



Clinical Case Report Competition

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The effects of Swedish massage on irritable
bowel syndrome: A case study

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Abstract:

Objective: The objective of this study was to determine the effects of Swedish massage therapy on a 22 year old male suffering from Irritable Bowel Syndrome. His primary symptoms include lower abdominal pain, abdominal bloating, and diarrhea.

Methods: Five-45 minute massage therapy treatments were given over a five week period of time. The patient's progress was monitored by an initial assessment one week prior to the first treatment, and assessment directly before and after each treatment using patient history, special tests, and gathering the patient's vitals. Progress was also measured by use of a daily bowel movement journal.

Results: The results include a slight increase in the patient's pulse and diastolic blood pressure; no change in systolic blood pressure; and a decrease in the number of painful bowel movements.

Conclusion: The results of this study were both unexpected and inconclusive. An increase in the patient's vitals shows that a parasympathetic response was not elicited. This indicates that more research should be done regarding IBS and massage therapy.

Keywords: IBS, visceral hypersensitivity, gastrointestinal disorder, anxiety, parasympathetic nervous system

Introduction

Irritable Bowel Syndrome (IBS) consists of recurring upper and lower gastrointestinal (GI) symptoms, including variable degrees of abdominal pain, constipation or diarrhea, and abdominal bloating (Beers, M.H. 2006). IBS is a chronic gastrointestinal disorder that causes irregular bowel habits and has a significant impact on the affected individual. For some people IBS can be disabling. They may be unable to work, attend social events, or even travel short distances (National Digestive Diseases Information Clearinghouse, 2007). IBS is one of the most common reasons for work or school absenteeism, second only to the common cold. People with IBS miss 3-4 times as many work days annually as the national average of 5 days of missed work (Cure Irritable Bowel, 2008). An estimated 10-15% of Americans suffer from Irritable Bowel Syndrome (About IBS, 2009). The main difference between patients with IBS and healthy people is the frequency of defecation and stool consistency (Physiology of the Gastrointestinal Tract, 2006).

Symptoms:

The symptoms usually appear in the late teens to early twenties, but can occur at any age. The key symptom associated with IBS is lower abdominal pain, or discomfort, accompanied with defecation (About IBS, 2009). Common signs also include abdominal pain that is described as intermittent and “crampy”, a change in stool frequency or form, relief of pain with defecation, and pain that does not usually occur at night or interfere with sleep (McPhee & Papadakis, 2009). About 25 - 50% of people report heartburn, an early feeling of satiety (fullness), nausea, abdominal fullness, and bloating (International Foundation for Functional Gastrointestinal Disorders, 2010). There are three major clinical subgroups of IBS; constipation-predominant, diarrhea-predominant, or mixed bowel habits. Patients with constipation-predominant IBS report infrequent bowel movements (less than three per week) accompanied with hard or lumpy stools. Patients with diarrhea-predominant IBS usually have loose or watery stools, frequent stools (more than three per day), urgency, tenesmus, or fecal incontinence. Finally, patients with mixed bowel habits report that they have firm stool in the morning followed by progressively looser movements (McPhee & Papadakis, 2009). Several studies indicate that the frequency and amplitude of spontaneous migratory contractions in the colon are significantly greater in those with diarrhea-predominant IBS than in healthy people. The increase in frequency of these contractions is associated with an almost six fold increase in transit time in patients with IBS than in healthy people (Physiology of the Gastrointestinal Tract, 2006). Despite the uncomfortable and chronic symptoms, IBS does not cause any permanent damage to the intestines (Mayo Clinic, 2009).

Etiology:

The true cause of IBS is not fully understood, and still unknown. However, visceral hypersensitivity and psychosocial factors have been linked to patients suffering from IBS. Ritchie (1973) observed that inflation of a balloon in the colon caused pain in 6% of the controls and 55% of patients with Irritable Bowel Syndrome. This is the result of a low threshold for visceral pain in the section of bowel in contact with the balloon. Other studies show that in patients with IBS, there are differences in regions of brain activity, namely the anterior cingulate cortex and associated limbic structure, as compared with control groups when visceral pain is induced. These areas of the brain have been related to psychosocial disturbances such as emotional instabilities and stress. This provides evidence to support the association of IBS and pain perception with psychosocial distress (Kwan & Lai, 2005). It has been reported that there is a correlation between high anxiety and an increase in

visceral hypersensitivity (Barbara, De Giorgio, Stanghellini, Cremon, Salvioli, & Corinaldesi, 2004). A study done with rats also found evidence of visceral hypersensitivity as a result of anxiety (Gunter, Shepard, Foreman, Myers, Beverley, Greenwood-Van Meerveld, 2000). A study was done in which tolerance for distention of a balloon in the rectosigmoid was compared with tolerance for holding one hand in ice water in patients with IBS and controls. Patients with IBS had significantly lower tolerance for balloon distention, but not for the ice water. This rejected their hypothesis that lowered tolerance of the rectosigmoid in patients IBS is caused by a psychological tendency to exaggerate the painfulness of any aversive stimulus (Whitehead, Holtkotter, Enck, Hoelzl, Holmes, Anthony, Shabsin, & Schuster, 1990).

Studies show that an acute gastrointestinal infection is a triggering factor for symptom development in patients with IBS, named post-infectious IBS. An increase in intestinal permeability and increase in inflammatory cells are observed in this subgroup of patients, which may subsequently lead to visceral hypersensitivity (Kwan & Lai, 2005).

Diagnosis:

Diagnosis of IBS is mainly based on a thorough patient history, characteristics of abdominal pain, and bowel movement frequency and consistency. Palpation of the abdomen may reveal tenderness, particularly in the left lower quadrant; associated with the sigmoid colon (Beers, M.H. 2006). The Rome III Diagnostic Criteria is often used in the conclusive diagnosis of IBS (Chang, 2006).

Rome III Diagnostic Criteria for Irritable Bowel Syndrome

At least 3 months, with onset at least 6 months previously of recurrent abdominal pain or discomfort** associated with 2 or more of the following:

- Improvement with defecation; *and/or*
- Onset associated with a change in frequency of stool; *and/or*
- Onset associated with a change in form (appearance) of stool

**Discomfort means an uncomfortable sensation not described as pain.

A flexible sigmoidoscopy, colonoscopy, lactose intolerance tests, and blood tests may also be used to rule out other conditions, and diagnose IBS (Mayo Clinic, 2009).

Different Treatment Types:

The general approach to treating Irritable Bowel Syndrome centers on the theorized pathologic mechanisms of the disorder; disturbed GI motility, hypersensitivity to pain, and psychological factors. Depending on the symptoms, IBS can be treated either pharmacologically (with medication), non-pharmacologically (without medication) or both strategies can be used. The medications can be divided into antidiarrheal agents, bulking agents, laxatives, and antidepressants (IBS Treatments, 2011). Whitehead (2006) observed that hypnotherapy proved to be effective in improving bowel symptoms in patients with IBS. Other alternative treatments commonly used are acupuncture, peppermint oil, probiotics, psychotherapy, cognitive therapy (Shen & Nahas, 2009).

Anatomy Involved:

To fully comprehend Irritable Bowel Syndrome, a brief overview of involved anatomy is required.

IBS is a condition that mainly affects the lower GI tract; which includes the small and large intestines, and the colon. The small intestines are the succeeding segment of the digestive system directly following the pylorus of the stomach, and contain three parts: the duodenum, jejunum, and ileum (Tortora & Derrickson, 2009). The average length of the small intestines is approximately 6.5 meters, and the main function is absorption of nutrients from the chyme after it leaves the stomach. The lining of the small intestines contains small finger-like projections called micro villi. These micro villi increase the surface area of the intestines to obtain the maximum nutrient absorption. The villi become less numerous and shorter from the small intestines to the large intestines due to the decrease in absorption rate. The mechanical digestion that occurs in the small intestines is called segmentation and is controlled by the myenteric plexus from the enteric nervous system. Segmentation occurs when the circular muscles of a portion of the intestines contract, which results in separation of that segment from the rest of the small intestines. Then, smaller contractions happen in that same segment to mix the chyme with intestinal juices.

The large intestine is approximately 1.5 meters in length, and its main functions are formation of feces and expulsion of feces from the body (Tortora & Derrickson, 2009). The large intestines are attached to the posterior abdominal wall by the mesocolon (double layer of peritoneum). Structurally, the four segments of the large intestines are the cecum, colon (ascending, transverse, descending, and sigmoid), rectum, and anal canal (Snell, 2008). The ascending colon is a continuation of the cecum and ascends on the right side of the abdomen, where it turns abruptly at the inferior surface of the liver. This curve is called the right colic (hepatic) flexure. The transverse colon continues across the abdomen where it turns abruptly again at the spleen. This curvature is called the left colic (splenic) flexure. The intestines then continue as the descending colon until the level of the left iliac crest, where the sigmoid colon begins. The sigmoid colon ends opposite to the third sacral vertebra (Heisler, 1920). The sigmoid becomes the rectum at the rectosigmoid. The rectum lies anterior to the sacrum and the coccyx and terminates as the anal canal.

The abdominal wall muscles can be tense in some patients suffering from IBS, perhaps secondary to the underlying bowel dysfunction (Talley, 2006). These muscles include Rectus Abdominus, External Abdominal Obliques, Internal Abdominal Obliques, and Transversus Abdominus. Other affected muscles may be the Iliopsoas and Quadratus Lumborum.

Research Findings:

Several studies have been done to explore the connection between Irritable Bowel Syndrome and the role of the parasympathetic nervous system. One study found that a reduced responsiveness of the parasympathetic nervous system plays a role in the pathogenesis of IBS (Van Orshoven, Andriessse, Van Schelven, Smout, Akkermans & Oey, 2006). In patients with IBS, the autonomic nervous system is a mediator for the brain-gut interaction. These patients have altered autonomic responsiveness to a visceral stressor, with increased sympathetic and decreased parasympathetic activity. These differences are predominantly seen in males (Tillisch, Mayer, Labus, Stains, Chang & Naliboff, 2005). Ohman & Simren (2007) also concluded that there is increased sympathetic and decreased parasympathetic activity in IBS patients compared with healthy control groups. The parasympathetic nervous system is responsible for decreasing heart rate, blood pressure, and increasing digestive activities (Kalat, 2007).

A reduction in both heart rate and blood pressure is associated with a relaxed state. Therefore, increasing parasympathetic activity in patients with an already reduced responsiveness will be beneficial in promoting relaxation.

Research recognizes that therapeutic massage may help with stress-related conditions; including Irritable Bowel Syndrome (Choice Nutrition Centre, 2011). Swedish massage therapy has been proven to be an effective method of increasing parasympathetic activity; which results in relaxation (Rakel & Faass, 2006). Swedish massage to the back and neck has been shown to decrease systolic and diastolic blood pressure (Aourella, Skooga & Carelson, 2005). This concludes that using Swedish massage to promote relaxation in patients with IBS will increase parasympathetic response; this can be measured by a reduction in pulse and blood pressure.

Introduction to the Case Study

The purpose of this study is to observe the efficacy of the application of a basic Swedish massage to a patient suffering from Irritable Bowel Syndrome. The goal of this study is to promote relaxation (by increasing parasympathetic activity), decrease the number of painful bowel movements, and decrease pulse and blood pressure post-treatment.

Hypothesis:

Increase in parasympathetic activity in a patient with Irritable Bowel Syndrome will decrease pulse and blood pressure, promote relaxation, and lessen the severity of the symptoms.

Patient Assessment Findings

History:

The patient is a 22 year old male who was diagnosed with diarrhea predominant IBS in August of 2007. The patient had experienced symptoms since childhood. The symptoms are worsened with stress, lack of sleep, greasy food, and alcohol. He presented with lower abdominal pain, abdominal bloating, pain that lasts through a bowel movement and dissipates upon defecation, and occasional low back pain with defecation. The abdominal pain accompanied with a “flare up” or defecation was a ten out of ten (10/10) on the numerical pain scale, and was described as a “stabbing” or “constricting pain”. The patient usually had approximately 15 to 16 bowel movements per week, with a hard, brown-green consistency. He was prescribed Dicetal to treat the symptoms of IBS, but has not needed to take this medication since 2008. The patient does, however, take 5mg of Dicetal before or after alcohol consumption in order to control the symptoms. His mother, grandmother (on mother’s side), and great aunt (on mother’s side) have also been diagnosed with IBS.

The patient has also been diagnosed with anxiety. In January 2010, he began choking on food, and could not swallow solid food due to anxiety and high stress levels. The patient was prescribed CipraleX (5mg/day) in order to treat the anxiety. The medication was stopped in April 2010 with resolution of the swallowing problem. He reported a current stress level of eight out of ten (8/10) on a numerical stress level scale; this stress was mostly work related.

He works a full time job that consists of mostly standing all day. The patient works out at the gym 5-6 days a week doing resistance and cardio exercises. He states that he eats 5-6 meals a day, with a high protein and fiber intake.

The patient complains of occasional low back pain due to a “slipped disc” in 2009. He had treatments from a chiropractor for one month, which relieved the majority of low back pain.

Observation:

Upon an initial scan exam, the patient’s right anterior sacroiliac crest was more anterior than the left, the trunk was rotated anteriorly on the right side (facing the left), and there was a head forward posture of one centimeter. Auscultation and percussion of the abdomen were performed before each treatment. See SOAP forms in appendix for detailed findings of auscultation and percussion.

Palpation:

The following muscles were palpated before each treatment: Rectus Abdominus, External Abdominal Obliques, Internal Abdominal Obliques, Quadratus Abdominus, and Psoas Major/Minor. The abdomen was assessed for any tenderness or masses (indicating possible fecal matter). See SOAP forms in appendix for detailed abdominal tenderness findings.

Movement:

The range of motion of the lumbar spine was assessed before each treatment. During the initial assessment, active, passive, and resisted range of motion was evaluated. There was no decrease in active or passive range of motions in flexion, extension, right and left lateral flexion, and right and left rotations. There was no weakness or pain with resisted range of motion of the lumbar spine. There was, however, bilateral low back pain with active extension. Before treatments one, two, four, and five, there was no bilateral low back pain with active extension. Before treatment three, there was central low back pain with active movement from full lumbar spine flexion to neutral (standing).

Neurological:

In reference to neurological symptoms, the patient was asked if they experienced any numbness, tingling, or weakness anywhere. There was no numbness, tingling, or weakness experienced.

Referred Pain:

The patient was asked if they experienced any referred pain (either muscular or visceral), explained as “pain perceived anywhere else other than the site of original pain”. In the patient’s case, there was no referred pain experienced; and no trigger points were discovered in any abdominal muscles.

Special Tests:

Before and after each treatment, pulse, blood pressure, and respiratory rate were taken to be used as a baseline. Pulse and blood pressure were taken on the right arm to ensure consistency. The blood pressure reading was taken using a sphygmomanometer. Pulse was taken via the right radial artery and measured during thirty seconds, then multiplied by two in order to achieve a reading for beats per minute. The respiratory rate was taken in the thirty seconds directly following the pulse reading. This was done so the patient was unaware of the therapist observing their breathing, and therefore wouldn’t consciously alter their breathing rate.

The special tests done before each treatment were the tenderness rebound test and the pinch and inch test on the abdomen, to assess for possible peritonitis or appendicitis. Both these tests were negative before all five treatments.

Daily Bowel Movement Charting:

The characteristics of the patient's bowel movements were assessed by using daily bowel movement charts. See appendix to view the charts.

Treatment Outline

Treatment Goals:

The short term goals established before each treatment were to promote relaxation, and encourage diaphragmatic breathing. Promotion of relaxation was achieved through the application of Swedish massage, and measured by a decrease in pulse and blood pressure post-treatment. Encouragement of diaphragmatic breathing was established through patient education of proper breathing technique, used during the treatment and given as home care.

Long term goals for this patient were to decrease the amount of painful bowel movements per week, and decrease the general stress level of the patient. Attempt to decrease the number of painful bowel movements was done through the combination of the relaxation massage and the warm abdominal compress used at home. Decrease of the patient's general stress level was also achieved through relaxation massage treatments, and measured by a numerical stress scale.

Management Plan:

The management plan focused on increasing relaxation of the patient post-treatment, decreasing the patient's pulse and blood pressure post-treatment, and an overall decrease in the patient's stress level. The patient was recommended to receive one treatment per week, for five weeks.

Treatment Protocol:

The treatments for this case study were purely concentrated towards Swedish massage techniques. There was one assessment session and five identical treatments. Each treatment was held on the same day every week, at the same time; Friday at 4:30pm. The time of bodywork done per session was forty-five minutes.

Each treatment began with the patient prone as the therapist applied a rocking technique to the full body. The practitioner placed a full palm on the patient's low back, and the patient was instructed to breathe diaphragmatically, or abdominally, for three full breaths. Then a sacral float was used to encourage lengthening of the spine for five full breaths. The therapist started on the left side of the body and used a small amount of oil to apply slow effleurage to the full back for five minutes. Then palmar stroking, using alternating hands, was used on the patient's left side of the back for five minutes. Next, open "C" kneading was utilized, also on the left side of the body, for five minutes. Wringing on the right and then left side was done for a total of five minutes. Palmar stroking, open "C" kneading, and effleurage were done on the right side of the body (identical to the left), each technique for five minutes. To conclude the prone portion of the treatment, slow, caudal neural stroking was done along the spine five times. In supine, a full sun-half moon technique was applied to the abdomen for

five minutes. The treatment was concluded by applying five minutes of effleurage to the chest, shoulders, and neck.

Oil was used for every treatment, and was applied as needed. Each technique was executed in a slow, rhythmical manner, at approximately five to seven strokes per minute.

Homecare

Hydrotherapy:

A warm abdominal compress was recommended for this patient. The patient was instructed to soak a wash cloth in warm water (approximately 38°C), wring out excess water, and apply to the abdomen. This was to be done once per day, and encouraged to be applied after a diarrhea-like bowel movement. Decreased gastrointestinal motility is a reflex effect that occurs when heat is applied to the abdomen (Rattray & Ludwig, 2000). Moor, Peterson, Manwell, Noble, and Muench (1964) agree by saying “prolonged heat to the abdominal wall causes decreased intestinal blood flow and diminished intestinal motility” (p. 15-16). This confirms that heat to the abdomen after diarrhea will be beneficial.

Remedial Exercise:

For home care, the patient was given diaphragmatic breathing exercises. The patient was instructed to practice diaphragmatic, or abdominal, breathing by expanding their belly on a full inhalation through the nose, and squeezing the belly inward on a full exhalation, through the mouth. This can be explained by telling them to imagine having a “Buddha belly” on the inhalation, and a “Barbie belly” on the exhalation. They were to practice this type of breathing once per day, five minutes before falling asleep while lying in bed, every night. Diaphragmatic breathing was chosen as a remedial exercise because “it promotes relaxation by decreasing the effects of the sympathetic nervous system” (Rattray & Ludwig, 2000, pp 33).

Treatment Results

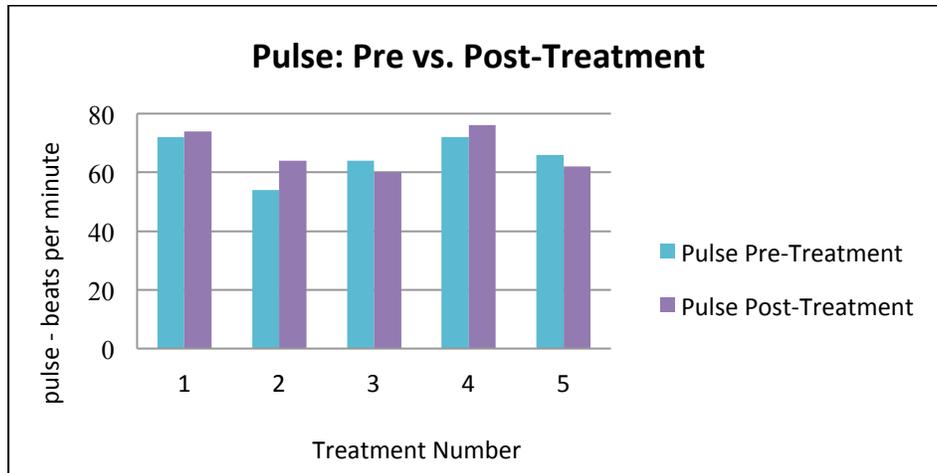
Application of Research to Treatments:

According to the research done for this paper, application of Swedish massage will elicit a parasympathetic response, which promotes relaxation. This results in a reduction of both pulse and blood pressure.

Pulse:

The findings of the patient’s pulse include measurements in beats per minute (bpm) pre and post-treatment.

Treatment Number	Pre-Treatment Pulse	Post-Treatment Pulse
1	72 bpm	74 bpm
2	54 bpm	64 bpm
3	64 bpm	60 bpm
4	72 bpm	76 bpm
5	66 bpm	62 bpm

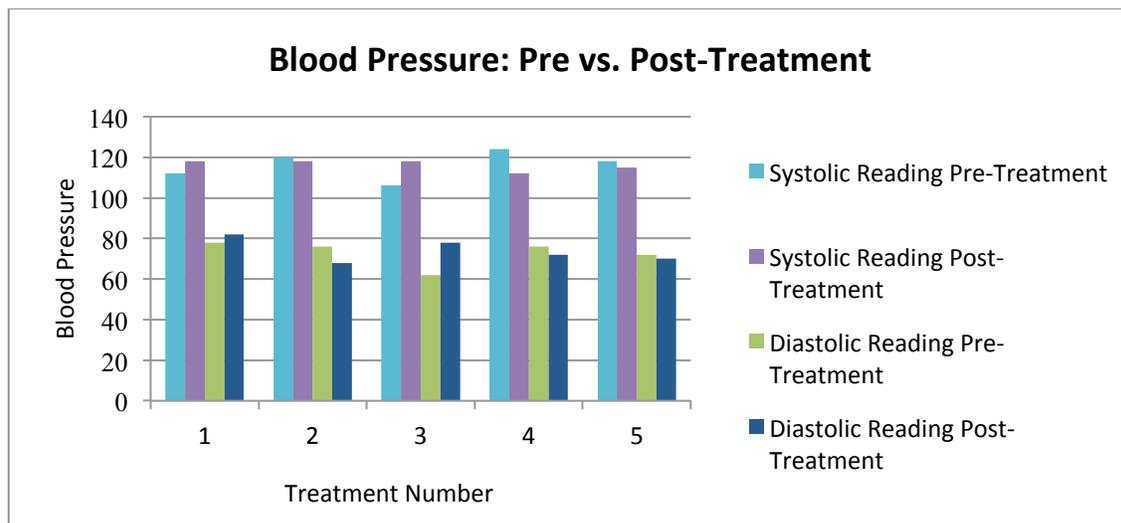


The patient's average pulse was 66 bpm pre-treatment and 67 bpm post-treatment. A slight increase was unexpected because a parasympathetic response should decrease pulse (Kalat, 2007).

Blood Pressure:

The findings of the patient's blood pressure include systolic and diastolic measurements pre and post-treatment.

Treatment Number	Pre-Treatment Systolic	Pre-Treatment Diastolic	Post-Treatment Systolic	Post-Treatment Diastolic
1	112	78	118	82
2	120	76	118	68
3	106	62	118	78
4	124	76	112	72
5	118	72	115	72



The patient's average systolic reading was 116 pre-treatment and 116 post-treatment. The patient's average diastolic reading was 72 pre-treatment and 74 post-treatment. Referring to the research provided, relaxation massage should decrease both systolic and diastolic blood pressure readings.

Respiratory Rate:

The findings of the patient's respiratory rate include measurements, in breaths per minute, pre and post-treatment.

Treatment Number	Pre-Treatment Respiratory Rate	Post-Treatment Respiratory Rate
1	12	12
2	10	10
3	14	14
4	14	14
5	14	14

There was no difference from pre to post-treatment respiratory rate throughout all five treatments.

Bowel Movements:

The patient recorded the characteristics of his bowel movements for a total of six weeks; one week before the first treatment, and five weeks during the treatments. There was twelve days before the first treatment, with a bowel movement once per day (with the exception of one day). There was a movement earlier on in the day of the treatment. This comes to a total of twelve movements, pre-treatment. Of those twelve movements, there were six that were not accompanied with abdominal pain (50% of pre-treatment movements). The remaining six passings were associated with abdominal pain (50% of pre-treatment movements). Of those six, three had relief of pain with defecation (50% of painful pre-treatment movements). Three movements were not followed by pain relief (50% of painful pre-treatment movements).

During the duration of the five treatments there were twenty-nine days assessed. There was a bowel movement once per day (with the exception of one day), for a total of twenty-eight movements. Of those twenty-eight movements, fifteen were not associated with pain on defecation (54% of post-treatment movements). The remaining thirteen passings were accompanied with lower abdominal pain (46% of post-treatment movements). Ten of those thirteen were relieved of pain upon defecation (77% of painful post-treatment movements). The last three were not accompanied with pain relief (23% of painful post-treatment movements).

There was a slight increase in the number of bowel movements that were not accompanied with abdominal pain; from 50% pre-treatment to 54% post-treatment. A decrease in the number of painful movements was noticed; from 50% pre-treatment to 46% post-treatment. There was an increase in the number of bowel movements that were relieved of pain upon defecation; from 50% pre-treatment to 77% post-treatment. Finally, there was a decrease in the amount of stool passings that were not followed with pain relief; from 50% pre-treatment to 23% post-treatment.

Conclusion

There was an unpredicted outcome from this study. Research shows that Swedish massage therapy activates the parasympathetic nervous system, which should decrease heart rate and blood pressure. Therefore the hypothesis of this paper was refuted, due to the slight increase in pulse and diastolic blood pressure. However, there was a decrease in the number of painful bowel movements throughout the duration of treatments. This is seen as a positive outcome from the patient's perspective.

The primary objective of this study was to investigate the efficacy of Swedish massage on the symptoms of Irritable Bowel Syndrome. This paper is insufficient to make any claims on the tangible effectiveness of these techniques used on this pathology. A single case is not enough to validate the protocol used. Further research into this gastrointestinal disorder is required to authenticate the efficacy of Swedish massage therapy as treatment for Irritable Bowel Syndrome.

Citations:

- Aourella, M., Skooga, M. & Carleson, J. (November, 2005). Effects of Swedish massage on blood pressure. *Complementary Therapies in Clinical Practice Journal*. Volume 11, Issue 4, Pages 242-246.
- Beers, M.H. (Ed.). (2006). *the Merck Manual of Diagnosis and Therapy* (18th ed., pp. 82-84). Whitehouse Station, NJ: Merck Research Laboratories.
- Chang, L. (2006). From Rome to Los Angeles -- The Rome III Criteria for the Functional GI Disorders. Retrieved from <http://www.medscape.com/viewarticle/533460>
- Cure Irritable Bowel. (2008). *IBS Facts and Statistics*. Retrieved February 1, 2011, from http://www.cureirritablebowel.com/irritable_bowel_syndrome_facts_and_statistics.htm
- Dummies.com. (2011). *Eliminating Common IBS Triggers*. Retrieved February 2, 2011, from <http://www.dummies.com/how-to/content/eliminating-common-ibs-triggers.html>
- Gunter, W., Shepard, J., Foreman, R., Myers, D., & Greenwood–Van Meerveld, B. (1990). Evidence for visceral hypersensitivity in high-anxiety rats. *Physiology & Behavior*, Volume 69, Issue 3, pp. 379-382.
- Heisler, J. (1920). *Practical Anatomy*. J. B. Lippincott.
- IBS Treatment. (2008-2011). *IBS – Approach to Treatment*. Retrieved February 2, 2011, from <http://www.ibstreatments.com/ibs-approach-to-treatment/>
- International Foundation for Functional Gastrointestinal Disorders. (2009). *Defining IBS*. Retrieved February 1, 2011, from <http://www.aboutibs.org/pdfs/IBSpatients.pdf>
- International Foundation for Functional Gastrointestinal Disorders. (2010, April 25). *Symptoms of IBS*. Retrieved February 2, 2011, from <http://www.aboutibs.org/site/about-ibs/symptoms/>
- Johnson, L. R. (2006). *Physiology of the Gastrointestinal Tract*. (Volume 1). Academic Press.
- Kalat, J. (2007). *Introduction to Psychology*. (8th ed.). Cengage Learning.
- Kwan, A., & Lai, T. (2005). Irritable Bowel Syndrome – A Syndrome in Evolution. *The Hong Kong Medical Diary*, Vol.10, No.12.
- Mayo Clinic. (2009, July 29). *Irritable Bowel Syndrome*. Retrieved February 1, 2011, from <http://www.mayoclinic.com/health/irritable-bowel-syndrome/DS00106>
- Mayo Clinic. (2009, July 29). *Irritable Bowel Syndrome: Tests and Diagnosis*. Retrieved February 2, 2011, from <http://www.mayoclinic.com/health/irritable-bowel-syndrome/DS00106/DSECTION=tests-and-diagnosis>
- McPhee, S., & Papadakis, M. (2009). *Current Medical Diagnosis and Treatment*. (48th ed., pp. 554-557). McGraw-Hill Companies, Inc.

- Moor, F., Peterson, S., Manwell, E., Noble, M., & Muench, G. (1964). *Manual of Hydrotherapy and Massage*. Boise, ID: Pacific Press Publishing Association.
- National Digestive Diseases Information Clearinghouse. (2007, September). *Irritable Bowel Syndrome*. Retrieved February 1, 2011, from <http://digestive.niddk.nih.gov/ddiseases/pubs/ibs/>
- Ohman, L. & Simren, M. (2007). New insights into the pathogenesis and pathophysiology of irritable bowel syndrome. *Digestive and Liver Disease*, 39; 201–215.
- Rakel, D. & Faass, N. (2006). *Complementary medicine in clinical practice: integrative practice in American healthcare*. Jones & Bartlett Learning.
- Rattray, F. & Ludwig, L. (2000). *Clinical Massage Therapy*. Elora, ON: Talus Incorporated.
- Ritchie, J. (1973). Pain from distension of the pelvic colon by inflating a balloon in the irritable bowel syndrome. *Gut*, 14, 125-132.
- Shen, Y., & Nahas, R. (2009). Complementary and alternative medicine for treatment of irritable bowel syndrome. *Canadian Family Physician*. 55(2): 143-8.
- Snell, R. (2008). *Clinical Anatomy by Regions*. (8th ed., pp. 229-234). Baltimore, MD: Lippincott Williams & Wilkins.
- Talley, N. (2008). *Conquering Irritable Bowel Syndrome: a Guide to Liberating Those Suffering with Chronic Stomach or Bowel Problems*. PMPH-USA.
- Tillisch, K., Mayer, E., Labus, J., Stains, J., Chang, L., Naliboff, B. (2005). Sex specific alterations in autonomic function among patients with irritable bowel syndrome. *Gut*, 54:1396-1401.
- Tortora, G., & Derrickson, B. (2009). *Principles of Anatomy and Physiology*. (12th ed., pp. 949-960). Hoboken, NJ: John Wiley & Sons, Inc.
- Van Orshoven, N., Andriessse, G., Van Schelven, L., Smout, A., Akkermans, L., & Oey, P. (2006). Subtle involvement of the parasympathetic nervous system in patients with irritable bowel syndrome. *Clinical Autonomic Research*, Volume 16, Number 1, 33-39.
- Whitehead, W. (2006). Hypnosis for irritable bowel syndrome: the empirical evidence of therapeutic effects. *The International Journal of Clinical and Experimental Hypnosis*. 54(1): 7-20.
- Whitehead, W., Holtkotter, B., Enck, P., Hoelzl, R., Holmes, K., Anthony, J., Shabsin, H., & Schuster, M. (1990). Tolerance for rectosigmoid distention in irritable bowel syndrome. *Gastroenterology*, 98(5

Appendix

The following tables are replications of the original daily bowel movement charting done by the patient, for a total of six weeks.

Sun, Oct. 24, 2010	Mon, Oct. 25, 2010	Tues, Oct. 26, 2010	Wed, Oct. 27, 2010	Thu, Oct. 28, 2010
Bowel movement? ■ yes □ no				
Colour : med brown	Colour : light	Colour : medium	Colour : light-green	Colour : green
Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? □ no pain ■ yes □ no
How long to pass? 2 min	How long to pass? 1 min	How long to pass? 1 min	How long to pass? 3-4 min	How long to pass? 4 min
Describe stools: hard/cylindrical	Describe stools: hard/cylindrical	Describe stools: hard	Describe stools: hard/mushy	Describe stools: mushy
Time of day: 11:30pm	Time of day: 12pm	Time of day: 1:30pm	Time of day: 12:30pm	Time of day: 12pm

Fri, Oct. 29, 2010	Sat, Oct. 30, 2010	Sun, Oct. 31, 2010	Mon, Nov. 1, 2010	Tues, Nov. 2, 2010
Bowel movement? ■ yes □ no	Bowel movement? ■ yes □ no	Bowel movement? ■ yes □ no	Bowel movement? □ yes ■ no	Bowel movement? ■ yes □ no
Colour : light	Colour : dark	Colour : light	Colour :	Colour : dark
Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain □ yes ■ no	Relief of pain? □ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no
How long to pass? 2 min	How long to pass? 2 min	How long to pass? 4 min	How long to pass? min	How long to pass? 5 min
Describe stools: hard/chunky	Describe stools: hard/chunky	Describe stools: mushy/light	Describe stools:	Describe stools: hard/chunky
Time of day: 1pm	Time of day: 3:30pm	Time of day: 6:30pm	Time of day:	Time of day: 1pm

Wed, Nov. 3, 2010	Thu, Nov. 4, 2010	Fri, Nov. 5, 2010	Sat, Nov. 6, 2010	Sun, Nov. 7, 2010
Bowel movement? ■ yes □ no	Bowel movement? □ yes ■ no			
Colour : light	Colour : medium	Colour : medium	Colour : dark	Colour :
Relief of pain? □ no pain □ yes ■ no	Relief of pain? □ no pain □ yes ■ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? □ no pain □ yes □ no
How long to pass? 1 min	How long to pass? 2 min	How long to pass? 2 min	How long to pass? 3 min	How long to pass? min
Describe stools: watery/mushy	Describe stools: oily/cylindrical	Describe stools: cylindrical	Describe stools: hard/chunky	Describe stools:
Time of day: 2:30pm	Time of day: 2pm	Time of day: 2:30pm	Time of day: 3pm	Time of day:

Mon, Nov. 8, 2010	Tues, Nov. 9, 2010	Wed, Nov. 10, 2010	Thu, Nov. 11, 2010	Fri, Nov. 12, 2010
Bowel movement? ■ yes □ no				
Colour : medium	Colour : dark	Colour : medium	Colour : medium	Colour : dark
Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? ■ no pain □ yes □ no
How long to pass? 2 min	How long to pass? 1 min	How long to pass? 1 min	How long to pass? 4 min	How long to pass? 1 min
Describe stools: hard	Describe stools: chunky	Describe stools: chunky	Describe stools: hard/chunky	Describe stools: chunky
Time of day: 1pm	Time of day: 9am	Time of day: 12:30pm	Time of day: 1pm	Time of day: 8pm

Sat, Nov. 13, 2010	Sun, Nov. 14, 2010	Mon, Nov. 15, 2010	Tues, Nov. 16, 2010	Wed, Nov. 17, 2010
Bowel movement? ■ yes □ no				
Colour : medium	Colour : light	Colour : dark	Colour : light	Colour : dark
Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? □ no pain □ yes ■ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no
How long to pass? 2 min	How long to pass? 2 min	How long to pass? 5 min	How long to pass? 3 min	How long to pass? 3 min
Describe stools: chunky	Describe stools: cylindrical	Describe stools: hard/cylindrical	Describe stools: cylindrical	Describe stools: hard/cylindrical
Time of day: 2pm	Time of day: 2pm	Time of day: 11am	Time of day: 12pm	Time of day: 2pm

Thu, Nov. 18, 2010	Fri, Nov. 19, 2010	Sat, Nov. 20, 2010	Sun, Nov. 21, 2010	Mon, Nov. 22, 2010
Bowel movement? ■ yes □ no				
Colour : light	Colour : pale	Colour : medium	Colour : dark	Colour : medium
Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no
How long to pass? 2 min	How long to pass? 4 min	How long to pass? 2 min	How long to pass? 1 min	How long to pass? 1 min
Describe stools: chunky/cylindrical	Describe stools: oily/cylindrical	Describe stools: chunky	Describe stools: lumpy/soft	Describe stools: chunky/hard
Time of day: 3pm	Time of day: 1pm	Time of day: 2pm	Time of day: 11am	Time of day: 12pm

Tues, Nov. 23, 2010	Wed, Nov. 24, 2010	Thu, Nov. 25, 2010	Fri, Nov. 26, 2010	Sat, Nov. 27, 2010
Bowel movement? ■ yes □ no				
Colour : light	Colour : medium	Colour : medium	Colour : light	Colour : dark
Relief of pain? □ no pain ■ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? □ no pain □ yes ■ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? ■ no pain □ yes □ no
How long to pass? 2 min	How long to pass? 3 min	How long to pass? 5 min	How long to pass? 3 min	How long to pass? 2 min
Describe stools: chunky/cylindrical	Describe stools: hard	Describe stools: oily/mushy	Describe stools: chunky/hard	Describe stools: dark/chunky
Time of day: 3pm	Time of day: 1pm	Time of day: 3pm	Time of day: 12pm	Time of day: 11am

Sun, Nov. 28, 2010	Mon, Nov. 29, 2010	Tues, Nov. 30, 2010	Wed, Dec. 1, 2010	Thu, Dec. 2, 2010
Bowel movement? ■ yes □ no				
Colour : dark	Colour : light	Colour : medium	Colour : dark	Colour : light
Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? ■ no pain □ yes □ no	Relief of pain? □ no pain ■ yes □ no	Relief of pain? ■ no pain □ yes □ no
How long to pass? 2 min	How long to pass? 3 min	How long to pass? 1 min	How long to pass? 3 min	How long to pass? 2 min
Describe stools: chunky	Describe stools: hard/cylindrical	Describe stools: cylindrical	Describe stools: chunky/hard	Describe stools: cylindrical/hard
Time of day: 2:30pm	Time of day: 1am	Time of day: 2pm	Time of day: 10pm	Time of day: 11am

Fri, Dec. 3, 2010	Sat, Dec. 4, 2010
Bowel movement? ■ yes □ no	Bowel movement? ■ yes □ no
Colour : light	Colour : medium
Relief of pain? □ no pain □ yes ■ no	Relief of pain? □ no pain ■ yes □ no
How long to pass? 5 min	How long to pass? 3 min
Describe stools: soft/oily	Describe stools: lumpy/mushy
Time of day: 11am	Time of day: 12pm

These lists were used as a reference for the patient while filling out the above charts.

List of colours:

- light brown
- medium brown
- dark brown
- green
- pale
- black
- red

Descriptive words:

- hard
- soft
- lumpy
- mushy
- watery
- flattened
- cylindrical
- oily/greasy
- bloody
- contains mucous
- chunky

SOAP's:

The following charts are the SOAP forms for treatments one thru six used in the student clinic.