

Massage Therapy as a Complementary Treatment for Stiffness and Numbness Post Cervical Spinal Cord Injury: a Case Study

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Introduction: Spinal Cord Injuries (SCI) commonly result in pain, stiffness, weakness and numbness. There are limitations in the ability of the standard medical approach to manage many symptoms of SCI. This case study examined the effects of massage therapy as a “complementary” therapy to treat post-operative numbness and stiffness after removal of a cavernous hemangioma intermeshed with a 26-year-old male patient’s spinal cord.

Methods: The patient received eight, one-hour therapeutic massage sessions over five months. Therapeutic massage techniques were performed by a Board-Certified Therapeutic Massage and Bodywork Therapist and consisted of cranial sacral, Swedish, myofascial release, trigger point therapy, and passive stretching. Symptom intensity was recorded prior to each session on a qualitative scale (1–10) and was trended over the course of the study.

Results: There was a slight decrease over time in left-arm and back numbness, as well as neck and upper body stiffness. The patient viewed therapeutic massage to be a beneficial component to his recovery.

Discussion/Conclusion: Massage therapy should be considered as an adjunct therapy as part of a rehabilitation plan to address numbness and stiffness post-SCI. Further research is needed to understand the effects of massage therapy on SCI numbness and stiffness.

KEY WORDS: massage therapy; spinal cord injury; myofascial; complementary therapy

INTRODUCTION

Spinal cord injuries (SCI) are life changing events, and post-injury pain, stiffness, weakness, paresthesia (tingling), and numbness are common.⁽¹⁾ The standard medical approach involves a specialized, multidisciplinary team involving physicians, therapists, nurses, and social workers aimed at managing the subsequent broad medical complications (pain, spasticity, bowel/bladder dysfunction, and skin pressure injuries, to name a few) and optimizing patient function and independence. Neuropathic medications (medications targeting the nerves) are frequently given for post-injury neuropathic pain, spasticity medications (medications that reduce muscle tone) are often given for muscle stiffness, and therapists can work with patients to help with weakness and improving patient function.⁽²⁾ However, there are limitations in the ability of the standard medical approach to manage the symptoms associated with SCI.⁽³⁾ Post-SCI pain is often difficult to manage with medications and other symptoms, including numbness and weakness, have limited effective treatments. The lack of effective solutions to these symptoms through standard medical care drives patients to complementary treatments.⁽⁴⁾

Massage therapy has been used for a variety of medical conditions and can even be as effective as standard medical care for chronic pain.⁽⁵⁾ The use of massage therapy is of particular interest in the

management of SCI-related pain due to the limitations of standard medical care. There are multiple studies showing that massage therapy is effective in reducing pain in patients with a spinal cord injury.^(6,7) While the mechanism is incompletely explored, there is evidence to suggest that the tactile stimulation of massage therapy reduces pain transmission.⁽⁸⁾

Despite these benefits, there has been limited study of the use of massage therapy in the alleviation of symptoms other than pain. Stiffness and numbness are major issues for SCI patients, and massage therapy can reduce muscle tension and increase blood flow into affected tissues, potentially reducing these symptoms.⁽⁸⁾ Some studies have demonstrated improvements in range of motion and strength of the upper limbs after application of a set routine of massage and stretching in people with chronic (more than one year) cervical SCI compared with an exercise group.⁽⁷⁾ In another study, a patient with a chronic SCI had improvement of gait mechanics after massage therapy.⁽⁹⁾

The objective of this case study is to explore the value of massage therapy as a “complementary” treatment to address neck and upper body stiffness, paresthesia, and numbness in SCI. We present a case of a patient who sought relief from these symptoms several months after an SCI. We anticipated that the massage therapy would be an effective “complementary” therapy in the treatment of these post-SCI symptoms.

METHODS

Patient Information

The patient is a 26-year-old male with no significant past medical history who was diagnosed with a 2 cm cavernous hemangioma (a vascular malformation) within the spinal column at level C2 in August 2017. Right-hand numbness had been ongoing for seven years, but the numbness worsened, and the patient started to experience right-knee weakness and right-arm tremors prior to radiographic diagnosis. The cavernous hemangioma was successfully surgically removed in November 2017. Intraoperatively, the tumor was found to be intermeshed with the spinal cord at C2. Removal resulted in new left-hand, arm, and back numbness, principally with

the loss of light touch and proprioception (sense of where the extremity is in space). Additionally, preoperative right-hand and right-knee weakness was largely maintained following surgery. All patient medical information was obtained from medical documentation review and patient interview with patient consent.

The patient saw improvements in neurological deficits with his inpatient and outpatient physical and occupational therapy courses, particularly his left-arm symptoms. At the conclusion of his therapy, he was fully independent with all activities of daily living and ambulatory without assistive devices. He took occasional ibuprofen for muscle pain, but otherwise took no medications.

The patient sought massage therapy two and a half months after surgery as a “complementary” treatment to support his ongoing rehabilitation. The patient’s major concerns were his neck and shoulder stiffness/pain, and his left-arm and hand numbness. He thought that massage therapy could possibly help, and he consented to be a part of this study.

Therapist Information

All massage treatments were completed by a single BCTMB Massage Therapist with over 25 years of clinical massage therapy experience.

Therapeutic Massage Sessions

Informed consent was attained at the first massage session. Eight therapeutic massages were held over the course of five months from December 2017 to April 2018. Each session was structured to include documentation of the patient’s current symptom intensity on the quantitative scale, hands-on table work lasting 1 hour, and a post-intervention qualitative evaluation of the experience.

The patient’s initial presenting complaints were: bilateral stiffness in his upper trapezius; stiffness in the muscles involved in mobility of his left shoulder; bilateral numbness across his upper back; numbness in his left arm and left hand; and paresthesia in his left hand.

The patient was supine on the massage table for the start of each treatment. Using massage techniques outlined in Table 1, and working proximal to distal, the massage therapist focused on the reduction of

hypertonic areas in muscle groups bilaterally. The massage techniques were layered throughout the treatment, starting with effleurage to warm the tissues and then transitioned into myofascial techniques, trigger point therapy, and passive stretching. Sessions began in the cervical and cranial region with a cranial sacral occipital still point hold (see Table 1) and continued to treat the suboccipitals, the nuchal ligaments, and the temporalis area bilaterally. Other muscles addressed bilaterally had origins in the cervical area and insertions in the shoulder girdle, including levator scapula, sternocleidomastoid, and scalenes.

The supine massage also included bilateral work into the muscles of pectoralis major and minor, biceps brachii, and extensor and flexor regions of the arm, wrist, and the finger digits. More firm and direct pressure was applied to these areas on the left, as they were more hypertonic than the right.

The patient was then positioned prone on the table where the muscle groups and fascial tissues surrounding the bilateral erector spinae and trapezius were warmed using more effleurage strokes. The posterior cervical incision area was worked with scar massage consisting of placing the pad of the therapist's thumbs on the scar and rubbing in a circular matter. The full length of the scar was treated and then the areas adjacent to the scar were treated to move the skin in all directions, up and down and left and right.

Intermittently, the patient was positioned in a right lateral decubitus position

to enhance access into the left scalene and suboccipital musculature. See Table 1 for further delineation of the massage techniques utilized.

Symptoms were assessed at the beginning of each session. Symptoms recorded were: stiffness in upper trapezius, stiffness in left shoulder, numbness in upper back, numbness in left arm, numbness in left hand, paresthesia in left hand. Qualitative comments on massage therapy and the recovery process were also assessed before and after sessions.

RESULTS

Session Physical Assessments

Upon initial assessment at the first session, the patient's gait and posture were grossly normal. Patient did not require a wheelchair or other assistive device. The patient described his main symptoms as bilateral stiffness in his upper back, shoulder muscles, numbness and paresthesia across his upper back, and in the muscles of his left arm and hand.

During the health history intake, the patient stated his symptoms were present in his right hand and right knee before surgery but, post-surgery, the symptoms were more severe on his left side of his neck, shoulder, and arm.

He sought out massage after concluding his outpatient physical and occupational therapy course (twice a week for three

TABLE 1. Therapeutic Massage Techniques: a Detailed Description of the Different Massage Techniques Utilized

1) Cranial Sacral Therapy	A "Still Point" occurs when the practitioner intentionally manually impedes the flow of craniosacral fluid, bringing the system to a complete rest. This action balances the autonomic nervous system and enhances relaxation. ⁽⁹⁾
2) Effleurage	Flowing strokes (light moderate pressure) of the hand to the muscles. These strokes are designed to relax the muscles and to promote blood flow.
3) Myofascial Release	Sustained mechanical pressure with the palms and fingers to soften the fascia surrounding the muscle. ⁽¹⁰⁾
4) Petrissage	Kneading strokes where the therapist grasps, lifts, and separates the muscle away from underlying structures. This can soften the fascia and release muscle adhesions.
5) Friction	Brisk strokes with the finger digits crossing the muscle fibers. This technique helps increase circulation and release adhesions.
6) Trigger Point Therapy	Digital pressure on a hyperirritable/adhesive area of a muscle which usually elicits a referred pain response. ⁽¹⁰⁾
7) Passive Stretching	Moving a muscle or joint through a range of motion with no assistance from patient.

weeks and then once a week for three weeks). He noted that he is physically active with exercise five to six times per week, usually on a treadmill or other cardio machine along with weight machines. He also used stretching to alleviate muscle tension as needed. The patient experienced an intermittent generalized tension headache with neck pain post-surgery, which is well controlled with over-the-counter ibuprofen.

Upon initial palpation of the neck, the left side presented with more hypertonic areas than the right side. The left scalenes, left levator scapula, and left upper trapezius were notably taut. The treatments began with effleurage and in the initial sessions more time was spent on broad warm-up strokes. Trigger point examination into the left middle scalenes reproduced a paresthesia sensation into his left arm and hand. The stiffness diminished somewhat as trigger point work continued proximal to distal throughout the left scalene musculature. A pin and stretch technique was used for the taut left pectoralis major muscle. The left arm, particularly biceps brachii, was taut. Deep pressure was tolerated when treating the left arm and hand. Deep stripping and lengthening techniques were used to treat the flexor musculature in the left forearm.

Patient Observations

After the first session, the patient stated the massage therapy felt helpful in general. The greater muscle hypertonicity on his left-side shoulder, neck and arm were apparent to him during the session. He noted that the referred pain from the trigger point work in his middle scalene neck muscles recreated his paresthesia symptoms down into the left arm.

In subsequent sessions, the patient noted he was experiencing more sensation in his fingers and described that as feeling like a “nerve repair sensation”. While there were slight changes in his overall symptoms, he did report feeling more dexterity in both hands while buttoning his shirt and playing video games. He said he thought the massage was helpful for his stiffness, and possibly numbness and paresthesia, as well.

The patient reported feeling generally sore after some of the middle sessions, but that the soreness only lasted for one day post-treatment each time. The progress

the patient reported over the sessions was slow. The area of greatest reported change was the decrease in numbness in the left upper back and left arm.

In the later sessions, the patient expressed frustration with the slowness of progress in overall functionality and hand dexterity (buttoning his shirts still not mastered). During this time, he reported an increase in the stiffness in his left upper trapezius and left shoulder musculature.

At the next session a month later, the patient stated he was feeling a slight improvement in function, specifically increased sensation in both of his hands and more fluidity of motion with his left arm. This change was reflected in the lower reporting numbers for stiffness and numbness.

In later sessions, his reported neck and back pain level increased in relation to his work at the computer in preparation for resuming his education. He was also working out more vigorously and was experiencing some delayed onset muscle soreness. During these sessions, the patient was able to tolerate deeper pressure than previous sessions in his left upper back and neck.

At the final session, the patient reported his friends had noticed improved dexterity in his hands. He also felt he had greater functionality in general, particularly citing better left-hand sensation. He was able to resume his educational studies in June of 2018.

Quantitative Data

Table 2 outlines the patient’s session-by-session assessment of the numbness, stiffness, and paresthesia.

There was a slight decrease in the measured parameters over time. The largest decreases noted were in the left-arm and upper-back numbness.

Follow-up

One year later, the patient reports he is doing well and is reintegrating back into his life with minimal accommodations. He views the massage therapy to have been a beneficial component to his recovery.

DISCUSSION

We present a study on the effects of massage therapy as a complementary treatment to a patient’s post-SCI care.

TABLE 2. Symptom Trends Chart: Symptom Intensity Over the Course of the Study^a

	12/01/17	12/08/17	12/20/17	01/05/18	01/31/18	03/01/18	03/29/18	04/26/18
Stiffness in upper trapezius	2	3	2	5	5	1	1	2
Stiffness in left shoulder	2	2	1	1	1	1	1	1
Numbness in upper back	6	5	6	6	5	4	4	3
Numbness in left arm	6	5	4	4	4	3.5	5	3
Numbness in left hand					2	2	1.5	1.5
Paresthesia in left hand	3	3	2	2	2	2	2	2

^aSymptom intensity scores were out of 10; symptoms were assessed at the beginning of each session.

Symptoms were primarily left-arm numbness, paresthesia, and stiffness. Over the course of eight massage therapy sessions, numbness, paresthesia, and stiffness all improved. The patient also was experiencing left-neck pain and stiffness, which also improved over the five-month course of massage therapy. Patient felt massage therapy was helpful in managing symptoms and a valuable component to his post-SCI recovery.

The patient was satisfied with his outcome and quickly went back to his pre-morbid life. His successful outcome was primarily due to the success of the surgical intervention (progressive debility would have otherwise likely occurred), as well as young age, good health, and access to rehabilitation services. However, massage therapy was subjectively helpful for this patient and correlated with improved symptomatology.

The exact mechanism for possible improvement in symptoms post-SCI with massage therapy remains an open question. In a study done with athletes, one of the proposed mechanisms of action by which massage works is through attenuation of the inflammatory process initiated by muscle injury. By altering signaling pathways and cytokine production involved with the inflammatory process, massage may decrease secondary injury and nerve sensitization, resulting in increased recovery from damage and reduction or prevention of pain.⁽¹²⁾ While most studies (like that by Waters-Banker et al.) addressed pain, we ask how massage therapy affects numbness and stiffness post-SCI, and we believe this should be another area for continued research.

The major limitations to our study are inherent to all case studies: small sample,

no control group, and possible lack of generalizability to other patients. In particular, this patient had higher neurological function than many SCI patients, and results may not generalize to other forms of SCI. Also, improvement of these symptoms is expected to some degree post-SCI, so it is difficult to tease out the true effects of massage therapy. Other limitations to our study include: not adhering to a strict treatment schedule, not collecting post-treatment scores, and an inconsistent data collection process. We believe a larger scale pilot study evaluating the effects of massage therapy on symptom management in SCI should be studied.

Therefore, based on our findings in this case report, massage therapy should at least be considered as part of rehabilitation after a SCI. The goal is to lead to collective improvement in the outcome after a SCI.⁽¹³⁾

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CONFLICT OF INTEREST NOTIFICATION

The authors declare there are no conflicts of interest.

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