



DEEP TISSUE MASSAGE AS A COMPLEMENTARY THERAPY FOR MUSCULOSKELETAL PAIN

HEALTH TECHNOLOGY ASSESSMENT SECTION (MaHTAS)
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003/2015

DISCLAIMER

Technology review is a brief report, prepared on an urgent basis, which draws on restricted reviews from analysis of pertinent literature, on expert opinion and / or regulatory status where appropriate. It has been subjected to an external review process. While effort has been made to do so, this document may not fully reflect all scientific research available. Additionally, other relevant scientific findings may have been reported since completion of this review.

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DISCLOSURE

The author of this report has no competing interest in this subject and the preparation of this report is totally funded by the Ministry of Health, Malaysia.

EXECUTIVE SUMMARY

Background

Musculoskeletal pain is the pain that affects the muscles, ligaments, tendons, and bones. Musculoskeletal pain has tremendous socioeconomic impact through direct and indirect effects on health. Despite its high prevalence, musculoskeletal pain remains poorly understood and insufficiently treated. Musculoskeletal pain significantly impinges on the psychosocial status of affected people as well as their families and carers.

Musculoskeletal conditions encompass a spectrum of conditions, from those of acute onset and short duration to lifelong disorders; including osteoarthritis, rheumatoid arthritis, osteoporosis, and low back pain. In surveys carried out in Canada, the United States of America (USA) and Western Europe, the prevalence of physical disabilities caused by a musculoskeletal condition has been estimated at 4% to 5% of the adult population. It increases distinctly with age, and many are influenced by lifestyle factors, such as obesity and lack of physical activity.

Musculoskeletal pain is best treated by treating its cause. Treatment for musculoskeletal pain includes analgesics such as acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs) and opioids. Many forms of complementary therapies exist, such as massage therapy, acupuncture and chiropractic manipulation. Massage therapy, in particular, has grown in popularity. In Malaysia, Malay massage using the concept of deep tissue massage technique has been used as a complementary therapy for musculoskeletal pain.

Deep tissue massage practices the use of hands or mechanical means, to manipulate the soft tissues of the body, particularly muscle. It is sometimes accompanied with special prayers. It starts from lower limb up to the upper limb and head area to focus on the blood circulation to the heart. It is claimed that deep tissue massage has potential benefit in relieving musculoskeletal pain by promoting suppleness of the muscle, improving circulation and reducing stress.

Massage has been categorised under the Manipulative and Body Base Method according to the National Centre for Complementary and Alternative Medicine, National Institute of Health, USA. Malay massage has been offered to patients as a complementary therapy for musculoskeletal pain in several hospitals in Malaysia since 2006 under the Traditional and Complementary Medicine (T&CM) unit which includes Putrajaya Hospital in Federal Territory of Putrajaya, Sultan Ismail Hospital in Johor and Kepala Batas Hospital in Penang.

This technology review was requested by the Director of Traditional and Complementary Medicine Division, Ministry of Health, Malaysia to review the evidence on deep tissue massage as a complementary therapy for musculoskeletal pain.

Objective/aim

To assess the effectiveness, safety and cost-effectiveness of deep tissue massage as a complementary therapy for musculoskeletal pain.

Results and conclusions

A total of 580 titles were identified through the OVID interface and PubMed. Two randomized controlled trials, one non-randomized controlled trial and one case report were included in this review.

There was limited fair level of retrievable evidence to suggest that deep tissue massage may be effective in reducing pain in patients with chronic low back pain. Visual Analogue Score (VAS) score difference was found statistically higher in deep tissue massage plus lumbar traction group compared to the lumbar traction only group (1.9 ± 0.9 versus 1.4 ± 0.8 , $P < 0.05$). There were also statistically significant differences in Modified Oswestry Low Back Pain Disability Index (ODI), Quebec Back Pain Disability Scale (QBPD) and VAS score after deep tissue massage in patients with chronic low back pain [ODI $P < 0.001$; QBPD $P < 0.001$; VAS $P < 0.001$]. However, there was a case report of spinal accessory neuropathy and two patients in another study experienced worsening of the low back pain after deep tissue massage. There was no retrievable evidence from the scientific databases on the cost-effectiveness of this technology.

Methods

Literature search was done to search for published articles to assess the safety, efficacy or effectiveness and cost-effectiveness of deep tissue massage as a complementary therapy for musculoskeletal pain. The following electronic databases were searched via OVID Interface: MEDLINE (1946 to 28 February 2015), EBM Reviews-Cochrane Database of Systematic Reviews (2005 to January 2015), EBM Reviews-Cochrane Central Register of Controlled Trials (January 2015), EBM Reviews-Database of Abstracts of Review of Effects (1st Quarter 2015), EBM Reviews-Health Technology Assessment (1st Quarter 2015) NHS economic evaluation database (1st Quarter 2015), Pubmed and INAHTA database. The last search was run on 28 February 2015.

DEEP TISSUE MASSAGE AS A COMPLEMENTARY THERAPY FOR MUSCULOSKELETAL PAIN

1. BACKGROUND

Musculoskeletal pain is the pain that affects the muscles, ligaments, tendons, and bones. Musculoskeletal pain has tremendous socioeconomic impact through direct and indirect effects on health. Despite its high prevalence, musculoskeletal pain remains poorly understood and insufficiently treated. It is the most common cause of severe long term pain and physical disability, and affects hundreds of millions of people around the world. Musculoskeletal pain significantly impinges on the psychosocial status of affected people as well as their families and carers.¹

Musculoskeletal conditions encompass a spectrum of conditions, from those of acute onset and short duration to lifelong disorders; including osteoarthritis, rheumatoid arthritis, osteoporosis, and low back pain. In surveys carried out in Canada, the USA, and Western Europe, the prevalence of physical disabilities caused by a musculoskeletal condition has been estimated at 4% to 5% of the adult population.¹ It increases distinctly with age, and many are influenced by lifestyle factors, such as obesity and lack of physical activity.¹ Furthermore, the pain and physical disability caused by musculoskeletal conditions affect social functioning and mental health, further diminishing the patient's quality of life.¹

Musculoskeletal pain is best treated by treating its cause. Treatment for musculoskeletal pain includes analgesics such as acetaminophen, non-steroidal anti-inflammatory drugs (NSAIDs) and opioids. Many forms of complementary therapies exist, such as massage therapy, acupuncture and chiropractic manipulation. Massage therapy, in particular, has grown in popularity. In Malaysia, Malay massage using the concept of deep tissue massage technique has been used as a complementary therapy for musculoskeletal pain.³

Deep tissue massage practices the use of hands or mechanical means, to manipulate the soft tissues of the body, particularly muscle. It is sometimes accompanied with special prayers. It starts from lower limb up to the upper limb and head area to focus on the blood circulation to the heart. It is claimed that deep tissue massage has potential benefit in relieving musculoskeletal pain by promoting suppleness of the muscle, improving circulation and reducing stress.⁴

Massage has been categorised under the Manipulative and Body Base Method according to the National Centre for Complementary and Alternative Medicine, National Institute of Health, USA.⁴ Malay massage has been offered to patients as a complementary therapy for musculoskeletal pain in several hospitals in Malaysia since 2006 under the Traditional and Complementary Medicine (T&CM) unit which includes Putrajaya Hospital in Federal Territory of Putrajaya, Sultan Ismail Hospital in Johor and Kepala Batas Hospital in Penang.⁴

This technology review was requested by the Director of Traditional and Complementary Medicine Division, Ministry of Health, Malaysia to review the evidence on deep tissue massage as a complementary therapy for musculoskeletal pain.

2. OBJECTIVE / AIM

To assess the safety, effectiveness and cost-effectiveness of deep tissue massage as a complementary therapy for musculoskeletal pain.

3. TECHNICAL FEATURES

3.1 What is Deep Tissue Massage?

Malay massage using the technique of deep tissue massage is a massage that involves soft tissue manipulation of the whole body, sought for different types of conditions and ailments. It is a mixture of kneading, stroking and pressing with hands. It is also sometimes accompanied with special pray incantations and take home advise in the form of post massage workouts or exercises. It is administered as a complement to the medical or rehabilitation therapy and sometimes, it is only carried out with the approval of a medical practitioner. Deep tissue massage is claimed to improve common musculoskeletal complaints including muscle sprains, muscle strains, muscle spasms and low back pain. Other than that, deep tissue massage is claimed to help in psychological aspects such as providing relaxation, improving confidence levels and reducing anxiety.⁴



3.2 Claimed mechanism of action

It is claimed that the deep tissue massage works by mobilisation of inter tissue fluid, reduction or modification of oedema, increment of local blood flow, reduction of muscle soreness and stiffness thus reducing the intensity of pain and facilitating relaxation. Deep tissue massage is claimed to enhance the circulation systems particularly the venous return and of the lymphatic system thus helps the elimination of toxin and waste products systemically. It is also claimed to have an indirect effect to the autonomous nervous system which sequentially improves the production of glandular secretions and organ functions. Deep tissue massage is also claimed to act on the reflex zones and helps to alleviate some of the symptoms associated with the diseases such as low back pain.⁴

3.3 Massage techniques

Malay massage using the technique of deep tissue massage is usually done on a raised floor that is made of wood known as *pangkin*. Massage treatment may last between 15 to 90 minutes; three sessions in a week, 15 to 45 minutes each session for chronic pain and seven sessions in three weeks, 60 to 90 minutes each session for post stroke patients. The massage oil used must not contain methylsalicylate.⁴

Deep tissue massage techniques consisted of few different strokes which include;

A. Fan Stroking:

- Hands are placed side by side on the body with palms down and gently slide upward, lead by the fingers
- Then, slide hands downward, moulding them to the contours of the body
- Repeat several times, covering the whole area



B. Basic Kneading:

The movement is like kneading dough and is claimed useful on the shoulders, back and hips

- Hands are placed flat on the body with the elbows apart and fingers pointing away
- With the right hand, grasp some flesh and release it to the left hand
- Let the left hand take the flesh and release it to the right hand
- Repeat several times, counting to keep the strokes rhythmic



C. Thumb stroking:

Thumb stroking involves firm movement which particularly useful on small and tense areas such as limbs.

- Stroke firmly outward and out to the side the left thumb
- Then , stroke firmly upward a little higher with the right thumb
- Make the stroke smooth and repeat several times, building up a steady rhythm



D. Static pressures:

These strokes are useful for releasing tension in the neck and shoulders, sides of the spine, buttocks and soles of the feet

- Ease into the pressure gradually and steadily, hold and then slowly release
- Hold for five to nine seconds and then release slowly
- Glide to the next point of tension



3.4 Contraindication

Deep tissue massage is contraindicated when it could cause worsening of a certain condition, spread of disease or infection and unwanted tissue destruction.⁴ It is contraindicated in patients with;

- **Acute infections:** Bacterial and fungal infections, viral infections, measles, herpes zoster, septicaemia and fever.⁴
- **Acute inflammations:** Gout, infective arthritis, ulcerative colitis and appendicitis.⁴
- **Trauma:** Open wounds, bone fracture and bony avulsion.⁴
- **Vascular diseases:** Aneurysm, varicose veins, venous thrombosis and portal hypertension.⁴
- **Others:** Impaired blood supply to a tissue, weakness in the wall of the blood vessels as in haemophilia, acute strains, suspicious lumps or growth and osteoporosis.⁴

4. METHODS

4.1 Searching

Electronic databases searched through the Ovid interface:

- MEDLINE (R) In-Process and Other Non-Indexed Citations and Ovid MEDLINE (R) 1946 to present
- EBM Reviews- Cochrane Central Registered of Controlled Trials- January 2015
- EBM Reviews- Database of Abstracts of Review of Effects- 1st Quarter 2015
- EBM Reviews- Cochrane Database of Systematic Reviews- 2005 to January 2015
- EBM Reviews- Health Technology Assessment- 1st Quarter 2015
- EBM Reviews- NHS Economic Evaluation Database- 1st Quarter 2015

Other databases:

- Pubmed
- Other websites: INAHTA

Additional articles were identified from reviewing the references of retrieved articles. General search engine was used to get additional web based information. The search was limited to articles on human. There was no language limitation in the search. Appendix 1 showed the detailed search strategies. The last search was conducted on 28 February 2014.

4.2 Selection

A reviewer screened the titles and abstracts against the inclusion and exclusion criteria and then evaluated the selected full-text articles for final article selection. The inclusion and exclusion criteria were:

Inclusion criteria

Population	Patients with musculoskeletal pain
Interventions	Deep tissue massage
Comparators	No comparator or usual treatment
Outcomes	Effectiveness: muscle pain reduction, muscle pressure reduction, muscle hardness reduction, increase in pain threshold, quality of life Safety: Complications, adverse events Cost, cost-effectiveness, cost utility, and economic evaluation

Study design	Systematic review (SR), Randomized Controlled Trial (RCT), Non-randomized controlled trial, Health Technology Assessment (HTA) reports, cohort studies, cross sectional studies, case reports
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Exclusion criteria

- i) Animal study / laboratory study
- ii) Narrative review
- iii) Non English full text articles

Relevant articles were critically appraised using Critical Appraisal Skills Programme (CASP) checklist and evidence were graded according to the US/Canadian Preventive Services Task Force (See **Appendix 2**)

5. RESULTS AND DISCUSSION

The search strategy yielded two randomized controlled trials and one non-randomized controlled trial related to the effectiveness of deep tissue massage as a complementary therapy for musculoskeletal pain. There was one case report on the safety of deep tissue massage. However, there was no retrievable evidence from the scientific databases on the cost-effectiveness of this technology.

5.1 EFFICACY / EFFECTIVENESS

A randomized controlled trial was conducted by Majchrzycki M et al. (2014) in Poland to investigate whether chronic low back pain therapy with deep tissue massage gives similar results to combined therapy consisting of deep tissue massage and non-steroid anti-inflammatory drugs (NSAID). Patients from the orthopaedic and rehabilitation outpatient clinic who suffered from chronic low back pain were recruited into the study. Fifty-nine patients were randomly assigned to receive deep tissue massage (treatment group; n = 30) and deep tissue massage with NSAID (control group; n = 29). Two patients from the treatment group and three patients from the control group dropped out of the study due to deteriorating health, unexpected surgery and personal reasons. Patients from both the treatment group and the control group underwent daily 30-minute session of deep tissue massage for two weeks for a total of 10 sessions. The deep tissue massage was performed by certified therapists who were blind to the clinical data. In the control group, an additional pain relief was used in the form of NSAID. The drugs were used for symptomatic benefit but not more often than once daily. The following functional questionnaires and pain scales were used to measure the level of pain and disability; the Roland-Morris questionnaires (RM), the Oswestry disability index (ODI) and the visual analogue scale (VAS). The VAS score was used to assess the pain intensity

during resting (VAS1), the pain intensity during motion (VAS2) and the pain intensity during mobility of the aching area of the spine (VAS3). The tests were performed before therapy and one day after the therapy has ended. The physician who performed the tests was also blind to the clinical data.⁵

The study found that in both the treatment group and the control group, a significant pain reduction and function improvement were observed (Table 1).^{5, Level II-1} VAS decreased from 58.3 ± 18.2 to 42.2 ± 21.1 (treatment group) and from 51.8 ± 18.8 to 30.6 ± 21.9 (control group).^{5, Level II-1} RM value decreased from 9.8 ± 5.1 to 6.4 ± 4.4 (treatment group) and from 9.3 ± 5.5 to 6.1 ± 4.6 (control group).^{5, Level II-1} ODI value decreased from 29.2 ± 17.3 to 21.4 ± 15.1 (treatment group) and from 21.4 ± 9.4 to 16.6 ± 9.4 (control group).^{5, Level II-1} All the pre and post treatment differences were statistically significant.^{5, Level II-1} However, there were no statistically significant differences between the two groups with regards to baseline and end results as well as with regard to differences between the initial and final results. The authors concluded that the deep tissue massage had positive effect on reducing pain in patients with chronic low back pain. Concurrent use of deep tissue massage and NSAID contributed to the low back pain reduction in similar degree that the deep tissue massage did.^{5, Level II-1}

Table 1: Results of the visual analogue scale (VAS), Roland-Morris questionnaire (RM) and Oswestry disability index (ODI) before treatment (baseline test value) and after treatment (end test value).⁷

Test	Group	Baseline test value	End test value	Wilcoxon test significance level	Difference value
VAS1	Treatment	58.3 [18.2]	42.2 [21.1]	*	16.1
	Control	51.8 [18.8]	30.6 [21.9]	*	21.2
VAS2	Treatment	56.1 [19.0]	36.5 [20.6]	*	19.6
	Control	55.9 [16.6]	31.2 [21.2]	*	24.7
VAS3	Treatment	47.4 [23.2]	33.5 [21.9]	*	13.9
	Control	41.8 [21]	25.3 [19.4]	*	16.5
RM	Treatment	9.8 [5.1]	6.4 [4.4]	*	3.4
	Control	9.3 [5.5]	6.1 [4.6]	*	3.2
ODI	Treatment	29.2 [17.0]	21.0 [15.1]	*	8.2
	Control	21.4 [9.4]	16.6 [9.4]	*	4.8

The values are given as mean with standard deviation in square brackets.
 *Significance at $P < 0.001$.
 VAS1—the pain intensity during resting; VAS2—the pain intensity during motion; VAS3—the pain intensity during mobility of the aching area of the spine.

Zheng Z et al. (2012) conducted a randomized controlled trial in China to observe the therapeutic effect of lumbar tender point deep tissue massage plus lumbar traction on chronic non-specific low back pain. Sixty-four outpatients from the rehabilitation medicine centre of Chinese PLA General Hospital who suffered from non-specific low back pain lasting more than three months and within age range of 21 to 75 years old were included in the study. After randomization, 32 patients were assigned to the treatment group (deep tissue massage with lumbar traction) and another 32 patients were assigned to the control group (lumbar traction only). Two patients from the treatment group

discontinued intervention as the low back pain got worse after the deep tissue massage and another two patients from the control group were lost to follow up thus excluded from the study. In the treatment group, the deep tissue massage was applied to the tender point and the peripheral taut band for twice per week combined with intermittent lumbar traction once daily. The traction force was set between 40% to 50% body weight in kilogram (kg) and the traction time was 20 minutes. Meanwhile, in the control group, the patients received only lumbar traction once daily. Both treatment courses were for three weeks. Pressure pain threshold, muscle hardness of the tender point and a VAS score were used to measure the pain intensity. The therapeutic effect was evaluated by change in; pressure pain threshold, muscle hardness and VAS score after treatment in the two groups (Table 2a, 2b and 2c).^{6, Level II-2}

The study found that after the treatment, there was statistically significant pressure pain threshold difference where it was markedly higher in the treatment group than that in the control group (1.5 ± 0.8 versus 1.1 ± 0.7 , $P < 0.05$).^{6, Level II-2} The study also found that after the treatment, there was statistically significant muscle hardness difference where it was markedly higher in the treatment group than that in the control group (4.2 ± 1.6 versus 3.5 ± 1.3 , $P < 0.05$).^{6, Level II-2} It was observed that after the treatment, the VAS score difference was also statistically higher in the treatment group compared to the control group (1.9 ± 0.9 versus 1.4 ± 0.8 , $P < 0.05$).^{6, Level II-2} The authors concluded that tender point deep tissue massage in combination with lumbar traction can increase local paraspinal pressure pain threshold and decrease muscle hardness level, while also lowering pain intensity in patients with chronic non-specific low back pain. However, the study was limited by the small sample size thus future studies with larger sample sizes may attain more reliable results.^{6, Level II-2}

Table 2a, Table 2b and Table 2c showing comparison between the treatment group and the control group before and after the treatment⁶

Table 2a. Comparison of pressure pain threshold between the two groups				
Group	<i>n</i>	Before treatment	After treatment	Difference
Treatment group	30	3.8 ± 0.6	5.3 ± 0.8	$1.5 \pm 0.8^*$
Control group	30	3.7 ± 0.6	4.7 ± 0.8	$1.1 \pm 0.7^*$

* $P < 0.05$

Table 2b. Comparison of muscle hardness between the two groups				
Group	<i>n</i>	Before treatment	After treatment	Difference
Treatment group	30	37.7 ± 9.9	33.4 ± 10.2	$4.2 \pm 1.6^*$
Control group	30	42.5 ± 11.2	39.1 ± 11.2	$3.5 \pm 1.3^*$

* $P < 0.05$

Table 2c. Comparison of VAS score between the two groups				
Group	<i>n</i>	Before treatment	After treatment	Difference
Treatment group	30	6.7 ± 1.6	4.9 ± 1.3	$1.9 \pm 0.9^*$
Control group	30	6.9 ± 1.6	5.9 ± 1.3	$1.4 \pm 0.8^*$

A non-randomized controlled trial by Romanowski M et al. (2012) was conducted in Poland to compare the effectiveness of therapeutic massage and deep tissue massage on chronic low back pain. Twenty six patients between the age of 60 and 75 years old with chronic low back pain were recruited into the study. The patients were separated into group I (n=13) and group II (n=13). Group I had therapeutic massage while group II had deep tissue massage. Both therapeutic massage and deep tissue massage lasted for 10 days, each of 30 minutes and were made by qualify massage therapist. No other treatment was given to the patients in both groups other than the massage. Outcome measures consisted of Modified Oswestry Low Back Pain Disability Index (ODI), Quebec Back Pain Disability Scale (QBPD) and Visual Analogue Scale (VAS) which were obtained at baseline and after treatment (Table 3a, 3b and 3c).⁷ The study found that there was statistically significant differences after therapeutic massage in group I in every test [ODI P = 0.01; QBPD P < 0.001; VAS P < 0.001].^{7, Level II-2} There were also statistically significant differences after deep tissue massage in group II in every test [ODI P < 0.001; QBPD P < 0.001; VAS P < 0.001].^{7, Level II-2} The study found that deep tissue massage was significantly better therapy than therapeutic massage in ODI (P = 0.038) and VAS (P = 0.015).^{7, Level II-2} The authors concluded that deep tissue massage was better therapy than therapeutic massage in patients with chronic low back pain. However, the study was limited with small sample size thus further research is needed to verify the results.^{7, Level II-2}

Table 3a and Table 3b showed results in group I and group II before and after treatment⁸
Table 3c showed comparison of results between group I and group II after treatment⁸

Table 3a. Results in group I (therapeutic massage) before and after treatment		
Tests	Before treatment	After treatment
ODI	46.61 ± 14.61	37.15 ± 12.36
QBPD	51.84 ± 14.31	41.92 ± 13.23
VAS	43.07 ± 17.58	29.53 ± 16.55

Statistically significant difference in all tests: ODI p=0.01, QBPD p<0.001; VAS p<0.001

Table 3b. Results in group II (deep tissue massage) before and after treatment		
Tests	Before treatment	After treatment
ODI	48.30 ± 13.63	31.92 ± 11.72
QBPD	40.76 ± 13.30	30.07 ± 11.49
VAS	59.15 ± 13.17	34.23 ± 10.70

Statistically significant difference in all tests: ODI p=0.01, QBPD p<0.001; VAS p<0.001

Table 3c. Comparison between the difference in pre and post treatment in group I (therapeutic massage) and group II (deep tissue massage)		
Tests	Group I	Group II
ODI	9.46 ± 11.22	16.38 ± 11.68*, P = 0.038
QBPD	9.92 ± 6.96	10.69 ± 7.92
VAS	13.54 ± 7.75	24.92 ± 13.55*, P < 0.015

5.2 SAFETY

With regards to safety, Aksoy IA et al. (2009) reported a case of spinal accessory neuropathy associated with deep tissue massage in Arizona, United States of America. A 38-year-old woman presented to a clinic with complaints of persistent right shoulder pain and limited range of motion (ROM), 10 days after a single session of deep tissue massage. She was previously well with no known medical illness when she underwent one session of deep tissue massage for relaxation without any particular musculoskeletal symptoms. During the performance of deep tissue massage along her neck and shoulders, she felt pain on the left side of her neck and at the top of her left shoulder radiating towards her arm. The pain continued afterward and the patient noted that her left arm felt “long and heavy” while standing. Besides that, she had difficulty lifting her arm up and reaching her back. There was no numbness or tingling during or after the deep tissue massage. She took over-the-counter NSAIDs to control the pain. Subsequently, after 10 days, the pain was reduced but not resolved, and shoulder dysfunction remained the same.⁸

Clinical evaluation revealed impaired left arm abduction with otherwise normal strength in the left upper limb muscles proximally and distally. The impairment of left shoulder abduction led to scapular winging. During active shoulder ROM testing, impairment of shoulder elevation causing droopy shoulder with shoulder shrug motion was observed. There was mild diffuse tenderness to palpation along the trapezius muscle, but no atrophy in the shoulder girdle muscles. Further evaluation with magnetic resonance imaging (MRI) and needle electromyography (EMG) noted findings which were consistent with spinal accessory neuropathy. The patient was referred to physical therapy for the management of weakness and pain. A course of one-hour physical therapy sessions twice a week for four to six weeks was prescribed. Patient education and counselling to guide the patient to compensate properly for the existing weakness and to avoid strenuous activity to prevent secondary injuries were given. After a total of 10 sessions of physical therapy, the patient was discharged with an independent home exercise program. Over the course of two years of follow-up, the patient experienced resolution of pain, however, recovery of function and strength were incomplete.⁸

In the study by Zheng Z et al. (2012), there were two patients who experienced worsening of the low back pain after deep tissue massage and subsequently discontinued the intervention.^{6, Level II-2} There was no adverse event reported by Majchrzycki M et al. (2014) and Romanowski M et al. (2012) related to the deep tissue massage performed in their studies.^{5,7,Level II-2}

5.3 COST-EFFECTIVENESS

There was no retrievable evidence from the scientific databases on the cost effectiveness on the use of deep tissue massage as a complementary therapy for musculoskeletal pain.

5.4 LIMITATIONS

This technology review has several limitations. The selection of studies was done by one reviewer. Although there was no restriction in language during the search but only English full text articles were included in this report. There were only two RCTs and one non randomized controlled trial on the effectiveness of deep tissue massage as a complementary therapy for musculoskeletal pain which were included in this review. However, these studies had small sample size and of short duration.

6. CONCLUSION

There was limited fair level of retrievable evidence to suggest that deep tissue massage may be effective in reducing pain in patients with chronic low back pain. There was a case report of spinal accessory neuropathy and two patients in another study experienced worsening of the low back pain after deep tissue massage. However, there was no retrievable evidence from the scientific databases on the cost-effectiveness of this technology.

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8. APPENDIX

8.1. Appendix 1: LITERATURE SEARCH STRATEGY

Ovid MEDLINE® In-process & other Non-Indexed citations and OvidMEDLINE® 1946 to present
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Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R)
<1946 to Present>

Search Strategy:

-
- 1 Musculoskeletal Pain/
 - 2 (musculoskeletal adj1 pain*).tw.
 - 3 Myalgia/
 - 4 (muscle adj1 tenderness).tw.
 - 5 (muscle adj1 soreness).tw.
 - 6 (muscle adj1 pain*).tw.
 - 7 myalgia.tw.
 - 8 Arthralgia/
 - 9 polyarthralgia*.tw.
 - 10 (joint adj1 pain*).tw.
 - 11 arthralgia*.tw.
 - 12 "Sprains and Strains"/
 - 13 strain*.tw.
 - 14 sprain*.tw.
 - 15 Tendinopathy/
 - 16 tend*.tw.
 - 17 Tendon Injuries/
 - 18 Tendon Injuries/
 - 19 tendon adj1 injur*.tw.
 - 20 Low Back Pain/
 - 21 back pain* lower.tw.
 - 22 pain* lower back.tw.
 - 23 lower back pain*.tw.
 - 24 low back ache.tw.
 - 25 low backache*.tw.
 - 26 back ache low.tw.
 - 27 backache* low.tw.

- 28 low back pain*.tw.
- 29 low back pain postural.tw.
- 30 postural low back pain.tw.
- 31 mechanical low back pain.tw.
- 32 low back pain mechanical.tw.
- 33 low back pain.tw.
- 34 recurrent low back pain.tw.
- 35 low back pain recurrent.tw.
- 36 lumbago.tw.
- 37 pain* low back.tw.
- 38 back pain* low.tw.
- 39 ache* low back.tw.
- 40 low back aches.tw.
- 41 back aches low.tw.
- 42 Neck Pain/
- 43 neckache*.tw.
- 44 anterior cervical pain*.tw.
- 45 pain* anterior cervical.tw.
- 46 posterior cervical pain*.tw.
- 47 pain* neck.tw.
- 48 (pain* adj1 cervical).tw.
- 49 neck pain*.tw.
- 50 (neck adj1 ache*).tw.
- 51 Back Pain/
- 52 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18
or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35
or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51
- 53 Massage/
- 54 (zone adj1 therap*).tw.
- 55 (massage adj1 therap*).tw.
- 56 (massage adj1 craniosacral).tw.
- 57 massage.tw.
- 58 bodywork*.tw.
- 59 (massage adj1 therapy).tw.
- 60 Deep tissue massage.tw.
- 61 Malay massage.tw.

8.2. Appendix 2

HIERARCHY OF EVIDENCE FOR EFFECTIVENESS STUDIES

DESIGNATION OF LEVELS OF EVIDENCE

- I Evidence obtained from at least one properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence.
- III Opinions or respected authorities, based on clinical experience; descriptive studies and case reports; or reports of expert committees.

**SOURCE: US/CANADIAN PREVENTIVE SERVICES TASK FORCE
(Harris 2001)**

8.3. Appendix 3

Evidence Table : Efficacy / Effectiveness

Question : Is deep tissue massage effective as a complement therapy for musculoskeletal pain?

Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up (if applicable)	Outcome measures/ Effect size	General comments
1. Majchrzycki M, Kocur P, Kotwicki T. Deep tissue massage and nonsteroidal anti-inflammatory drugs for low back pain: a prospective randomized trial. ScientificWorldJournal. 2014;23:2014:287597.	<p>Randomized controlled trial</p> <p>Aim: To investigate whether chronic low back pain therapy with deep tissue massage gives similar results to combined therapy consisting of deep tissue massage and non-steroidal anti-inflammatory drugs (NSAIDs).</p> <p>Methods: -Study subjects were recruited among patients admitted to the orthopaedic and rehabilitation outpatient clinic.</p> <p>-All study subjects suffered from low back pain and were diagnosed by a consultant with one of the following: a. Degenerative changes of the spine b. Spine pain c. Other intervertebral discs diseases</p>	II-2	<p>59 patients were randomly assigned to receive deep tissue massage (treatment group; n = 30) and deep tissue massage with NSAID (control group; n = 29)</p> <p>Patients were between age 40 and 60 years old</p>	Deep tissue massage	Deep tissue massage and NSAIDs	2 weeks	<p>Outcome measures:</p> <p>1.Pain intensity during resting (VAS1):</p> <p>Baseline test value: 58.3 [18.2] Treatment 51.8 [18.8] Control End test value: 42.2 [21.1] Treatment 30.6 [21.9] Control P < 0.001</p> <p>2.Pain intensity during motion (VAS2):</p> <p>Baseline test value: 56.1 [19.0] Treatment 55.9 [16.6] Control End test value: 36.5 [20.6] Treatment 31.2 [21.2] Control P < 0.001</p> <p>3.Pain intensity during mobility of the aching area of the spine (VAS3):</p> <p>Baseline test value: 47.4 [23.2] Treatment 41.8 [21.0] Control End test value: 33.5 [21.9] Treatment 25.3 [19.4] Control P < 0.001</p>	Small sample size

Evidence Table : **Efficacy/ Effectiveness**
Question : **Is deep tissue massage effective as a complement therapy for musculoskeletal pain?**

Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up (if applicable)	Outcome measures/ Effect size	General comments
<p>1. Majchrzycki M, Kocur P, Kotwicki T. Deep tissue massage and nonsteroidal anti-inflammatory drugs for low back pain: a prospective randomized trial. ScientificWorldJournal. 2014;23:2014:287597.</p>	<p>-Participants were randomly assigned in a 1:1 ratio to receive deep tissue massage (treatment group) or deep tissue massage and NSAID (control group).</p> <p>-Randomization was carried out using unmarked envelopes</p> <p>-The deep tissue massage was performed by certified therapist who was blind to the clinical data</p> <p>-Patients from both the treatment group and the control group underwent daily 30 minute session of deep tissue massage for 2weeks (total of 10 sessions)</p> <p>-In the control group, an additional pain relief was used in the form of NSAIDs. The drugs were used for symptomatic benefit but not more than once daily</p>						<p>4.Roland-Morris Questionnaire (RM):</p> <p>Baseline test value: 9.8 [5.1] Treatment 9.3 [5.5] Control End test value: 6.4 [4.4] Treatment 6.1 [4.6] Control P < 0.001</p> <p>5.Oswestry Disability Index (ODI):</p> <p>Baseline test value: 29.2 [17.0] Treatment 21.4 [9.4] Control End test value: 21.0 [4.4] Treatment 6.1 [4.6] Control P < 0.001</p> <p>Conclusion: Deep tissue massage had positive effect on reducing pain in patients with chronic low back pain. Concurrent use of deep tissue massage and NSAID contributed to the low back pain reduction in similar degree that the deep tissue massage did.</p>	

Evidence Table : **Efficacy/ Effectiveness**
Question : **Is deep tissue massage effective as a complement therapy for musculoskeletal pain?**

Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up (if applicable)	Outcome measures/ Effect size	General comments
<p>1. Majchrzycki M, Kocur P, Kotwicki T. Deep tissue massage and nonsteroidal anti-inflammatory drugs for low back pain: a prospective randomized trial. ScientificWorldJournal. 2014;23;2014:287597.</p>	<p>The following functional questionnaires and pain scales were used: - Roland-Morris questionnaire (RM) -Oswestry disability index (ODI) -Visual Analogue Scale (VAS) VAS was used to assess: 1. Pain intensity during resting (VAS1) 2. Pain intensity during motion (VAS2) 3. Pain intensity during mobility of the aching area of the spine (VAS3) Tests were performed twice: - Before therapy, during initial medical examination - One day after the therapy ended. Physician who performed the tests was blind to the clinical data</p>							

Evidence Table : **Efficacy/ Effectiveness**
Question : **Is deep tissue massage effective as a complement therapy for musculoskeletal pain?**

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2. Zheng Z, Wang J, Gao Q, Hou J, Ma L, Jiang C, Chen G. Therapeutic evaluation of lumbar tender point deep massage for chronic non-specific low back pain. J Tradit Chin Med. 2012;32(4):534-537.	<p>Randomized controlled trial</p> <p>Aim: To observe the therapeutic effect of lumbar tender deep tissue massage plus lumbar traction on chronic non-specific low back pain</p> <p>Method: -64 outpatients (34 males and 30 females) from the rehabilitation medicine centre of Chinese PLA General Hospital were included in this study and all patients gave informed consent</p> <p>-Patients with non-specific low back pain lasting more than 3 months and between the age of 21 to 75 years old</p> <p>-Patient evaluation included physical examination as well as conventional radiograph, CT scan or MRI of the lumbar spine</p>	II-2	<p>64 patients were randomly assigned to the treatment group and to the control group</p> <p>32 patients were assigned to the treatment group (tender point deep massage plus lumbar traction) and 32 patients to the control group (lumbar traction only)</p>	Deep massage plus lumbar traction	Lumbar traction only	3 weeks	<p>Results:</p> <p>1. Pressure Pain Threshold</p> <table border="1"> <thead> <tr> <th>Group</th> <th>Before tx</th> <th>After tx</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Treatment group</td> <td>3.8 ± 0.6</td> <td>5.3 ± 0.8</td> <td>1.5 ± 0.8 P<0.05</td> </tr> <tr> <td>Control group</td> <td>3.7 ± 0.6</td> <td>4.7 ± 0.8</td> <td>1.1 ± 0.7 P<0.05</td> </tr> </tbody> </table> <p>2. Muscle hardness</p> <table border="1"> <thead> <tr> <th>Group</th> <th>Before tx</th> <th>After tx</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Treatment group</td> <td>37.7 ± 9.9</td> <td>33.4 ± 10.2</td> <td>4.2 ± 1.6 P<0.05</td> </tr> <tr> <td>Control group</td> <td>42.5 ± 11.2</td> <td>39.1 ± 11.2</td> <td>3.5 ± 1.3 P<0.05</td> </tr> </tbody> </table> <p>3. VAS score</p> <table border="1"> <thead> <tr> <th>Group</th> <th>Before tx</th> <th>After tx</th> <th>Difference</th> </tr> </thead> <tbody> <tr> <td>Treatment group</td> <td>6.7 ± 1.6</td> <td>4.9 ± 1.3</td> <td>1.9 ± 0.9 P<0.05</td> </tr> <tr> <td>Control group</td> <td>6.9 ± 0.6</td> <td>5.9 ± 1.3</td> <td>1.4 ± 0.8 P<0.05</td> </tr> </tbody> </table>	Group	Before tx	After tx	Difference	Treatment group	3.8 ± 0.6	5.3 ± 0.8	1.5 ± 0.8 P<0.05	Control group	3.7 ± 0.6	4.7 ± 0.8	1.1 ± 0.7 P<0.05	Group	Before tx	After tx	Difference	Treatment group	37.7 ± 9.9	33.4 ± 10.2	4.2 ± 1.6 P<0.05	Control group	42.5 ± 11.2	39.1 ± 11.2	3.5 ± 1.3 P<0.05	Group	Before tx	After tx	Difference	Treatment group	6.7 ± 1.6	4.9 ± 1.3	1.9 ± 0.9 P<0.05	Control group	6.9 ± 0.6	5.9 ± 1.3	1.4 ± 0.8 P<0.05	Small sample size
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Question : **Is deep tissue massage effective as a complement therapy for musculoskeletal pain?**

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<p>2. Zheng Z, Wang J, Gao Q, Hou J, Ma L, Jiang C, Chen G. Therapeutic evaluation of lumbar tender point deep massage for chronic non-specific low back pain. J Tradit Chin Med. 2012;32(4):534-537.</p>	<p>32 patients were randomly assigned to the treatment group (tender point deep massage plus lumbar traction) and 32 patients to the control group (lumbar traction)</p> <p>Treatment group:</p> <ul style="list-style-type: none"> -receives deep massage over the tender point 8 to 10 seconds after the patient begins to feel slight discomfort -Repeated 4 to 5 times -Treatment was performed twice a week and combined with intermittent lumbar traction once daily -Traction force was set between 40% to 50% body weight (kg) and traction time was 20minutes. -Treatment course was 3 weeks 						<p>Conclusion:</p> <p>Lumbar tender point deep tissue massage combined with lumbar traction produced better improvement in pressure pain threshold, muscle hardness and pain intensity in patients with chronic non-specific low back pain than with lumbar traction alone.</p>	

Evidence Table : **Efficacy / Effectiveness**
Question : **Is deep tissue massage effective as a complement therapy for musculoskeletal pain?**

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Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up (if applicable)	Outcome measures/ Effect size	General comments																								
3. Romanowski M, Romanowska J, Grześkowiak M. A comparison of the effects of deep tissue massage and therapeutic massage on chronic low back pain. Stud Health Technol Inform. 2012;176:411-414.	<p>Non-randomized controlled trial</p> <p>Aim: To compare the effectiveness of two different kind of massage: therapeutic and deep tissue massage on chronic low back pain</p> <p>Method:</p> <p>-26 patients between the age of 60 and 75 years old who had chronic low back pain were included in the study</p> <p>-Patients' medication had to be stable for at least one month before the study and no intra-articular injections carried out during previous month</p> <p>-Patients were separated into two groups; Group I and Group II</p>	II-2	<p>26 patients were randomly assigned to two groups.</p> <p>13 patients were assigned to Group I (Therapeutic Massage) and another 13 patients were assigned to Group II (Deep Tissue Massage)</p>	Deep Tissue Massage	Therapeutic Massage	10 days	<p>Results:</p> <p>1. Statistically significant differences were noted in Group I (Therapeutic Massage) in every test. [ODI P = 0.010; QBPD P < 0.001; VAS P < 0.001]</p> <table border="1"> <thead> <tr> <th>Tests</th> <th>Before tx</th> <th>After tx</th> </tr> </thead> <tbody> <tr> <td>ODI</td> <td>46.61 ± 14.62</td> <td>37.15 ± 12.36</td> </tr> <tr> <td>QBPD</td> <td>51.84 ± 14.31</td> <td>41.92 ± 13.23</td> </tr> <tr> <td>VAS</td> <td>43.07 ± 17.58</td> <td>29.53 ± 16.55</td> </tr> </tbody> </table> <p>2. Statistically significant differences were noted in Group II (Deep Tissue Massage) in every test. [ODI P < 0.001; QBPD P < 0.001; VAS P < 0.001]</p> <table border="1"> <thead> <tr> <th>Tests</th> <th>Before tx</th> <th>After tx</th> </tr> </thead> <tbody> <tr> <td>ODI</td> <td>48.30 ± 13.63</td> <td>31.92 ± 11.72</td> </tr> <tr> <td>QBPD</td> <td>40.76 ± 13.30</td> <td>30.07 ± 11.49</td> </tr> <tr> <td>VAS</td> <td>59.15 ± 13.17</td> <td>34.23 ± 10.70</td> </tr> </tbody> </table>	Tests	Before tx	After tx	ODI	46.61 ± 14.62	37.15 ± 12.36	QBPD	51.84 ± 14.31	41.92 ± 13.23	VAS	43.07 ± 17.58	29.53 ± 16.55	Tests	Before tx	After tx	ODI	48.30 ± 13.63	31.92 ± 11.72	QBPD	40.76 ± 13.30	30.07 ± 11.49	VAS	59.15 ± 13.17	34.23 ± 10.70	<p>Small sample size</p> <p>Lack of blinding</p> <p>Short duration</p>
Tests	Before tx	After tx																														
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<p>3. Romanowski M, Romanowska J, Grześkowiak M. A comparison of the effects of deep tissue massage and therapeutic massage on chronic low back pain. Stud Health Technol Inform. 2012;176:411-414.</p>	<p>Group I had therapeutic massage which used;</p> <p>effleurage- gliding or sliding movement over the skin with a smooth continuous motion,</p> <p>petrissage- lifting, wringing or squeezing of soft tissues in a kneading motion, or pressing or rolling of the tissues,</p> <p>friction- pressure applied through the fingertips and</p> <p>tapping- various parts of the hand striking the tissues at a fairly rapid rate.</p> <p>Group II had deep tissue massage which uses oblique pressure, a combination of:</p> <p>lengthening strokes- extending a joint while at the same time working the muscle in the direction of lengthening</p>						<p>3. Average differences from all tests showed that the Group II (Deep Tissue Massage) was statistically significant better therapy than Group I (Therapeutic Massage). [ODI; P = 0.038 and VAS; P = 0.015]</p> <table border="1" data-bbox="1409 667 1902 919"> <thead> <tr> <th>Tests</th> <th>Group I (Therapeutic Massage)</th> <th>Group II (Deep Tissue Massage)</th> </tr> </thead> <tbody> <tr> <td>ODI</td> <td>9.46 ± 11.22</td> <td>16.38 ± 11.72</td> </tr> <tr> <td>QBDP</td> <td>9.92 ± 6.96</td> <td>10.69 ± 7.92</td> </tr> <tr> <td>VAS</td> <td>13.54 ± 7.75</td> <td>24.92 ± 13.55</td> </tr> </tbody> </table> <p>Conclusion:</p> <p>Deep tissue massage was statistically significant better therapy for chronic low back pain than the therapeutic massage. Further research is needed to verify the results.</p>	Tests	Group I (Therapeutic Massage)	Group II (Deep Tissue Massage)	ODI	9.46 ± 11.22	16.38 ± 11.72	QBDP	9.92 ± 6.96	10.69 ± 7.92	VAS	13.54 ± 7.75	24.92 ± 13.55	
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<p>3. Romanowski M, Romanowska J, Grześkowiak M. A comparison of the effects of deep tissue massage and therapeutic massage on chronic low back pain. Stud Health Technol Inform. 2012;176:411-414.</p>	<p>cross-fiber strokes- rolling the fingers over the tendon or muscle, back and forth, perpendicular to the fiber direction for two or three minutes,</p> <p>anchor and stretch- anchoring at a tight area and stretching away from the spot,</p> <p>freeing muscle from entrapment- mobilizing the erector spinae muscle in the lateral/medial by using both fingers of both hands to apply force along the border of the muscle and slowly push the muscle to the opposite site</p> <p>Therapeutic massage and deep tissue massage lasted for 10 days, each 30 minutes and were made by qualify massage therapist</p>							

Evidence Table : **Effective/ effectiveness**
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<p>3. Romanowski M, Romanowska J, Grześkowiak M. A comparison of the effects of deep tissue massage and therapeutic massage on chronic low back pain. Stud Health Technol Inform. 2012;176:411-414.</p>	<p>Outcome measures obtained at baseline and after treatment consisted of:</p> <ol style="list-style-type: none"> 1. Modified Oswestry Low Back Pain Disability Index (ODI) 2. Quebec Back Pain Disability Scale (QBPD) 3. Visual Analogue Scale (VAS) <p>which is the 100mm line where patient marked his sensation of pain, 0 means no pain and 100 for very severe pain.</p> <p>The final result is shown in points (1 point = 1 mm on the scale)</p>							

Evidence Table : Safety
Question : Is deep tissue massage safe as a complement therapy for musculoskeletal pain?

Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up (if applicable)	Outcome measures/ Effect size	General comments
<p>1. Aksoy IA, Schrader SL, Ali MS, Borovansky JA, Ross MA. Spinal accessory neuropathy associated with deep tissue massage: a case report. Arch Phys Med Rehabil. 2009 ;90(11):1969-1972.</p>	<p>Case report, Arizona, United States of America</p> <p>A 38-year-old woman presented to a clinic with complaints of persistent right shoulder pain and limited range of motion (ROM), 10 days after a single session of deep tissue massage.</p> <p>She was previously well with no known medical illness when she underwent one session of deep tissue massage for relaxation without any particular musculoskeletal symptoms.</p> <p>During the performance of deep tissue massage along her neck and shoulders, she felt pain on the left side of her neck and at the top of her left shoulder radiating towards her arm.</p>	<p>III</p>	<p>38-year-old woman</p>	<p>Deep tissue massage</p>		<p>2 years</p>	<p>Outcome:</p> <p>Clinical evaluation revealed impaired left arm abduction with otherwise normal strength in the left upper limb muscles proximally and distally.</p> <p>The impairment of left shoulder abduction led to scapular winging.</p> <p>During active shoulder ROM testing, impairment of shoulder elevation causing droopy shoulder with shoulder shrug motion was observed.</p> <p>There was mild diffuse tenderness to palpation along the trapezius muscle, but no atrophy in the shoulder girdle muscles.</p> <p>Further evaluation with magnetic resonance imaging (MRI) and needle electromyography (EMG) noted findings which were consistent with spinal accessory neuropathy.</p>	

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<p>1. Aksoy IA, Schrader SL, Ali MS, Borovansky JA, Ross MA. Spinal accessory neuropathy associated with deep tissue massage: a case report. Arch Phys Med Rehabil. 2009 ;90(11):1969-1972.</p>	<p>The pain continued afterward and the patient noted that her left arm felt “long and heavy” while standing.</p> <p>Besides that, she had difficulty lifting her arm up and reaching back. There was no numbness or tingling during or after the deep tissue massage.</p> <p>She took over-the-counter NSAIDs to control the pain. Subsequently, after 10 days, the pain was reduced but not resolved, and shoulder dysfunction remained the same.</p>						<p>The patient was referred to physical therapy for the management of weakness and pain.</p> <p>A course of one-hour physical therapy sessions twice a week for four to six weeks was prescribed.</p> <p>Patient education and counselling to guide the patient to compensate properly for the existing weakness and to avoid strenuous activity to prevent secondary injuries were given.</p> <p>After a total of 10 sessions of physical therapy, the patient was discharged with an independent home exercise program.</p> <p>Over the course of two years of follow-up, the patient experienced resolution of pain, however, recovery of function and strength were incomplete</p>	

Evidence Table : Safety
Question : Is deep tissue massage safe as a complement therapy for musculoskeletal pain?

Bibliographic citation	Study Type / Methods	LE	Number of patients and patient characteristics	Intervention	Comparison	Length of follow up	Outcome measures/ Effect size	General comments
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