

Reducing Tension-Like Headaches of a Full-time Student Using Swedish Massage and Trigger Point Pressure Release

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I would like to thank my parents, brothers, and dear children for their constant love and support. I would mostly like to thank my patient who was so happy to allow me to assess her cervical spine active range of motion with a “CROM” goniometer, even though it looked so silly.

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING
SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

3

TABLE OF CONTENTS

Abstract	4
Introduction	5
Methodology	11
Participant.....	12
Assessment.....	13
Treatment.....	16
Results.....	18
Results During Treatment Phase	22
Discussion	26
References	25
Appendices	31

ABSTRACT

Tension-like headaches have muscular origins and are associated with trigger points (TrPs). “The pain is bilateral, diffuse and constant” (Rattray, & Ludwig 2000). This study investigates Swedish massage and reviews five studies that suggest it is possible to decrease headache (HA) pain through the treatment of TrPs pressure release therapy. This study hypothesizes that Swedish massage and TrPs pressure release therapy may be successful at decreasing the frequency, intensity, duration and area of tension-type HAs of a full-time female student. The model of this study is a single-participant case, involving five treatments over a two-week treatment period. The participant is a 32-year-old who was experiencing an increase in frequency of tension-like HAs. Each session was 30 minutes of Swedish massage and 20 minutes of TrPs pressure release therapy. The patient kept a HA journal for six weeks. An examiner assessment was done before and after all five treatments to track therapist goals including; decrease tension-like HA, increase right cervical flexion, decrease blood pressure and decrease of head forward posture. It is concluded that Swedish massage and TrPs pressure release therapy may have been efficient at decreasing the frequency, and area of the tension-type HAs of a female student. Further recommendations would be to use a larger population sample study, including a placebo group over a longer period of time.

Keywords: tension-like headaches, trigger points, ischemic compression

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

5

Reducing Tension-Like Headaches of a Full-time Student Using Swedish Massage and Trigger Point Pressure Release

Tension-like headaches are a health concern experienced by many, and the population percentile that experiences these types of HAs is growing (Lyngberg, Rasmussen, Jørgensen, & Jensen, 2005). Fortunately the amount of research being done for treating these types of HAs is also growing (Toro-Velasco, Arroyo-Morales, Fernández-De-Las-Peñas, Cleland, & Barrero-Hernández, 2009). In this case study report, the efficacy of Swedish massage and TrPs pressure release therapy used to decrease the frequency, intensity, duration and area of tension-type HAs of a full-time female student is investigated.

TrPs are found within skeletal muscles and are characterized by a number of physical features including, a palpable tender nodule within a taut muscular band, point tenderness at the nodule, characteristic patterns of referred pain and the presence of a local twitch response when stimulated (Simons & Travell, 1999).

So far, the pathogenesis of these types of HAs remains unclear, and most likely has multiple factors. The clear connection of TrPs to tension-like HAs is interesting in the way that pressure placed on peripheral muscular tissue can re-create the central pain of a HA sufferer. Recent, studies that are directed towards the treatment of tension-like HAs by manual therapy to myofascial TrPs have supported the work of Simons & Travell (1999), as an effective way of decreasing the amount of referred pain fields originating from the myofascial TrPs in both HA and non-HA populations (Moraska et. al, 2015). Some research also suggests that the presence of metabolites in the muscles of the head

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

6

and neck are the cause of tension-like HA pain. Where there are TrPs there may be an increase of metabolic activity. However, the flushing of these metabolites with manual therapy may decrease HA pain (Moraska, & Chandler, 2008).

Upon investigating the efficacy of TrPs pressure release therapy on tension-like HAs, five studies with the similar objectives are investigated. They are similar in that they treated patients of chronic primary tension-like HAs with trigger-point release therapy in hopes of decreasing their frequency, intensity and duration. In these studies, all of the therapists used direct treatment of TrPs found in muscles of the neck and head. There are a few different types of TrPs releasing techniques found in source authority materials on treating TrPs, so to be clear these studies all used ischemic pressure to the TrPs to release them as did the treatment for this case study.

When using TrP pressure release, a massage therapist would use introductory techniques of massage, or warm up techniques as per the authority of Simons & Travell, (1999).

These techniques are more general and in this study will be referred to as Swedish massage. In the studies mentioned, the therapists chosen to carry out the treatments had at least three years of practical experience in massage and all had used Swedish massage to warm up the tissues before the application of TrP pressure release therapy. For example, in the randomized control of Berggreen, Wiik, & Lund, (2012) a warm up technique is described as, “The muscle tissue was massaged using petrissage (kneading) so the patient felt comfortable with the hands of the therapist.” Petrissage, along with other general techniques such as palmar stroking, fingertip kneading, muscle belly stripping among others are classified as Swedish technique (Rattray & Ludwig, 2000) that has its own

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

7

benefits to decreasing tension-like HAs, by increasing local circulation and flushing possible metabolites in the area.

Since stress may be a cause of tension in muscles, it is important to note that Swedish massage can be used in a smooth, rhythmic and slow pace. By doing so there will be a decrease in the firing of the sympathetic nervous system, that is in controls of the fight or flight responses (Rattray & Ludwig, 2000). When applying Swedish massage in this way, the goal would be to increase relaxation by relieving stress, therefore stimulating the parasympathetic nervous system (rest and digest), and hopefully decreasing the HAs caused by tension in muscles. In the pilot study of Toro-Velasco et. al, (2009), she speculates that “[it] therefore seems sensible that impairments in the autonomic nervous system (ANS) could be associated with tension-type HAs.”

Much research was found by Dr. Albert F. Moraska (collaborating with other medical professionals), including a pilot study (Moraska, & Chandler, 2008), and two randomized, placebo-controlled clinical trials (Moraska et. al, 2015) (Moraska, Schmiede, Mann, Butryn, & Krutsch, 2017). A randomized controlled trial that involved female participants is also of interest for this present study (Berggreen, Wiik, & Lund, 2012). Lastly, the pilot study of Toro-Velasco, Arroyo-Morales, Fernández-De-Las-Peñas, Cleland, & Barrero-Hernández (2009) was chosen because in that study they looked at data collected on how mood and blood pressure were affected short-term by manual therapy of tension type HAs. All five studies showed positive results in treating primary tension-like HAs with massage and trigger-point release therapy.

The pilot study of Moraska, & Chandler (2008), assessed short term changes on primary

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

8

and secondary HA pain measures in “tension-type” HAs. The 16 participants, who made it to the completion of the study treatments received two treatments a week over three weeks. In summary, the participants collectively experienced an increase of one HA free day per week during the first week of treatment and 1.5 days per week during the follow-up phase. Interestingly, “...the therapists reported that [TrPs] became increasingly difficult to locate and required greater pressure to elicit referred pain phenomenon following repeated massage visits, [these] factors [may] suggest a reduction in [the muscle area’s] metabolic activity (Moraska, & Chandler, 2008).”

The randomized, placebo-controlled clinical trial of Moraska et. al, 2015, assessed “myofascial trigger point - focused head and neck massage for recurrent tension-type HAs of 56 subjects. The 56 study subjects were randomized to receive a massage, a placebo treatment: or put on a waitlist... Each massage or placebo session was 45 minutes in duration, administered twice per week, and separated by at least 48 hours”. The sham session was 45 minutes in duration, where a detuned ultrasound was administered twice per week. The wait-list group was included to assess the natural course of tension-type HAs over time.

To summarize some relevant findings, “[a]nalysis of the collected data indicated HA frequency decreased from baseline for both massage and placebo but no difference was detected between massage and placebo in the frequency” and “self-report did indicate a [positive] difference in overall headache pain.” Though the massage treatment was effective, this highlights the importance of how “[tension-type HAs] like other chronic conditions, is responsive to placebo.”

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

9

Another randomized placebo-controlled clinical trial of Moraska et. al, 2017 assessed the “effects of single and multiple massage treatments on pressure-pain threshold (PPT) at myofascial trigger points (MTrPs) in people with myofascial pain syndrome expressed as tension-type headache.” Similar to the previous trial of 2015, the subjects were randomized to receive either 12 twice-weekly 45-min massage, sham ultrasound sessions or wait-list control. From the HA diary findings they found that for the group that received massages and the sham treatments there was a decrease in the frequency of HAs, but not for the intensity or duration of them. The group that received massage also reported that they experienced a great reduction of HA pain compared to the placebo or wait-list groups. The report also showed that the “PPT [pressure-pain threshold] improved in all muscles tested” for the massage group.”

The randomized controlled trial that involved female participants was of interest because the present case study’s patient is female as well. “The [aims] of this study were therefore to evaluate the efficacy of myofascial TrP massage in the muscles of the head, neck and shoulders regarding pain in the treatment of patients with chronic HAs. Secondly, the study strived to observe changes in medicine consumption and quality of life” (Berggreen, Wiik, & Lund, 2012). The participants were randomized into either a treatment group that received one session of TrP massage per week for 10 weeks, or a control group receiving no treatment. The report found “[a] significant improvement in morning pain was recorded in the treatment group compared with the control group.” and that “a significant decrease in the number of TrPs was observed in the treatment group compared with the control group.” Concluding that, “myofascial trigger point massage

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

10

has a beneficial effect on pain in female patients with chronic tension-type headache.”

The final study researched for its positive findings of TrP pressure release therapy to treat tension-like HAs is the pilot study by Toro-Velasco et. al, (2009), where the short-term effects of manual therapy on heart rate variability, mood state and pressure pain sensitivity were tested. “Heart rate variability (HRV) has become the conventionally accepted term to describe variations of both instantaneous heart rate and rate recovery intervals. Heart rate variability reflects the influence of the [ANS] on heart rate.” Some studies have shown that “it would be plausible to suggest that manual therapy aimed at inactivating muscle TrPs may have some [positive] impact on the ANS in patients with [chronic tension-type headaches]” (Toro-Velasco et. al, 2009). There were eleven patients (8 females), between 20 and 68 years old, with chronic tension HAs that participated in the study. Participants “received either the experimental treatment (massage protocol) or a placebo intervention (detuned ultrasound).” The study found that even with the application of a single session of manual therapy, there was an immediate increase of index HRV and a decrease in tension, anger status, and perceived pain in patients with chronic tension-like HAs. The pilot study discusses how, “the sympathetic facilitation of mechanical sensitization and facilitation of the local and referred pain reactions in muscle TrPs exists, confirming sympathetic responses elicited by muscle TrPs. It therefore seems sensible that impairments in the ANS could be associated with tension-type headaches.” This is important to the current study, because the proper protocol of TrP pressure release is to pretreat the muscles with Swedish massage.

Swedish massage is said to be able to decrease the nervous responses of the sympathetic

division of the ANS. The ANS is responsible for causing systemic tension which then further leads to tension in muscles. When TrPs are present from tension in the muscles, tension-like HAs are caused (Rattray & Ludwig, 2000).

These studies had control groups that suffered from primary tension-like HAs. The researchers were all careful to rule out participants of other HA types, like migraine HAs. The majority of the studies selected to review had treatments utilizing TrP pressure release therapy to muscles of the head and neck. All studies showed a decrease of pain associated with tension-like HAs when this type of therapy was used. Similar to the studies reviewed, it is hypothesized that for the current study, the manual work of Swedish massage and TrP pressure release may be successful at decreasing the frequency, intensity, duration and area of tension-type HAs of a full-time female student, over a two-week treatment period.

METHODOLOGY

The model chosen for this experiment is that of a single- participant case study in which the researcher, examiner and therapist are one in the same. The experiment is comprised of 5 treatments over 10 days. Each treatment included a 50 minute massage therapy session with an initial assessment done at the time of the 1st treatment and before and after treatment assessments done at every subsequent treatment. The assessment measures included objective and subjective data.

Participant

The participant is a 32-year-old female who is a full-time naturopathic medical student.

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

12

She has no known allergies and no relevant history of injury or medication intervention. She has had a moderately active life up until she started school about two years ago, and she spends most of her time studying in a lecture-type environment. She is still able to make time in her schedule for light cardio once a week, strength training once a week and stretching for 40 minutes almost daily. She sleeps well, and has no history of bruxism. According to the patient, she usually does not wake up with HAs but has noticed an increase of tension-like HAs, especially over the last six months. She says they will often be present as “pressure in the temples and suboccipital area.” She believes they have been getting worse due to the stress of her schooling. Her goal for the study is to understand how to prevent the HAs from getting to the point of being severe. The participant visits a student naturopathic clinic once a week, but for the purposes of this study, she did not see them for any treatment from, “the waist and up”.

Assessment

The patient kept a HA journal for 6 weeks. The first two weeks are referred to as, “the pretreatment phase.” The data collected from this first phase was used to establish what was normal for the patient. The following two weeks was when the patient was received treatments referred to as, “the treatment duration phase”. The data collected from this phase was used to test the efficacy of immediate benefit. “The post treatment phase” was the two weeks following the last treatment day. The data collected from this phase was used to test the longer lasting benefits of treating tension-type HAs with Swedish and TrP pressure release therapy. A data summary of the patient’s HA journal is found in GRAPH 1, GRAPH 2 and GRAPH 3 in the results section. These graphs compare the frequency

and intensity and area of HAs experienced in the pretreatment phase and the treatment duration phase.

She also completed a McGill Pain Questionnaire before the study treatments began and two weeks after the last study treatment. This was done to evaluate the patient's experienced pain and to monitor her pain in general before and after treatment.

For the initial visit there was a thorough assessment including: patient history, full postural assessment, palpation of the muscles of mastication, neck and shoulders, active/passive/resisted range of motions for the temporomandibular joint, cervical spine, shoulder joint, and thoracic spine, manual muscle tests, muscle length tests, cervical spine joint play, blood pressure, Measurement of Head Posture Test, Spurling's Test, Cervical Compression Test, and Cervical Distraction Test.

History was done to assess the patient's experience of HAs, sleeping habits, and possible triggers, moreover to ruling out history of bruxism and hypoglycemia which may be a cause of tension-like HAs for some individuals (Hertling & Kessler, 2006) (Simons & Travell, 1999). The history was also used to rule out migraine HAs as the studies previously discussed did. During every visit there was a verbal analogue scale test to help the therapist gauge the level of HA pain the patient was feeling. This scale is numbered from 0 (no pain), to 10 (the worst pain you've ever experienced). This test was done at the end of every treatment to measure the immediate amount of decreased HA pain.

Since postural issues and muscle imbalances may lead to the developments of TrPs in shortened or lengthened muscles, a full postural assessment was done to examine head-

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

14

forward posture, hyperkyphosis, hyperlordosis, scoliosis and pes planus.

A thorough palpation of the muscles of mastication, neck and shoulders was performed to locate areas of tension and TrPs. In the patient's HA journal, there was an area for her to draw the specific location where she was feeling her HAs. Using this part of the patient's HA journal as reference in comparison to the "Trigger Points 1", chart by Murton, Tim, and McDonald (1984), the therapist found and confirmed TrPs with the patient's feedback. Together they were able to locate where they were feeling their HA while the TrP was being firmly pressed.

An active/passive/resisted range of motions for the temporomandibular joint, cervical spine, shoulder joint, and thoracic spine were also performed because according to Rattray, & Ludwig (2000), "there is reduced cervical and thoracic mobility in [active and passive] ranges of motion in muscles affected by TrPs. There may also be reduced ranged in mandibular motion."

There were manual muscle tests and muscle length tests done on the upper trapezius, splenius capitus/cervicis, semispinalis capitus/ cervicis, and sternocleidomastoid muscles because these muscles may be weak due to the presence of TrPs (Rattray & Ludwig, 2000). The results of the manual muscle testing before and after treatment are found in CHART 2 of the results section.

The cervical spine active range of motion was measured by a CROM goniometer including flexion, extension, bilateral rotations and bilateral side flexions. Upon initial assessment, restriction of right cervical rotation was found. Results for only the active cervical rotation to the right, assessments for before and after treatment are found in

GRAPH 4.

Upon the initial postural assessment of the patient, the examiner found that the patient had slight head forward posture. Poor posture may be an aggravating factor of the development of TrPs (Rattray & Ludwig, 2000). The “Measurement of Head Posture Test” found in Hertling & Kessler’s text (2006) describes this test as an effective way of assessing the sternocleidomastoid angle. Therefore, it’s not only a postural test for head forward posture, but it also assesses as the natural resting position of the sternocleidomastoid muscle.

The test is performed by having the patient stand with their heels in line with the edge of an open door, and having the apex of their sacrum and the apex of the kyphosis of the thoracic spine rest on the edge of the open door. A perpendicular measurement is taken from the edge of the door to the apex of the lordosis of the cervical spine. A measurement of 4-8cm is considered normal. This test was performed before and after every treatment and the results can be found in GRAPH 5.

Before and after every treatment, the patient’s blood pressure was taken by a barometric blood pressure cuff in conjunction with stethoscope to note any changes in the firing of the sympathetic nervous system. This is an effective way to assess any change, since this is the autonomic nervous division responsible for the increase of blood pressure (Rattray & Ludwig, 2000). There was also interest in these findings for this present study to see if they correlate to the findings from the Toro-Velasco et. al, (2009) pilot study already discussed. The results of pre-and post treatment blood pressure measurements are found in GRAPH 6.

The following special tests; “Spurling’s Test, Cervical Compression Test, and Cervical Distraction Test, were performed to differentiate a facet joint irritation that may underlie the headache” (Rattray & Ludwig, 2000). Grade two cervical spine joint play was performed to rule out capsular restrictions of the cervical spine.

Based off the relative findings from the initial assessment including every treatment (#1-#5), the following before and after treatment tests were performed: verbal analogue scale (Chart 1), cervical spine active range of motion (GRAPH 4), “Measurement of Head Posture” (GRAPH 5), blood pressure (GRAPH 6), and a manual muscle test of sternocleidomastoid (CHART 2).

Treatment

The case participant was treated over 2 weeks, over 5 treatments, for 50 minutes each session. The treatment was comprised of Swedish massage warm-up techniques leading to TrP pressure release to muscles of the head and neck. The treatments would always start in prone position where general Swedish massage techniques were applied to the shoulders and thoracic spine for at least 10 minutes. The Swedish techniques included in sequence; compressions of the back, effleurage of the back, alternate palmar stroking and deep palmar stroking of both sides of the back in a caudal direction to the level of rib 12, open- c to both sides of the thorax and shoulder area, knuckle stroking in a caudal direction of the posterior and lateral neck to the shoulders, picking up of the upper trapezius muscle, then alternate stroking in a caudal direction to the posterior and lateral neck, and to the upper and mid back, finishing with a slow effleurage.

The patient would then lay supine for the duration of the treatment. More general

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

17

Swedish massage with effleurage, fingertip stroking and kneading to muscles that presented with TrPts. These Swedish techniques were alternated with TrP pressure release. This was including muscle belly stripping to prepare the muscles presenting with TrPs was performed to follow proper protocol of TrP pressure release. TrP pressure release (also described as ischemic compressions or myofascial TrP pressure release in some texts) was applied when TrPs were reported by the patient to have a referral pain pattern to the head, of three out of ten on the pain scale or greater when pressed.

The muscles where TrPs were found varied from treatment to treatment since the therapist experienced something similar to what the therapists experienced in the Moraska, & Chandler (2008) study. It is written that the TrPs “became increasingly difficult to locate and required greater pressure to elicit referred pain phenomenon following repeated massage visits.”

Specific muscles that were usually treated with TrP pressure release were sternocleidomastoid, upper trapezius, splenius capitis, and semispinalis cervicis. These muscles, among others were also listed for muscles that were treated with TrP pressure release, in the randomized control trial of Berggreen, Wiik, & Lund, (2012). Usually a total of four TrPs were worked on during one treatment because of time constraints and to “create a balance between the desire to thoroughly inactivate all TrPs causing the headache and overtreatment” (Rattray & Ludwig, 2000).

The massage treatment was finished with gentle and very slow cervical spine, passive range of motion as per Rattray & Ludwig’s massage guidelines (2000).

The case study protocol did not include remedial exercise or hydrotherapy as the goal

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING
SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

18

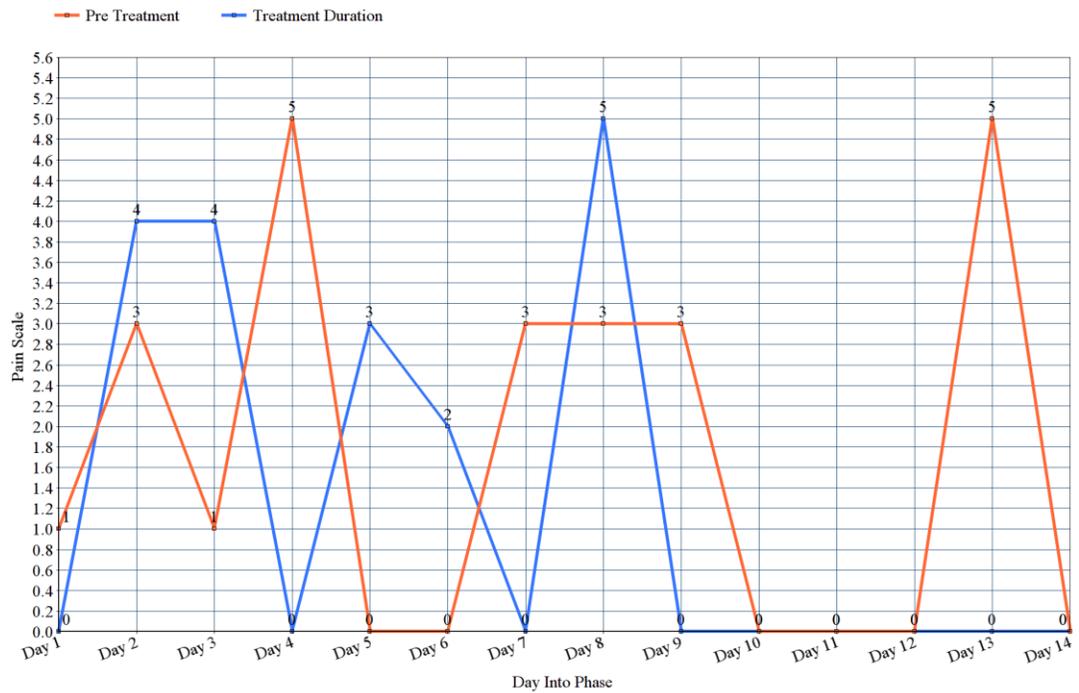
was to assess the efficacy of the chosen modalities as a stand-alone therapeutic treatment.

RESULTS

The following three graphs are visual summaries of the patient's HA journal during the first two phases, the pretreatment phase, and the treatment duration phase. Note that during the post treatment phase, the patient did not experience any HAs so there was no data to show.

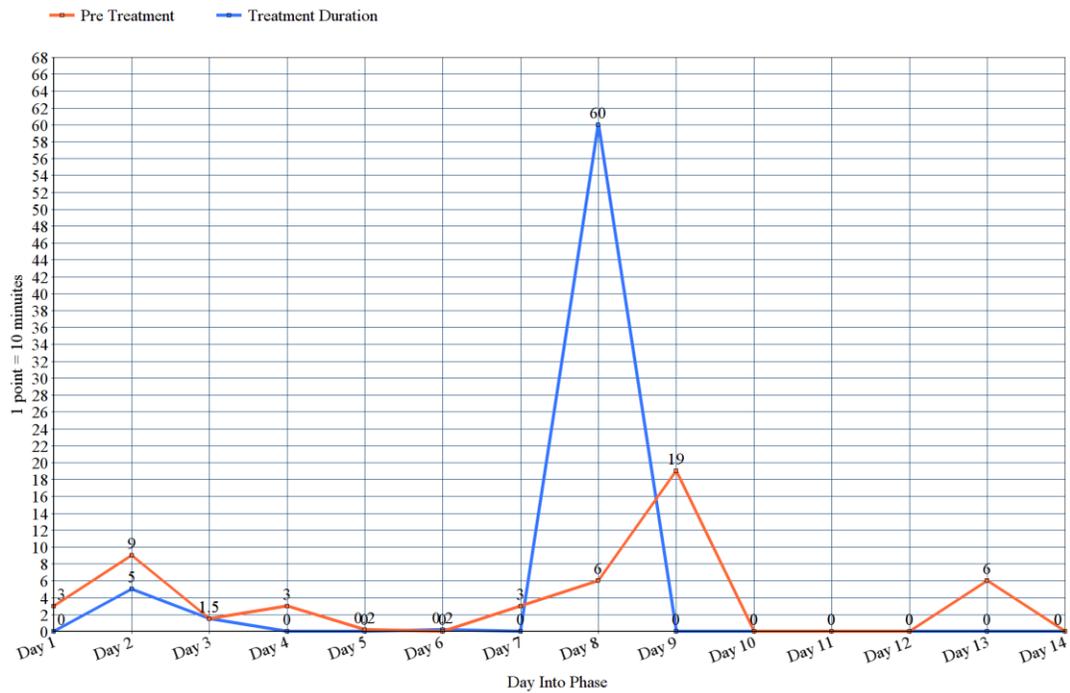
REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

Graph 1: Headache Journals - Verbal Analogue Scale - Intensity



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Graph 2: Headache Journals - Verbal Analogue Scale - Duration

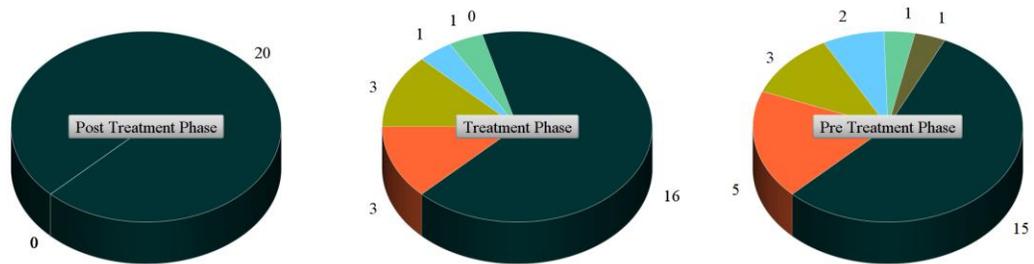


Graph 3: Headache Journals - Area of Headache

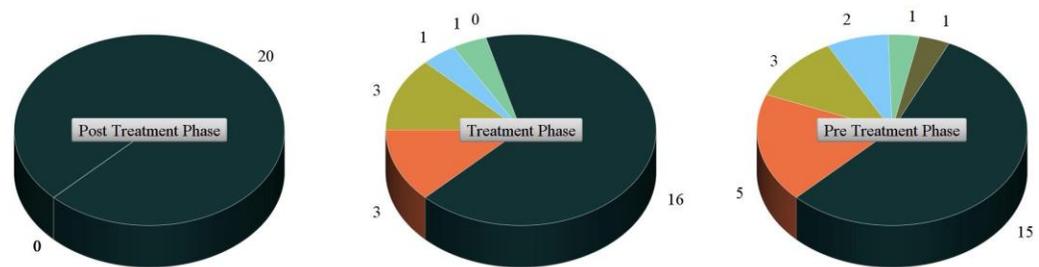
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Graph 6 - Areas of Headache Pain - Headache Journal Summary

■ Left Occiput
 ■ R Occiput
 ■ R Temple
 ■ L Temple
 ■ L eye
 ■ HA free area



■ Left Occiput
 ■ R Occiput
 ■ R Temple
 ■ L Temple
 ■ L eye
 ■ HA free area



REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING
SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

The Mc Gill Pain Questionnaire was also used before the initial assessment. The patient scored at 41. A person scoring 0 would be considered to have no true pain, and 78 would be the maximum score. Two weeks after the last treatment the patient scored a 21.

The following special tests; “Spurling’s Test, Cervical Compression Test, and Cervical Distraction Test, were negative.

Results During Treatment Phase

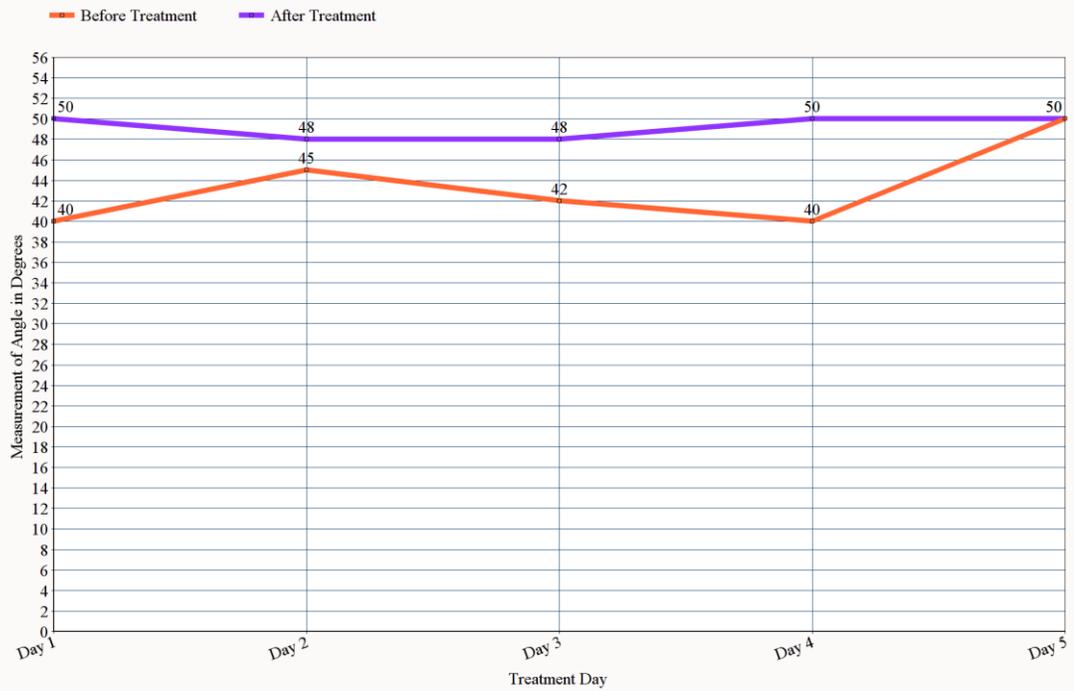
Dated: May 1st, 2017 - May 14th, 2017

Chart 1: Pain Scale - Verbal Analogue Scale Out of 10 - Before and After Treatment

Treatment Number	1	2	3	4	5
Before	1	0	2	3	0
After	0	0	0	0	0

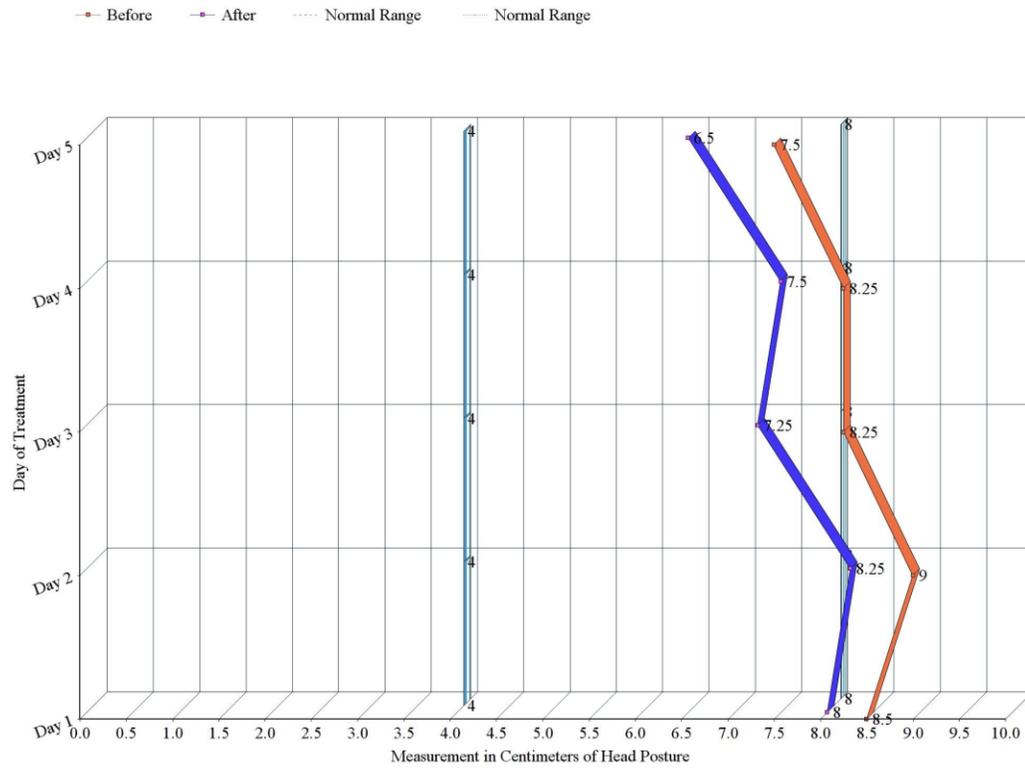
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GRAPH 4: Active Cervical Right Rotation - Before and After Treatment



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GRAPH 5: Measurement of Head Posture Test - Before and After Treatment



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GRAPH 6: Blood pressure - Before and After Treatment

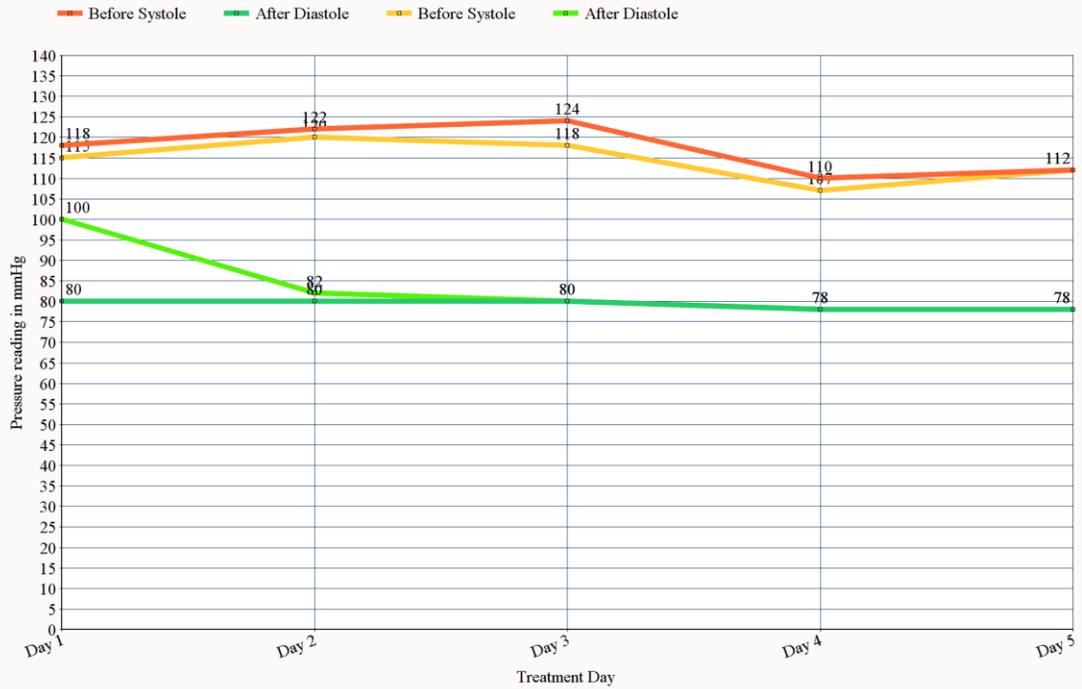


Chart 2- Manual Muscle Test of Sternocleidomastoid

Treatment	1	1	2	2	3	3	4	4	5	5
Side	R	L	R	L	R	L	R	L	R	L
Before	3+	3+	3+	3+	4	3+	4	3+	4	3+
After	3+	3+	3+	3+	4	3+	4	3+	4	3+

R= muscle on right side of neck

L= muscle on left side of neck

DISCUSSION

After looking at all of the collected data from this current study it appears as that the manual work of Swedish massage and TrP pressure release was successful at decreasing the frequency, and area of tension-type HAs of a full-time female student over a two-week treatment period. Due to an uncontrollable variable, the treatment of the intensity and duration of the HAs is left inconclusive.

According to the HA journals (Graph 1 and 2), it appears as though the treatment was moderately successful at decreasing the frequency of tension-type HAs, over the two-week period where treatments were received and the two weeks following. This seems to be the result, especially since the patient did not experience any HAs at all in the post treatment phase of two weeks after treatment ended indicating acute and subacute benefits of TrP pressure release as treatment.

The data collected to see if there was change in the intensity, and duration of the patient's tension-type HAs remains inconclusive. This observation was made because on May 8th, 2017, the patient had the worst recorded tension-like HA that lasted nearly 10 hours. That day also happened to be a treatment day, and it was during the treatment phase of the study. By the time her treatment was over, her HA that she rated a 3-5/10 on the verbal analogue scale, diminished to a 0/10. The patient was under a lot of emotional stress that day, due to exams. This was an uncontrollable variable that was encountered, therefore the study cannot say that there was a definite decrease in the intensity, or duration of her tension-type HAs because this HA skewed results.

According to Graph 3, there was a decrease in the areas that the patient felt her tension-type HAs. During the pretreatment phase the patient felt her HAs in five different places

REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

27

in her head. That number changed to four during the treatment phase and declined to zero during the post treatment phase.

The assessments done during the treatment phase shown in Chart 1 and 2, and Graphs 4, 5, and 6 shows that the therapist's goals were met including; decrease tension-like HA, decrease TrPs in head and shoulder muscles, increase right cervical flexion, decrease blood pressure and decrease of head forward posture.

A particularly interesting find was that for the assessments of treatment 3, 4, and 5 the patient's sternocleidomastoid right muscle was stronger (day 2 it was a 3+ when there was a TrP present, then day 3, 4, and 5 it was graded at a 4). This result also happened to correlate with no TrP being found in the right sternocleidomastoid muscle after treatment day 3. This then confirms the idea that muscles may be weak due to the presence of TrPs (Rattray & Ludwig, 2000)

According to the results of the McGill Pain questionnaire, which was used to assess the amount of general pain the patient felt, the amount decreased from 41 to 21 (a 26% decrease). In conclusion, the hypothesis was supported for massage therapy and TrP pressure release being an effective modality in decreasing the frequency and area of tension-like HAs.

One of the challenges to the consistency of this study's treatments was that for each treatment, different TrPs were worked on since the original ones would become increasingly harder to locate since the effects of the previous treatment seemed to be effective at decreasing their size, and density.

In both of the Moroska studies there were groups of patients who responded positively to

their sham treatments. In this study there was no placebo group so the question of whether the treatment itself was effective, or just the idea of the patient receiving treatment is effective enough to decrease HA pain, is still not answered.

Further recommendations would be to do a larger population sample study, including a placebo group and over a longer period of time. The examiners would be able to test the placebo effect and hopefully be able to compare before and after treatment trends. Times of high stress are inevitable in life and are most likely the culprit to affect test results of assessing tension-like HAs over a short period of time.

It appears as though the manual work of Swedish massage and TrP release was moderately successful at decreasing the frequency, and area of tension-type HAs of a full-time female student, over a two week treatment period, but the effectiveness of the treatment of the intensity and duration of the HAs is left inconclusive.

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REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING
SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

29

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30

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REDUCING TENSION-LIKE HEADACHES OF A FULL-TIME STUDENT USING
SWEDISH MASSAGE AND TRIGGER POINT PRESSURE RELEASE

31

APPENDICES

The following pages are from the record keeping of the therapist/ examiner for this case study.