

CHIROPRACTIC MANAGEMENT OF MIGRAINE WITHOUT AURA

A Case Study

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Abstract:

Objective: To assess the response of a patient with chronic migraines to a short program of chiropractic care (diversified technique).

Method: The study was run over a 13 week period with chiropractic spinal manipulative therapy (CSMT) on a once weekly schedule for 5 weeks, followed by an 8 week re-evaluation.

Outcome measures: To measure the effect of treatment, a previously reported diary system was used which noted the intensity of a range of symptoms that are recorded following each migraine episode.

Results: The results attained showed there was a marked improvement in the migraine symptoms following the chiropractic care. The patient reported an improvement in frequency, intensity, duration and use of medication. These findings appear to also confirm other evidence which documented similar changes following a large randomised controlled trial of chiropractic treatment of migraine.

Discussion: The case is presented as further support for CSMT in the treatment of migraine. The outcome of this case is also discussed in relation to recent research that concludes that CSMT is a very effective treatment for some people with non-neuromusculoskeletal conditions.

Conclusion: It now appears clear that chiropractic care may be used to assist patients with migraine. Research is currently being undertaken to investigate the potential mechanisms of chiropractic in the treatment of migraine. This research should also assess what (if any) prognostic signs can be identified to assist practitioners making a more informed decision on the treatment of choice for migraine.

MeSH: Classic Migraine; chiropractic; manipulation, spinal; case report.

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INTRODUCTION

Descriptions of migraine can be traced from the ancient civilisations of Mesopotamia through to medieval times and the 17th century, when European physicians first gave full case reports (1). Gobel et al contend that in the Bible (Acts 9) the conversion of Saul to Paul, where a flashing light caused Saul to fall down with additional symptoms of "not seeing", or photophobia, and anorexia, was an illustration of a migraine episode which fulfils the current classification for migraine with aura (2).

Migraine is a common condition where prevalence is influenced by gender, nationality, race and possibly socioeconomics. In the USA migraine affects 6% of males and 18% of females (3), in Canada 8% of males and 25% of females (4) and Denmark 6% of males and 15% of females (5). In the United States, migraine prevalence is highest in Caucasians, followed by African Americans, then Asian Americans (3). This is supported by a study showing that migraine in Ethiopia affects 2% of males and 4% of females (6). Stewart et al reported the incidence of migraine to be greater in lower socioeconomic groups in the USA (3). However, this was challenged by a subsequent Canadian study (4).

An accepted system of classification and diagnostic criteria for migraine is vital for correct diagnosis and for research in this area. There were no internationally accepted classification or diagnostic criteria until the 1960s. An ad hoc committee of the United States National Institutes of Health then produced a classification of headache disorders. However, descriptions were adopted rather than definitions and were therefore open to interpretation (7). In 1988 the International Headache Society (IHS) published an internationally accepted classification of headaches including diagnostic criteria. The first four categories cover primary headaches (those without association to organic disease) and of these migraine forms Category 1 (7).

Migraine is a recurrent and debilitating condition. The IHS classification for migraine describes a headache lasting 4 to 72 hours, having at least two of the following features: unilateral location, pulsating, inhibiting daily activity and aggravated by daily activity. The person must experience nausea and/or vomiting, or, photophobia and phonophobia (7). Prior to the headache the person may experience visual disturbances (aura), tingling or numbness (8).

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Numerous factors are implicated in triggering migraine (8):

- Emotional stress - excitement, expectation, sudden news, relaxation after stress;
- Physical stress - exercise, sudden exertion, head trauma, heat, bright lights, weather change, menstruation, oversleeping;
- Foods - alcohol, chocolate, cheese, citrus fruit, food preservatives, fasting;
- Drugs - oestrogen, contraceptives containing oestrogen, nitrates, monosodium glutamate (8);

Even rubbing the eyes has been identified as a trigger (9).

For decades, migraines have been understood as vascular events resulting from vasoconstriction or vasodilation. Aura is related to cerebral vasoconstriction followed 30 to 60 minutes later by vasodilation in vessels that are pain sensitive, culminating in headache (10). It is now more widely accepted that migraine is a result of a variety of aetiological factors: autonomic/vascular, biochemical/platelet, cellular/immunological/allergic, psychophysiological, neurogenic and somatic (11).

Vernon stated that individual susceptibility, symptoms and progression of migraine results from a combination of these factors and also proposed the concept of vertebrogenic migraine. The vertebrogenic migraine model links somatic dysfunction of the cervico-thoracic spine, disturbance of autonomic tone (leading to vasoconstriction and de-stabilisation of central aminergic system) and the migraine cascade of symptoms. Somatic dysfunction of C7-T4 causes joint pain and fixation resulting in sustained discharge from the sympathetic chain leading to transient cerebral ischaemia which reaches threshold levels to create cerebral ischaemia which then activates the migraine cascade. Increased catecholamine levels would result from the sub-threshold central excitation leading to destabilisation of platelet membranes. Somatic dysfunction of atlanto-occipital and the atlanto-axial joints also results in pain and fixation. This facilitates upper neurons reducing the inhibitory effect of descending pain pathways (at least one of which arises from the locus ceruleus) and increasing facilitation of neurons of the spinal tract of the trigeminus. Transient stimulation of the locus ceruleus results in focal and spreading vasoconstriction in intracerebral circulation leading to vasodilation of extracranial circulation with cranial pain mediated by the ipsilateral trigeminal nerve. Based on this model, three categories of migraine sufferers can be described, those where vertebrogenic migraine is aetiological, the second group where the vertebrogenic component is secondary and a group where the vertebrogenic component is not present. The first two categories of migraine sufferers would probably benefit

from chiropractic spinal manipulative therapy (11).

According to Nelson there exists both diagnostic and therapeutic overlap between migraine and tension headaches and that they do not exist as discrete pathophysiologic entities but form a continuum. Nelson's continuum model has at its centre the trigeminocervical nucleus. Headache pain is a function of the spinothalamic tract activity that arises from this nucleus. Three components influence activity, somatic source of pain from pain sensitive tissue innervated by C1-C3, vascular source of pain from intracranial and extracranial blood vessels innervated by the trigeminal nerve and disinhibition of headache pain, mediated through the serotonin system. The serotonergic system is regulated by and influences autonomic control centres. This model defines a two dimensional continuum with a somatic (tension headache) dimension and biochemical (migraine headache) dimension. The spectrum of headaches may include individuals on either extreme or individuals where one dimension may predominate but the other dimension may also be present. Based on the continuum model, the effectiveness of spinal manipulation therapy may be determined by the predominance of the somatic dimension of the headache or migraine (10).

MIGRAINE ASSESSMENT

In the clinical situation a reliable and cost effective method for determining the outcome of chiropractic treatment for migraine is required. This may be achieved by the patient using a migraine/headache diary to record date, headache score, other symptoms, duration, disability, medication, medication relief score and possible triggers. In addition, practitioners will record their examination findings.

Research of chiropractic treatment for migraine could benefit from independent objective measurements for treatment outcomes. Emerging and established methods are available to test saliva (12,13), blood (14,15), cerebral blood flow (16,17) and muscle tone (18,19). Saliva could represent a fluid particularly suitable to the study migraine as serum cortisol levels are increased by stress as in migraine and are reflected in salivary cortisol levels (12). In addition, Gamma-aminobutyric acid (GABA) levels in saliva have also been shown to increase during migraine (13). Studies have shown that platelet levels of cyclic adenosine-3, 5-monophosphate (AMP) increase during migraine (14) and the plasma level of some Th2-type cytokines are elevated in the interictal period of migraine (15). The use of transcranial doppler ultrasound on migraine patients with aura during the interictal period has shown that measuring mean flow velocity change and resistance index change in the middle cerebral artery could be used to detect patients with aura symptoms (16). Positron Emission Tomography (PET) allows the quantitative measurement of regional cerebral blood flow

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and has been used to monitor blood flow during the aura and headache phase of migraine (17). Electromyographic (EMG) readings of neck and temporal muscles during headaches have shown increases in EMG activity (18). Therefore, EMG is a potentially effective way of analysing the effects of spinal manipulative therapy in the treatment of migraine (19).

CASE FEATURES

A 41 year old male presented with a major complaint of headaches and migraines. The headaches occurred every two weeks, usually early on Saturday mornings. Every two months the headache escalated into migraine with nausea and vomiting. The headache/migraine episodes lasted for 18 hours and up to 6 paracetamol (Panadol) were taken during that period. These episodes have been occurring for two years. The patient worked as a massage therapist and was also a university student and felt the episodes were due to physical stress. He reported no other health problems.

The pain was located unilaterally in the suboccipital area and behind the eye. He described the pain as intense '...as though a steel spike was being driven into the base of my skull and out through my eye'. During an episode the location may change to the other side. The migraine episodes caused nausea and vomiting. At the initial visit he rated the headache 5 on a visual analogue scale (VAS), where 1 indicated "no pain" and 10 indicated "terrible pain". The VAS was 9 for the migraine. He reported that between episodes he experienced a slight but constant dull ache and stiffness in the suboccipital area.

Motion palpation revealed restricted movement at the atlanto-occipital facet joint (Occ-C1), between the second

and third cervical vertebra (C2-C3) and the third and fourth thoracic vertebra (T3-T4) with hypertonicity in the suboccipital, levator scapulae and upper trapezius muscles. In addition, he had a functional scoliosis (negative on Adam's Test) in the thoracic and lumbar regions.

TREATMENT

The patient received chiropractic adjustments to Occ-C1, C2-C3 and T3-T4. Massage was applied to the suboccipital, levator scapulae and upper trapezius muscles. Home stretching of the suboccipital and trapezius muscles was also advised.

The patient was seen a total of 5 times over a period of 5 weeks. The patient kept a migraine/headache diary during the course of treatment. For each migraine/headache episode the following was recorded:

VAS score (1 = slight to 10 = terrible), duration, disability (time unable to undertake normal daily routine), medication (type and number of tablets) and other associated symptoms.

RESULTS

The patient reported having had one tension-type headache which lasted three days (rated 3 on a VAS 1-10) during the five week treatment period. He had not experienced a migraine. He noted that the dull ache and stiffness in the suboccipital area was no longer present.

At an informal follow up eight weeks after completion of treatment the patient reported no migraine episodes. The migraine/headache diary was not thoroughly kept during this period, as there had been few symptoms relevant to headaches or migraines.

Table. Results of Treatment

	Pre Treatment	Treatment Period (5 weeks)	Post Treatment (8 weeks)
Frequency	Headache - 1 every 2 weeks Migraine - 1 every 8 weeks	Headache - 1 only Migraine - nil	No Headache details Migraine - nil
Headache Score VAS (1-10)	Headache - 5 Migraine - 9	Headache - 3	Nil
Duration	Headache - 18 hours Migraine - 18 hours	36 hours	Nil
Disability	Headache - nil Migraine - 12 hours	nil	Nil
Medication	Headache - 4 Panadol Migraine - 6 Panadol	nil	Nil
Other symptoms	Headache - none Migraine - nausea/vomiting	none	Nil

DISCUSSION

The patient noted he had a decrease in the frequency of headaches and migraine following the chiropractic treatment (Table). It appears that there was somatic dysfunction at C0-C1, C2-C3 and T3-T4. Therefore, the patient's condition fits into categories within both the vertebrogenic migraine and headache continuum models that could respond to spinal manipulation therapy. The condition appeared to be aggravated by massage work and postures where the patient bent forward for long periods of time, predisposing the thoracic spine to restrictions. This was coupled with a decrease in the lower cervical curve and an increase in extension of the upper cervical spine with forward head carry predisposing this area to restrictions. The patient was advised to seek further chiropractic treatment to assess and correct any cervical and thoracic dysfunctions, and myalgia in the neck and shoulder muscles.

In 1995, Vernon (20) reviewed the literature on outcome studies of chiropractic manipulation for tension-type and migraine headaches. He concluded that there existed only a modest body of clinical studies, only three of which dealt with the treatment of migraine. However, well controlled studies in migraine were definitely warranted and should include:

- Precision in classifying headaches
- Appropriate baselines
- Use of a waiting-list control group
- Large sample sizes to detect clinically important differences
- Refinement of diagnostic and assessment procedures for cervicogenic dysfunction
- Exploration of different modes of chiropractic treatment.

A series of studies on chiropractic treatment for migraine have been presented by Tuchin (21-24). The conclusion from a case study of a patient with chronic headaches was that the patient was originally misdiagnosed with migraine, highlighting the importance of correct diagnosis of patients participating in clinical trials (21). Correct diagnosis of migraine was examined in a subsequent retrospective study and confirmed that patients were being incorrectly diagnosed with migraine (22). In addition, the current migraine classification system resulted in the patients falling into more than 1 category. Also, the review of treatment outcomes suggested that chiropractic spinal manipulation techniques (SMT) may reduce both the disability associated with migraine and the frequency of migraine. Tuchin's larger prospective clinical trial on the efficacy of SMT in the treatment of migraine (23) using 32 migraineur volunteers showed the treatment to be effective for migraine without aura. Tuchin noted that

the study had a small sample size which necessitated the recording of the number of associated symptoms rather than the actual symptoms and the lack of a control group, although he argued that the participants acted as their own control because they participated in 2 months of pre-treatment. The strength of this study was the 6 month period used to allow for the cyclical nature of migraines. A further case series by Tuchin reported on the dramatic lessening of disability of 4 participants in the previous trial (24). These patients experienced significant reduction in both the frequency of migraines and use of medication. Due to the small number of cases, it cannot be concluded that this would be the case for all migraineurs.

A recent prospective, randomised, parallel group comparison trial involving 218 migraine sufferers concluded that spinal manipulation seemed to be as effective as the well established, efficacious treatment, amitriptyline, and on the basis of a benign side effects profile, it should be considered as a treatment option for patients with frequent migraines (25). This study is significant due to the large number of participants and the 4 month period of the trial.

Another, randomised controlled trial involving 127 migraine sufferers has also been recently concluded (26). The results confirmed that spinal manipulation is an effective treatment, which appears to have few benign side effects. The evidence appears now strong enough to state that chiropractic should be considered as a treatment option for patients with frequent migraines. This study is also very significant due to the long period of the trial (6 months) and the number of participants.

Many other studies have assessed the effects of manipulation in "type O" conditions including dysmenorrhea, colic, asthma, hypertension, as well as migraines (27-44). The evidence for CSMT in "type O" conditions is limited and no strong conclusions can be drawn, however, case studies such as this as some weight to the scientific knowledge about the condition (26).

The "Philosophy of Chiropractic" hypothesises a relationship between the integrity or health of the nervous system and the resultant integrity and health in the individual (42). The effects of vertebral dysfunction have also been substantiated with alteration in the autonomic nervous system and associated changes in physiology or homeostasis (30,42,44).

It should also be noted that the improvements observed in this case could also be explained through other potential mechanisms. For example, changes may have occurred through psychological factors, climactic cycles, stress changes, dietary alteration, etc. However, it should be noted that this case study was a patient with a chronic history of migraine and therefore the symptomatic improvement gained following chiropractic care was

possibly independent of the other factors.

CONCLUSION

CSMT appeared to decrease the frequency of headaches and migraines for this patient. The informal follow-up undertaken eight weeks after treatment ceased provided a period of time sufficient to permit assessment for the cyclical nature of migraine. However, the controlled 5 week period of this study was insufficient and confirms the need to conduct these types of studies over an appropriate time period.

Initially there was a paucity of clinical studies for chiropractic and migraine. However, the work by Vernon, Tuchin and Nelson are important steps towards the ability to undertake further trials on the potential mechanisms of CSMT for migraine (20,25,26). It can be argued that to date trials have used only subjective measures but where these measures are well established, such as the visual analogue scale and headache diary, they remain suitable. Further research into independent objective measures must continue and it appears that substances within saliva may prove suitable for such measures.

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