

The Effects of Massage Therapy after Decompression and Fusion Surgery of the Lumbar Spine: a Case Study

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Background: Spinal fusion and decompression surgery of the lumbar spine are common procedures for problems such as disc herniations. Various studies for postoperative interventions have been conducted; however, no massage therapy studies have been completed.

Purpose: The objective of this study is to determine if massage therapy can beneficially treat pain and dysfunction associated with lumbar spinal decompression and fusion surgery.

Participants: Client is a 47-year-old female who underwent spinal decompression and fusion surgery of L4/L5 due to chronic disc herniation symptoms.

Research Design: The research design was a case study in a private clinic involving the applications of seven, 30-minute treatments conducted over eight weeks. Common Swedish massage and myofascial techniques were applied to the back, shoulders, posterior hips, and posterior legs. Outcomes were assessed using the following measures: VAS pain scale, Hamstring Length Test, Oswestry Disability Index, and the Roland-Morris Disability Questionnaire.

Results: Hamstring length improved (in degrees of extension) from pretreatment measurements in the right leg of 40° and left leg 65° to post-treatment measurement at the final visit, when the results were right 50° and left 70°. The Oswestry Disability Index improved 14%, from 50% to 36% disability. Roland-Morris Disability decreased 1 point, from 3/24 to 2/24. The VAS pain score decreased by 2 points after most treatments, and for three of the seven treatments, client had a post-treatment score of 0/10.

Conclusions: Massage for pain had short-term effects. Massage therapy seemed to lengthen the hamstrings bilaterally. Massage therapy does appear to have positive effects in the reduction of disability. This study is beneficial for understanding the relationship between massage therapy and clients who have undergone spinal decompression and fusion. Further research is warranted.

KEYWORDS: spinal fusion, massage, lumbar region

INTRODUCTION

Two of the most common surgical procedures performed on the spine are discectomies for herniated discs^(1,2) and nerve root decompression for spinal stenosis⁽³⁾. These interventions are both being performed more and more frequently, especially decompression surgery for problems such as spinal stenosis^(3,4).

Decompression surgery refers to the restorations of normal spaces for the spinal cord and nerve roots to pass through. The purpose of spinal fusion is to restore symmetry and strength to the spinal column⁽⁵⁾. Spinal fusion has been performed since the start of the 20th century and was mainly used for spinal deformities and infections. Currently, spinal fusion is often used for trauma, tumors, infections, deformities, and IVD disease complications, bleeding, and scar formation within the spinal canal. Additional reasons that spinal fusions are being performed are: failure of other treatment, prolonged chronic pain, disability for more than one year, and advanced disc degeneration⁽⁶⁾.

For years, the primary treatment choice for disc degeneration was vertebral fusion⁽⁷⁾. Spinal decompression is now the most common type of spinal surgery carried out (particularly in the older patient), and is being performed with greater frequency. After spinal decompression, rehabilitation through physiotherapy is very often recommended post-surgery, although its benefits compared with no formal rehabilitation have yet to be demonstrated in randomized control trials⁽⁸⁾. This rehabilitation is important because there is evidence to suggest that approximately 60% of patients have postoperative symptoms after a first operation for intervertebral disc herniation^(9,10). Research employing physiotherapy show mixed results in its usefulness for pain management and disability. In one study by McGregor et al.⁽¹¹⁾, 338 patients were studied and used treatments of a rehabilitation program and an education booklet, and measurements were obtained preoperatively and then repeated at six weeks, three, six, nine, and 12 months postoperatively. Twelve months postoperatively they found that neither intervention had a significant impact on long-term outcome.

Mannion et al.⁽⁸⁾ looked at one hundred and fifty-nine patients undergoing decompression surgery for spinal stenosis/herniated disc and were randomized to one of the following programs beginning two months post-op: recommended to “keep active”; physiotherapy, spine stabilization exercises; and physiotherapy mixed techniques. The final outcome for the patients two years after surgery still suggested that they experienced (on average) moderate disability in everyday activities due to their back trouble.

A study done by Erdogmus et al.⁽¹²⁾ included a total of 120 patients following first-time, uncomplicated lumbar disc surgery. The patients were randomly assigned to comprehensive physiotherapy, sham neck massage, or no therapy. At the end of therapy (12 weeks), the Low Back Pain Rating Scale (LBPRS) revealed a significantly better improvement in the physiotherapy group than in the untreated group. LBPRS outcome, however, did not significantly differ between physiotherapy and sham therapy.

In a systematic review, Ostelo et al.⁽¹³⁾ reviewed 13 studies, six of which were of high quality, and concluded that there is no strong evidence for the effectiveness for any treatment starting immediately post-surgery, mainly because of the lack of good quality studies.

These results indicate that an additional approach for postoperative treatment may be needed, particularly for long-term results and chronic symptoms. The use of massage therapy in conjunction with conventional physiotherapy treatments or as a stand-alone treatment may be beneficial, and further research could be warranted to investigate. Massage therapy has shown to have some benefits for someone who has undergone different types of surgery. In one study, Dion et al.⁽¹⁴⁾ examined the effectiveness of massage therapy delivered in the postoperative thoracic surgery setting. After 160 people completed the pilot study, they found that patients receiving massage therapy had significantly reduced pain scores after massage. Massage therapy also can have a positive effect by reducing muscle hypertonicity and reducing pain⁽¹⁵⁾. The fact that these symptoms can occur long-term postoperatively is the reason that massage therapy can be beneficial to help someone return to normal functioning.

There are no specific studies that look at the effectiveness of massage therapy for the care of postoperative lumbar spine surgery. This case study can help to determine if massage therapy is an effective form of treatment to help clients decrease pain and dysfunction associated with lumbar spine surgery. Is massage therapy beneficial in the treatment of pain and dysfunction associated with lumbar spinal decompression and fusion surgery? It is predicted that massage therapy used after conventional therapeutic physiotherapy approaches for postoperative care after spinal decompression and fusion of the lumbar spine decreases pain and dysfunction.

METHODS

Client Profile

A new client sought massage therapy after a referral from her physiotherapist who wanted to see if soft tissue mobilization could address the chronic low level of pain and disability the client was experiencing. The client had a work place injury where she was lifting a heavy load with a flexed back posture. She was diagnosed by a medical doctor in 2009 with a herniated disc at L4-L5. In January 2011, client underwent lumbar spine decompression and fusion surgery of the L4-L5 vertebrae. Between April 2011 and June 2011 the client had physiotherapy treatment. The treatment protocol for physiotherapy consisted of nerve flossing for lower extremity, stretching, strengthening, and work simulation. The goal was to return to work with normal functioning. The client returned to work in May, 2011. The postsurgical treatment plan of conventional physiotherapy was complete; however, the client continued to experience pain and dysfunction. This was an interesting case to follow and observe due to the lack of research regarding the use of massage therapy to treat symptoms following a decompression and fusion surgery of the lumbar spine.

The initial massage therapy assessment was completed in July, 2011 (seven months post-surgery). The client is a 47-year-old female who works as an educational assistant and, at the time of initial assessment, she was not working (due to lack of work unrelated to her injury). The client had no previous massage therapy treatment during the last six years. The client was not taking any medications other than Tylenol (type three) for pain management, which she indicated she took very rarely.

Treatment Plan

The goal of this treatment plan was to reduce pain levels and decrease dysfunction. Secondary treatment goals were increase quality of life by increasing endurance with activities such as walking, standing, and sitting.

The rationale used to come to this treatment protocol was varied. There has been no research done on how massage therapy can treat this particular condition. There have been many studies indicating the benefits of physiotherapy after lumbar fusion, but none to indicate if massage therapy techniques would be beneficial after conventional physiotherapy has been exhausted.

The first treatment approach used was the rocking and shaking techniques, which were simply employed to induce initial relaxation of the client and to allow client to become used to touch over the sheets before skin contact is made⁽¹⁶⁾. Myofascial release techniques were used to decrease and prevent further scar tissue formation as is common with any type of

surgical intervention. Massage can soften scar tissue by freeing restrictive fibrous bands and increasing circulation. Scar tissue fascial techniques such as skin rolling, connective tissue cutting, fascial spreading, S-bowing, and C-bowing are employed⁽¹⁶⁾, and were the techniques used in this study.

For patients who have undergone a lumbar fusion, the rehabilitation goals are to maximize the flexibility of the surrounding structure. Specific rehabilitation goals in post-fusion patients include stretching muscles prone to shortening to above average lengths. Paraspinal muscle tension should be reduced over the proximal and distal segments adjacent to the fusion to avoid increased intradiscal pressure⁽¹⁷⁾. These results were attempted using general Swedish massage techniques to the back, posterior neck, shoulders, gluteal muscles, and posterior and lateral leg, as well as passive range of motion to the hip. Also the client was instructed to complete home care doing active range of motion exercises for the hip joint while in a pool. Client was already doing light swimming a minimum of once per week and up to three times per week.

The treatment plan for this case study consisted of seven, 30-minute massage therapy sessions that were spaced one week apart. Seven treatments were chosen because the client was going to be returning to work in eight weeks and results could be altered if client was going back to work after an extended absence and doing treatment at the same time. The VAS pain scale for the lumbar spine area was recorded before and after every session. The sessions consisted of the client in the prone position throughout the entire duration of the treatment. Techniques used included rocking and shaking techniques over the sheets for approximately 3 minutes. Following this, myofascial release techniques were performed on the entire back including skin rolling, connective tissue cutting, fascial spreading, C-bowing, and S-bowing for approximately 5 minutes total. Fascial techniques were specifically directed at the lumbar region where the surgical scar was. General Swedish massage techniques were performed on the entire back, shoulders, and posterior neck regions including gliding, wringing, muscle stripping, and ischemic compressions for approximately 10 minutes total. Moderate pressure was applied to the client's tolerance level to ensure additional inflammation was not produced. Palmar compressions and palmar kneading was used on gluteal muscles over top of the sheets for approximately 5 minutes. General Swedish techniques were then applied to posterior and lateral leg musculature bilaterally, using the same techniques that were used on the back, for approximately 4 minutes each leg, however no fascial techniques were employed. Passive internal and external range of motion of the hip was done in the prone position. The client gave written consent to the writing up of this case report, and their anonymity is ensured in any publication about this case.

Measurements Used

Assessments that were performed before the initial treatment, as well as after the last treatment, included: Hamstring Length Test, Oswestry Disability Index, and the Roland-Morris Disability Questionnaire. VAS pain scale indicating pain level in the lower back was used before and after every treatment session. These tests are commonly used within the field of massage therapy. The client continued to have some limitations of activities of daily living and, therefore, disability indexes were used for this study for the purpose of determining if improvement was occurring. This case report wanted to illustrate both the pain and disability components of the subject's complaints, so all of these tests were employed.

The Oswestry Disability Index is composed of ten sections, where each is scored between 0–5, with 5 representing the greatest disability. The index is a percentage that is calculated by dividing the total score by the total possible score then multiplying by 100. The Oswestry Disability Index has become one of the principal condition-specific outcome measures used in the management of spinal disorders, and remains a valid and vigorous measure⁽¹⁸⁾. This test has been considered the gold standard of low back functional outcome tools, and is a measurement of patients impairment and quality of life⁽¹⁸⁾.

The Roland Morris Disability Questionnaire is short, simple, sensitive, and reliable⁽¹⁹⁾. It is measured by totaling the positive responses to 24 questions about limitations of daily activities that may happen due to back pain. It has shown that a change of 2 to 3 points indicates a significant difference⁽²⁰⁾.

The Visual Analog Scale (VAS) for pain comprises a 0–10 scale on which people can indicate how much pain they are feeling immediately, with 0 being no pain and 10 being severe. Research suggests that the VAS is a simple and often-used method for variations in pain intensity⁽²¹⁾.

Hamstring Length test, also known as Straight Leg Raise (SLR), is a conventional test and is performed with the client in the supine position, with hip and knee extended. After instructing patient in motion desired, the patient's hip is flexed through full available ROM, while maintaining knee in full extension. One hand is placed over the anterior thigh to ensure knee is maintained in full extension during movement, and hip is flexed until firm muscular resistance is felt. A goniometer is used and landmarks for alignment are lateral midline of trunk, greater trochanter, and lateral femoral epicondyle. The measurement is then expressed in degrees⁽²²⁾. The hypertonicity that is presented in a shortened hamstring muscle often is reported in people with low back pain⁽²³⁾.

RESULTS

The VAS pain scores were collected before and after each of the seven treatments (Fig. 1). It appeared

that the general pattern on most days was 2/10 pain level before treatment and 0/10 pain level after. After the first couple of treatments, pain decreased more in treatments 3, 5 and 6 where the client had no pain post-treatment. The last treatment session, the client had an increase in pain to the highest pain level observed throughout the duration of the treatment plan at 6/10 pretreatment; however, it did reduce by 2 points post-treatment, which was also the highest post-treatment score observed.

Hamstring Length Test was done pretreatment and post-treatment on the first and final treatments. At the initial visit, the right hamstring range of motion (ROM) went from 40° to 60° and the left went from 65° to 70°. After the final visit, right hamstring ROM went from 50° to 65° and the left went from 70° to 75° (Fig. 2). This showed a hamstring length improvement bilaterally after treatment and an improvement overall after the eight-week treatment plan.

The Oswestry Disability Index showed an improvement. The client completed all 10 categories

both pre- and post-eight-week treatment plan. Over the eight weeks of treatment, the Oswestry Disability Index rating dropped from 50% to 36%. Over the eight weeks for treatment, The Roland-Morris Disability Questionnaire dropped from 3/24 to 2/24, which indicated a decrease in disability.

The secondary goals were measured using the Oswestry Disability Index questions. Before the eight-week treatment plan, the client was able to walk 1/4 mile before experiencing pain, improving to 1/2 mile; sitting time improved from 1/2 hour to 1 hour, and standing time improved from not being able to stand for more than 1 hour to standing with no extra pain.

DISCUSSION

The VAS pain scores were collected before and after each of the seven treatments (Fig. 1). It appeared that the general pattern on majority of days was 2/10 pain level before treatment and 0/10 pain level after. This indicates that the decrease in pain levels had a short-term effect because, upon returning the next week, the pain levels were elevated again. The first two treatments, the client had pain after the session and in treatments 3, 5 and 6, the client had no pain post-treatment. In treatment 4, the client's pain returned to the same level as the first two treatments; however, the client mentioned doing housework the day before, perhaps overexerting herself. An interesting observation during the 4th treatment was that the client indicated that she had observed many days of 0/10 pain level for the entire day, which she had never experienced before the start of the treatment plan. At the final treatment, the pain level was 6/10 pretreatment, which was the highest pain level observed throughout the duration of the treatment plan. This was reduced by 2 points post-treatment to 4/10, which was also the highest post-treatment score. This change in pattern may be attributed to the client returning to work earlier than expected where there was an increase in physical activity such as walking, lifting, climbing stairs, and prolonged sitting, which could immediately increase pain levels.

Hamstring length test was useful to see if the length of the hamstring increased after the study. However, since the client returned to work, the results could be influenced. If hamstring length is less than 70° of hip flexion in an adult, it indicates that the hamstrings can be too tight⁽²⁴⁾. Given the client made no other changes (no range of motion exercise or new self-care protocol), it appears that the use of massage therapy in this study may have assisted in the lengthening of the hamstring muscles bilaterally.

The two disability indexes indicated different results from one another. In the Roland-Morris Disability Questionnaire, the higher the number of yes responses, the greater the disability⁽²⁵⁾. In this case, the postassessment revealed that there was a one

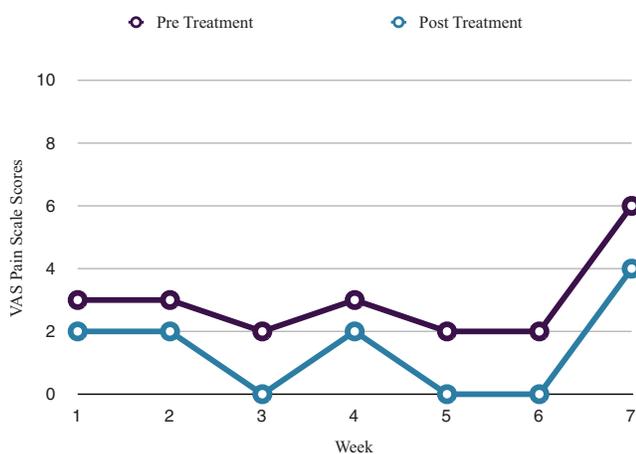


FIGURE 1. Visual analog scale for pain levels pre- and post- each treatment.

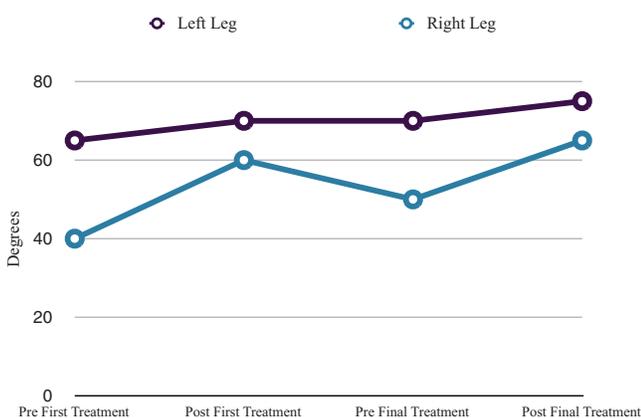


FIGURE 2. Hamstring Length Test results bilateral in degrees pre- and post- first and last treatment.

point decrease, indicating that there was less of a disability present. The scale is a 24-point scale, so the improvement of one point is not significant. Scores under 4 and over 20 may not show significant change over time in patients with score of less than 4 and deterioration in patients who have score greater than 20⁽²⁶⁾. Because the score was 3 at the beginning of the treatment plan, perhaps this questionnaire was not appropriate to use for this study. The results of the Oswestry Disability Index showed a significant improvement. A score of 50% disability to a 36% is a 14% decrease in the level of disability. Moreover, the patient went from being classified as have a severe disability to having a moderate disability⁽¹⁹⁾.

Millisdotter et al.⁽²⁵⁾ did a study to determine the effect of early neuromuscular customized training after lumbar disc herniation surgery. It showed that early neuromuscular customized training has a superior effect on disability.

In the Mannion et al.⁽⁸⁾ study, the authors found that 12 weeks of postoperative physiotherapy did not influence the course of change in pain or disability up to 24 months after decompression surgery. Furthermore, they found that advising patients to keep active by carrying out the type of physical activities that they most enjoy appears to be just as good as administering a supervised rehabilitation program, and at no cost to the health care provider.

Currently lumbar spine fusion and decompression postoperative treatment in similar cases is varied. In the McGregor et al. study⁽¹¹⁾, it was found 12 months postoperatively that neither the rehabilitation program or education booklet intervention had a significant impact on long-term outcome. There have not been any studies specifically observing the effects of massage therapy with spinal decompression and fusion surgery.

This study could have been improved by ensuring the completion of reassessment prior to any major disruption in daily living. More specifically, the results should have been gathered and completed prior to the client returning to work. Or the results could have been recorded at the end of every treatment so that in the event of an emergency, the treatment plan would not be negatively affected. It may have also been beneficial to record the range of motion of the hip and lumbar spine before and after the treatment plan. There was only one client studied in this case and using more subjects with a cross-section of the population would have produced less restrictive results.

Massage therapy appears to have had some beneficial effects for this client who had chronic back pain after a spinal fusion and decompression surgery. After seven treatments conducted over eight weeks, the test results showed some improvements. The most notable improvements were in the Oswestry Disability Index and the VAS pain scale. Data interpretation became more complex because client returned to work during the last two weeks of the study prior to the last

treatment and the reassessment. The last treatment was scheduled to be completed before the client went back to work and the client had to cancel, which made the time between the 6th and 7th treatment two weeks instead of the proposed one week as the initial treatment plan indicated. Because the client had a physically demanding job, returning to work before reassessment may have affected the results. Also of note, active range of motion pool exercises once per week gradually moving to three times per week was recommended for home care, but the client did not do this. Perhaps including more active or passive range of motion in the treatment would have produced different results that could be explored in further research.

The techniques used in this study could be incorporated into treatment protocols for practice immediately, as there were no negative effects of the treatments. The treatment plan may need to be longer to provide more substantial effects or could be incorporated earlier postoperatively. This study was conducted six months after surgery and one month after conventional physiotherapy treatments had ended. It may be beneficial for future research for massage therapy in this area to examine the effects of massage either in conjunction with physiotherapy or as a stand-alone treatment immediately postoperatively.

CONCLUSION

Additional research needs to be conducted in order to further develop protocols for spinal fusion and decompression postoperative treatment plans. This study is beneficial in beginning to understand the relationship between massage therapy and clients who have undergone spinal decompression and fusion. Further research in how massage therapy affects the long-term outcome of spinal decompression and fusion is warranted.

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CONFLICT OF INTEREST NOTIFICATION

The authors declare there are no conflicts of interest.

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