Literature Review: Effectiveness of Conservative Treatment via Chiropractic Spinal Manipulation on Migraine Headache, Tension-Type Headache, & Cervicogenic Headache

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ABSTRACT:

OBJECTIVE: The literature review analyzes the effectiveness of chiropractic treatment by means of spinal manipulation of the cervical spine and the effectiveness as a treatment with patients suffering from migraine headache, tension-type headache, and cervicogenic headache. Therapeutic measures that were researched include patients’ progression of headache through treatment by documenting headache severity, occurrence, and duration. The literature review also establishes the reader to the foundation of anatomic structures of the cervical spine and the connection of the pathophysiology and neurophysiology to the various types of headache.

METHODS: Articles chosen met the following search criteria. All articles were found utilizing the Logan College of Chiropractic Online Database and through the use of PubMed. The search criteria entered including: Chiropractic Manipulation and Headache; Tension Type Headache and Spinal Manipulation; Migraine Headache Chiropractic; Cervicogenic Headache Conservative Care.

RESULTS: Results varied from demographics age from study to study. Chiropractic intervention also varied from the studies gathered in the literature review. The literature review and clinical trials reviewed in this literature review found chiropractic to be an effective treatment in patients who suffer from migraine headaches and cervicogenic type headaches. The literature found spinal manipulation administered to tension-type headache patients to be non warranted. The literature review also demonstrates the connection between the cervical spine and different types of headaches.

CONCLUSIONS: Based upon the studies selected in the literature review chiropractic manipulation of the cervical spine can be an advantageous form of treatment for patients suffering from certain types of headaches. Patients who suffer from migraine headaches, cervical manipulation warranted to improve chronic or episodic classic migraine headaches. In cervicogenic type headaches, patients who received chiropractic manipulation warranted to improve frequency and severity. Tension type headache patients who received manipulation from a chiropractor were found to be not warranted.
INTRODUCTION:

Headaches are very common conditions that may cause people to seek care from a practitioner. There are several types of headaches that are managed either by conservative care or medical intervention. "Headaches are also found to be the most common reason for the sale of over-the-counter analgesic medication" (Alix). There are three headaches that will be discussed in the following literature review. Definitions as reported by the Committee of International Headache Society (IHS) will be a guideline in the literature review. Migraine headaches, tension type headaches, and cervicogenic headaches will be examined with the corresponding effectiveness of conservative care via chiropractic spinal manipulation. The literature review will compare treatment protocols and demonstrate the efficacy of spinal manipulation treatment via chiropractic care in management of various types of headaches.

Spinal manipulative therapy has been found to be a controversial subject. The efficacy and randomized clinical trial data has been found to be lacking in the field. Researched data is a current exploration of the chiropractic community and is an area that has great need. Erickson reports, "Previous observational studies have shown that adverse events following spinal manipulative therapy applied to the neck and/or back (i.e., local discomfort in treatment area, radiating symptoms, headache) are relatively common, although these reactions tend to be mild in intensity and self-limiting."

The Committee of the IHS differentiates migraines from other types of headaches because of the accompanying nausea, vomiting, photophobia, and/or phonophobia (Harris). Harris goes on to include, "A true migraine headache has at least two of the following characteristics: unilateral location, pulsating quality, moderate or severe intensity, and aggravation by routine physical activity. Further, a migraine with aura causes transient visual,
sensory, motor, or other focal neurological symptoms. Migraines with or without aura may occur periodically and last several hours or even days" (Harris). Posadzki defines Migraine Headache as, "...common episodic neurobiological disorder, typically presenting with recurrent attacks of severe headache and autonomic dysfunction. The pathophysiology of migraine headache is complex and may involve activation of subcortical structures such as the midbrain and the pons as well as the trigeminovascular system. Recent research has also established the first genetic risk factor for migraine headache" (Posadzki). It is most often the case that individuals who suffer from migraine headaches experience their first attack by age 40. Individuals who suffer from migraine headaches and are between the ages of 22-25 typically experience more severe symptoms (Harris).

Migraines have been demonstrated to have several connections between the immune system and the nervous system. Mast cell degranulation releases several inflammatory mediators including histamine, heparin, serotonin, and cytokines. Migraines have been found to have elevated serum levels of histamine and tumor necrosis factor alpha, both during attacks and intermittent phases (Baun). Baun report, patients report certain foods in the patient's diet also play a vital role in the inflammatory process.

Prevalence of Migraine headaches among the population is a very common condition. Posadzki reports, "The prevalence of migraine headache is high, affecting more than 10% of the general population. Migraine headache is associated with a high burden of personal suffering and considerable socioeconomic costs. The World Health Organization (WHO) ranked migraine headache as number 19 among all diseased causing disability." Harris reported similar statistics in the research, "estimates of the number of adults who have been diagnosed with migraine
headaches vary from 8-15%. Females are 2 to 4 times more likely to experience migraines, affecting 18-27% of females but only 6-14% of the male population” (Harris).

Chiropractors are practitioners that treat musculoskeletal conditions that are typically known for treating low back pain. Chiropractors provide manipulative care therapy of the spinal column to treat musculoskeletal conditions. As reported in an article conducted by Bryans, "cervicogenic headaches are secondary headaches commonly treated by chiropractors and involve pain referred from a source in the neck and perceived in 1 or more regions of the head. The IHS recognizes cervicogenic headache as a distinct disorder, and evidence that headache can be attributed to a neck disorder or lesion based on history and clinical features (history of neck trauma, mechanical exacerbation of pain, reduced cervical range of motion, and focal neck tenderness, excluding myofascial pain alone) is relevant to diagnosis but is not without controversy in the literature (Bryans)." The IHS suggests that cervicogenic headaches account for approximately 15-20% of all recurrent benign headaches (Alix). Wells reports that 16% of adults with headaches report having tried manipulation therapies.

"Tension type headache is the most prevalent form of benign primary headache with a reported prevalence varying from 10% to 65%, depending on the classification, description, and severity of headache features" (Vernon). Vernon goes on to define tension type headaches, "The [IHS] characterizes tension type headaches as bilateral headaches of mild to moderate intensity that are experienced with an aching, tightening, or pressing quality of pain. Headaches may last from 30 minutes to 7 days, are not accompanied by nausea or vomiting, and may have photophobia or phonophobia (but not both)...headache frequency is classified as episodic or chronic” (Vernon).
Recent publications indicate the potential connection between soft tissue structures of the cervical spine connecting to the spinal cord dura mater as a culprit for a headache source generator (Scali). Research has been conducted that states a connective tissue bridge between the rectus capitis posterior minor muscle and the posterior spinal dura at the atlanto-occipital junction exists anatomically (Alix).

The pathogenesis of the various types of headaches is still very poorly understood. Chiropractic spinal manipulative therapy is addressed to an anatomical joint to correct neuromuscular components via affecting neural pathways to muscle. Research currently underway addresses the relevance of muscle tension in the cervical spine and the correlation to tension type headaches. Fernandez-de-las-Penas "qualitatively found marked atrophy in the suboccipital muscles, i.e. rectus capitis posterior minor and major muscles, in chronic neck pain patients compared with healthy subjects. Elliott et al. have recently published preliminary data of normal morphometry of the cervical extensor muscles in cohort of healthy females within a defined age range (18-45 years)" (Fernandez-de-las-Penas). Muscle size of the cervical extensors as indicated may provide a further insight on potential causes of headaches. The soft tissue bridges to the dural spine may provide insight as to the effectiveness of the effect on chiropractors’ manipulation on the cervical spine and the subsequent effect on the neuro-pathophysiology.

**MATERIALS AND METHODS**

The purpose of the literature review was to demonstrate the effectiveness of chiropractic spinal manipulative therapy on the treatment of various types of headaches. Specifically
migraine headaches, tension type headaches, and cervicogenic headaches were studied by the researcher. Literature reviews and cohort studies were selected as the inclusion criteria.

The procedures used in the following study were performed on actual patients. All research reviewed and utilized in the study is in accordance with the ethical standards of the Committee on Human Experimentation of the institution in which the research was conducted and was performed adhering to the protocol established by the Helsinki Declaration of 1975. The IRB at Logan College of Chiropractic approved the literature review on the effectiveness of spinal manipulative therapy on various categories of headaches.

Articles chosen met the following search criteria. All articles were found utilizing the Logan College of Chiropractic Online Database and through the use of PubMed. The search criteria entered including: Chiropractic Manipulation and Headache; Tension Type Headache and Spinal Manipulation; Migraine Headache Chiropractic; Cervicogenic Headache Conservative Care.

The researcher excluded any case report in the literature review. Case reports/series were not chosen by the researcher because of their uncontrolled nature and probable low methodological quality compared to randomized control trials and control clinical trials.

Many of the reviews and randomized clinical studies used the following outcome measures: headache frequency defined as the number of headache days in the last 28 days; headache severity reported in a headache diary; headache duration was also reported.

Patient demographics ranged from population base. Majority of studies set age criteria while others included patients under the age of 18. No bias between gender was indicated in the study. Patients suffering from the aforementioned definition of the given headache established by the IHS was utilized in the literature review.
The statistical analysis of the literature review assessed by Bryans utilized the following, "The Guidelines Development Committee planned for and adapted searching, screening, review, analysis, and interpretation." A quality rating scale was used to determine the effectiveness of the studies selected. "Quality ratings of CCTs or RCTs included 11 criteria answered by 'yes' (score 1) or 'no (score 0)/ do not know (score 0)'. Quality rating of articles were judged on a score out of 9 total. "Systematic reviews coring more than half of the total possible rating (ie, greater than or equal to 5) with no or minor flaws were rated as high quality. Systematic reviews scoring 4 or less and/or with major flaws were excluded" (Bryans).

Literature review performed by Vernon had the following methodological qualities. Population of people studied had to meet criteria as defined by the review committee. Individuals had to be suffering from chronic neck pain, which was defined as being a minimum of 8 weeks duration. There were no restrictions on gender. Studies excluded included any studies involving whiplash, headache, pain other than neck (such as back pain), or arm pain. "The method of each initially selected study was scored using the Amsterdam-Maastricht Consensus List... from which a score of 19 was generated...This instrument is used by the Cochrane Collaboration Back Review Group for Spinal Disorders...Two assessors scored studies separately. A cutoff score of 11.5 (60%) was used for selecting trials for analysis." Other inclusion criteria of articles selected included that the study design had to be a Randomized Control Trial with at least 1 treatment group of adults ages 18 to 50 was provided with a course of 1 of manual therapies [mobilization, chiropractic adjustment, massage] (Vernon). Of the studies that met the criteria stated above, patient's response to treatment was documented via the visual analog scale of pain or numerical rating scale. "Data on measures of function or self-rated
disability were not analyzed in this review.” Of the studies, progress of therapies were documented at 6 week, 12 week, and up to 104 weeks (Vernon).

Lensoinck Study population included adults of both genders ranging in age from 18 years and older. Patients were included that had been diagnosed with Tension Type Headache from the International Headache Society or by other criteria met by the given researcher in an accepted article. Inclusion criteria that had to be met included: only randomized controlled trials; all studies were required to assess at least the effect of physiotherapy or spinal manipulation; trials must have reported at least one patient rated outcome measure (such as headache pain severity, frequency, duration, quality of life, or satisfaction). Two reviewers rated the methodological quality of the included trials using the Delphi-list. “The Delphi list is a comprehensive criteria list and is regarded valid and reliable for the assessment of the methodological quality of clinical trials.” It consists of nine methodological criteria with one extra item included by the reviewers. A score of 10 points for the overall methodological quality was possible, and a score of 6 or more was defined as high quality. 12 articles met the inclusion criteria using data bases specified in the article with 4 studies overlapping 8 articles were examined. Statistical analysis of the articles reviewed included outcome measures done by the patients on the tension type headache’s severity, intensity, frequency, and EMG activity. “Headache index was calculated by multiplication of the frequency of headache with the severity of pain.” 5 studies provided the follow up period to be short term (less than 3 months) to long term (3 months- 1 year). The Delphi-list was utilized to statistically analyze the quality of the research examined.

Posadzk’s literature review paper focused on people who were diagnosed to suffer from migraine headaches. There was no gender or age bias in the articles selected. To be included in
In the literature review, articles selected had to be randomized or quasi-randomized. The studies also had to test the effectiveness of spinal manipulation therapy and focus treatment on migraine headache. Cervicogenic and tension type headaches were exclusion criteria. “The methodological quality of all reviewed studies was estimated using the Jadad score” (Posadzk). The Jadad score was calculated by two independent reviewers. Primary outcome measures of the articles reviewed included: headache index; duration of migraines; pain and disability; migraine frequency, intensity, duration, disability, and use of medication.

One research paper was selected to help correlate the effect and connection of the cervical spine to various types of headaches. 34 headache sufferers and 14 controls were selected for study. Of the 34, 14 subjects suffered from tension type headaches and 20 patients suffered from migraine headaches. Both groups of headaches were selected according to the criteria of the definition of tension type headache and migraine headache stated by the International Headache Society. The control group were designated the non headache group and experienced mild non migraine headache no more than 6 times per year. There was no gender or age bias in study. Migraine headaches were to be the non aura type. Data examination was performed by single doctor. Intraexaminer reliability was analyzed using Cohen’s Kappa. Intervertebral mobility was graded on a 5 point scale, ranging from hypomobile to very hypermobile. Grade 3 of the 5 point scale was considered normal and grade 1 was very hypermobile. Symptomatic response was recorded, no discomfort, local pain, local pain and headache, and headache only. Two techniques were used with intention of passively stressing specific intervertebral joint and same pressure technique was used on the biceps brachii in both arms. Pain intensity scale was recorded 0-10 scale, 10 being intolerable pain. Patient verbal response was recorded (Drummond).
RESULTS (DATA)

A study that involved chiropractic spinal manipulative therapy was performed by Hass et. al to demonstrate the efficiency of management of cervicogenic headache. The study involved 80 patients with patients divided into three subgroups. One subgroup consisted of patients that would receive spinal manipulation for eight treatments while the other subgroup would receive sixteen spinal manipulations. The other subgroup would receive a light massage to the cervical region. Patients reported diminished severity and occurrence of headaches. Cervical and upper thoracic adjusting proved to be more beneficial compared to soft tissue massage (Hass).

In the article discussed by Vernon, 233 chronic neck pain study demonstrated effects of one cervical spinal manipulation. The results demonstrated that the one manipulation had a moderate to high relationship of improved effects. The article centers on chronic neck pain not due to whiplash and without arm pain and headaches and effectiveness of conservative treatment. Interventions of the studies reviewed included chiropractic adjustment, mobilization, and massage therapies. No trials of manual traction were found in the search criteria in the review. "The average baseline pain score in the manipulation groups was 42.7/100. Only 1 mobilization trial reported baseline pain data with a value of 51/100." No baseline was measured in the massage studies, interpreted by this review. There was positive progress on the Visual Analog Scale on patients’ response to care in the studies reviewed. "There is moderate to high-quality evidence that subjects with chronic neck pain not due to whiplash and without arm pain and headaches who are randomized to receive a course of spinal manipulation or mobilization show clinically important improvements at 6, 12, and up to 104 weeks posttreatment” (Vernon).

The article titled "Evidence-Based Guidelines for the Chiropractic Treatment of Adults with Headache" had the following results about chiropractic and treatment with headache. The
systematic literature review selected 21 articles that met the criteria. Inclusion of articles were of the following types: controlled clinical trials (CCTs); randomized controlled trials (RCTs); and systematic reviews (SRs). Search engines were specified in the article and the search strategy was intentionally broad. The following were selected as the evidence base for this guideline consistent with current standards for interpreting clinical findings. Search strategy was limited to adults over the gage of 18 diagnosed with Migraine, Tension type, and Cerviogenic headaches as defined by the International Headache Society. However, studies utilized in literature review included patients ranging from adolescents, 10 years old, to adults. "Excluded therapies included invasive analgesic or neurostimulation procedures, pharmacotherapy, injections of botulinum toxin, cognitive behavioral therapies, and acupuncture” (Bryans).

Spinal manipulation was the intervention to be monitored for mode of treatment for headache sufferers. "Spinal manipulation was defined as a high-velocity low-amplitude thrust delivered to the spine” (Bryans). Other interventions performed to headache patient's included massage, deep neck flexor exercises, electrical stimulation, and education. Research by Bryans resulted in the following, "Spinal manipulation is recommended for the management of patients with migraine or cervicogenic headaches. Multimodal multidisciplinary interventions including massage may benefit patients with migraine. Joint mobilization or deep neck flexor exercises may improve symptoms of cervicogenic headache. Low load craniocervical mobilization may improve tension type headaches" (Bryans). The literature review found that patients who suffer from migraine headaches cervical manipulation warranted improving chronic or episodic classic migraine headaches. In cervicogenic type headaches, patients who received chiropractic manipulation warranted to improve frequency and severity. Tension type headache patients who received manipulation from a chiropractor were found to be not warranted. Cervical
manipulation in tension type headache was found to be no more effective than a placebo type baseline. However low load craniocervical mobilization (eg, Thera-Band, Resistive Exercise Systems; Hygenic Corporation, Akron) is recommended for longer term, 6 months, management of patients with episodic or chronic tension type headaches (Bryans).

Lenssinck performed a literature review entitled “The Effectiveness of Physiotherapy and Manipulation in Patients with Tension-Type Headache: a Systematic Review.” The article focuses on Physiotherapy and Chiropractic Manipulation on the musculoskeletal component of Tension Type Headache. “Several interventions were used in the studies, ranging from chiropractic spinal manipulation, connective tissue manipulation, osteopathic manipulation, CV4 technique. Physiotherapy consisted of combinations of paraffango, massage, ultrasound, relaxation techniques, cryotherapy, etc. Comparison groups included acupuncture, deep friction massage with mobilization, palpation, rest, and in one study a placebo was used: low power laser light” (Lenssinck). Two studies of the eight reviewed were found to be of high quality yet showed inconsistent results. A study comparing spinal manipulation to a control group, receiving the medication amitriptyline, found that both groups’ headaches improved at similar rates. Three studies evaluated the effect of physiotherapy compared to that of acupuncture. The other three studies evaluated and compared a form of manipulation. Based on the poor methodological quality of the remaining six articles reviewed, it is not possible to draw a valid conclusion on the comparison of physiotherapy or spinal manipulation effectiveness on Tension-Type Headache.

Posadzk’s literature review paper examined effectiveness of chiropractic manipulation on musculoskeletal components and the effectiveness of treating migraine headaches. The intervention of choice for the management of migraine headache was spinal manipulation. “…
we defined SMT (spinal manipulative therapy) as a manual technique commonly used by chiropractors, osteopaths, physiotherapists, or bone setters to correct misalignments of the spinal joints” (Posadzk). Spinal manipulation was performed no more than twice a week and treatment lasted 8 weeks or 2 months, but no treatment went over 16 visits. Only one RCT was calculated to be of high quality, of which had a negative conclusion on the effectiveness of SMT. One study of low quality arrived at negative conclusions. The third and final article selected for the literature review was determined to be of low quality yet favored SMT care for migraine headaches.

Drummond had a research paper that demonstrated the effect of the cervical spine components and the connection between headaches. Applied pressure to the cervical spine via finger pressure on facet joints of cervical spine was compared between three groups to try and trigger headache like symptoms. The three groups studied were migraine headache, tension type headache, and a control group with reports of no headache. The intervention utilized sought to reproduce typical head pain via applying sustained pressure to the lateral posterior arch of C1 and the articular pillar of C2, stressing the AO and C2-3 segments respectively. None of the participants reported head pain during the stress technique to the biceps brachii. Head pain referral during cervical examination was reported by 8 of 14 control, all tension type headache patients and 19 of the 20 patients suffering migraines reported head pain referral similar to familiar headache pain (Drummond).

**DISCUSSION**

The study conducted by Hass et. al regarding spinal manipulative therapy on cervicogenic headaches had many aspects of the study that could interfere with the results. As a critique of the study many factors need to be limited to minimize outside influence. For example,
chiropractors in the study used hot moist heat packs on geriatric patients to better administer adjustments. However, hot most packs were also used in the soft tissue massage patients. Overlap of study could be a contributing factor in the results in regards to the heat pack being administered to all subgroups.

The Bryans literature review on the management of various types of headaches and the intervention with spinal manipulative therapy had several positive aspects and several negative aspects. Strengths of the literature review included the inclusion criteria of CCTs, RCTs, and SRs, and the exclusion of case studies. The greater the amount of people diagnosed with various types of headaches and the management course of the patients allow for greater diagnostic results. Also the average treatment plan for patients with a given type of headache was twice a week for a period of 6 weeks. The progression of frequency, severity, and duration of headaches in this given time was able to be monitored regularly during the studies reviewed. While there were several positive aspects in the review, there were also several negative aspects of the literature review including all of the studies reviewed failed to include a control group. Only 6 of the 21 studies documented side effects related to receiving manipulative therapy. Including a placebo group in the study would allow for the effectiveness of treated vs. non treated patients. Even in the multidisciplinary management study of headache via relaxation, massage, and exercise the non treated group was educated on exercises that could benefit in reducing headache frequency, duration, and severity. The number of people per given study was also relatively low, the largest being 83 participants. To accurately measure the effectiveness of chiropractic manipulation with managing headaches, a larger sample size would be beneficial.

The literature review by Vernon also provided some insight into the effectiveness of spinal manipulation with the treatment of headaches. An important strength of this study is to
clearly define the inclusion criteria for chronic neck pain, which the researchers set at 8 weeks. Also the researchers had a well defined condition that was studied, chronic neck pain not due to whiplash and without arm pain and headaches. The inclusion criterion was also consistently performed throughout the review of articles, by implementation of the Amsterdam-Maastricht Scale. There are numerous limitations to the studies reviewed. The statistical analysis of the reviews relied too heavily on subjective responses to care. The verbal analog scales fail to accurately determine the patient's response to care. A greater outcome assessment tool should have been utilized, such as a neck pain oswestry. Also, of the studies reviewed the sample size of patients is very small, largest study incorporating 60 patients. Allowing for a larger sample size will increase the impact factor of the study.

The strength of the Lennsinck article was the inclusion/exclusion criteria, and the effectiveness of the reviewers to acknowledge the limitations of the review. The reviewers supply in great detail the limitations of the studies, including clinical heterogeneity and poor methodological quality. The reviewers did an effective job at examining articles that incorporated the use of several different types of modalities and the effectiveness of them against tension type headaches. The reviewers accurately conclude that insufficient evidence to draw firm conclusions on the effectiveness of physiotherapy and spinal manipulation for tension type headache exists. Bringing to light the fact that little evidence is out there is a major strength of this review article. The articles chosen in this review article were quite limited in nature. The criteria for which Tension-Type Headache was diagnosed was not uniform. The reviewers state that some of the articles chosen did not follow the International Headache Society definition for tension type headache. Performing a literature review on tension type headache should have a uniform definition and guideline procedures. Only 8 articles were chosen that met the inclusion
criteria, many of which had less than 20 participants. The limited amount of people that were involved in the studies limits the significant power of the paper.

Posadzk’s literature review consistently used a selection procedure and scoring system for rating and including appropriate articles. The search process for selecting articles that dealt with spinal manipulative therapy on migraine headache was effectively done. Limitations of the literature review were only three case studies were selected that fit the criteria for the researches to evaluate. Also, the articles selected were very inconsistent with the therapy of choice. Spinal manipulation was not always carried out by a chiropractor, which the literature review routinely states that chiropractic manipulation is ineffective. The researches state that manipulation performed by chiropractors is not effective. However, the research they chose did not always have a chiropractor performing the adjustment. Another flaw of the articles selected was that the subjects chosen to have a migraine headache were not always diagnosed consistently by adhering to the definition provided by the International Headache Society.

Strengths of the Drummond article are the inclusion of a control group that has no history of recurrent headaches. Also, by selecting patients that are diagnosed based on the International Headache Society definition of tension type headache and migraine headache the researches incorporated consistency to their research. Also, the incorporation of the consistent technique to stress specific vertebral levels to reproduce pain is a simple reproducible method. The limitations of the article are sample size. Including a larger sample size of patients diagnosed with both tension type headache and migraine headache along with increased numbers of control group will add a lot of statistical power to the article. There may be some examiner bias on the pressure utilized to each group. The examiner was not blinded to which group he was
examining. The examiner may potentially have included bias on the technique utilized given a certain type of group.

CONCLUSION

Based upon the studies selected in the literature review chiropractic manipulation of the cervical spine can be an advantageous form of treatment for patients suffering from certain types of headaches. Patients who suffer from migraine headaches, cervical manipulation warranted to improve chronic or episodic classic migraine headaches. In cervicogenic type headaches, patients who received chiropractic manipulation warranted to improve frequency and severity. Tension type headache patients who received manipulation from a chiropractor were found to be not warranted.

Research has been conducted that states a connective tissue bridge between the rectus capitis posterior minor muscle and the posterior spinal dura at the atlanto-occipital junction exists anatomically (Alix). Further research should be performed to better understand the physiological connection, if any, between the connective tissue bridges of the cervical spine with the dura mater and corresponding relationship to headache patients. A better understanding of headaches will allow more research to be conducted to further evaluate the efficacy of chiropractic manipulative therapy in the management of headache patients.


