QUERI

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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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.

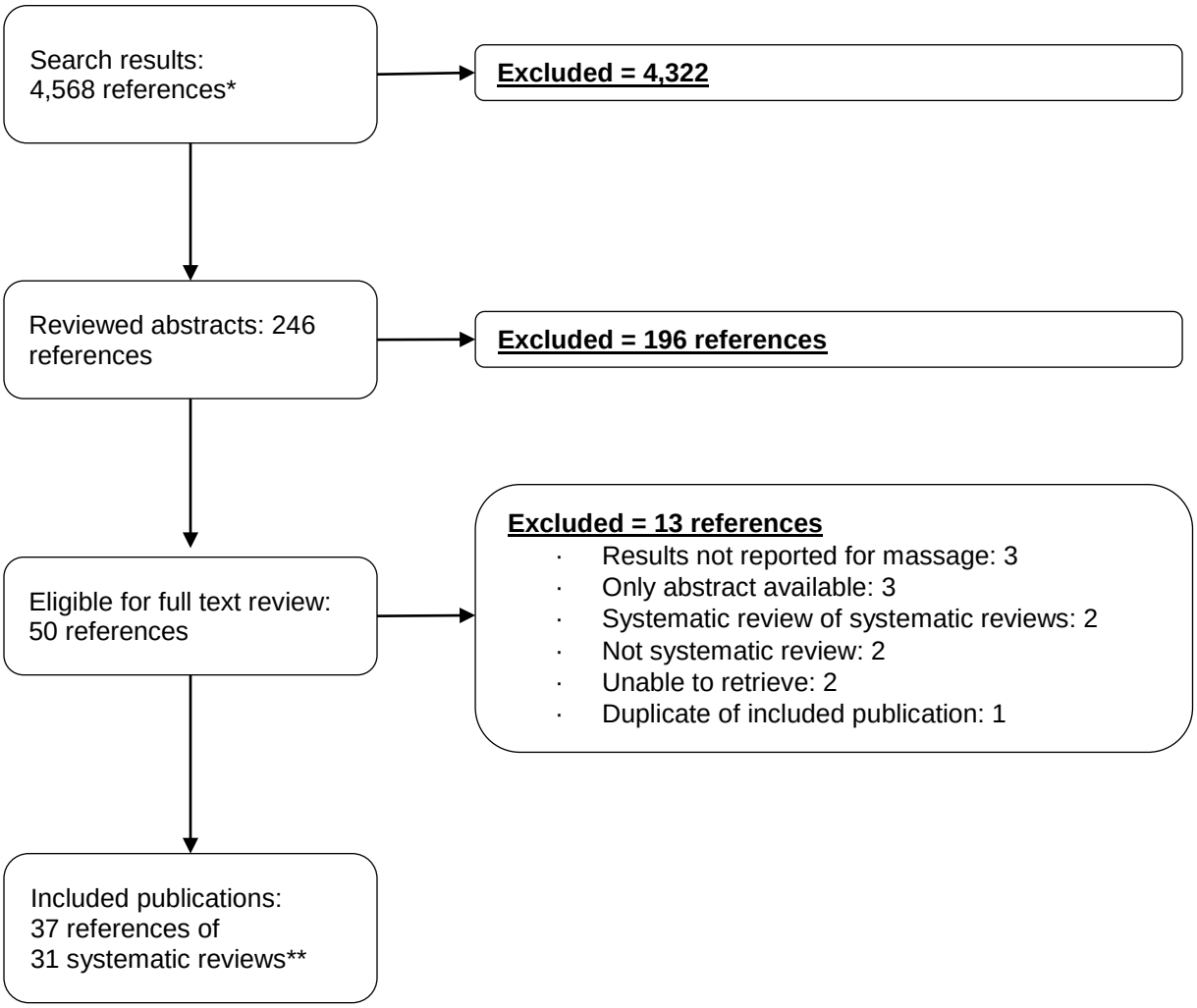
RESULTS

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

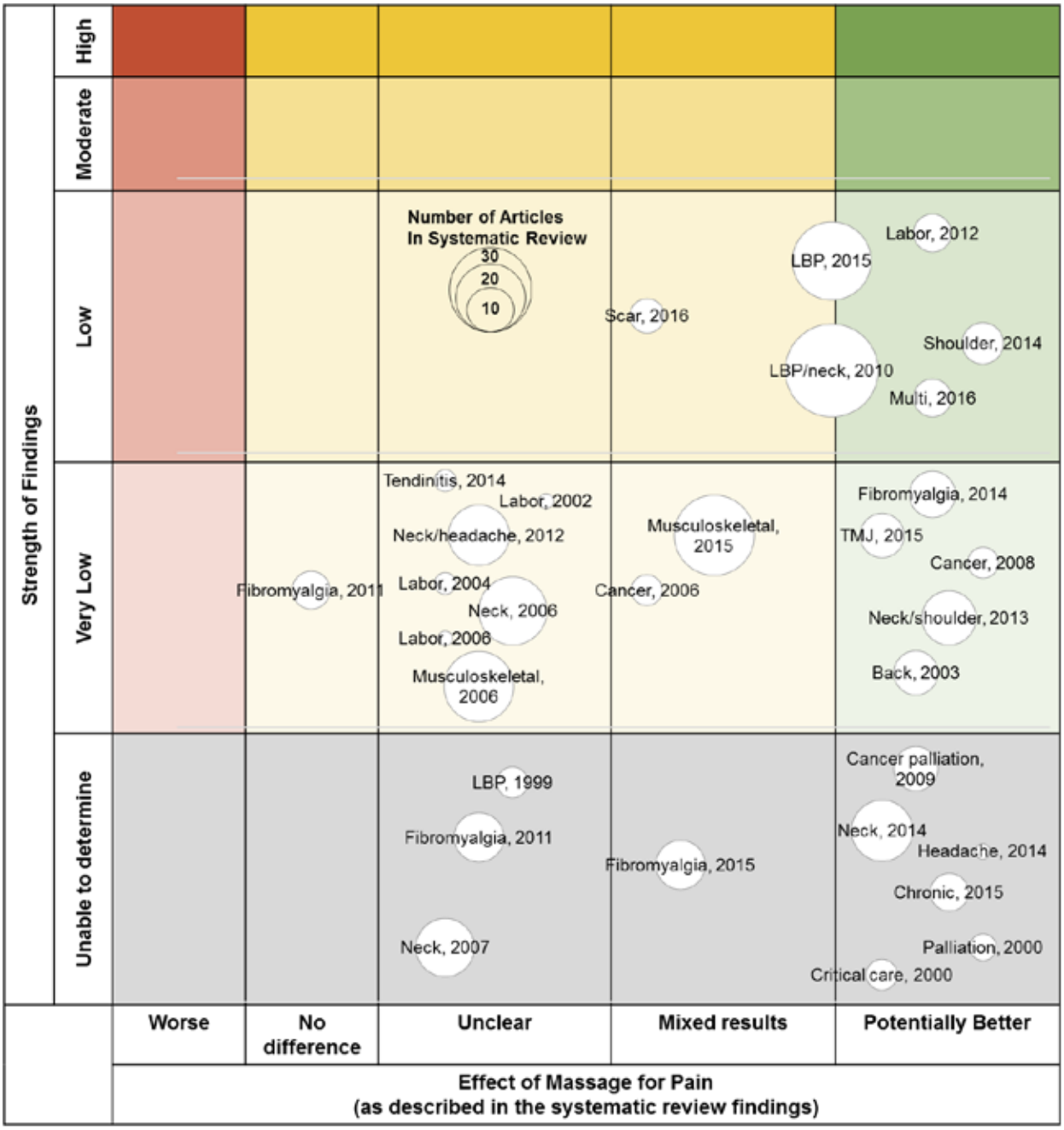
Ernst 2009	No	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	?	No	7
Wilkinson 2008	?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Ezzo 2007	?	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes	?	Yes	8
Bardia 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Smith 2006	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	?	Yes	9
Haraldsson 2006	Yes	Yes	Yes	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 sub-acute 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 massage[31] and deep transverse friction massage[33] – 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	●	●	●	●	●	●

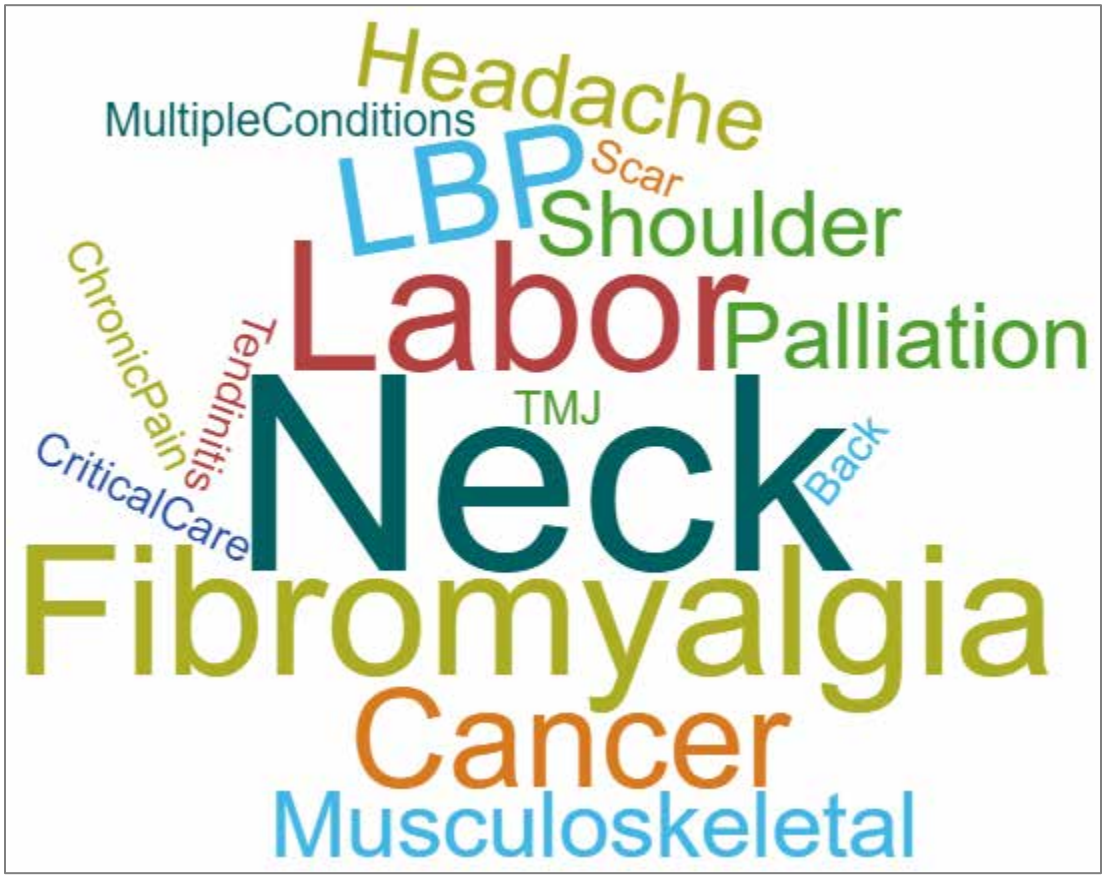
● = yes; ○ = no

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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