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Review Article

# Effectiveness of massage therapy for shoulder pain: a systematic review and meta-analysis

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**Abstract.** [Purpose] This study performed an effect-size analysis of massage therapy for shoulder pain. [Subjects and Methods] The database search was conducted using PubMed, CINAHL, Embase, PsycINFO, RISS, NDSL, NANET, DBpia, and KoreaMed. The meta-analysis was based on 15 studies, covering a total of 635 participants, and used a random effects model. [Results] The effect size estimate showed that massage therapy had a significant effect on reducing shoulder pain for short-term efficacy (SMD: −1.08, 95% CI: −1.51 to −0.65) and for long-term efficacy (SMD: −0.47, 95% CI: −0.71 to −0.23). [Conclusion] The findings from this review suggest that massage therapy is effective at improving shoulder pain. However, further research is needed, especially a randomized controlled trial design or a large sample size, to provide evidence-based recommendations.

**Key words:** Shoulder pain, Massage, Meta-analysis

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## INTRODUCTION

Shoulder pain is one of the most common musculoskeletal disorders. The lifetime prevalence is estimated to be in the range of 6.7–66.7%[1)]. Shoulder pain and stiffness may reduce the performance efficiency of a person in family life or social life as well as reduce productive activities. It also has a strong statistical correlation with somatizing tendency and poor mental health[2)]. There are many cases of shoulder pain that have not improved over time, remain persistent, or occur repeatedly[3)]. The prognosis becomes poorer the longer the illness is present[4)]. According to a survey, more than 50% of the patients diagnosed with shoulder pain, received physical therapy[5)]. Massage therapy is widely used in physical therapy for the treatment of shoulder pain[6)]. However, there are very few limited systematic reviews with a meta-analysis that have specifically investigated the effectiveness of massage therapy for the treatment of shoulder pain[7, 8)]. In previous studies, meta-analysis has been performed in order to evaluate the effectiveness of soft tissue massage and exercise for the treatment of non-specific shoulder pain[7)], and the effectiveness of massage for the treatment of neck and shoulder pain[8)]. Therefore, the aim of this study was to conduct a systematic review and meta-analysis to assess the short-term and long-term effectiveness of massage therapy for shoulder pain.

## SUBJECTS AND METHODS

The study eligibility criteria were based on the systematic literature review description format, Participants, Interventions, Comparisons, Outcomes, and Study design (PICOS), and can be described as follows. Participants (P) refer to adults (18 years old and above) with shoulder pain. Interventions (I) refer to a massage therapy that was given alone or in combination with another treatment. Comparisons (C) refer to a group that received no intervention, placebo, or other intervention. Outcomes (O) refer to the studies for assessing shoulder pain using a standardized instrument. Study design (S) refers to a randomized controlled or non-randomized controlled trial. The study languages were limited to English and Korean. The

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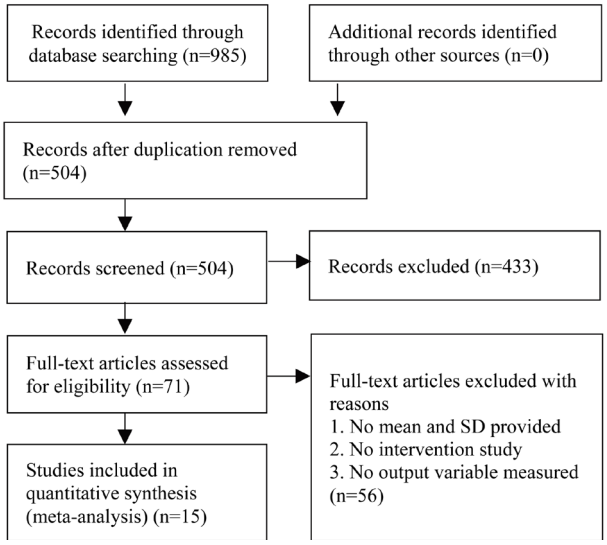


**Fig. 1.** Flow diagram of the study selection process

exclusion criteria for the data analysis included studies of subjects diagnosed with infection, neoplasm, fracture, instability, dislocation, hemiplegia, or postoperative or perioperative shoulder pain, and studies for which the mean and standard deviation could not be estimated.

In the data search, there was no limit on the year of publication, and all papers published until April 2016 were included. The database search was conducted using PubMed, CINAHL, Embase, PsycINFO, RISS, NDSL, NANET, DBpia, and KoreaMed. The major keywords used for the search included shoulder pain, shoulder impingement syndrome, rotator cuff, bursitis, adhesive capsulitis, massage, therapeutic touch, reflexotherapy, reflexion, manual, manipulative, clinical trial, random, and placebo, among others. The available data were extracted and coded according to information on author, published year, study design, participants, intervention contents, and outcome measurement. The risk of bias was assessed using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) system recommended by the Cochrane Back Review Group. This system comprises 12 items, such as study design, consistency of results, generalizability of the finding, sufficient data and report bias. A higher score means a lower risk of bias[9].

For the selected papers, the effect size, homogeneity of studies, and publication bias were analyzed using the RevMan 5.3 program of The Cochrane Library. The effect size was calculated using a random effect model, and the standardized mean difference (SMD) was calculated. The homogeneity of studies was assessed using Higgins's $I^2$ [2, 10]. Subgroup analysis was conducted by dividing the control group into an inactive therapy group and an active therapy group. Publication bias was tested with a funnel plot.

## RESULTS

The database searches identified 985 studies and the abstracts of 504 studies suggested that 71 articles were potentially eligible for inclusion; however, only 15 studies met the inclusion criteria (Fig. 1). The experimental group comprised 340 participants, while the control group comprised 295 persons (a total number of 635 participants). The range of risk-of-bias scores was between 5 points to 11 points out of 12 points (M ± SD, 8.5 ± 2.03) (Table 1). The effect size of the short-term efficacy was −1.08 (95% CI: −1.51 to −0.65), and the $I^2$ of the heterogeneity was 81%. The funnel plot was symmetric. In the subgroup analysis, 11 studies assessed the effect of massage versus inactive therapies, and their effect size was −1.12 (95% CI: −1.60 to −0.63, $p<0.001$) (Fig. 2). There were four studies that compared the effect of massage with active therapies for shoulder pain, and their effect size was −1.06 (95% CI: −2.18 to 0.06, $p=0.06$) (Fig. 2). In addition, there were five studies that assessed the follow-up effect of the massage. The effect size of their long-term efficacy was −0.47 (95% CI: −0.71 to −0.23, $p=0.001$), and the $I^2$ of their heterogeneity was 84%. The funnel plot was symmetric.

## DISCUSSION

In many countries, massage therapy has been used as an important intervention for the treatment of shoulder pain. However, a comprehensive analysis of the effect of massage has rarely been conducted. In order to investigate the short-term and long-term efficacies of massage therapy for shoulder pain, this study conducted a systematic literature review followed by a meta-analysis of 15 studies that included a total of 635 participants.

**Table 1.** Characteristics of included studies

| First author and year | Study design | Participants | | | Interventions | | | | | Comparisons | Scale | Total risk-of-bias score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total N (eN/cN) | Mean age | % of females | Type | Location | Duration weeks | N. of session /Min. | Follow-up weeks | | | |
| Bergman 2010 | RCT | 149 (79,70) | 48.1 | 52.0 | Massage, usual care | Cervical spine, upper thoracic spine, upper ribs | 12 | 6/NR | 14 | Usual care | PQ | 11 |
| Bron 2011 | RCT | 65 (34,31) | 43.8 | 62.0 | Massage, stretching, cold application | Myofascial trigger points | 12 | 12/NR | - | No treatment | VAS | 11 |
| Buttagat 2011 | RCT | 20 (10,14) | 25.0 | 85.0 | Thai massage | Clavicle, back, shoulder | 3 | 9/30 | 2 | Physical therapy | VAS | 11 |
| Choi 2004 | NRCT | 58 (30,28) | 75.2 | 74.1 | Kyongrak massage | Cervical spine | 5 days | 5/10 | - | No treatment | VAS | 5 |
| Dolder 2003 | RCT | 29 (15,14) | 64.4 | 31.0 | Soft tissue massage | Shoulder | 2 | 6/15–20 | - | No treatment | VAS | 10 |
| Donoyama 2010 | RCT | 15 (9,6) | 55.4 | 100.0 | Anma therapy | Whole body | 3 days | 2/40 | - | Rest intervention | VAS | 8 |
| Dyson-Hudson 2001 | RCT | 18 (9,9) | 45.1 | 22.2 | Massage therapy | Shoulder, upper extremities | 5 | 10/45 | 5 | Acupuncture | WUSPI | 9 |
| Kim 2016 | RCT | 6 (3,3) | 50.0 | 0.0 | Sports massage, hot pack | Neck, shoulder, back | 12 | 36/20 | - | Hot pack | VAS | 7 |
| Lim 2011 | NRCT | 40 (30,10) | 40.6 | 70.0 | Deep-tissue massage | Whole body | 5 | 10/50 | - | No treatment | VAS | 6 |
| Park 2016 | NRCT | 30 (15,15) | 49.6 | 100.0 | Sports massage | Shoulder | 2 | 12/30 | - | No treatment | VAS | 7 |
| Senbursa 2007 | RCT | 30 (15,15) | 30–55 | NR | Manual therapy | Shoulder | 4 | 12/ NR | - | Self-training | VAS | 8 |
| Sung 2006 | RCT | 41 (21,20) | 75.9 | 85.3 | Kyongrak massage | Cervical spine, upper extremities | 5 days | 5/10 | - | No treatment | VAS | 7 |
| van den Dolder 2003 | RCT | 29 (15,14) | 64.0 | 31.0 | Soft tissue massage | Shoulder | 2 | 6/15–20 | - | No treatment | VAS | 10 |
| van den Dolder 2015 | RCT | 80 (40,40) | 62.6 | 52.5 | Soft tissue massage, exercise | Shoulder, back | 4 | 7/10–15 | 12 | Exercise | VAS | 11 |
| Yang 2011 | NRCT | 25 (15,10) | 47.2 | 50.0 | Deep-tissue massage | Shoulder | 5 | 10/NR | 9–10 | No treatment | VAS | 7 |

RCT: randomized controlled trials; NRCT: non-randomized controlled trials; NR: not reported; PQ: pain questionnaire, VAS: Visual analogue scale, WUSPI: wheelchair user's shoulder pain index

The results indicate that the effect size of short-term efficacy was large and robust, thereby supporting the hypothesis that massage is an effective treatment for reducing shoulder pain. Based on the subgroup analysis, the effect size of massage therapy was greater than that of no treatment or placebo treatment. However, there were no significant differences in comparisons with the effect sizes of other active treatments such as physical therapy, rest intervention, acupuncture, and self-training. These results are consistent with other systematic reviews. Van den Dolder et al.[7] reported there was low-quality evidence that soft tissue massage was effective at improving the pain of patients with non-specific shoulder pain immediately following treatment. Kong et al.[8] suggested that massage therapy may have been more beneficial than inactive therapies with regard to the immediate effects of shoulder pain. A closer examination revealed that sports massage with a hot pack applied to the neck, shoulders, and back for 36 sessions had the greatest effect size[11].

The effect size of the long-term efficacy in improving shoulder pain was small; however, an effect was still evident even when it was compared with active therapy and inactive therapy. Kong et al.[8] reported that massage had a long-term efficacy

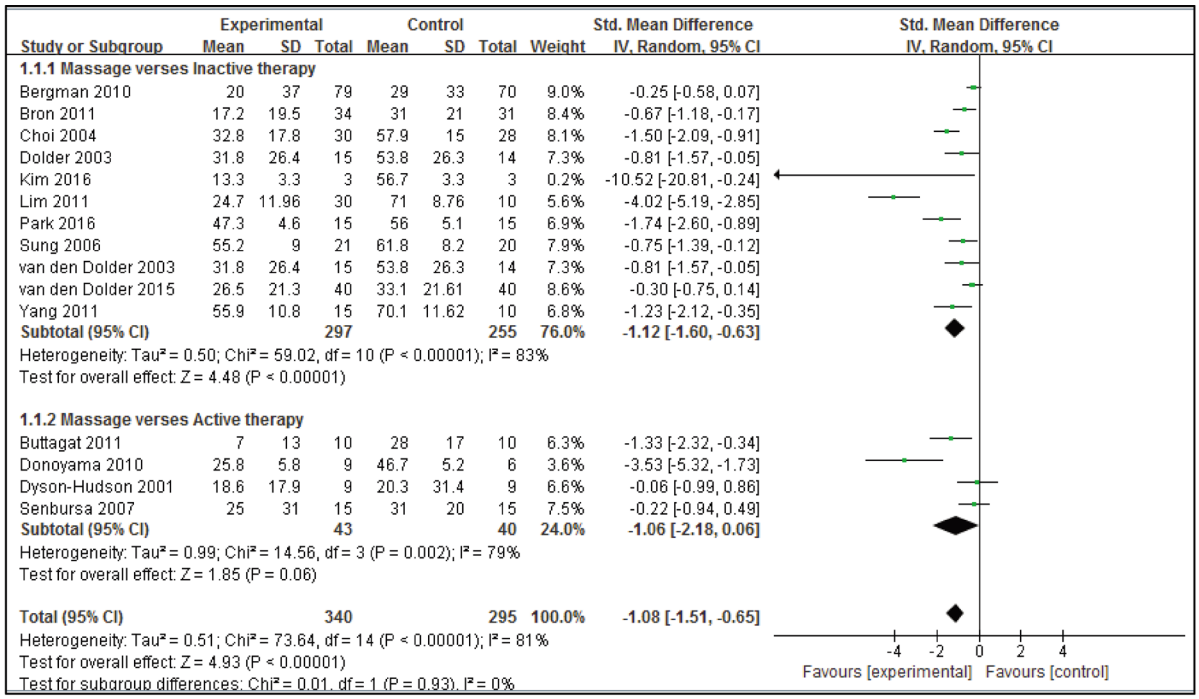


**Fig. 2.** Forest plot of massage therapy for shoulder pain

in reducing shoulder pain, but they did not perform subgroup analysis of inactive and active therapies because there were only three studies that measured the effect of the follow-up. Based on the individual studies, deep-tissue massage applied to the shoulders for 10 sessions had the greatest long-term effect size[12]. Since the studies conducted in this area had small sample sizes and a short follow-up period, care is required when generalizing the results. It is thought that a systematic literature review will still be necessary in the future.

This is the first meta-analysis to comprehensively investigate the effect of massage therapy on reducing shoulder pain. Various kinds of massage skills, studies with a small sample size, and low-quality trials were included, and these were limitations of this study. Future studies of shoulder pain massage should adhere to high-quality RCTs with a long follow-up. The RCTs should adopt a standard massage and a large sample size. In addition, studies of ways to maximize short-term effectiveness or maintain long-term effectiveness must continue to be conducted.

## ACKNOWLEDGEMENT

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