The effects of massage after failed lumbar disc surgery

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Abstract

Background: 31 year old woman presents low back pain with radicular pain into hips bilaterally, the right knee behind the patella and pain and some numbness into right ankle. The low back pain has been ongoing for a number of years and since 2000 had progressively worsened leading to excision surgery of extruded nucleus pulposus at L4-5 vertebra in June 2011. Client reported that for about three months post-surgery, low back pain diminished. Since then low back pain has progressively increased and daily living has been difficult. The client has been given the option by her medical doctor of lower lumbar spinal fusion.

Purpose: The objective in this case report is to describe the effects therapeutic massage has on the client’s symptoms and impairments of low back pain after failed disc excision surgery.

Research Design: The research design was a case report at a private school- The Center for Neurosomatic Studies. The application of assessment and treatment designed over a 6 week period of 5 sessions of 1 hour per treatment session.

Common Swedish type massage and myofascial techniques were applied.

Assessment and therapeutic massage was based on neuromuscular therapy.

Massage and myofascial release techniques were applied to the back, pelvic region, thigh and lower leg. Client homework was also given to include exercise in activating supporting musculature and educating the client about condition
management. Progress outcomes utilized visual analog pain scale and Oswestry Disability Index.

Results: After the five treatment sessions the client’s symptoms had improved substantially. There was a reported decrease in pain and improvement in quality of daily living. The client also had a better understanding of the physiologic barriers lumbar disc dysfunction presents.

Conclusion: This case report was very interesting in that it allowed a better understanding of how massage therapy can affect pain associated with failed spinal disc surgery; 2 years post-surgery, in this individual. Additional research is needed to observe a relationship between massage and failed back surgery.

Key words: spinal disc excision, spinal fusion, low back pain, lumbar region, failed back surgery syndrome, massage

INTRODUCTION

About 70-85% of adults suffer from low back pain at some point during their life, implicating low back pain as one of the primary reasons for physician office visits(1). Studies suggest low back pain to be multi-factorial, initiating for example from structures including spinal muscles and ligaments, spinal nerve roots, and the intervertebral disc (IVD)(1). Common surgical procedures for spinal disc herniation are discectomies (excision) and fusion (2,3)
Discectomies can be performed by either aggressive disc removal (AD) or limited removal of the disc (LD). It remains unknown whether aggressive disc removal with curettage or limited removal of disc fragment alone with little disc invasion provides a better outcome for the treatment of lumbar disc herniation with radiculopathy. Though a greater incidence of long-term recurrent back and leg pain after AD is reported, study shows a greater incidence of recurrent disc herniation after LD(4). Return of pain after this type of procedure can result in Failed Back Syndrome (FBS)(5,6,7).

Failed back syndrome (FBS), also called "failed back surgery syndrome" (FBSS), refers to chronic back and/or leg pain that occurs after back (spinal) surgery(5,6). It is characterized as a chronic pain syndrome. Multiple contributing factors include but are not limited to residual or recurrent disc herniation, persistent post-operative pressure on a spinal nerve, altered joint mobility, joint hypermobility with instability, scar tissue (fibrosis), depression, anxiety, sleeplessness and spinal muscular deconditioning. Another concern with spinal fusion itself, particularly if more than one spinal level is operated on, may result in "adjacent segment degeneration"(7).

There is an increasing recognition of the importance of "chemical radiculitis" in the generation of back pain(8). A primary focus of surgery is to remove "pressure" or reduce mechanical compression on a neural element: either the
spinal cord, or a nerve root. But it is increasingly recognized that back pain, rather than only due to compression, may instead entirely be due to chemical inflammation of the nerve root. It has been known that disc herniations result in inflammation of the associated nerve root(8,9,10,11). In the past five years increasing evidence has pointed to a specific inflammatory mediator of this pain, tumor necrosis factor-alpha (TNF)(12)(13). This inflammatory molecule is released not only by the herniated or protruding disc, but also in cases of disc tear (annular tear), by facet joints, and in spinal stenosis(8,14,15,16). In addition to causing pain and inflammation, TNF may also contribute to disc degeneration(17). If the cause of the pain is not compression, but rather is inflammation mediated by TNF, then this may well explain why surgery might not relieve the pain, and might even exacerbate it, resulting in failed back surgery syndrome.

A surgical option for many patients with failed disc excision surgery is spinal fusion(1,2,3). Spinal fusion has been practiced since the beginning of the 20th century and was mainly used for spinal deformities and infections; in particular for spinal tuberculosis cases with vertebral collapse and kyphosis. Today, fusion is the most commonly performed spinal operation(1,2,3). It is widely employed for trauma, tumors, infections, deformities, and IVD disease(1). The objective is to restore symmetry and strength to the spinal column(18). Studies showed a 220% increase from 1990 to 2001 in spinal fusion surgeries per 100,000
increasing to an estimate of 250,000 in 2003, and 500,000 in 2006 (19) However, there is little evidence to support spinal fusion in association with discectomy for patients with herniated disks and radiculopathy(20). Although there have been no randomized trials of lumbar discectomy plus fusion versus discectomy alone, comparative cohort studies generally suggest that there is no advantage to adding fusion(21). Spinal-fusion surgery is undoubtedly effective for some conditions in some patients however there are wide variations in the rates of use, high rates of reoperation, and high rates of complications generate concern that the procedure may be overused(22). Its efficacy for the most common indications, such as degenerative disk disease, remains unclear(22).

In a systematic review of 13 studies reports that although several rehabilitation programs, physical fitness programs, or protocols regarding instruction for patients to return to work after lumbar disc surgery have been suggested, little is known about the efficacy of these treatments, and there are still persistent fears of causing re-injury, re-herniation, or instability. There is no strong evidence for the effectiveness for any treatment starting immediately post-surgery, mainly because of the lack of good quality studies.(23)

These results indicate 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. Massage therapy has shown to be an effective option post thoracic surgery (24,25) and for those with chronic low back pain(24,). Specific studies that look at the effectiveness of massage therapy for the care of post-surgical lumbar spine surgery are limited(24). Rehabilitation is important as evidence suggests that approximately 60% of patients have postoperative symptoms after a first operation for intervertebral disc herniation(26,27).

This case report will apply to determine if massage therapy is an effective form of treatment to decrease pain and dysfunction associated with failed lumbar spine surgery and restore a more functional quality of daily living for this client.

METHODS

Client Profile

A 31 year old female sought neuromuscular massage therapy. She has not sought other therapy modalities since surgery in June 2011 except the associated physical therapy after surgery. She exercises 3-4 times per week to include cardio, light weight training and gentle stretching. The client does not take medication. She believes that a healing level of about 80% might be obtained and is willing to put forth an effort of 10 on (1-10 scale) to achieve maximum healing.
She indicated that the low back pain has been long term but without a direct known cause leading to this disc failure. The low back pain was aggravated during a pregnancy in 2000; this birth required the use of epidural injection because the low back pain was so severe. Since this birth her low back pain continued to increase and the quality of life was affected. She indicates that some of the basic activities of life like walking, sleeping, sitting and standing had become painfully difficult. She sought relief through chiropractic, acupuncture and physical therapy during the years after the birth of her first child in 2000 and into the pregnancy of her second child during 2011. However these modalities had limited effect on the pain. During this second pregnancy the pain and discomfort continued to increase and in May 2011 while in the 5th month of pregnancy she needed assistance in walking and had eventually become bedridden.

She sought the advice of her medical doctor and an MRI (magnetic resonance imaging) was taken in May 2001 that revealed disc protrusion at L3-4 and L5-S1 and herniated nucleus pulposus of L4-5. The surgical pathology report indicated a diagnosis of lumbar disc and bone requires excision of benign fibrocartilagenous tissue and bone consistent with disc material.

The excision surgery for the herniated L4-5 nucleus pulposus was performed during the 6th month of pregnancy in June 2011, followed by a physical therapy
routine of strengthening and stretching. The client indicated that post surgery relief from low back pain lasted about three months. The birth of the second child required cesarean section because of low back complications. During follow-up visits with her medical doctor it was indicated that fusion would be the adjunct option to disc excision surgery. She hopes to reduce or eliminate low back and referred pain into the hip, knee and ankle and increase the quality of everyday life; simple things like sitting, sleeping and carrying the her little girl.

**Treatment Plan**

For this case study 5 treatment sessions of 1 ½ hours each (includes assessment and interview) spaced over a 6 week period, equates to a session every 7-10 days. Progress was recorded by the client using a quality of daily living questionnaire. Client also recorded the pain level on a visual analog scale before and after each treatment. Postural measurements were also charted (28) each session.

Treatment sessions utilize dural tube compression and decompression which encourages relaxation of spinal column and its structures, facilitates the flow of cerebral spinal fluid (CSF) within the spinal column and relaxation of soft-tissue surrounding the spinal column. The client is supine with therapist at head of table. Compression phase requires the therapist to place hands on top of clients head with heels together and press the client’s cranium inferior. De-compression phase requires therapist to gently traction the client’s cranium superiorly by hooking the
fingers under the nuchal line of the occiput and pulling in a superior direction (29).
Each compression and traction should result in more movement as muscles relax.
Myofascial release was used to soften the tissue and scar formation around
incision site at lumbar vertebra L4-5. Specific techniques used were skin rolling,
fascial stretch and spreading and j-stroke. Various Swedish massage strokes:
gliding, kneading, compressions, compression with opposition, cross and with
fiber friction, wringing, pin and stretch. These were used on the back, upper and
lower legs, and muscles of the pelvis region. Massage pressure was applied to
what the client could tolerate. Depth and direction of pressure, excursion, speed,
rhythm and continuity, frequency, duration, sequence were considered at each
treatment but varied based on tissue response and client feed-back. Static
compression for trigger point release was also used (30). The client was given 2
exercises to perform at home: transverse abdominal (TVA) activation and
strengthening and shoulder/cervical girdle complex activation and strengthening
The client was already performing some light stretching, aerobic and light weight
training during the week when pain was not preventing such activity.

Rationale for the treatment plan during each session was based on client
interview, Oswestry Disability Index, visual analog pain scale and the posture
chart in the attempt to release soft-tissue that could be contributing to the pain and
postural dysfunction.
Each treatment session began with dural tube mobilization at the cranium and cervical level and myofascial release of the low back region at L4-5 and surrounding tissue to release the tight fascia. Massage can soften scar tissue by freeing restrictive fibrous bands and increasing circulation(31). Paraspinal muscle tension should be reduced over the proximal and distal segments adjacent to the incision site to avoid increased intradiscal pressure(32) and was also addressed during each treatment.

Swedish massage strokes were also employed for specific musculature. The first treatment plan addressed quadratus lumborum of the back, right and left psoas muscles and tendon attachments at the right knee. The second session addressed quadratus lumborum, gluteal muscles, sacral ligaments and right psoas. The third session addressed the anterior muscles of the thigh and lower leg and left psoas. The fourth session addressed posterior muscles of the thigh and lower leg, gluteal muscles, paraspinal muscles of the back and the left iliacus. The fifth session addressed the right psoas, left TFL, left anterior thigh, left adductor brevis, right posterior thigh, gluteal and deep hip rotators, deep paraspinals, quadratus lumborum and serratus posterior inferior. Observation of tissue response in successive sessions allowed alteration of technique as tissue became more pliable and trigger points were de-activated.
**Assessment Measurements**

Oswestry Disability Index for Low Back Pain (ODI) and visual analog pain scale (VAS) are common measurement tools used in the field of massage therapy for determining client progress (33,34). Postural charting is a regular assessment tool used by NeuroSomatic Therapy (NST) for assessing client progress (28).

The Oswestry Disability Index for Low Back Pain 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 to obtain a percentage. The ODI has become one of the principal condition-specific outcome measures used in the management of spinal disorders, and remains a valid and vigorous measure (33). This test has been considered the gold standard of low back functional outcome tools, and is a measurement of patient’s impairment and quality of life (33). The client completed 9 of the 10 categories of Oswestry Disability Index for Low Back Pain which records daily living activities. ODI was used for the week prior to initial treatment, during the treatment period and 5 days post treatment period.

The Visual Analog Scale (VAS) for pain comprises a 0–10 scale on a 10cm line 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 (34). A before treatment
VAS and an after treatment VAS was completed by the client at each session, as well as a 5-day post treatment VAS.

The posture assessment chart is a measurement tool to record bony landmarks. It is used by the NST therapist to locate and measure bony landmarks to record inferior to superior and anterior to posterior positions, as well as flexion, extension, obliquity, projection and translation. Measurement can also record the relationship of bony landmarks in consideration of the righting reflex mechanism of the body. A posture assessment was performed of the client in standing, seated, and lying positions based on NST posturology manual at each session(28). Chart example in appendix.

RESULTS

VAS pain scores and for primary low back pain reduced from a pre-treatment high of 45mm to a during treatment low of 10mm to a post treatment low of 15mm(Fig. 1). Pain score for radiate or referral pain to hip/knee/ankle reduced from a pre-treatment high of 50mm to a during treatment low of 0mm to a post-treatment low of 25mm(Fig.2). Pain reduction of this magnitude has been shown to be clinically significant(35).
Figure 1. Visual Analog Scale for primary pain levels before and after treatment session and post treatment.

Figure 2. Visual Analog Scale for radiate or referral pain levels before and after treatment session and post treatment.
The Oswestry Low Back Pain Disability Index showed an improvement. Highest possible score is 100%. The clients range scored a high of 45% to a low of 16% (Fig. 3). A 29 point reduction in disability score is clinically significant. Interpretation of the scores moves the client from 45%, which is considered severe disability to 16% which is considered minimal disability based on ODI questionnaire instruction.

![Figure 3. Oswestry Disability Index Score before, during and after treatment periods.](image)

**DISCUSSION**

A good percentage of adult population suffer from low back pain(1). This case of low back pain with radiculopathy was unique in the fact that to relieve pain and
more importantly to prevent complications of pregnancy invasive disc excision surgery was performed.

Generally for patients that have undergone lumbar disc excision a goal is to rehabilitate surrounding soft-tissue with stretching and strengthening exercise but for this client the goal was to reduce or eliminate potential complications during the remaining 3-months of pregnancy. Post-op physical therapy was employed to encourage tissue healing around the surgical site. Light stretching and strengthening exercises for the low back musculature was performed directly after surgery in June 2011. Even though the client indicated she did experience temporary pain relief, it is not known if removal of the compressive force of extruded disc material or the reduction of TNF as mediator as sole contributor, it may be a combination of the two in temporarily relieving the pain. However, after about 3-months the pain began to return. According to the client, the May 2011 diagnosis by her medical doctor optioned to spinal fusion if there were complications with the disc excision surgery. In review of spinal fusion studies it is reported that spinal fusion may be overused and that its use may be better suited for spondylolisthesis and only rare cases of disc herniation, also noting that among many medicare patients, in comparison with any operation without fusion, surgery that included fusion was associated with a doubling of the risk of complications, an increase in the rate of blood transfusion by a factor of six, and a doubling of postoperative mortality assessed at six weeks(22). Ironically, though,
the rates of reoperation after spinal fusion surgery may be slightly higher than the rates of reoperation after laminectomy or discectomy without fusion(22). This client wanted to explore an alternative method for improvement and/or management of her low back and referral pain.

The client presented to this study symptoms regarded as failed back surgery syndrome, which refers to chronic back and/or leg pain that occurs after back (spinal) surgery(5,6,7). It is characterized as a chronic pain syndrome.

Review of recent literature in two databases (pubmed.org and ijtmb.org) for failed back surgery syndrome finds several medical and alternative methods of approach. However, there was no literature that addressed massage as a method of intervention. This in itself is important to this study. It would allow the therapist and the client to observe how neuromuscular massage therapy would affect symptoms of FBSS including chronic pain, dysfunction and the decrease in the quality of life.

Massage appears to be effective in this case even though the study was limited to 5 sessions. In addition to improvement of VAS and ODI scores the client’s low back lumbar region showed improvement in tissue response. During the first session, massage of the tissue surrounding the surgical site was tight and tender to touch. Each successive treatment session observed the tissue become more pliable under massage and less painful as described by the client. By the 5th session the
therapist was able to effectively release more musculature with effective pressure. There was a 2-week period between the 4th and 5th session due to illness in the client family but it seemingly did not have an effect on the results.

Results were positive in this case, but not able to compare to other studies due to lack of research for FBSS and massage. Releasing hyper-tonicity of musculature, removing pressure in those tissues surrounding the disc area(31,32) and increasing vascular flow(32,37) in these tissues could have contributed to the positive results. Massage may have also reduced the impact TNF plays as a mediator in inflammation and pain(8,12,13,17). In a 2-year follow-up study of 171 patients that had undergone lumbar spinal fusion as a revision procedure, only small improvements were reported in health-related quality of life(38). This author would suggest a comparative study using these or similar massage techniques and spinal fusion as a revision procedure to see the relative effects on the long term quality of life.

This study could have been improved by recording a range of motion of the spine and pelvis before and after each treatment session. Another improvement could have recorded a daily VAS. There was only one client in this case report. Larger studies are needed to extrapolate the effect on the population as a whole. The treatment session(s) could be more numerous to see if it would produce a more substantial outcome.
CONCLUSION

This case study was very interesting in that it allowed a better understanding of how massage therapy can decrease pain associated with failed spinal disc surgery two years post-surgery in this client. Additional research is needed to observe a relationship between post-surgical massage and failed disc excision surgery and warrants further research in to how massage therapy can benefit in the long term.

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REFERENCES


