 4 trials of 225 women (standardized mean difference -0.82, 95% CI: -1.17, -0.47). Overall, the authors found that massage may reduce pain during labor, but none of the included trials were completely at a low risk of bias for all quality domains and data were available for 326 women total, so our research team assigned their finding at low strength of evidence. The next systematic review aimed to determine the effectiveness of exercise and soft-tissue massage, either individually or in combination, when used to treat shoulder pain, and 7 of the 23 included publications were relevant to massage for pain. Their findings included studies using massage alone, as well as with combinations of treatments. They concluded that there is low-quality evidence supporting the effectiveness of massage for shoulder pain, when compared to no treatment or active controls like hot packs or short wave diathermy. All included studies had small sample sizes. The final systematic review with low-strength findings suggested that massage may be beneficial described the effectiveness of soft-tissue therapies for multiple conditions, including carpal tunnel syndrome, lateral epicondylitis, subacromial impingement syndrome, and plantar fasciitis. They found 6 studies with low risk of bias that suggested that overall, various types of massage may be effective for the musculoskeletal disorders and injuries of the lower extremities, however for each comparison identified, a single randomized controlled trial served as the source of information.

Three high-quality systematic reviews found mixed results, when massage sometimes performed better than the comparator, with low-strength findings. Two reviews were authored by Furlan and colleagues, with one focused on massage for low back pain and the other looking more broadly at complementary and alternative medicine for back and neck pain. These were the 2 of the 3 largest systematic reviews included in this evidence map, with 25 RCTs and 35 studies included, respectively. Both met all AMSTAR criteria, and described a number of detailed findings relevant to massage for pain for different pain types (*eg*, acute, subacute, chronic), follow-up periods, and comparators. Both grouped the comparison groups into 2 types: inactive controls that are not expected to improve outcomes (*eg*, sham therapy, waiting list, or no treatment), and active controls that are intended to improve outcomes (*eg*, manipulation, mobilization, acupuncture, traction, relaxation, physical therapy, exercises, pain medication, or self-care education). Massage for low back pain performed better than both active and inactive comparators in the short-term follow-up, but only compared to active comparators in the long-term follow-up. No difference was found between massage and inactive controls for long-term follow-up. Furlan and colleagues rated the strength of this evidence as low or very low due to the small sample sizes and methodological issues of the RCTs included in this Cochrane review. In their other review, massage was found to be superior to inactive comparators for acute and subacute low back pain, superior to active comparators for back pain, and superior to both active and

inactive comparators for neck pain. For patients with nonspecific chronic low back pain, massage did not differ from inactive comparators but compared to active controls it performed significantly better in 2 meta-analyses. Massage for neck pain performed better than inactive comparators. These findings were ranked by their authors as mostly low strength. The final review in this group examined a range of conservative treatments, of which massage was one, for burn scars. Two of the 22 studies included in this systematic review were relevant to massage for pain, and both reported reductions in pain in the massage groups. These studies were small, and there were variations in massage techniques and populations, so we ranked this finding as low strength.

Five systematic reviews found very low-strength findings suggesting that massage may be better than the comparator for a variety of conditions. According to the GRADE approach, very low strength means there is “very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect. Any estimate of effect is very uncertain.”¹⁹ So while these 5 reviews had positive findings, there is very little confidence in these positive effects. All 5 systematic reviews reported positive findings, but our research team assigned a very low strength, using the GRADE approach to all of them.

For fibromyalgia pain, massage therapy was reported in all 9 RCTs identified by Li and colleagues. Six of these were included in a meta-analysis that found nonsignificant reductions in pain, but the 3 RCTs reporting on massage with a duration 5 weeks or longer did show significant reductions in a subgroup analysis (SMD: 0.62; 95% CI: 0.05, 0.1.2; $p=0.03$). We rated this finding as very low strength. The second systematic review found very low strength of evidence from 8 small studies that manual therapies, including massage, improve pain in subjects with temporomandibular disorder. The third systematic review focused solely on massage for neck and shoulder pain and found 12 studies, 10 of which were RCTs that were included in the meta-analyses. Pooled outcomes showed significant immediate effects compared to inactive therapies (*ie*, waiting list control, standard care, and sham therapies) for both shoulder and neck pain (SMD: 1.79; 95% CI: 1.01, 2.57 and SMD: 1.5; 95% CI: 0.55, 2.45 respectively), and nonsignificant positive effects compared to active therapies (*eg*, acupuncture, traction, physical therapy, exercise, and activator trigger point therapy) for both shoulder and neck pain. The fourth systematic review assessed the evidence for massage for cancer symptom relief, with 4 of the 10 included studies reporting pain outcomes. These 4 studies suggested that pain improved with massage for patients with cancer, however the authors note that despite statistically significant findings in individual studies, the poor methodological quality and small sample sizes necessitate cautious interpretation of the findings. The final systematic review in this group summarized the evidence for complementary and alternative medicine for back pain, with 8 of the 17 included studies relevant to massage for back pain. Overall, the authors concluded that massage was effective for persistent back pain, but described the need for further research in the area.

One systematic review included 60 RCTs on complementary and alternative medicine for fibromyalgia pain and found 6 small RCTs relevant to massage. The individual studies varied in whether they favored massage or the control, with most demonstrating no statistical significance. The pooled result reflects this ambivalence, with a nonsignificant positive outcome.

In broad review of massage for musculoskeletal pain, 26 studies contributed to findings supporting the use of massage for shoulder pain and osteoarthritis of the knee, while no benefits or reductions in pain were found for low back pain, neck pain, fibromyalgia, and general

musculoskeletal pain. These studies had different follow-up periods and comparators, contributing to the very low strength and heterogeneous nature of the evidence from this systematic review. The other systematic review with very low strength of evidence for mixed results examined the use of complementary and alternative medicine for cancer pain in 14 studies, 4 of which included massage. The studies were split between showing no difference and improvements in pain with massage, with the small sample sizes and other methodological considerations creating additional uncertainty.

Seven high-quality systematic reviews found very low strength of evidence demonstrating unclear findings for massage.^{15,33,45-48,53} These reviews all described the need for more research before any conclusions could be drawn for topics including tendinitis, labor, neck pain, headache, and other musculoskeletal conditions.

Findings from Low Quality Systematic Reviews

Ten systematic reviews were scored as having not met 3 or more quality criteria using AMSTAR. This indicates that there were flaws in the reporting or methodology of these systematic reviews that make it difficult to determine how their findings should be interpreted. As such, these findings were not able to be categorized by strength, and the conclusions drawn in these systematic reviews should be interpreted with caution. To the extent that higher quality systematic reviews have covered the same topics, these findings may be interpreted with more confidence than the findings in this group of lower quality reviews. For instance, neck pain, fibromyalgia, low back pain, cancer, and headache have all been the subject of higher quality systematic reviews.

FEATURES OF MASSAGE DESCRIBED IN INCLUDED SYSTEMATIC REVIEWS

Systematic reviews varied in the amount of detail they collected in describing the massage performed in primary studies, as well as how they reported this information (see Table 2). Twenty of the systematic reviews focused solely on interventions they categorized as massage, while the other 11 systematic reviews included other types of similar interventions in their systematic reviews. This latter group of systematic reviews covered a variety of intervention types, the most common group being types of complementary and alternative medicine.^{16,40} Other examples of interventions included in broad systematic reviews include manual therapies,³⁴ exercise,³⁸ nonpharmacologic strategies, and conservative treatments,²⁶ which included silicone gel application, ultrasound, pressure therapy, hydration, and combinations of therapy in addition to massage.

All 31 systematic reviews included descriptions of the other interventions against which massage was compared, as well as the duration or timing of massage treatment. Twenty-eight systematic reviews included descriptions of co-interventions, or reported that they excluded studies with co-interventions. These 3 features of massage were most often reported for each primary study included in the review, with variability between these primary studies. Some reviews, like the one by Furlan and colleagues,¹⁶ parsed out findings for different comparators, while many did not.

Some type of description of massage style was included in all but 2 of the systematic reviews. Two systematic reviews limited included studies to particular types of massage – traditional Thai massage³¹ and deep transverse friction massage³³ – but these reviews were small, with 6 and 2 included studies respectively. Another 2 systematic reviews included studies of therapeutic massage, however they included a different range of therapies within this categorization, with one including chiropractic management in their review,⁵² while the other explicitly excluded manipulation techniques.⁵³ Other systematic reviews had general inclusion criteria for massage interventions, and there was variation in whether related interventions like reflexology or manipulation techniques were included. Some common massage types included Swedish massage, myofascial therapies, Shiatsu, Chinese traditional massage, Thai massage, slow stroke massage, and more general descriptions of massage. As noted in one high-quality systematic review that focused on massage as the sole intervention, most of the primary research studies “lacked a clear definition, description, or rationale for massage, the massage technique, or both.” There is considerable variability both within individual systematic reviews as well as between reviews in what is considered to be massage. Abridged descriptions for each systematic review are provided in the evidence tables (Appendix D).

The feature of massage least often described in the systematic reviews was the provider of the massage therapy. Thirteen systematic reviews did not provide descriptions of the massage provider. Multiple reviews mentioned that primary research study descriptions often did not provide this information, which affected the reviewers’ abilities to abstract and report on provider information systematically.

Table 2. Features of Massage Described in Included Systematic Reviews

Author, year	Focused on massage	Style	Provider	Co-interventions	Duration	Comparators
Anthonissen 2016	○	●	○	●	●	●
Piper 2016	●	●	●	●	●	●
Furlan 2015	●	●	●	●	●	●
Bervoets 2015	●	●	●	●	●	●
Calixtre 2015	●	●	●	●	●	●
Keeratitanont 2015	●	●	○	●	●	●
Yuan 2015	●	●	●	●	●	●
Loew 2014	●	●	●	●	●	●
Chaibi 2014	○	●	●	●	●	●
Cheng 2014	●	●	○	●	●	●
Li 2014	●	●	○	●	●	●

Kong 2013	●	●	○	●	●	●
Patel 2012	●	●	●	●	●	●
van den Dolder 2014	○	○	○	●	●	●
Smith 2012	●	●	●	●	●	●
Terhorst 2011	○	●	○	●	●	●
Furlan 2010	○	●	●	●	●	●
Ernst 2009	●	●	●	●	●	●
Wilkinson 2008	●	●	●	○	●	●
Ezzo 2007	●	●	○	●	●	●
Bardia 2006	○	○	○	○	●	●
Smith 2006	○	●	●	●	●	●
Haraldsson 2006	●	●	●	●	●	●
Huntley 2004	○	●	○	●	●	●
Cherkin 2003	○	●	○	●	●	●
Simkin 2002	○	●	●	●	●	●
Pan 2000	○	●	●	●	●	●
Richards 2000	●	●	●	●	●	●
Ernst 1999	●	●	○	●	●	●
Kong 2011	●	●	○	○	●	●
Lewis 2006	●	●	●	●	●	●

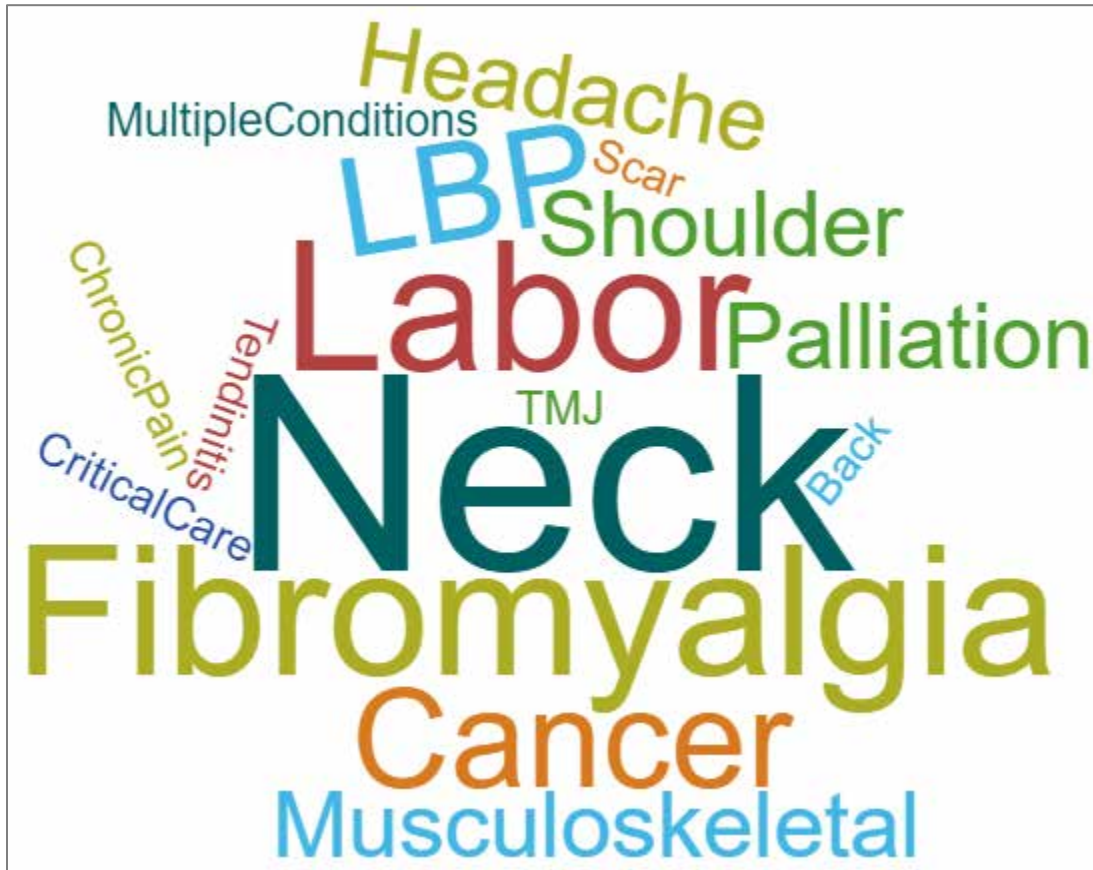
● = yes; ○ = no

TYPES OF PAIN IN INCLUDED SYSTEMATIC REVIEWS

Types of pain described by the 31 included systematic reviews are visualized in the word cloud depicted in Figure 3. The size of each pain descriptor is proportional to the number of systematic reviews focused on that pain type, with some reviews covering multiple pain types (eg, neck and low back pain). The most common type of pain included in systematic reviews was neck pain (n=6), with 3 systematic reviews focused exclusively on neck pain, and the others also including low back pain, headache, or shoulder pain. Labor pain and fibromyalgia each had 4 systematic reviews dedicated to that particular pain type, while cancer pain and low back pain each were the subject of 3 systematic reviews. Four pain types were included in 2 systematic reviews: shoulder pain, headache, musculoskeletal pain, and pain treatment in palliation. Tendinitis, temporomandibular disorder, scar pain, back pain, pain in a critical care setting, chronic pain (ie, chronic myofascial pain syndrome, chronic low back pain, and scapulocostal syndrome), and multiple conditions (ie, carpal tunnel syndrome, lateral epicondylitis, subacromial impingement syndrome, and plantar fasciitis) were each the subject of a systematic review. Some of these groupings are overlapping or contain multiple types of pain, and are described in this report as they are described in the original systematic reviews in order to preserve the classifications of the

systematic review authors. The 2 reviews of musculoskeletal pain in particular subsumed many of the other pain types, including low back pain, neck pain, and shoulder pain.^{29,53} More detailed descriptions are provided for each review in the evidence tables (Appendix D).

Figure 3. Types of Pain in Included Systematic Reviews



LBP = low back pain; TMJ = temporomandibular disorder

SUMMARY AND DISCUSSION

Findings from high-quality systematic reviews describe potential benefits of massage for pain indications including labor, shoulder, neck, back, cancer, fibromyalgia, and temporomandibular disorder. However, no findings were rated as moderate- or high-strength, indicating that more research is needed to establish confidence in the effect of massage for pain. A third of included reviews did not meet our threshold for high quality. While some of these reviews overlapped in scope with higher quality reviews, others did not, and these topics need to be revisited with strong synthesis methodology before conclusions can be drawn from the findings.

Systematic review authors found that primary studies often do not provide adequate details of the massage therapy provided, especially in the descriptions of provider type. In addition, terminology is unclear, with no standardized definition of massage types or what specific therapies are included under the umbrella term “massage.”

FUTURE WORK

This evidence mapping process was intended to describe the range of evidence on massage for pain. When multiple systematic reviews within the evidence map overlap in pain indications, cross-checking of these reviews may be necessary to determine if the same primary studies are being described, the extent of the overlap, and applicability of some or all findings in a review for a particular research or policy question. In one such example, fibromyalgia systematic reviews had differing findings, with 2 of lower quality. A future synthesis would be needed to see which studies were included in all reviews, and which were included in some but not others to determine a new finding inclusive of all potential evidence. The topics with multiple bubbles, especially with differing findings, may be areas that are ripe for an update systematic review. Other areas where future synthesis efforts would be beneficial include updating pain indications for which existing reviews are outdated (*eg*, critical care).

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APPENDIX A. SEARCH STRATEGIES

DATABASE SEARCHED & TIME PERIOD COVERED:

PubMed – From inception to 2/17/2016

SEARCH STRATEGY 1:

"Massage"[Mesh] OR massag*[tiab] OR massag*[ot] OR shiatsu

AND

pain[mh] OR pain*[tiab] OR pain*[ot] OR pain management[mh] OR ache*[tiab] OR sore*[tiab] OR discomfort[tiab] OR backache* OR headache*

SEARCH STRATEGY 2:

“Similar Article” searches for the following 3 publications:

Patel, K. C., A. Gross, N. Graham, C. H. Goldsmith, J. Ezzo, A. Morien and P. M. Peloso (2012). "Massage for mechanical neck disorders." *Cochrane Database Syst Rev* 9: Cd004871.

Furlan, A. D., F. Yazdi, A. Tsertsvadze, A. Gross, M. Van Tulder, L. Santaguida, D. Cherkin, J. Gagnier, C. Ammendolia, M. T. Ansari, T. Ostermann, T. Dryden, S. Doucette, B. Skidmore, R. Daniel, S. Tsouros, L. Weeks and J. Galipeau (2010). "Complementary and alternative therapies for back pain II." *Evid Rep Technol Assess (Full Rep)*(194): 1-764. Oct

Cherkin, D. C., K. J. Sherman, R. A. Deyo and P. G. Shekelle (2003). "A review of the evidence for the effectiveness, safety, and cost of acupuncture, massage therapy, and spinal manipulation for back pain." *Ann Intern Med* 138(11): 898-906. Jun 3

DATABASE SEARCHED & TIME PERIOD COVERED:

EMBASE - From inception to 2/17/2016

LANGUAGE:

English

SEARCH STRATEGY:

'massage'/exp OR 'massage' OR massag* OR 'shiatsu'/exp OR shiatsu

AND

pain* OR ache* OR sore* OR discomfort OR backache* OR headache*

NOT

'case report'/de

AND

Human

DATABASE SEARCHED & TIME PERIOD COVERED:

Cochrane - From inception to 2/17/2016

massag* or shiatsu:ti,ab,kw (Word variations have been searched)

AND

pain* or ache* or sore* or discomfort or backache* or headache*:ti,ab,kw (Word variations have been searched)

APPENDIX B. CRITERIA USED IN QUALITY ASSESSMENT

MODIFIED AMSTAR – A MEASUREMENT TOOL TO ASSESS THE METHODOLOGICAL QUALITY OF SYSTEMATIC REVIEWS.

NOTE: where alterations were made to original AMSTAR criteria, language is bolded. Removal of original criteria are displayed with a strikethrough, and additions are displayed in italics.

1. Was an 'a priori' design provided?

The research question and inclusion criteria should be established before the conduct of the review.

Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a “yes.”

Yes/ No/ Can't answer/ Not applicable

2. Was there duplicate study selection and data extraction?

There should be at least 2 independent data extractors and a consensus procedure for disagreements should be in place.

Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other’s work.

Yes/ No/ Can't answer/ Not applicable

3. Was a comprehensive literature search performed?

At least 2 electronic sources should be searched. The report must include years and databases used (eg, Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.

Note: If at least 2 sources + ~~one supplementary strategy used~~, select “yes” (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary).

Yes/ No/ Can't answer/ Not applicable

4. Was the status of publication (*ie* grey literature) used as an inclusion criterion?

The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.

Note: If review indicates that there was a search for “grey literature” or “unpublished literature,” indicate “yes.” SIGLE database, dissertations, conference proceedings, and trial

registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.

Yes/ No/ Can't answer/ Not applicable

5. Was a list of studies (included ~~and excluded~~) provided?

A list of included ~~and excluded~~ studies should be provided.

Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select “no.”

Yes/ No/ Can't answer/ Not applicable

6. Were the characteristics of the included studies provided?

In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed *eg*, age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.

Note: Acceptable if not in table format as long as they are described as above.

Yes/ No/ Can't answer/ Not applicable

7. Was the scientific quality of the included studies assessed and documented?

'A priori' methods of assessment should be provided (*eg*, for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.

Note: Can include use of a quality scoring tool or checklist, *eg*, Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study (“low” or “high” is fine, as long as it is clear which studies scored “low” and which scored “high”; a summary score/range for all studies is not acceptable).

Yes/ No/ Can't answer/ Not applicable

8. Was the scientific quality of the included studies used appropriately in formulating conclusions?

The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.

Note: Might say something such as “the results should be interpreted with caution due to poor quality of included studies.” Cannot score “yes” for this question if scored “no” for question 7.

Yes/ No/ Can't answer/ Not applicable

9. Were the methods used to combine the findings of studies appropriate?

For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (*ie*, Chi-squared test for homogeneity, I²). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (*ie*, is it sensible to combine?).

Note: Indicate “yes” if they mention or describe heterogeneity, *ie*, if they explain that they cannot pool because of heterogeneity/variability between interventions.

Yes/ No/ Can't answer/ Not applicable

10. Was the likelihood of publication bias assessed?

An assessment of publication bias should include a combination of graphical aids (*eg*, funnel plot, other available tests) and/or statistical tests (*eg*, Egger regression test, Hedges-Olken).

Note: If no test values or funnel plot included, score “no”. Score “yes” if mentions that publication bias could not be assessed because there were fewer than 10 included studies.

For strictly narrative systematic reviews (*ie*, no quantitative methods employed), some narrative discussion of publication bias is required to score yes.

Yes/ No/ Can't answer/ Not applicable

11. Was the conflict of interest included?

Potential sources of support should be clearly acknowledged in **both** the systematic review ~~and the included studies~~.

Note: To get a “yes,” must indicate source of funding or support for the systematic ~~review AND for each of the included studies~~.

Yes/ No/ Can't answer/ Not applicable

Original source:

Shea et al. BMC Medical Research Methodology 2007 7:10 doi:10.1186/1471-2288-7-10

APPENDIX C. PEER REVIEW COMMENTS/AUTHOR RESPONSES

Comment	Response
<p>Pages 4 and 6 Steven Ezeji-Okoye should be Stephen and title should be Integrative Health Coordinator, Patient Care Services.</p>	<p>This has been corrected</p>
<p>A brief discussion of what an "active" or "inactive" comparators would be beneficial. Language is ambiguous in the literature regarding "active" or "inactive" comparators or controls and a discussion of these per study (if at all possible) may help with downstream decision making and may shed greater light on the actual comparative effectiveness of the intervention.</p>	<p>For all findings using the terms "active" or "inactive" we have now added examples or definitions from that particular review to provide more clarity for that finding. Because this report looks at systematic reviews, rather than individual studies, we are limited to reporting what the systematic reviews report, and could not collect these details from the included studies from each of the 31 systematic reviews.</p>
<p>Is it possible to add the date of publication to the evidence map? That would help the reader understand how old the review is.</p>	<p>The dates for each systematic review have been added to the bubble labels in the evidence map.</p>
<p>You might want to comment in your summary that some of these reviews are quite old and could be updated in the future. For example the review on massage in a critical care setting was done in 2000. There are other studies on massage that include patients in a critical care setting that have been published including the largest RCT of massage for postoperative pain which was funded by HSRD and published in 2007(I was a co-investigator on that study.</p>	<p>This has been included in the "Summary and Discussion" section.</p>
<p>I do not understand this sentence on page 14, line 38, "These 3 features of massage were most often reported for each primary studying including in the review, with variability between these primary studies".</p>	<p>This sentence has been revised to fix the grammatical issues.</p>
<p>My one concern is that when one looks at the Evidence Map and sees "mixed results" for so many of the LBP reviews, it gives a bit of a different picture then when one reads the text. The fact is it seems to me that overall the evidence is fairly good for the utility of massage in LBP and neck pain--and this does come through in the text--but visually when one sees that the bigger reviews of these conditions fall in the "mixed results" category the impression is that the evidence is really equivocal. I realize this may be part of how the evidence map methodology works but for some readers who will only look at the graphic and not read the text I think it is a bit problematic.</p>	<p>Both larger reviews described by the peer reviewer (Furlan, 2010 and Furlan, 2015) are described in the text as finding a number of positive findings, but both also included findings of no difference between massage and the control in certain comparisons. We have updated the evidence map to have these studies crossing the boundary between "mixed results" and "potentially better" in order to signal that both these important systematic reviews do lean positive, with many positive findings.</p>



<p>In most evidence maps that I have reviewed, there is not a bubble representing each review, but rather a bubble representing the strength of evidence for a given condition. This article's representation, which has several bubbles for many conditions, will not be as helpful to decision making (ex: Fibromyalgia has studies in 4 categories). It does represent the wide array of findings, but is not as useful a presentation for the decision makers as a synthesis.</p>	<p>While single bubbles for each condition may be more useful for decision makers, this type of depiction would be less faithful to the evidence, since it would require the report authors to make judgements in synthesizing findings across systematic reviews. The current figure presents the findings of each included systematic review, but does not judge how these would be integrated with each other, which would require looking at all the primary studies within each of the systematic reviews for topics with multiple bubbles.</p> <p>In the example of Fibromyalgia, we would need to see which studies were included in all reviews, and which were included in some but not others to determine a new finding inclusive of all potential evidence. The topics with multiple bubbles, especially with differing findings, may be areas that are ripe for an update systematic review. This is now noted in the "Summary and Discussion" section.</p>
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APPENDIX D. EVIDENCE TABLES FOR INCLUDED SYSTEMATIC REVIEWS

Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Anthonissen 2016	includes a variety of interventions, of which massage is one 2/22 includes relevant to massage Quality Score: 10	Style: Soft tissue mobilization, massage with cocoa butter, skin rehabilitation massage (detailed descriptions provided) Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Standard care, no treatment	Scar pain	A reduction of pain was shown in 2 studies... these findings were based on subjective rating scales and mostly based on trials with small sample sizes.
Piper 2016	focused solely on massage as the intervention 6/6 includes relevant to massage Quality Score: 10	Style: Soft-tissue therapy Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Placebo/sham, waiting list (wait and see), or no intervention.	Carpal tunnel syndrome, lateral epicondylitis, subacromial impingement syndrome, plantar fasciitis	Myofascial release therapy was effective for treating lateral epicondylitis and plantar fasciitis. Localized relaxation massage combined with multimodal care may provide short-term benefit for treating carpal tunnel syndrome.
Furlan 2015	focused solely on massage as the intervention 25/25 includes relevant to massage Quality Score: 11	Style: Soft-tissue manual manipulation Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Acute and chronic low-back pain	Massage was better than inactive controls for pain in the short-term, but not in the long-term follow-up. Massage was better than active controls for pain both in the short- and long-term follow-ups. There were no reports of serious adverse events in any of these trials. The most common adverse events were increased pain intensity in 1.5% to 25% of the participants.

Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Bervoets 2015	focused solely on massage as the intervention 26/26 includes relevant to massage Quality Score: 9	Style: Swedish massage, Thai massage, self-massage, combination of techniques, not described Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Low back pain, shoulder pain, fibromyalgia, osteoarthritis of the knee, chronic musculoskeletal pain, neck pain, chronic patellar tendinopathy, carpal tunnel syndrome, hand pain, and hand osteoarthritis	Low- to moderate-level evidence indicated that: (1) massage reduces pain in the short term compared to no treatment in people with shoulder pain; (2) massage reduces pain in the short term compared to no treatment in people with osteoarthritis of the knee; (3) massage does not reduce pain in those with low back pain; (4) massage does not reduce pain in those with neck pain. Low- to very low-level evidence from single studies indicated no clear benefits of massage over active treatments in people with: (5) fibromyalgia, (6) low back pain, and (7) general musculoskeletal pain.
Calixtre 2015	focused solely on massage as the intervention 8/8 includes relevant to massage Quality Score: 9	Style: Provided Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Acute and chronic temporomandibular disorder	Widely varying evidence that manual therapy improves pain and pressure pain threshold in subjects with temporomandibular disorder signs and symptoms, depending on the technique.
Keeratitanont 2015	focused solely on massage as the intervention 6/6 includes relevant to massage Quality Score: 6	Style: Traditional Thai massage Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Not provided	Chronic myofascial pain syndrome, chronic low back pain, scapulothoracic syndrome	Traditional Thai massage benefits of pain reduction appear to maintain for up to 15 weeks.



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Yuan 2015	focused solely on massage as the intervention 10/10 includes relevant to massage Quality Score: 8	Style: Swedish massage, connective tissue massage, manual lymphatic drainage, myofascial release, shiatsu, a combination of different massage styles Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Fibromyalgia	There is moderate evidence that myofascial release has positive effects on multiple fibromyalgia symptoms, especially pain, anxiety, and depression, for which the effect sizes are clinically relevant. Shiatsu improves pain and Swedish massage does not improve outcomes.
Loew 2014	focused solely on massage as the intervention 2/2 includes relevant to massage Quality Score: 11	Style: Deep transverse friction massage Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Lateral elbow or lateral knee tendinitis	We do not have sufficient evidence to determine the effects of deep transverse friction on pain, improvement in grip strength, and functional status for patients with lateral elbow tendinitis or knee tendinitis, as no evidence of clinically important benefits was found.
Chaibi 2014	includes a variety of interventions, of which massage is one 1/6 includes relevant to massage Quality Score: 7	Style: Head and neck massage Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Chronic headache	The massage therapy study included only 11 participants, but the massage group had significantly more reduction in their headache intensity than detuned ultrasound group.
Cheng 2014	focused solely on massage as the intervention 15/15 includes relevant to massage Quality Score: 8	Style: Chinese traditional massage, common Western massage, manual pressure release, strain/counterstrain technique, and myofascial band therapy Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Chronic neck pain	This systematic review found moderate evidence of manual therapy on improving pain in patients with neck pain compared with inactive therapies and limited evidence compared with traditional Chinese medicine.



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Li 2014	focused solely on massage as the intervention 9/9 includes relevant to massage Quality Score: 10	Style: Swedish massage, connective tissue, Shiatsu, therapeutic touch, unspecified, Chinese traditional massage, myofascial therapy Provider: Not provided Co-interventions: None Duration: Provided Comparators: Provided	Fibromyalgia	Massage therapy with duration ≥ 5 weeks had beneficial immediate effects on improving pain in patients with fibromyalgia. The meta-analyses showed that massage therapy with duration ≥ 5 weeks significantly improved pain (SMD, 0.62; 95% CI 0.05 to 1.20; $p = .03$)
Kong 2013	focused solely on massage as the intervention 12/12 includes relevant to massage Quality Score: 10	Style: Massage therapy, Chinese traditional massage, soft tissue massage, slow-stroke back massage, manual pressure release, strain/counterstrain technique, myofascial band therapy, Thai massage Provider: Not provided Co-interventions: None Duration: Provided Comparators: Provided	Acute and chronic neck pain, acute and chronic shoulder pain	In immediate effects, the meta-analyses showed significant effect of MT for neck pain (standardised mean difference, SMD, 1.79; 95% confidence intervals, CI, 1.01 to 2.57)
Patel 2012	focused solely on massage as the intervention 15/15 includes relevant to massage Quality Score: 10	Style: Included Swedish techniques, fascial or connective tissue release techniques, cross fibre friction, and myofascial trigger point techniques Provider: Provided Co-interventions: Provided Duration: Provided Comparators: included no treatment, hot packs, active range-of-movement exercises, acupuncture, exercises, sham laser, manual traction, mobilization, and education	Acute and chronic neck pain without radiculopathy, cervicogenic headache, neck disorders with radiculopathy	No firm conclusions could be drawn and the effectiveness of massage for improving neck pain and function remains unclear. There was very low-level evidence that massage may have been more beneficial than education in the short term for pain bothersomeness.



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
van den Dolder 2014	includes a variety of interventions, of which massage is one 7/23 includes relevant to massage Quality Score: 9	Style: Not provided Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Acute and chronic shoulder pain	There is low-quality evidence that soft tissue massage is effective for improving pain in patients with shoulder pain in the short term.
Smith 2012	focused solely on massage as the intervention 6/6 includes relevant to massage Quality Score: 11	Style: Slow stroke, effleurage, variety of techniques, none specified Provider: Partner, masseuse, not reported Co-interventions: None Duration: Provided Comparators: Provided	Labor pain	Massage may have a role in reducing pain, and improving women’s emotional experience of labour.
Terhorst 2011 Terhorst 2012	includes a variety of interventions, of which massage is one 6/60 includes relevant to massage Quality Score: 9	Style: Swedish massage, connective tissue massage, tui na and yoga, massage Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Fibromyalgia	Of the 5 pooled studies, 4 showed no effect; and the composite effect indicated that massage was not effective in reducing FM pain in this set of studies. All studies scored low- or very low-quality.

Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
<p>Furlan 2010 Furlan 2012</p>	<p>includes a variety of interventions, of which massage is one</p> <p>35/356 includes relevant to massage</p> <p>Quality Score: 11</p>	<p>Style: Myofascial pressure release, transverse friction, connective tissue, traditional Chinese massage, soft tissue, Swedish, Thai, bone setting, reflexology, accupressure, underwater, roptrotherapy, undescribed styles</p> <p>Provider: included: licensed or experienced massage therapists, physical therapists, reflexologists, acupressure therapists, folk healers, general practitioners, manual therapists, bone setter, chiropractic students, and not provided</p> <p>Co-interventions: Provided</p> <p>Duration: Provided</p> <p>Comparators: Provided</p>	<p>Acute and chronic low back pain, neck pain</p>	<p>Massage was superior to placebo or no treatment in reducing pain (grade: moderate) immediately post-treatment only in subjects with acute/subacute but not in subjects with chronic low back pain (grade: low). Massage was significantly better than relaxation (clinical importance of difference: medium degree) or physical therapy (clinical importance of difference: large degree) in reducing chronic nonspecific low back pain intensity immediately after the treatment (grade: low to moderate). Massage was better than no treatment in reducing immediate-term post-treatment pain intensity in subjects with chronic or unknown duration of nonspecific pain (grade: low). Massage was better than placebo in reducing neck pain intensity immediately after the treatment in subjects with acute/subacute or unknown duration of nonspecific pain (grade: low).</p>
<p>Ernst 2009</p>	<p>focused solely on massage as the intervention</p> <p>8/14 includes relevant to massage</p> <p>Quality Score: 7</p>	<p>Style: Style not directly addressed aside from: "Classical massage was defined as a manual treatment using effleurage (long, slow strokes), friction (small circular strokes), percussion (chopping and drumming motions) and petrissage (kneading action on muscles)."</p> <p>Provider: excluded lay persons</p> <p>Co-interventions: Provided</p> <p>Duration: Provided</p> <p>Comparators: Provided</p>	<p>Cancer palliation</p>	<p>Collectively, studies suggest that massage can alleviate pain, however the methodological quality was poor, preventing definitive conclusions</p>



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Wilkinson 2008	focused solely on massage as the intervention 4/10 includes relevant to massage Quality Score: 10	Style: Soft tissue manual manipulation, including foot massage, Swedish, unspecified, aromatherapy/carrier oil massage. Provider: A therapist with recognized qualification Co-interventions: Not provided Duration: Provided Comparators: Provided	Cancer symptoms including pain	In the 4 studies using pain as an outcome measure, there was a nonstatistically significant trend towards improvement.
Ezzo 2007	focused solely on massage as the intervention 14/19 includes relevant to massage Quality Score: 8	Style: Soft tissue manual manipulation, including Swedish techniques, fascial or connective tissue release techniques, cross fiber friction, and myofascial trigger point techniques. Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Acute and chronic neck pain	The contribution of massage to managing cervical pain remains unclear.
Bardia 2006	includes a variety of interventions, of which massage is one 4/18 includes relevant to massage Quality Score: 11	Style: Not provided Provider: Not provided Co-interventions: Unclear Duration: Provided Comparators: Provided	Cancer pain	Mix of results from methodologically weak studies
Smith 2006	includes a variety of interventions, of which massage is one 1/14 includes relevant to massage Quality Score: 9	Style: Directional firm rhythmic massage comprised of effleurage, sacral pressure, and shoulder and back kneading. Provider: Researcher and partner Co-interventions: Standard care Duration: Provided Comparators: Standard care	Labor pain	There was a significant reduction in women's perception of pain for the massage group compared to the control group during all 3 phases of labour in the one included study. The efficacy of massage has not been established.

Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Haraldsson 2006	focused solely on massage as the intervention 19/19 includes relevant to massage Quality Score: 11	Style: Soft tissue manual manipulation including Swedish techniques, fascial or connective tissue release techniques, cross fiber friction, and myofascial trigger point techniques Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Chronic neck pain	No recommendations for practice can be made at this time because the effectiveness of massage for neck pain remains uncertain.
Huntley 2004	includes a variety of interventions, of which massage is one 2/12 includes relevant to massage Quality Score: 10	Style: Provided Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Labor pain	Both of the massage trials showed positive effects for the relief of pain during labor. These trials did not rate highly on the Jadad scale because and it is impossible to make any definitive conclusions regarding effectiveness in labor pain control.
Cherkin 2003	includes a variety of interventions, of which massage is one 8/17 includes relevant to massage Quality Score: 9	Style: Included to therapeutic massage, comprehensive massage, unspecified. Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Back pain	Two reviews, including 5 studies total, concluded that high-quality trials were needed before the value of massage for back pain could be determined. The 3 RCTs that evaluated massage reported that this therapy is effective for subacute and chronic back pain. Initial studies suggest that massage is effective for persistent back pain.
Simkin 2002	includes a variety of interventions, of which massage is one 1/38 includes relevant to massage Quality Score: 9	Style: Described as for back, head, hands, feet Provider: Partner Co-interventions: Lamaze Duration: Provided Comparators: Usual care	Labor pain	The randomized controlled trial of massage by partners in labor found that the massaged women had significant emotional and physical relief, as reported by the women themselves, and assessed by their partners and a blinded observer. The intervention of massage has not undergone sufficient scientific study to provide clear conclusions regarding benefits and risks.



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Pan 2000	includes a variety of interventions, of which massage is one 3/21 includes relevant to massage Quality Score: 6	Style: Swedish massage, unspecified Provider: Not provided Co-interventions: Provided Duration: Provided Comparators: Provided	Palliative care patients' pain	Massage with or without aromatherapy, might provide short-term relief for patients with intractable cancer pain. Evidence level 3.3 (second lowest rating of 6).
Richards 2000	focused solely on massage as the intervention 4/22 includes relevant to massage Quality Score: 5	Style: Therapeutic massage, myofascial trigger point therapy, Swedish, unspecified Provider: Provided Co-interventions: Provided Duration: Provided Comparators: Provided	Pain in critical care setting	In studies in which the effect of massage on discomfort was investigated, it was found to be effective in reducing pain.
Ernst 1999	focused solely on massage as the intervention 4/4 includes relevant to massage Quality Score: 6	Style: Gentle stroking back massage, light effleurage, soft tissue lumbosacral massage, underwater massage Provider: Not provided Co-interventions: None Duration: Provided Comparators: Provided	Low back pain	It is concluded that too few trials of massage therapy exist for a reliable evaluation of its efficacy. Massage seems to have some potential as a therapy for LBP.
Kong 2011	focused solely on massage as the intervention 10/10 includes relevant to massage Quality Score: 3	Style: Swedish massage, tui na, other soft tissue manual manipulation Provider: Not provided Co-interventions: Not provided Duration: Provided Comparators: Provided	Fibromyalgia	All studies reported an association between the therapeutic massage and improved clinical symptom of pain. The meta-analysis results showed that 4 studies with 3 to 10 weeks of therapy had a decrease in pain versus either other therapies or no treatment controls. The pooled effect size was -0.92 (95% CI, -1.28 to -0.56) favoring therapeutic massage. The studies are very heterogeneous, and there is insufficient evidence for a definitive conclusion.



Author, year	Description of systematic review	Description of massage	Description of pain	Excerpted findings relevant to massage
Lewis 2006	focused solely on massage as the intervention 20/20 includes relevant to massage Quality Score: 9	Style: Therapeutic massage, including Swedish Provider: Provided Co-interventions: None Duration: Provided Comparators: Provided	Musculoskeletal pain (low back, neck, various chronic, shoulder, diffuse, eccentric exercise limb, post-running soreness)	Research on the effectiveness of TM to relieve pain of musculoskeletal origin is inconclusive. TM was superior to no treatment in 5 out of 10 comparisons, superior to sham laser treatment in one out of 2 comparisons, and superior to active treatment in 7 out of 22 comparisons.