The Effect of Active Release Technique On Tension Headaches: A continuation study

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ABSTRACT

Introduction: This research project is a continuation of a previous study that evaluated the effect of Active Release Technique® on tension type headaches. The treatment protocols and evaluation methods used in the previous study were also used in this study. The goal of this three week study was to treat participants who suffered from tension headaches. Data was collected to evaluate the effectiveness of ART® treatments to treat this common condition.

Methods and Results: Prior to the first treatment, a Headache Disability Index (HDI) and a Quadruple Visual Analog Scale (QVAS) was filled out by the participant to measure the amount of functional impairment. At each subsequent visit, a QVAS was complete to track progress or non-progress. After the final visit, another HDI was completed by the participant. The HDI mean of the study participants was 22.7 prior to treatment and 15.7 post treatment. The QVAS mean prior to treatment was 35.2 and the post treatment mean was 29.3.

Discussion: Often times tension type headaches are treated by pharmaceutical means. These treatments typically have adverse side effects associated with them. ART® utilizes a manual approach to treating muscle adhesions and nerve entrapments that may cause the headache; treating the cause rather than masking the symptoms. By doing a continuation study, the number of participants in the study was doubled and the results show that the use of ART® can improve the symptoms associated with tension type headaches.

Conclusion/Significance: When comparing the data of this follow up study to the original study done by M. Diller D.C. and R. Smith D.C., it is evident that Active Release Technique® is an appropriate alternative for tension-type headaches. When comparing the two separate data groups, a similar trend is noted in decreasing symptomatology and disability caused by the headaches.

INTRODUCTION

The three most common headaches, according to the International Headache Society (IHS), are the migraine, cluster and tension-type headache. 78 percent of adults suffer from tension headaches making them the most common. The pain is typically described as pressing or tightening on both sides of the head. According to the National Headache Foundation, these headaches have two different classifications: chronic and episodic, depending on frequency and severity of symptoms (9). The headache must meet diagnostic criteria before it can be classified as tension-type. The criteria set by the IHS is as follows [1]:

A. At least 10 episodes occurring on <1 day per month on average (<12 days per year) and fulfilling criteria B-D
B. Headache lasting from 30 minutes to 7 days
C. Headache has at least two of the following characteristics:
    a. Bilateral location
    b. Pressing/tightening (non-pulsating) quality
    c. Mild or moderate intensity
    d. Not aggravated by routine physical activity such as walking or climbing stairs
D. Both of the following:
    a. No nausea or vomiting (anorexia may occur)
    b. No more than one of photophobia or phonophobia

Tension headaches may be "episodic" if they are less than 15 days per month or "chronic" if they occur more than 15 days per month. These headaches are often described as a steady band-like pain, tightness or pressure around the forehand or back of head and neck. These patients usually have these headaches at the end of the day. According to *Standards of Care for Headache Diagnosis and Treatment*, most sufferers have reported that their tension headaches often develop in the afternoon or at times in the early parts of the evening. This may be as a result of built up stress as the day wears on (1). Chronic tension headache sufferers usually describe a throbbing pain that affects the front, top and sides of the head. These headaches may be relatively constant for the chronic sufferer. "Suboccipital muscles might send nociceptive inputs to the central nervous system not only in a direct way through the trigeminal nerve nucleus caudalis but also in an indirect way by irritation or facilitating the afferent input from dural nociceptors" (3).

In a study titled *Epidemiology of Tension-Type Headache* published in the Journal of American Medical Association in 1998, the overall prevalence of tension type headache was 38.3% over one year. Females had a higher prevalence than men in all age, race, and educational groups. 8.3% of these people lost work days due to the headache (5). Of the people indicating that they had headaches, 38% of them admitted they felt they had a decreased effectiveness at work, school or home. It was also stated that tension type headache is the least studied of all primary headache disorders, despite having perhaps the highest total socioeconomic impact.

There are several triggers and aggravating factors associated with tension headaches. Some triggers may include stress, depression, anxiety, skipping meals, lack of sleep, poor posture, over use of headache medication, and hormonal imbalances. (7)

Most treatments used today involve the use of medication. Allopathic medicine typically recommends over the counter pain medication, non-steroidal anti-inflammatory drugs

(NSAIDS), to control the headache. Sometimes the medical doctor will also prescribe antidepressants, blood pressure medication and antiseizure medications if the headache is chronically affecting the patient. "Most general practitioners will consult recommendations by the national clinical guideline when managing patients with headaches." (2) This seems to lump all different types of tension-type headache sufferers into one group, when it is a known fact that there can be several different types of headaches. NSAIDS can be helpful at the time of headache but can be toxic to the liver, stomach and other organs. The extensive use of NSAIDS can increase the risk of heart attack or stroke.

Alternative forms of medicine focus on treating the cause of the headaches not just the symptoms. One of the many forms of alternative treatment that can be used is the Active Release Technique® (ART®), developed by Dr. Michael Leahy D.C., CCSP. According to the ART® website, headaches, back pain…..are just a few of the many conditions that can be resolved quickly and permanently with ART®. These conditions all have one important thing in common: they are often a result of overused muscles. Over-used muscles can change in three different ways which include acute conditions (pulls, tears, collisions), accumulation of small tears (micro-trauma), and not getting enough oxygen (hypoxia).

Dr. Leahy describes the dense scar tissue that is formed when muscles, tendons, ligaments, fascia and nerves become injured. This scar tissue can bind and tie down tissues that need to move freely. When this scar tissue builds up, the muscles are unable to function appropriately and become weak and short. This causes tension on the tendons and can cause nerves to become entrapped. Decreased range of motion, loss of strength and pain can be the result of these entrapped nerves as well as tingling, numbness and weakness.

The purpose of this study is to treat muscular adhesions in patients with headaches. It is hypothesized that the treatment of muscular adhesions in the neck and suboccipital region using the Active Release Technique® can result in a decrease in the duration, frequency, and intensity of the patient's headache.

MATERIALS AND METHODS

The Institutional Review Board at Logan College of Chiropractic approved the study. All procedures were performed in accordance with the Helsinki Declaration of 1975. A clinical trial of care was conducted to treat tension type headaches with ART protocols.

Participants

Participants were limited to Logan College of Chiropractic students and their families. They were recruited via flyers and class announcements. Participants who were pregnant, had whiplash previously, and those who were unwilling to discontinue other treatments for headaches were not eligible to partake in the study. Those who did qualify for the study were asked to sign an informed consent, fill out an initial and post Headache Disability Index (HDI) form and a Quadruple Visual Analog Scale (QVAS) form at each visit. The initial HDI had to have a disability of 10% or greater in order for the patient to qualify for the study.

Study Protocol

Since this was a continuation study, the same study protocols were used as the previous study. There were six participants that completed the study. Two participants did not complete the study due to time constraints. The study lasted three weeks with two visits per weeks. On the first and last visits, the participants were required to fill out the HDI form to evaluate the pre and post results of treatment. Each visit, participants were required to fill out a QVAS form to objectively score their progress and current pain levels. Notes were also taken by the providers regarding any headaches since the last visit. This was done to ensure the headaches were typical for the patient and followed the cervicogenic nature of the headaches being treated in the study. All patients were treated using the ART® Spine Protocols only. Treatment was focused on the posterior cervical spine muscular. Each investigator was certified in the ART® Spine Protocols.

After the pre-treatment QVAS was filled out, the participant would lay supine on an adjustment table. The examiner would palpate the posterior cervical spine musculature, feeling for any muscle adhesions or nerve entrapments. The treatment for the session was determined by each individual examiner depending on the palpation of the musculature. The muscles were then treated using the ART® specific protocol for that particular muscle. To maintain inter-examiner reliability, each participant was treated by the same examiner at each intervention.

Intervention

Three Logan College of Chiropractic students certified in the ART® Spine Protocols recruited several students to participate in the study. Nine Logan students initially showed interest. Only six of the students followed through to complete the study. Treatment was aimed toward cervical spine musculature that has been related to tension type headaches. These muscles include: splenius capitus, splenius cervicis, iliocostalis cervicis, longissimus cervicis, superior oblique, inferior oblique, rectus capitus major, rectus capitus minor, trapezius, scalenes,

sternocleidomastoid, cervical rotators, cervical multifidi, and cervical intertransversii. The methodology behind ART® technique is to maximally shorten the specific muscle being treated, apply tension, and maximally lengthening the muscle to remove any adhesions (4). All treatments were completed by the student investigators.

Outcome Measures

The outcome of this study was measured using the HDI and QVAS forms. (Research) The HDI was completed on the first and last visits to measure overall change in the headaches and any disability. The QVAS forms were completed by the patient at each visit. This provided a subjective statement by the patient that was then turned into data.

Sample Size

The size of the research group consisted of six participants. This was due to the limiting factors of the research study. Only Logan College of Chiropractic students and their families were eligible to participate. Some students who were interested in participating were unwilling to discontinue other treatments for their headaches therefore they were unable to participate.

Statistical Methods

The HDI and QVAS were the primary methods used to track improvement in symptoms or lack of improvement. An HDI percentage was obtained once prior to the first treatment and once after treatment was over. The QVAS was obtained at each visit and again two weeks after the treatment had ceased.

Results

Recruitment for the study lasted approximately eight weeks. Eight people contacted the investigators while only six participants completed the treatments. The two participants who neglected to finish the study opted out due to time constraints and unwillingness to discontinue other treatments.

The participant age range for the group was 21-26 years. All participants received ART treatment to the posterior cervical spine region. All participants complained of at least one headache per week and all headaches were moderate in nature.

The analysis compares the results of the pre and post HDI scores and the overall trend of the QVAS scores.

The HDI score from each visit was calculated by totaling the index score and dividing it by one hundred to obtain a percentage disability score. The mean HDI score of the six participants prior to treatment was 22.7 while the post HDI mean was 15.7. The P-value for the HDI data set is 0.0212 which is statistically significant.

The QVAS score from each visit was determined by totaling the four scores, dividing by three and then multiplying by ten. The range of score possibilities is between zero and one hundred. The mean QVAS score prior to treatment for all six participants was 35.2. The sixth

treatment mean QVAS score was 29.3 while the two week follow up mean was 26.7. The P-value for the QVAS data set from week one to week six was 0.236 in a paired t test which shows the data is statistically significant. The P-value from week 1 through the two week follow up was 0.0002 also deeming the data statistically significant.

There was a significant improvement or decrease in symptoms according to both the QVAS and HDI scores.

In the previous study, pre and post HDI values decreased from 38.7 to 29.7% respectively, while the QVAS from the first to sixth visit decreased from 54.0 to 22.8. (6)

Figure 1: Pre and Post HDI results for each patient

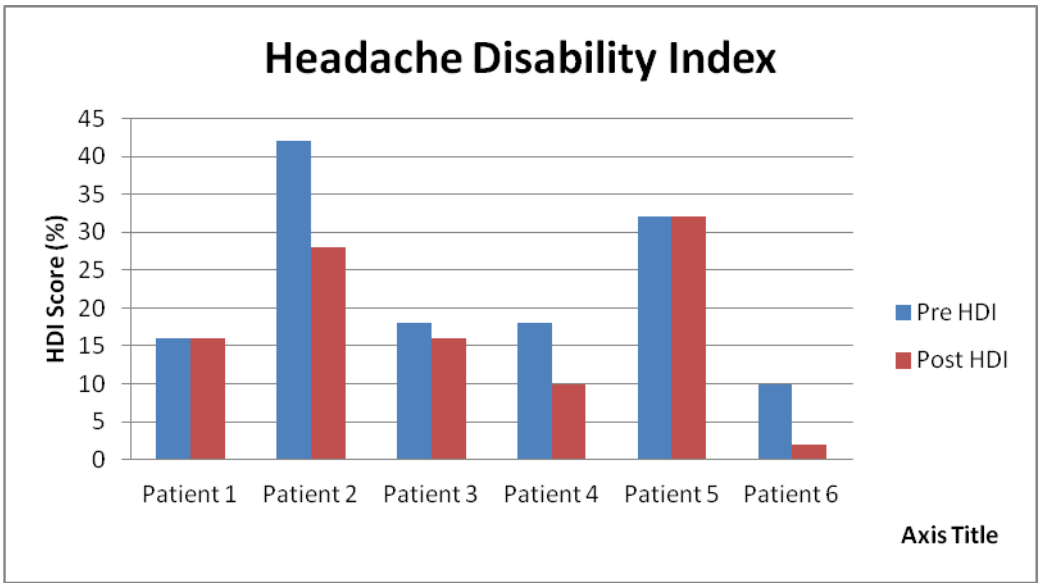

Figure 2: First, sixth, and the two week follow up visit measuring QVAS for each patient

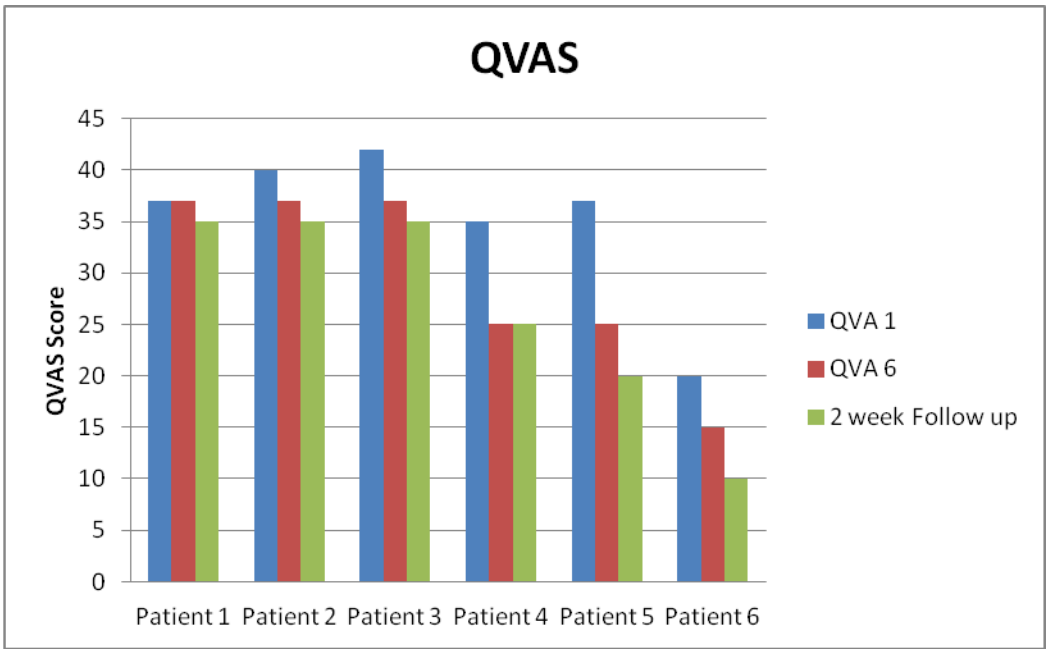

Figure 3. Combined total pre and post HDI data from the original study and this current study.

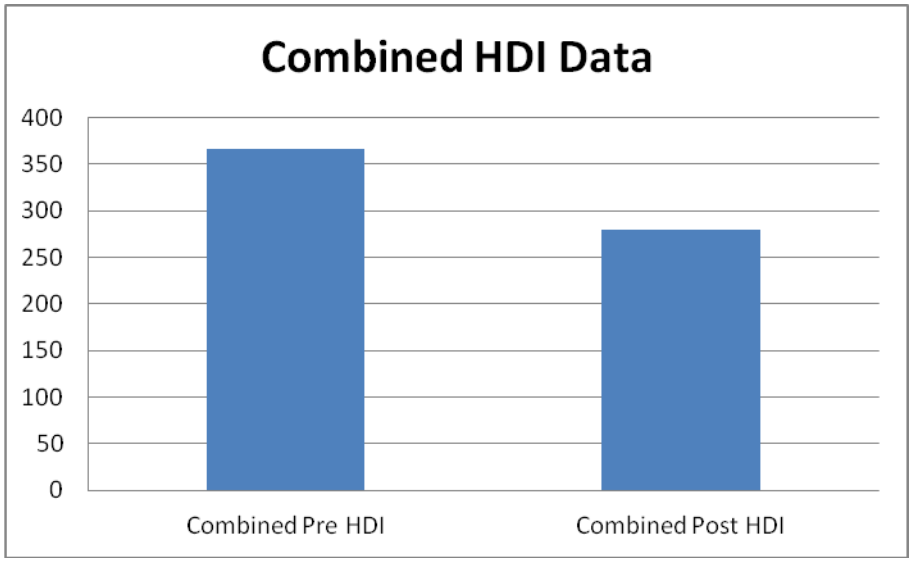

Figure 4. Combined total QVAS data from the original study and this current study.

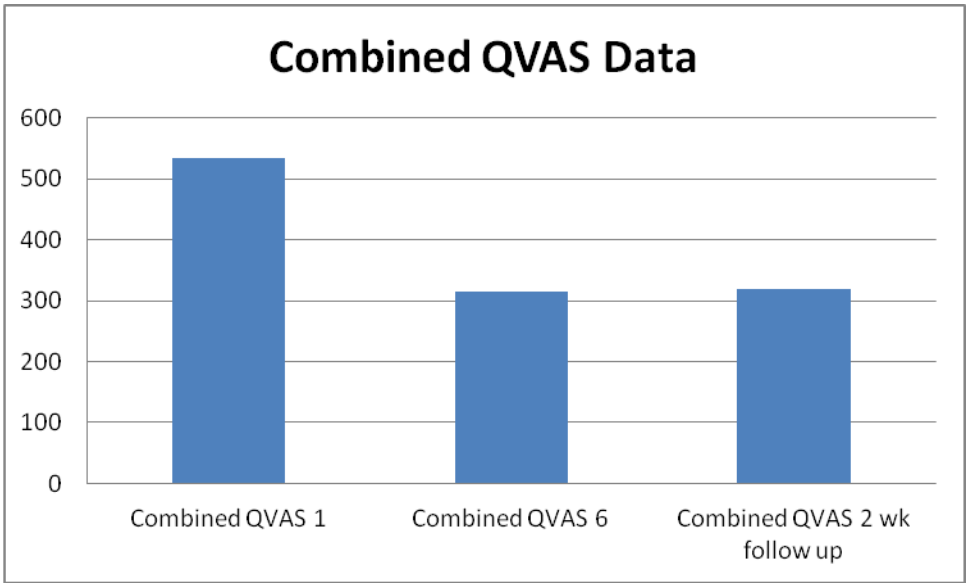

Figure 5. Statistical value between treatments and follow up visits

Column1	mean	SD	t value	p value
QVAS 1	35.2	7.83		
QVAS 6	29.3	9.16	3.2139	0.0236
QVAS 1	35.2	7.83		
2 Wk Follow up	26.7	8.34	9.8287	0.0002
QVAS 6	29.3	9.16		
2 Wk Follow up	26.7	8.34	2.6656	0.0446

Primary Outcome

Figure 1, shown above, shows the pre and post HDI percentages for each participant. The data in the graph demonstrates that participants had an overall decreased level of disability over the course of the study.

Figure 2 shows the QVAS score for each patient's first and sixth visit, as well as the two week follow up score. The data demonstrates that participants showed a decreased level of tension headache frequency and severity over the three week study.

Figures three and four are the combined HDI and QVAS scores respectively. It is a cumulative total of the scores in the original study and this continuation study. The trend still exhibits a decreased level of tension headache frequency and severity.

Figure 5 displays the QVAS mean, standard deviation, t values, and p values for the continuation study only. It compares the first visit verses the sixth treatment visit as well as the first treatment visit to the two week follow up visit. It also compares the sixth treatment visit to the two week follow up. The p values have all been deemed clinically significant.

Adverse Effects

None of the participants reported any adverse effects from the ART treatment. Adverse side effects of ART treatment include, but are not limited to, reddening of the skin, increased headache and muscle soreness.

Discussion

Because many medical practitioners do not know how to conservatively treat tension-type headaches, they simply resort to the use of pharmacology. According to the National Headache Foundation, "Side effects of NSAID therapy may include dyspepsia, heartburn, upper GI bleeding, diarrhea, constipation, nausea, and vomiting." (1) Along with a these symptoms, long term use of NSAIDS can result in nephropathy ultimately resulting in death. In a study done on 32 patients who developed renal complications from NSAID use, there was interstitial morphologic changes seen all patients (10). As stated above, ART has little to no adverse effects and is proven to be a much safer and effective way to treat tension-type headaches.

Each of the three investigators went through the ART Spine Protocol coursework and certification. However, as all people are different, each investigator also is different in their treatment and "touch." To minimize the effect of this variable, each investigator treated the same participant each week.

The sample size of the study was small but the results showed positive outcomes based upon objective and subjective findings. When this continuation study is added to the original study, the sample size doubled. The findings and outcomes of the two studies are similar.

This is a continuation study done by R. Smith D.C. and M. Diller D.C. The parameters of the original study were kept the same to provide continuity between the two studies. The previous study showed significant change ($p=0.002$) in HDI scores in the study. However there were only six participants in the original study. The purpose of the continuation study was to gain more participants with the same parameters to determine if the results would still be significant.

Conclusion

In this study, ART has proven to be helpful in the treatment of tension-type headaches. "…clinicians should treat subocciptals muscles in all patients with tension type headaches not only with passive techniques (stretching, manipulative therapy, compression) but also with therapeutic exercises to restore the normal function of these muscles." (3) In a study done to compare spinal manipulation vs. amitriptyline for tension-type headaches, it was found that spinal manipulation is an effective treatment for tension headaches. It was also found that the effects of spinal manipulation had longer lasting effects than those treated with amitriptyline. "The sustained therapeutic benefit associated with spinal manipulation seemed to result in a decreased need for over-the-counter medication" (11). It is hypothesized that the combination of ART® and chiropractic manipulative therapy would provide the most benefit to a patient. A larger sample would also be needed to determine the clinical significance.

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