



# Clinical Case Report Competition

Okanagan Valley College of Massage Therapy

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First Place Winner

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The potential for massage therapy techniques to help relieve symptoms associated with subacute whiplash

**Case Report: The Potential for Massage Therapy Techniques  
To Help Relieve Symptoms Associated  
With Subacute Whiplash**  
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Case Report Supervisors: Julie Dais & Heather Taylor

**ABSTRACT**

**Objective:** This case report explored the effectiveness of massage therapy techniques in the treatment of sub-acute whiplash and whether they decreased specific symptoms of pain, limited range of motion of the cervical spine, and paresthesia in the right hand. **Methods:** A method of six 30 minute massages over a period of 21 days; therefore two massages per week. Specific techniques used included Myofascial Release (MFR), Swedish, Neuromuscular (NMT), Strain/Counterstrain, Trigger Point (TP) Release, Cervical Traction, and Active-Assisted Range of Motion (AAROM). The focus of the work was on muscles of the cervical spine bilaterally such as: Sternocleidomastoid, Scalenes, Longus Colli, and Multifidus segmentally at C5-C7. Structures that were also addressed bilaterally were: the investing fascial layer, upper trapezius, platysma, hyoids, suboccipitals, splenius capitis, cervical spine erectors, and hypomobile joints of the cervical spine. **Results:** Subject experienced neck pain with associated post-traumatic headaches 4-5 times/week for 1.5 months; paresthesia in right hand especially at night, on average 3 times/week for 1 month; limited range of motion in the cervical spine in rotation, lateral flexion and extension bilaterally, but worse on the right, with pain associated with active movement for 2

months. All of these symptoms were experienced prior to massage therapy treatments. Headaches were reduced significantly after the first week of massage to 2 times/week, and after the second week to 1 time/week and after the final week of massages to no headaches at all. Paresthesia in the right hand was reduced to 2 times/week after the 2<sup>nd</sup> week and was non-existent after the 3<sup>rd</sup> week of massage. Range of motion was increased in extension from 35 degrees to full range of 70 degrees; on the right side: increased in lateral flexion from 10 degrees to full range of 45 degrees; and in rotation from 45 degrees to full range of 90 degrees; on the left side: increased in lateral flexion from 15 degrees to full range of 45 degrees, and in rotation from 55 degrees to full range of 90 degrees. **Conclusion:** Specific massage techniques to cervical spine fascia and muscles as well as joint play to the cervical spine can help restore range of motion, decrease headaches, and paresthesia associated with these tight/hypomobile structures. A more complete rehabilitation program which involves massage as well as other manual/physical therapies with a strengthening program may help achieve results more quickly. A need to address other joints related to the cervical spine such as the thoracic spine, the temporomandibular joints, and the glenohumeral joints to determine

whether or not they may be contributing factors would also be beneficial.

## INTRODUCTION

Whiplash is defined as an acceleration-deceleration injury to the head and neck resulting from a motor vehicle accident or high speed sports (Rattray, 2005). Eighty-five percent of all whiplash injuries are due to rear-end collisions (type I collision), which are often more severe and long lasting than any other point of impact (see figure 1). The direction of initial impact was found to be an important predictor of prognosis (Hertling & Kessler, 2006). There does not seem to be an absolute speed or amount of damage a vehicle sustains for a person to experience injury. Crash tests indicate that a change of vehicle velocity of 4 km/hr (2.5 mph) may produce occupant symptoms (Davis, 1998).

Possible predictors of a poor prognosis are: evidence of Degenerative Disc Disease and whether there were any neurological signs immediately following the accident.

There are four different phases in which different structures of the body may or may not be injured depending on body position and point of impact (Rattray, 2005).

*Phase I:* cervical spine discs may be injured.

*Phase II:* the neck is in hyperextension, this can injure anterior neck muscles and ligaments, the temporomandibular and facet joints of the c-spine.

*Phase III:* head and neck are in peak acceleration.

*Phase IV:* the head and neck are in full deceleration, in hyperflexion, this is when most stress is placed on the

muscles, discs, ligaments of the lower C-Spine and upper T-Spine C5-C7 most affected.

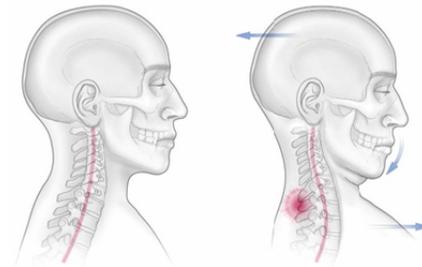


Figure 1: Rear Impact Collision

Factors involved in the severity of injury are the subjects head position; head rest position, whether they were wearing a seatbelt, if the airbag was deployed, and the stature of the person.

The Forman and Croft (F/C) classifies whiplash in 5 categories (Rattray, 2005).

*Grade 1 / Minimal:* no limitation of motion; no ligamentous injury; no neurological findings.

*Grade 2 / Slight:* limitation of motion; no ligamentous injury; no neurological findings.

*Grade 3 / Moderate:* limitation of motion; some ligamentous injury; neurological findings may be present.

*Grade 4 / Moderate to Severe:* limitation of motion; ligamentous instability, neurological findings are present; fracture or disc derangement is present.

*Grade 5 / Severe:* injury requires surgical management or stabilization.

Any structures in the neck, upper thorax and head, including vertebrae, intervertebral discs, facet joints, joint capsules, ligaments, lymphatic and blood vessels, fascia, nerve roots, vagus and phrenic nerves, meninges, spinal cord,

and the autonomic nervous system may also be involved.

The two muscles most affected in a rear impact collision are primarily the sternocleidomastoid and secondarily the longus colli. The posterior muscles affected are suboccipitals, rotators, multifidus, semispinalis cervicis, upper trapezius, and levator scapula. The anterior muscles affected are rectus capitis anterior, longus capitis, hyoids, and platysma. The lateral muscles affected are rectus capitis lateralis and anterior, middle and posterior scalenes. Other muscles involved are the muscles of mastication, intercostals, posterior spinals and the diaphragm.

An acceleration injury should be classified according to the findings from examination rather than the length of time since the accident. Typically the acute phase lasts from the time of the accident up to 2-3 weeks; the sub-acute phase lasts anywhere from 2-10 weeks; the chronic phase begins when the acute healing phase is over and can last for years (Hertling & Kessler, 2006).

Eighty percent of whiplash sufferers experience neck pain with stiffness which resolves in less than 4 weeks. Initially following the accident the subject may feel few, if any symptoms, pain and stiffness tend to appear and worsen within 48-72 hours. They can also experience dizziness, blurry vision, tinnitus, vertigo, headaches, paresthesia, nausea, and low back pain. Signs and symptoms in the sub-acute stage include inflammation, edema, increasing stiffness, pain that refers to the head, scapular area and arm, increased muscle tone, adhesion formation. Observations include head forward posture, and

pained and/or medicated expression. Upon palpation the tissues may feel cold due to ischemia, point tenderness, increase muscle tone, and edema.

It is difficult to work on a subject during the acute phase because of the acute muscle splinting and inflammation occurring due to soft tissue injury; two major contraindications to local massage. Rest and ice are the most effective treatment protocol at this time, as well as gentle massage to compensatory structures may be addressed.

During the sub-acute phase, there is a decrease in muscle splinting and inflammation, therefore gentle massage techniques may be introduced in order to help increase circulation to the tissues to speed up healing time, to decrease and impede adhesion and trigger point formation, which will in turn help stop the limitation in motion of the cervical spine. Specific massage techniques such as MFR, SWD, NMT, TP release, strain/counterstrain, cervical traction, and AAROM may all benefit rear-end collision whiplash subjects in order to decrease pain and paresthesia as well as increase flexibility and increase range of motion to cervical spine muscles. There have been studies done that suggest evidence favouring intermittent traction for pain reduction (Graham, Gross & Goldsmith, 2006). Strength training for patients with whiplash in the subacute phase may also be beneficial in reducing pain and improving physical endurance (Ask, Strand, & Scouen, 2009). An appropriate and effective therapy in subacute whiplash management should comprise of pain relief, home exercises to maintain cervical movement, postural exercises, as well as continuing on with

activities of daily living as best as possible (Lundmark & Persson, 2006).

## CASE HISTORY

Subject is female, age 57, currently retired. Hobbies include looking after her grandchildren, sewing, reading and hiking. She was involved in a rear impact collision in Oct 2009. She was stopped at a traffic light and was struck from behind at a speed of approximately 30-40 km/hour. She was unaware of the impending collision, (therefore she wasn't at fault. During the moment of impact she had both of her hands on the wheel and she was facing forward waiting for the light to turn green. Her headrest was adjusted at the proper position which did resist hyperextension of her cervical spine. She was wearing her seatbelt. Her vehicle did strike the vehicle in front of her which resulted in a sudden impact from behind then from in front. She didn't notice any dizziness, numbness, or tingling immediately following the accident so she didn't go to the hospital. She did follow up with her doctor a few days later after her pain and stiffness worsened.

Subject's major complaint was a sore neck, mostly on her right side which was limiting the movement of her cervical spine in all directions. She also felt dizziness when she moved her head in extension. A week after the accident she started noticing paresthesia in her right hand, which woke her up at night. Her symptoms are worse immediately after waking in the morning as well as in the late afternoon following activities of daily living. Light activity seemed to help relieve or take her mind off of her symptoms. Excessive activity and immobility seemed to aggravate her

symptoms. Subject's expectations for the series of treatments are to relieve pain and increase mobility/flexibility of her neck as soon as possible in order for her to continue with her activities of daily living. She hasn't been receiving any other methods of treatment such as physiotherapy or from a chiropractor.

## ASSESSMENT

Assessment followed the Cyriax Model. On the initial assessment a detailed case history and postural assessment including palpation of the cervical muscles were performed. AROM and PROM were also performed with painful movements done last. Gentle joint play, which included motion palpation, was performed in order to assess hyper- and hypomobility of specific cervical spine segments. Muscle testing of the major muscle groups of the cervical spine was performed to assess which muscles needed strengthening. Special testing included the Vertebral Artery Test to rule out neurovascular involvement and the possibility of referral to a doctor. The Alar & Transverse Ligament Tests were done to rule out C0-C1-C2 instability. The Valsalva Maneuver was done to rule out a space occupying lesion. Spurling's and Maximal Compression tests were done to rule out cervical nerve root compression, facet joint involvement and vertebral artery compression. Thoracic Outlet Syndrome tests were done to rule out possible locations of nerve entrapment causing the paresthesia in the right hand. Post assessment replicated pre assessment of the ranges that were limited in AROM, retesting strength of weak muscles as well as retesting TOS special tests.

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Each subsequent assessment included a pre and post assessment of AROM of the cervical spine in all ranges; flexion, extension, lateral flexion, rotation; and general muscle testing of all these muscle groups that create these movements. A Visual Analogue Scale was used in order to establish a working pain scale (see figure 2). The subject's pain was at a 7/10 on the day of the initial assessment and treatment. During treatment, the working scale peaked at a 3/10 and reduced it to hover around a 2/10. It decreased to a 2/10 after the final treatment.

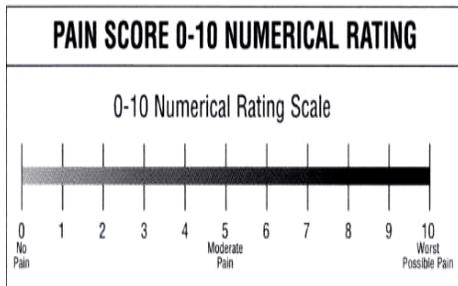


Figure 2: Visual Analogue Scale

### TREATMENT PLAN

A method of six 30 minute massages was performed, over a period of 21 days; therefore two massages per week. It is crucial for the whiplash treatment to be gradual and gentle in order to first gain the client's trust as well as not create an acute flare-up situation. This is a major factor in order to see any results. Work was done bilaterally, and progressively releasing superficial structures such as the investing layer of cervical fascia, upper trapezius, platysma, sternocleidomastoid, and hyoids, in order to address the deeper structures of longus colli, multifidus C5-C7, scalenes, splenius capitis, and suboccipitals.

My treatment goals were to decrease sympathetic Nervous System firing in order to decrease pain; decrease hypertonicity, trigger points and adhesions in the neck muscles mentioned above, increase local circulation to the neck in order to speed the healing process by bringing in oxygen to the tissues and removing wastes; and gradually increase pain-free range of motion of the cervical spine.

The treatment began with the client in the prone position for 5 minutes and ended with the client in the supine position for 25 minutes. In the prone position the back and upper trapezius were addressed. The massage began with hands in resting position on the back for three diaphragmatic breaths, for approximately 30 seconds in order for the client to get accustomed and settle in to the treatment. The Swedish massage technique effleurage was used bilaterally from the head to the low back beginning with a light touch and progressively using more pressure each subsequent time. On the left side of the back palmar effleurage was repeated three times; then repeated three times with the forearm, working from the low back up around the upper shoulder and back down, each time progressively using more pressure. Fingertip kneading was then introduced to the left upper trapezius and repeated five times working lateral to medial. Trigger points were found and released in the muscle using point compression and fascial unwinding. Shaking of the left upper trapezius was used by a pincer grip for 15 seconds. The above techniques on the left back and trapezius were then repeated on the right side. Effleurage was then repeated three times working bilaterally on either side of the spine from the head to the low back.

Light stroking bilaterally from the head to the low back was repeated 3 times to end treatment on the back.

In the supine position, the massage began with gentle myofascial release techniques on the investing layer of cervical fascia and shaping techniques on the sternocleidomastoid (SCM) working first on the left side, then following with the same on the right side. Effleurage to the left lateral, posterior, and anterior neck was introduced lightly, and progressively got deeper, working superior to inferior down towards the heart. Fingertip kneading was used on the left SCM, scalenes and splenius capitis. Trigger points were released in these muscles using point compression and fascial unwinding. Segmental fingertip kneading was used on the left multifidus C5-C7 in the lamina groove. The left suboccipitals were released using the lever technique with the head, following with strain/counterstrain technique. Effleurage to the posterior, lateral and anterior neck was repeated three times working from the occiput down to the clavicle. Gentle fingertip kneading was introduced to the left hyoid muscles and longus colli. Trigger points were released using gentle compression. Effleurage was repeated to the anterior neck three times. All of the above techniques on the left were repeated exactly the same on the right side. Effleurage was repeated bilaterally working from the head down to the shoulder anteriorly, laterally and posteriorly three times each position. Active assisted range of motion was done in all ranges; flexion, extension, lateral flexion and rotation; starting first on the left and ending on the right. The massage ended with intermittent cervical

traction, held for ten seconds and repeated three times; traction was combined with diaphragmatic breathing by the subject.

Homecare was given to subject to do on a daily basis. Chin tuck exercises; 5-10 repetitions, 3 times per day for 6 weeks maximum. Isometric strengthening: flexion, extension, lateral flexion and rotation; hold each range for 6 seconds each, repeat 3 times each direction, 3 times per day until strength has returned to cervical spine muscles. Pain free active range of motion (AROM) in all ranges was repeated 3 times per day.

## OUTCOMES

Subject experienced neck pain with associated post-traumatic headaches 4-5 times/week for 1.5 months; paresthesia in right hand especially at night, on average 3 times/week for 1 month; limited range of motion in the cervical spine in rotation, lateral flexion and extension bilaterally, but worse on the right, with pain associated with active movement for 2 months. All of these symptoms were experienced prior to massage therapy treatments. Headaches were reduced significantly after the 1<sup>st</sup> week of massage to 2 times/week, and after the 2<sup>nd</sup> week to 1 time/week and after the final week of massages to no headaches at all. Paresthesia in the right hand was reduced to 2 times/week after the 2<sup>nd</sup> week; and was non-existent after the 3<sup>rd</sup> week of massage.

Assessment revealed that range of motion of the cervical spine was increased in extension from 35 degrees to full range of 70 degrees; on the right side: increased in lateral flexion from 10 degrees to full range of 45 degrees; and

in rotation from 45 degrees to full range of 90 degrees; on the left side: increased in lateral flexion from 15 degrees to full range of 45 degrees, and in rotation from 55 degrees to full range of 90 degrees (see figure 3).

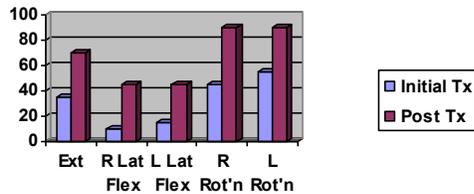


Figure 3: ROM Pre & Post Treatment

Special testing involved Vertebral Artery, Alar & Transverse Ligament, Valsalva, Spurling, and Maximum Compression Tests which were all negative. The Thoracic Outlet Syndrome tests Adson's and Travel's were both positive on the right indicating that the anterior and middle scalene muscles were causing the paresthesia in the right hand.

Palpation revealed hypertonicity and tenderness in the upper trapezius, SCM, scalenes, splenius capitis, multifidus, longus colli, hyoids, and suboccipitals. Adhesions were beginning to form in multifidus on the right side between C5-C7. This decreased over the span of each treatment. Trigger points released during each treatment, and returned in following treatments but seemed to release more quickly each time. Subject claimed that there was a decrease in pain from a 7/10 on the initial treatment day to a 2/10 after the final treatment (see figure 2).

Homecare was done by the subject on a daily basis and it was mentioned that it

got easier to perform after each treatment and noticed a decrease in pain, an increase in ease of movement, an increase in stamina, and was therefore able to complete more activities of daily living.

## CONCLUSION

Treatment proved to be beneficial and effective in decreasing the amount of pain associated with movement as well as a decrease in the number of post traumatic headaches. Also an increase in quality and range of motion of the cervical spine was noticed. Compensatory structures such as the temporomandibular joints, glenohumeral joints and the thoracic spine were not addressed, and they may be a contributing factor for the recurring trigger points and headaches. A longer more comprehensive rehabilitation program involving complimentary modalities such as physiotherapy and chiropractor could possibly help achieve beneficial results more promptly. We also need to keep in mind that each individual is different, many people hold their stress in their neck and upper shoulders; and with injured tissue, it is important to stay regimented with their rehabilitation program in order to maintain their results. Currently whiplash is difficult to classify as a significant condition due to the subjectivity of the client's symptoms. The medical system relies upon x-rays to prove that a person's symptoms are justified, yet soft-tissue injuries to muscles and ligaments such as in subjects with whiplash, do not appear in x-rays. This determines that there needs to be more studies done to prove that soft-tissue manipulation has a positive effect on subjects with whiplash.

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