Massage Therapists' Association of British Columbia

Clinical Case Report Competition

West Coast College of Massage Therapy

Winter 2010

First Place Winner

Krys Dybowski

Decreasing symptoms of multiple sclerosis using petrissage techniques

P: 604.873.4467
F: 604.873.6211
research@massagetherapy.bc.ca
massagetherapy.bc.ca

Table of Contents

List of Figures

List of Tables

Abstract

Objective: The objective of this case study is to determine if petrissage techniques can increase venous return thereby decreasing symptoms in a Multiple Sclerosis patient that has narrowing in the internal jugular veins.
Methods: The study, which included a single male patient, consisted of five one and a half hour treatment sessions conducted over a two week period. Petrissage techniques such as fingertip/thumb stroking were used to address the treatment goals.
Results: All measurements were noted and record on three scales which were the berg balance scale, fatigue severity, and personalized scale. Overall the patient's balance improved and along with their score on the personalized scale, but fatigue slightly increased.
Conclusion: This case study demonstrates that petrissage techniques, such as fingertip and thumb kneading, along the IJV may help decrease symptoms and increase balance in patients with MS that have blocked IJVs.

Introduction of the Medical Condition (Physiology/Pathology)

Multiple Sclerosis (MS) is a complex and unpredictable disease that affects approximately 2.5 million people worldwide (Stauffer, 2006). The disease is believed to be an immune disorder that is usually diagnosed in patients between the ages of 15-40 (Multiple Sclerosis Society of Canada, n.d.). It is characterized by inflammatory episodes that damage the central nervous system (CNS) (Stauffer, 2006). Scars, also known as plaques or brain lesions, develop during the inflammatory episodes and are noticeable in the brains white matter. Through MRI's, used to diagnose MS, brain lesions are evident in approximately 80 percent of patients (Damjanov, 2006). Furthermore, there is increased damage at the cellular level. For example, the myelin sheath of the nerve is broken down consequently slowing down impulses (Stauffer, 2006), which causes muscle weakness. This disease can greatly affect a patient's life, clarifying the need for further research based on decreasing life altering symptoms and the pain that is associated with MS.

The symptoms of MS vary between patients and can be debilitating. The diseases unpredictable nature creates multiple symptoms that can present in patients. MS has the ability to

affect vision, hearing, balance and mobility. Gait problems are also a great consequence of MS. According to Noseworthy, Lucchinetti, Rodrigues and Weinshenker (2000) approximately fifty percent of those diagnosed need assistance walking within 15 year after diagnosis. In addition, the patients may experience great pain resulting from a combination of MS symptoms. Fatigue is also one of the most common complaints of those diagnosed with MS. Patients describe it as either weakness with exercise or increasing weakness as the day progresses, as well as an unusual continual sense of tiredness (Flachenecker, 2002). It is pertinent to understand that symptoms of MS can impact a patient's life physically, emotionally and financially.

Patients may be diagnosed with one of the four types of MS: Relapsing Remitting (RR), Primary Progressive (PP), Secondary Progressive (SP), and Progressive Relapsing (PR) MS (Multiple Sclerosis Society of Canada, n.d.). RR is unpredictable in nature and is characterized by random episodes whereby new symptoms appear, or existing ones get worse. These attacks may last hours, days or months (Multiple Sclerosis Society of Canada, n.d.). A distinguishing feature of RR is that recovery and remission occurs between attacks. In addition, there are two sub groups of RR, which are Benign MS and Clinically Isolated Syndrome. Benign MS is defined by remission occurring between relapses. During remission stages there are minimal signs and symptoms of a physical disability. Unlike Benign MS, Clinically Isolated Syndrome usually refers to a single episode of neurological symptoms that can be traced through an MRI. The next type of MS is PP which is caused by a slow and steady accumulation of plaque in the CNS and excludes periods of remission. The third type of MS is SP. If a patient is diagnosed with SP the disease continues to progress generating disabilities within the patient. Also, as the disease advances within the patient relapses and remissions become less noticeable. The last and rarest type of MS is PR as it only occurs in approximately five percent of those diagnosed

with MS. PR patients experience a steady increase of symptoms and periods where attacks are evident. PR patients do not experience any remission (Multiple Sclerosis Society of Canada, n.d.).

Currently, if a patient is diagnosed with MS they are told that there is no known cause or cure for the autoimmune disease (Zamboni et al., 2009). However, according to Stauffer (2006) people suffering with MS have a substantial amount of treatment options available. Pharmaceutical substances are primarily used as treatment options. Stauffer (2006) recognizes that "disease progression can be delayed with one of several disease-modifying drugs…. [used] along with corticosteroids" (Stauffer, 2006, p. 43, Table 1). Corticosteroids are typically used during an inflammatory attack to decrease inflammatory response. With prescriptions and common over the counter drugs, such as ibuprofen, patients with MS can control some of their symptoms to a certain degree.

Table 1. Comparison of disease modifying drugs

Brand Name	Generic Name	Manufacturer	Type of MS	Administration Method
Avonex	Interferon beta-1a	Biogen, Inc.	Relapsing	Weekly intramuscular injecti
Betaseron	Interferon beta-1b	Berlex Labs, Inc.	Relapsing, including secondary progressive	Subcutaneous injection every other day
Copaxone	Glatiramer acetate	Teva Pharmaceutical Industries	Relapsing-remitting	Daily subcutaneous injectior
Rebif	Interferon beta-1a	Serono, Inc.	Relapsing	Subcutaneous injection thre times weekly
Novantrone	Mitoxantrone	Immunex	Rapidly worsening relapsing, progressive-relapsing, or secondary progressive	Four intravenous injections per year

Source: Stauffer, M. (2006). *Understanding multiple sclerosis.* Jackson: University Press of Mississippi.

Although there is no known cure for MS a recent medical breakthrough has been discovered. Zamboni et al. (2009) have found a new innovative surgery, called the Liberation Treatment, to treat the vascular disease which they believe causes neurological damage in MS

patients. Zamboni et al. (2009) believe that iron deposits, which form as a result stenosed veins, produce MS. Therefore, the surgical procedure includes angioplasty or stent insertion performed on the narrowed vein, which is predominantly the internal jugular vein (IJV) (Zamboni et al., 2009). Before deciphering if the procedure can be performed many preliminary assessments need to be completed. For example, Zamboni et al. (2009) require that a patient obtains one or both of either a high-resolution echocolour Doppler (ECD) and/or transcranial colour-coded Doppler sonography (TCCS). These Doppler ultrasounds help determine if narrowed veins are the source of the patients MS.

The theory by Zamboni et al. (2009) proposes that MS patients have narrowing of the IJV(s) and by opening the veins venous return increases ultimately decreasing patients' symptoms. Therefore, the objective of this study is to determine if petrissage techniques such as fingertip and thumb stroking will increase venous return from the head and neck region via the IJV in MS patients. The expectation is that with increased venous return there will be a decrease of symptoms such as fatigue, pain, and muscle weakness, as well as improvements in balance.

Case Study

Patient History

The case study participant is a 57 year old male that was diagnosed with RR MS in June of 2000. The patient experiences daily symptoms: balance problems, due to a lesion in his cerebellum; severe fatigue; cognitive deficiencies; brain fog; slurred speech; and extreme nerve pain (patient, personal communication, June 28, 2010). To manage the nerve pain the patient has become dependent on Abapentin, Amitriptyline, Naproxen, as well as Advil or Motrin, and to manage fatigue he takes Methylphenidate Hydrochloride (Ritalin) once or twice per day. The

patient has also resorted to using a cane and at times relies on a wheelchair in order to become mobile. The patient still has the ability to drive and partake in daily activities, but daily routines are difficult due to brain fog, intense fatigue, and balance difficulties. (Appendix A shows the patients intake form)

Observations prior to treatment

Before treating the patient Doppler ultrasounds were provided. The doctor's assessment concluded that there is signal loss in the superior and inferior aspects of the right IJV. The left IJV also has signal loss in the superior aspect. Signal loss represents narrowing of the veins. Figure 1, shows part of the Doppler ultrasound provided for this study.

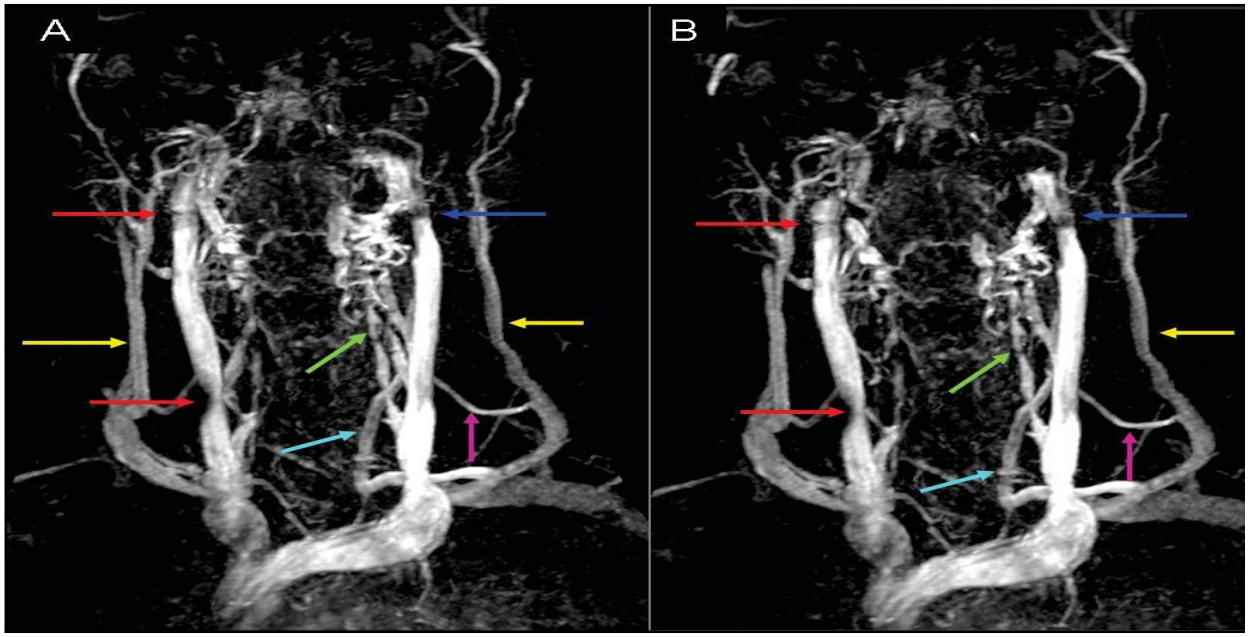

Figure 1. Doppler Ultrasound showing narrowing of the IJVs

The red arrows show signal loss, which indicate narrowing, at the upper and lower area of the neck in the right IJV. The deep blue arrows also show signal loss in the left IJV at the superior level of the neck.

Source: Cast study MRI. (2010). *MR Innovations Inc*.

Prior to treatment it was apparent that the patient has major balance difficulties, but despite this he has established practices to help him overcome this predicament. For example, throughout the assessments the patient was asked to partake in a balancing exercise that prevented the use of any balancing support. Despite the difficulty of balancing he had acquired a technique to stabilize balance when needed. To regain balance he would stand still and re-center himself by clenching his fist on the side of his body that he feels most unbalanced. For example, if he feels as if he is falling to the left then he clenches his right fist. Balancing is a large issue for the patient, but he has acquired beneficial techniques to help him through the hindrance.

Assessment measures

Throughout the study scales were used to gauge the severity of the patient's symptoms and assess balance. The Berg balance scale (BBS, Appendix B) was used prior to treatment as it is a credible assessment tool for determining functional balance (Berg, Wood-Dauphinee, Williams & Gayton, 1989; Whitney, Wrisley & Furman, 2003). According to Berg et al. (1989, p. 304) "… the capacity to maintain various positions, to make automatic postural responses to voluntary changes in the body and its segments, and to react to external disturbances are all crucial to functioning in daily life", and are key factors that need to be assessed when determining balance function. The assessment tests 14 functional tasks that are scored based on a five point scale. Zero points indicate the lowest level of function and a score of four indicates the highest level of function. To reveal a reliable change in function between each assessment a change of eight points is required (Conradsson, et al., 2007).

Furthering the assessment the patient was asked to complete two other scales both prior and post treatment, as well as the day after. First, a general fatigue severity scale (FSS) was utilized to evaluate fatigue in the patient. It is often used to determine fatigue in patients with MS

as well as other chronic conditions. Flachenecker et al. (2002, p. 523) describe that quantitative scales such as the FSS "…are thought to assess the impact of fatigue on daily performance more precisely than unstructured self-assessments, and are thought to be less vulnerable to impulsive answers". As shown in Appendix C¸ FSS asks nine questions focusing on physical aspects that are rated on a seven-point scale where 'one' represents that the statement is not appropriate and 'seven' indicates that the patient agrees with the statement (Krupp, LaRocca, Muir-Nash & Steinberg, 1989). The average is taken to acquire a score and average scores in patients with MS that are greater than 6.5 equate to fatigue related to the disease. Second, a personalized scale was created based on the study patient's symptoms (Appendix C). The rating concept of the FSS was used in order to formulate a better understanding of the average symptoms that the patient feels.

Treatment Goals, Precautions, and Modalities

The study consisted of five one and a half hour treatment sessions conducted over a two week period, beginning on July 14, 2010 and ending on July 28, 2010. Treatments began with a 30 minute assessment using the BBS and continued with a 30 minute treatment, and a 30 minute post treatment assessment using the BBS. Treatments were done at approximately 2:00 pm every second day. There was a week gap between treatments four and five due to schedule conflicts.

Overall, the goal for each treatment and for the study included increasing venous return, ultimately to decrease the patient's symptoms for a few days. Treatment goals for each session included increasing balance, which was assessed by using the BBS, as well as decreasing the average scores of the FSS and the personalized scale. An additional goal included seeing improvements in the FSS and personalized scales that were done by the patient the day after.

Throughout the 30 minute treatment there were particular elements and modalities that were pertinent to achieving the overall goal. For example, a thermophore was used because "the application of heat to any portion of the periphery of the body causes not only a local increase of blood flow but it appears to cause an increased circulation in all portions of the body surface" (Hewlett, 1922, p. 277). The thermophore was placed locally over the origin of the pectoralis major muscle on the side of the body that was being treated to help increase venous return. In addition, treatment was done with the patient in supine position with the neck at zero elevation because according to Valdueza, von Munster, Hoffman, Schreiber, and Einhaupl (2000) when the body is elevated to zero degrees blood flow through the IJV is at its greatest potential (Table 2). Figure 2, demonstrates that the top of the IJV has greater accessibility when the patient is in supine anatomical position. In addition, throughout the treatment the patient's head was turned

Table 2. Effects of body elevation on blood flow

Body elevation	IJV		Vertebral veins	
	Flow (mL/min)	Area (mm^2)	Flow (mL/min)	Area (mm^2)
0°	700 (270)	106 (37)	40 (20)	10·6 (2·8)
+15°	150 (130)	57 (25)	90 (60)	10·9 (2·5)
+30°	140 (200)	51 (24)	110 (70)	11·0 (3·2)
+45°	110 (150)	37 (18)	130 (70)	11·0 (3·3)
+90°	70 (100)	17 (8)	210 (120)	11·9 (3·6)

Source: Valdueza, J.M., von Munster, T., Hoffman, O., Schreiber, S., & Einhaupl, K.M. (2000). Postural dependency of the cerebral venous outflow. *The Lancet, 355*(9199), 200-201.

contralaterally in order to expose the inferior aspect of the IJV which runs behind the sternal and clavicular head of the sternocleidomastoid (Figure 3). The patient remained in supine position with zero elevation throughout the treatment while techniques were done for seven and a half minutes in each position. The treatment began with the therapist working on the right superior aspect of the IJV while the patient was in neutral supine position. Next, the patient's neck was

contralaterally rotated to the left in order to access the inferior aspect of the IJV on the right side. The last two positions included the patient being treated again in neutral supine position where the therapist worked on the left superior aspect of the IJV and lastly, the patient's neck was contralaterally rotated to the right in order to access the inferior aspect of the IJV on the left side. In every position five strokes of each fingertip and thumb kneading were alternated. These techniques were chosen because they classify as petrissage applications and according to Basmajian (1985) petrissage techniques increase venous return. After the completion of treatment the patient's head was elevated to approximately 45 degrees for 5 minutes. The patient's head was elevated because it allows for continued drainage of the vertebral veins due to gravity (Valdueza, 2000).

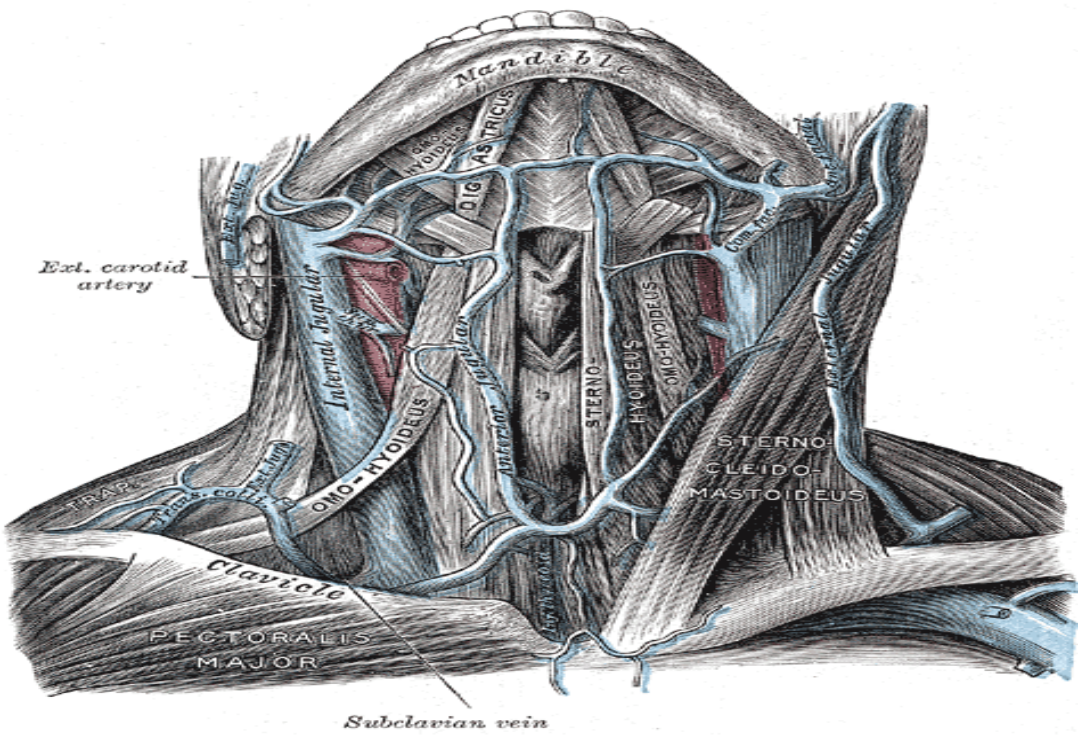

Figure 2. Neutral position of IJV

Source: Gray, H. (1918). *Anatomy of the human body, 20th edition.* Philadelphia: Lea & Febiger. Retrieved, June 3, 2010, from http://www.bartleby.com

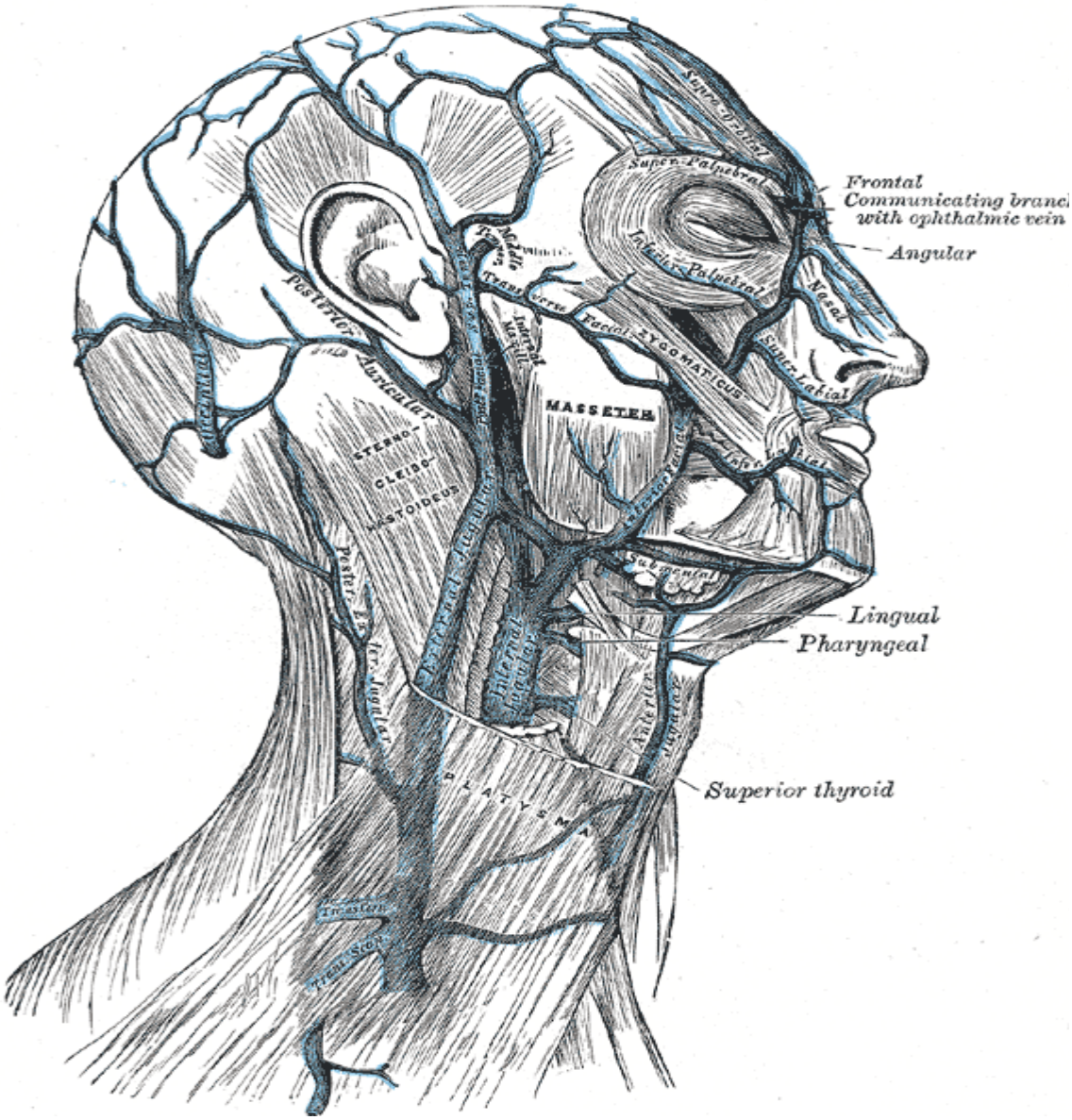

Figure 3. Inferior aspect of IJV

Source: Gray, H. (1918). *Anatomy of the human body, 20th edition.* Philadelphia: Lea & Febiger. Retrieved, June 3, 2010, from http://www.bartleby.com

After treatment home care instructions were given. The patient was informed to switch their sleeping position. During sleep the patient's head should rest at a 45 degree angle in order for there to be a greater blood flow through the vertebral veins rather than the IJV during sleep.

Results

Berg balance scale (BBS)

The patient completed the BBS twice during each treatment session. As Figure 4 shows the patient's final score on the BBS before the first treatment was 37 and after treatment was 43, which was a six point increase. At treatment two the patient's pretreatment score was 40 and the post-treatment score was 53. This was a significant increase of 13 points, which accounts for a considerable change in balance before and after treatment. Prior to treatment the patient was classified in the medium fall risk group, but had progressed to the low fall risk group after treatment two was completed. Treatment three showed very different results then treatment two. At treatment three the patient had a pretreatment score of 48 and post-treatment score of 50, only a slight increase of two points. Although the results are greatly different than the previous treatment it appears that the patient's pretreatment scores seem to be increasing with each visit. Treatment four results show that the patient scored 48 before treatment and managed to score 50 points after treatment, once again a slight increase of two points was observed. At the last visit the patient's BBS score was 49 in both assessments before and after treatment. Although there was only a genuine eight point change during a single treatment, it is evident that overall the patient's balance improved because the pretreatment scores increased slightly as treatments progressed. The increase in points on the BBS transfers the patient from a medium fall bracket, which they started at, to a low fall bracket. Results suggest that treatments were effective because balance improved, but due to MSs unpredictable nature improvements in balance may also be correlated to a number of different factors. For example, the increase in balance could be because the patient may be adapting to the BBS.

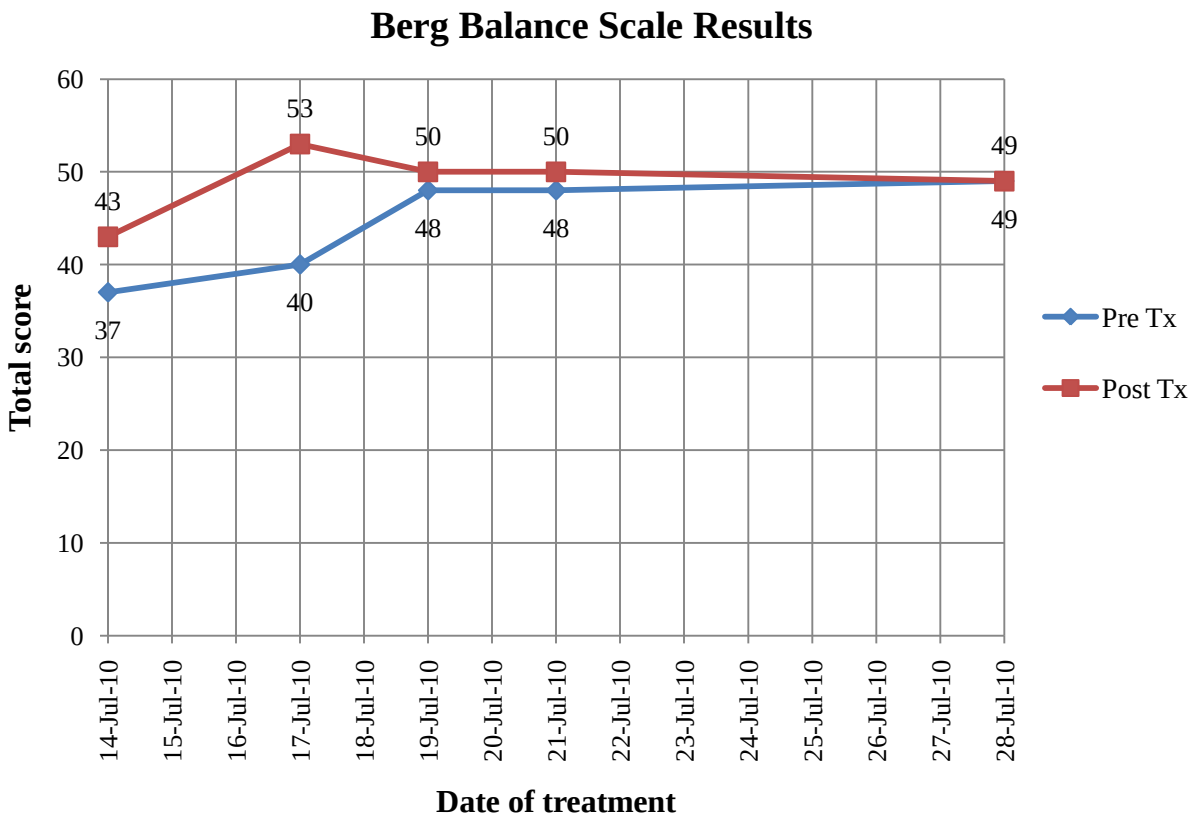

Figure 4. BBS Results

Fatigue severity scale (FFS)

The patient completed FSS scales three days prior to the first treatment as well as before, after and the day after treatment. The average for the baseline measurement on day one was 6.7, day two was 6.4 and day three was 6.2, equating to a mean of 6.4 for the three days. Treatment one results show an average pretreatment score of 6.9 and post-treatment average of 7.0 (Figure 5). Results for the day after treatment equate to an average of 6.8. Pretreatment and post-treatment averages for treatment two and three as well as the averages for the day after were all 7.0, meaning that the patient was fatigued. Treatments four and five showed similar results. The

patient's pretreatment and post-treatment averages were both 7.0; however, the following day the patient recorded an average of 6.4. The overall results indicate that the total mean for pretreatments and post-treatments are 7.0 and the mean for the day after is 6.7, which shows that the patient feels fatigued on a regular basis. The patient's active involvement in the BBS and the increase in temperature changes over the course of the treatments may have contributed to the increase in fatigue overtime.

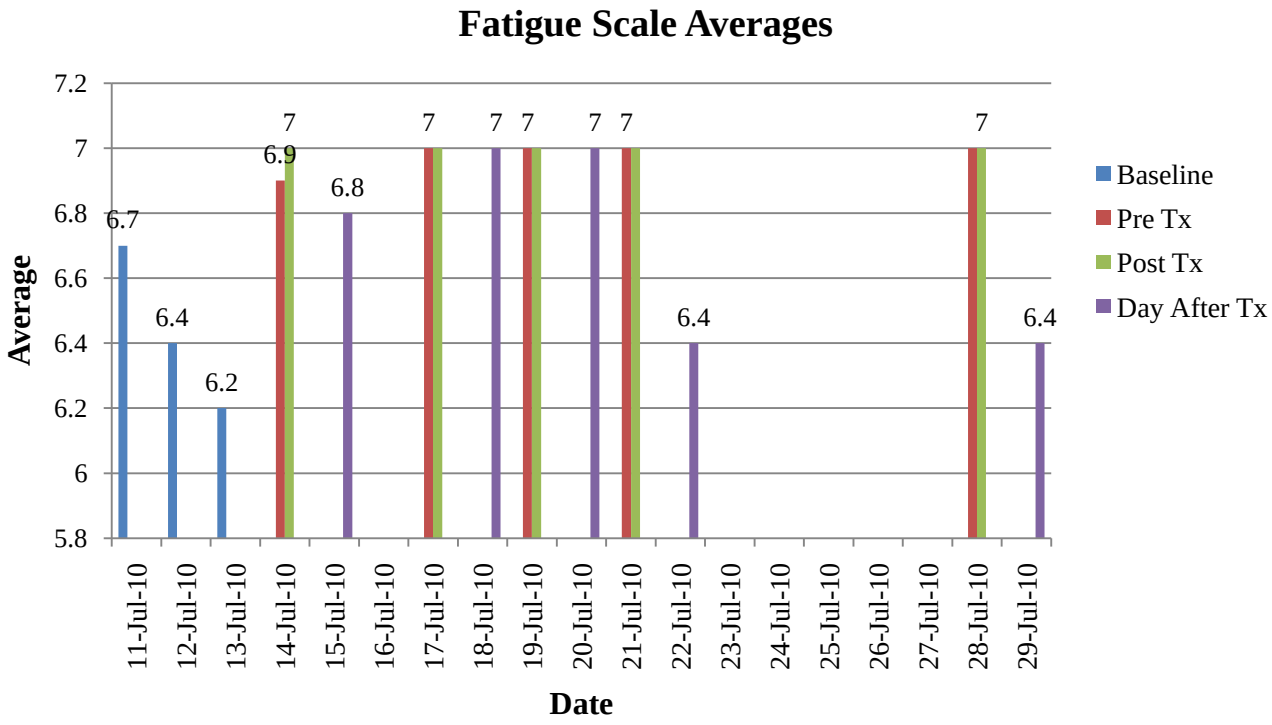

Figure 5. FSS Results

Personalized scale (PS)

The patient completed PS scales three days prior to the first treatment as well as before, after and the day after treatment. The PS scale baseline measurements for the three days before treatment were 4.6, 4.8, and 5.0. The pretreatment average at the first treatment was 4.8 and the

post-treatment average slightly increased to 5.2 (Figure 6). The day after the average decreased to 4.6. Treatment twos pretreatment average was 4.3 while the post-treatment average slightly increased to 5.0. The third treatments pretreatment average was 4.8 and there was a slight increase in the post-treatment average to 5.0. The following day the patient's average dropped to 3.6. The fourth treatment showed a pretreatment score of 5.9 and a decreased post-treatment average to 4.3. A further drop to an average of 3.6 was seen the day after. The last treatment displays a pretreatment average of 4.1 that decreased substantially to 3.1 after treatment. Although an ample decrease was seen after treatment the average increased the following day to 5.1. The overall mean before treatment was 4.78, after treatment was 4.52 and the day after treatment was 4.3. The PS has no mean average to decipher if particular symptoms are improving; however, evident decreases in the total mean after treatment, as well as the following day illustrate general symptom improvements.

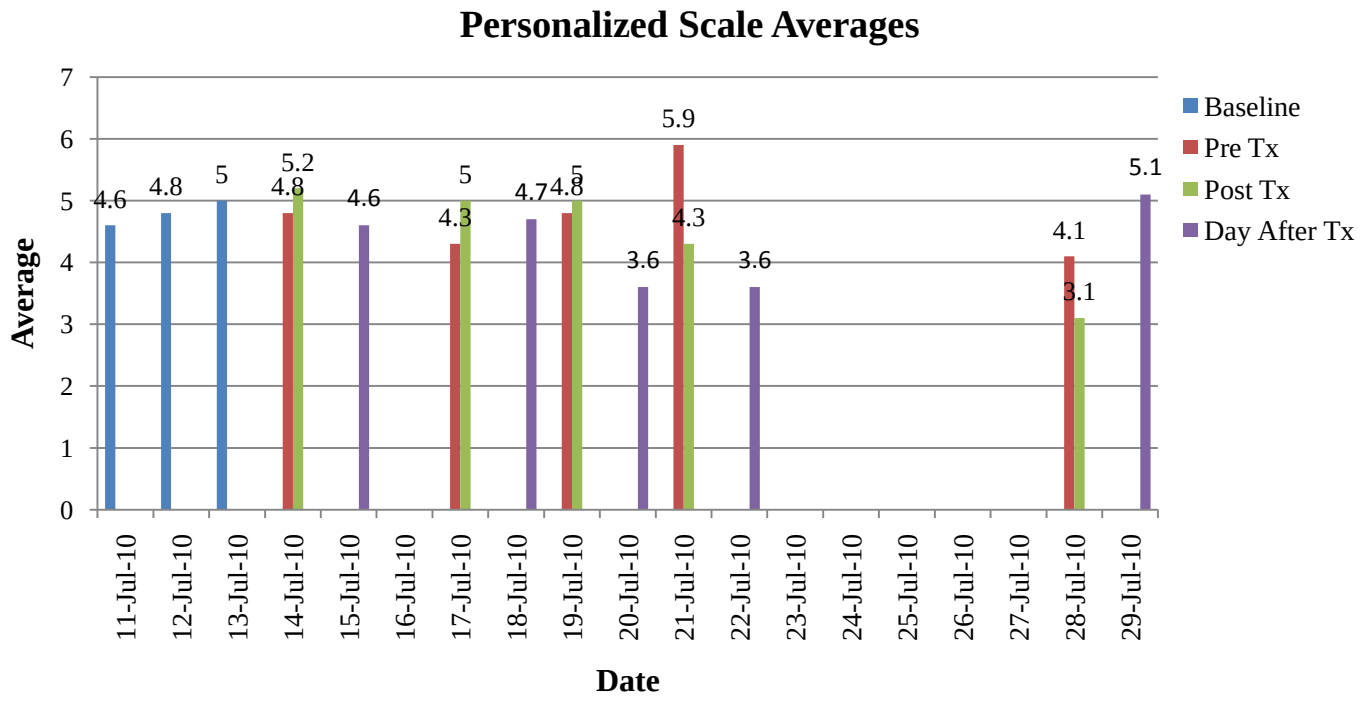

Figure 6. PS Results

Conclusion

This case study demonstrates that petrissage techniques such as fingertip and thumb kneading along the IJV may help decrease symptoms and increase balance of patients with MS that have blocked IJVs. As expected, the patient's balance and usual symptoms slightly improved except for fatigue. Contrary to the hypothesis, the patients fatigue increased instead of decreased.

Past research on this particular topic is limited as the theory proposed by Zamboni et al. (2009), that widening blocked IJV(s) with angioplasty or stents can help greatly decrease a patient's MS symptoms, is recent to the medical field. Although the Liberation Treatment (Zamboni et al., 2009) is still being evaluated it is important to remember that MS in general has been a prominent disease researched, especially throughout the past 10 years (Multiple Sclerosis Society of Canada, n.d.). With more patients receiving MRI's diagnosis is happening quicker (Multiple Sclerosis Society of Canada, n.d.) and after diagnosis patients are being carefully assessed to study the progression of the disease. For example, with great research resources such as the FSS, which was used in this study, are able to be utilized in order to track degeneration.

Although the objectives of this study were met there are many factors that need to be examined. For example, this study was limited due to its low number of participants compared to other studies such as the one by Zamboni et al., (2009), where 65 patients acted as participants. The one patient that took part in the study was not randomly selected because this study required a participant that has received a Doppler ultrasound. If the study participants are not randomly selected, then the patient used in the study cannot be an accurate representative of an MS population. Furthermore, FFS and PS scales were based on patient subjectivity, which can consequently distort the results.

To minimize these limiting factors, future research can use a larger, randomly selected group of MS patients. This will ensure a representative sample of the MS population. In addition, a larger array of assessment scales may provide greater insight into the patient's symptoms before and after treatment to determine if there have been significant changes. Using a greater amount of functional assessments rather than subjective quantitative measurements may also increase the reliability of the study.

In conclusion, this case study did support the findings from the study done by Zamboni et al., (2009) whereby increasing venous return decreases symptoms of MS. The findings merely illustrate that certain massage therapy techniques can increase venous return, which can offer a minor relief of symptoms, especially balance.

References

Berg, K., Wood-Dauphinee, S., Williams, J.I., & Gayton, D. (1989). Measuring balance in the elderly: Preliminary development on an instrument. *Physiotherapy Canada, 41*(6), 304-311.

Basmajian, J. (1985). *Manipulation, traction and Massage, 3rd edition.* Baltimore: Williams and Wilkins.

Cast study. (2010). *MR Innovations Inc*.

Conradsson, M., Lundin-Olsson, L., Lindelof, N., Littbrand, H., Malmqvist, L., Gustafson, Y., & Rosendahl, E. (2007). Berg Balance Scale: Intrarater test-retest reliability among older people dependent in activities of daily living and living in residential care facilities. *Physical Therapy, 87*(9), 1155-1163.

Damjanov, I. (2006). *Pathology for the health professional.* Missouri: Elsevier Inc.

Flachenecker, P., Kumpfel, T., Kallmann, B., Gottschalk, M., Grauer, O., Rieckmann, P., Trenkwalder, C., & Toyka, K.V. (2006). Fatigue in multiple sclerosis: A comparison of different rating scales and correlation to clinical parameters. *Multiple Sclerosis, 8*(6), 523-526.

Gray, H. (1918). *Anatomy of the human body, 20th edition.* Philadelphia: Lea & Febiger. Retrieved, June 3, 2010, from http://www.bartleby.com

Hewlett, A. W. (1922). The effect of massage heat and exercise on the local circulation. *California State Journal of Medicine, 20*(8), 276-277.

Krupp, L.B., LaRocca, N.G., Muir-Nash, J., & Steinberg, A.D. (1989). The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. *Arch Neurol, 46,* 1121- 1123.

Multiple Sclerosis Society of Canada. (n.d.). *About MS.* Retrieved July 4, 2010, from http://mssociety.ca/en/information/default.htm

Noseworthy, J.H., Lucchinetti, C., Rodriguez, M., & Weinshenker, B.G. (2000). Multiple sclerosis. *New England Journal of Medicine* 343, 938–952.

Stauffer, M. (2006). *Understanding multiple sclerosis.* Jackson: University Press of Mississippi.

Valdueza, J.M., von Munster, T., Hoffman, O., Schreiber, S., & Einhaupl, K.M. (2000). Postural dependency of the cerebral venous outflow. *The Lancet, 355*(9199), 200-201.

Whitney, S., Wrisley, D., Furman, J. (2003). Concurrent validity of the Berg Balance Scale and the Dynamic Gait Index in people with vestibular dysfunction. *Physiotherapy Research International,(8)*4, 178-186.

Zamboni, P., Galeotti, R., Menegatti, E., Malagoni, A.M., Tacconi, G., Dall'Ara, S., Bartolomei, I., & Salvi, F. (2009). Chronic cerebrospinal venous insufficiency in patients with multiple sclerosis. *Journal of Neurology, Neurosurgery, and Psychiatry, 80*, 392-399.