

A CASE STUDY OF CHRONIC HEADACHES

PETER TUCHIN B.Sc., Grad.Dip.(Chiro), Dip.OHS.*

MELINDA J. BROOKES B.Sc., M.(Chiro).

TAMARA SWAFFER B.Sc., M.(Chiro).

Abstract: The following paper is a case study of a patient with a history of chronic headaches (originally diagnosed as migraine without aura) who was being treated at the Macquarie University Chiropractic Outpatients Clinic for cervical spine dysfunction. The treatments successfully reduced the upper neck and thoracic pain that the patient was experiencing and for which they had initially presented at the clinic. During the treatments, the patient also showed a significant subjective reduction in prevalence and intensity of headaches over a four month period. Analysis of the outcome is complicated by the fact that it is not clear whether the patient's headaches were initially misdiagnosed as common migraine when in fact, they were cervicogenic. There may be some overlap between the two conditions, and a possible causative relationship between cervical spine dysfunction and common migraine. Furthermore, this case study discusses the validity of chiropractic treatment of organic disorders such as chronic headache or migraine.

INTRODUCTION

Migraine is a common cause of visits to primary care practitioners (1). The incidence of migraine in Australia is estimated at 12%, with the cost to industry an estimated \$250 million per year (1). In the USA approximately 8% of headache diagnosed by medical practitioners are called migraine headaches (2). A 1992 study in Canada found that 14% of the population suffer from migraines, and that 50% of these have significant disability (3). Migraine, in its various forms, affects an estimated 5% to 25% of people throughout the world (4).

The origin or pathophysiology of the headache is far from clear or simple (5). In addition, there are many variations of diagnosis and treatment which occur when dealing with the problem and even the definitions or terminology used to describe the various types of headache can be complex and suffer from a degree of overlap in actual practice (6). The current classification of chronic headaches has been provided by the Headache Classification Committee of the International Headache Society (I.H.S.), see Table 1 (7). The I.H.S. classify headaches as either one of 13 categories, most commonly: Category I (migraine), see Table 2, Category 2 (tension), or Category 11.2.1 (cervicogenic) (7).

* HEAD, DEPARTMENT OF CHIROPRACTIC SCIENCES
CENTRE FOR CHIROPRACTIC, BUILDING E7A,
MACQUARIE UNIVERSITY, SYDNEY, NSW. AUSTRALIA. 2109.

TABLE 1

Category 1	Migraine
Category 2	Tension-type headache
Category 3	Cluster headache and chronic paroxysmal hemicrania
Category 4	Miscellaneous headaches un-associated with structural lesion
Category 5	Headache association with head trauma
Category 6	Headache associated with vascular disorder
Category 7	Headache associated with non-vascular intracranial disorder
Category 8	Headache associated with substances or their withdrawal.
Category 9	Headache associated with non-cephalic infection
Category 10	Headache associated with metabolic disorder
Category 11	Headache or neck pain associated with disorder of cranium, neck, eyes, nose, sinuses, teeth, mouth, or other facial or cranial structures
Category 12	Cranial neuralgia's
Category 13	Headache not classifiable

Previously, chronic headaches were divided into migraine and tension headaches. Tension headaches are considered to be the result of hypertonic pericranial or cervical paraspinal muscles (5). There is much published research which suggests that a common origin for these tension headaches may be cervical spine dysfunction which could possibly contribute to the hypertonicity of the muscles in the cervical region (5,6,8,9). In comparison, migraine headaches have been considered to be vascular in origin (6, 10).

Migraine with aura or prodrome usually describes a classic migraine, that is, one which is preceded by visual disturbances, numbness and tingling, thought to coincide with vasoconstriction (6,7). In contrast, common migraine is defined as a migraine without prodrome or aura, however, the two entities often share the same aetiology. There are a number of plausible aetiologies for migraine proposed in the literature. These have been categorized by Vernon (11) into the following 6 classifications:

- 1) autonomic/vascular
- 2) biochemical/platelets
- 3) cellular/immunological/allergy
- 4) psychophysiological
- 5) neurogenic
- 6) somatic

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The most common medical model is based on a vascular cause of migraine, where a migrainous attack is initiated by a decreased blood flow to the cerebral vasculature or a cerebrovascular spasm but characterized by extra cranial vasodilatation during the headache phase (10,12,13). However, other practitioners involved in the treatment of migraine find that a number of factors are also involved (6,14).

One of the factors which has been implicated is "cervical spondylosis" with neck pain and stiffness (15). Anthony, a neurologist, states that, "when this is recognized, appropriate treatment can give impressive results ... the aim is to relieve pressure on nerve roots and the upper neck thereby reducing activation of the spinal tract of the trigeminal nerve, which is part of the pain centre in the head and neck" (15).

Surgical decompression of the lower cervical nerve roots as carried out by Ghavamian (16) showed relief of migraine symptoms. He proposed that irritation and compression of the deep sympathetic fibres incited such symptomatology.

In 1987, a subcategory of chronic headache which is known as cervicogenic was introduced. The symptomatology of the cervicogenic headache is strictly defined as almost always unilateral, accompanied by autonomic symptoms, provokable by movements of the head and neck, and most importantly, originating from cervical spine structures (17 - 19). Sjaasted et.al. have

proposed that this headache may be due to entrapment of the occipital nerve or a C2/3 rhizopathy (19). Vernon (6), after his study of the literature available proposed a model which incorporates components from the different categories previously stated. Primary cervical (upper and lower) and upper thoracic lesions are widely accepted in the research community as a predisposing factor for cervicogenic headache as follows:

a) The lower cervical/upper thoracic spine (C7-T4) model proposed that dysfunction (i.e. Somatic) at these vertebral levels caused joint fixation and pain. This pain alters the neural messages received, and therefore sent, by the Central Nervous System (CNS). The Autonomic Nervous System which controls, amongst other functions, blood supply, is thus also affected. It is proposed that when certain threshold levels of transient cerebral ischaemia (due to vasoconstriction caused by the above mechanism) are reached a migraine cascades of symptomatology may be precipitated.

b) In contrast, somatic dysfunction in the upper cervical spine (Occiput-C2) may produce local pain and fixation leading to increased neural input to the CNS (6,20). This results in a reduction in descending pain-inhibiting impulses from the CNS and consequently increases activity within the spinal trigeminal tract (which transmits the majority of sensory afferents and pain signals from the upper cervical region to the cerebral cortex). Having exceeded a threshold level, this excessive afferent input to the CNS will trigger focal, and spreading

The following table is the sub-classification of migraine based on Headache Classification Committee of the International Headache Society (I.H.S.). The I.H.S. classify migraine in 18 sub-categories including: (see Table 2)

TABLE 2

Category 1	
1.1	Migraine without aura
1.2	Migraine with aura
	1.2.1 Migraine with typical aura
	1.2.2 Migraine with prolonged aura
	1.2.3 Facial hemiplegic migraine
	1.2.4 Basilar migraine
	1.2.5 Migraine aura without headache
	1.2.6 Migraine with acute onset aura
1.3	Ophthalmologic migraine
1.4	Retinal Migraine
1.5	Childhood Periodic syndromes that may be precursors to migraine.
	1.5.1 Benign paroxysmal vertigo
	1.5.2 Alternating hemiplegia
1.6	Complications of migraine
	1.6.1 Status migrainous
	1.6.2 Migrainous infarction
1.7	Migrainous disorder not fulfilling above criteria

vasoconstriction within the intracerebral vasculature. This mediated by the ipsilateral trigeminal nerve (6).

This subcategory has since been criticized by Vernon (21) as being too narrow and that cervicogenic headaches are merely part of a larger group of chronic headaches to which muscle hypertonicity is common. Sjaasted himself acknowledges the tremendous potential overlap between cervicogenic, tension and migraine headaches (19). A number of other causes of cervicogenic headaches include "degenerative joint disease, myofascial pain, entrapment of the greater occipital nerve, mechanical irritation of the C1 and C2 nerve roots, the vertebral nerve and the postganglionic sympathetic chain, all as potential peripheral sources of cervical dysfunction capable of producing headache" (20,22).

While there is good indication for cervical spine dysfunction in terms of cervicogenic headache aetiology, there is no such compelling evidence for the involvement in the origin of migraine headache. However, a recent theory of the origin of chronic headaches proposes that all headaches have the same pathophysiologic origin and that the different types of headache are different expressions of this origin along a continuous scale. This is known as the "Continuum Concept" (23).

According to Nelson (23) it became apparent that the migraine vascular model does not satisfactorily account for all the clinical manifestations of a migraine episode. The proposed vascular events often appear to be inconsistent with some of the physiological changes such as visceral, somatic and behavioural. Similar conflicts arise for tension headaches, in that hypertonicity is not always able to be linked to the presence of headache and that other symptoms (eg. Visceral and behavioural) exhibited by the patients could not be explained by muscle contraction alone (23). Nelson also demonstrated pathophysiological, epidemiological, psychological and symptomatological similarities in patients diagnosed with both tension and migraine headaches.

Simply put, the model proposed by Nelson involves convergence of trigeminal and cervical nociceptive inputs where the CNS has no way of differentiating the source of pain, i.e. the pars caudalis. Thus, theoretically, head pain could be interpreted from upper to mid (Occiput to C4) cervical spinal nerve irritation and subsequent hyperfacilitation into the trigeminocervical nucleus. This is supported by Drummond who speculated that neck pain may excite trigeminovascular reflexes by way of convergence of C1 and C2 afferent with the trigeminal nucleus (24). In addition, Nelson proposes a failure in the normal inhibitory process in the trigeminal system, which would normally monitor and reduce afferent stimuli from all sources feeding into this nucleus. This could not only

result in headache, but also produce other associated somatic, visceral and behavioural changes. The relevance of this theory would suggest that a cervical spine dysfunction could well be a component of all categories of chronic headache whether as a primary cause or a secondary result.

The following case study, in light of this model, suggests an apparent link between incidence of migraine without aura and Chiropractic adjustment of the cervical spine. The case presented could also be diagnosed as cervicogenic headache.

CASE REPORT

A 44 year old female presented to the Macquarie University Chiropractic Outpatient's Clinic in May 1994, complaining of a sharp pain at the base of the neck, radiating centrally down to the level of mid scapular region. The patient could not recall a specific incident which caused the pain and she noted the pain had gradually increased over a period of four weeks. The patient also complained of "migraines" which she stated she had experienced for "years". The "migraines" were located behind the eyes and around the temples. The patient described the headaches of varying intensity which lasted three days duration.

The migraines had recurred approximately every two weeks for several years, and she also suffered from neck pain, muscle tension and spasm. However, she had not associated the symptoms of neck pain with the occurrence of chronic headaches. The patient had been on prescription drugs (Cafergot) for migraine headaches as of April 1994. The migraines had remained relatively consistent since taking the medication, but she noticed migraines approximately every two weeks which would last two to three days. The patient could not recall other family members complaining of migraines.

On initial examination, the patient exhibited a moderately reduced cervical range of motion, through visual estimation, with associated symptoms of sub-occipital and trapezius muscle tension. The patient also exhibited tenderness on springing the upper cervical spine and mid thoracic spine. Motion palpation revealed restriction in mobility of upper cervical spine (C1/2), lower cervical spine (C5/6) and the mid thoracic spine (T4/5). Other orthopedic and neurological tests, including cranial nerve tests were unremarkable.

Cervical spine radiographs (dated 09/05/94) showed a lack of cervical lordosis and anterior calcification of the annulus at C5/6 and T1/2 discs. No other bony, soft-tissue or congenital abnormalities were detected.

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Due to the patients' acute presentation, the first treatment was general mobilizations and stretching with some home exercise. A regime of two treatments per week for the first 2 weeks was implemented. At the second visit, the patient reported that neck pain had decreased in intensity and that the back muscles seemed to be somewhat "looser" in feel. Adjustments were now able to be performed on C1/2, C7/T1, and T7/8, since the acute stage had subsided following the initial treatment. Heat was applied to the neck muscles and a suboccipital release implemented. Soft-tissue work was also carried out on the trapezius, levator scapulae and rhomboid muscles. This gave the patient some relief to the pain in the back.

On subsequent treatments more soft-tissue work around the anterior scalene muscles, suboccipital and trapezius muscles was administered. There were repeat adjustments to C1/2, C7/T1, and T4/5. Over the course of 20 weeks, the patient had 12 treatments.

On the fourth visit the patient reported that after the previous treatment, she had felt extremely tired and had subsequently vomited. However, the next day she felt greatly improved and noticed a reduction in the frequency and intensity of headaches. The chiropractic sessions were reduced to one per week and at the last visit had been reduced to one per two months. At the follow-up progress examination at four months, the patient reported no headaches for three weeks and the C1/2 and C7/T1 restrictions in motion were found to have resolved.

DISCUSSION

It is probable the patient was originally misdiagnosed as a migraine sufferer instead of tension type headache (Category 2) or cervicogenic (Category 11.2.1) (7). This is based on the lack of an aura, no associated nausea (even though she vomited after treatment) and the location of the "migraine" or head pain.

This case shows evidence of cervical spine involvement in a patient who reported being diagnosed a "migraine" sufferer by a General Practitioner. The patient also had a high degree of suboccipital tenderness. This is consistent with reports in the literature of tenderness and pain in the muscles of the upper cervical spine of migraine and tension headache sufferers (6). The manifestation of these symptoms and the relief provided by the cervical spine adjustment seem to highlight the potential overlap in the diagnosis of patients with chronic headache or migraine (6, 21, 23, 26, 31).

The importance of the role of cervical vertebrae and musculature in headache aetiology may be best noted by Vernon et al (6), who postulated that physical activation of the muscles of the neck may contribute to headache

genesis and this may be a new target for treatment interventions.

Vernon et al state that there is a very strong argument for the role of the cervical spine in the aetiology of the chronic headache from both traditional and modern medical and heterodox writings (21). Vernon also notes that the treatment of cervical spine dysfunction with a specific view to treat chronic headaches is rarely recognized as a common approach (except perhaps amongst chiropractors). If further research in this area was to show a closer link between cervical spine abnormalities and chronic headaches, then this would give impetus to include cervical adjustment regime in the treatment of headache thus possibly providing a drug free alternative to the headache sufferers. This indicates how treatment directed towards removing vertebral dysfunction, via such methods as spinal manipulation, may prevent the initiation of the migraine cascade.

Increasingly, manipulation of the spine is being used in the treatment of migraine by medical practitioners and physiotherapists. Chiropractic is a profession based wholly on this type of physical therapy (i.e. spinal adjustments or spinal manipulative therapy - SMT), with aims to:

- a) "Diagnose joint dysfunction of subluxation (i.e. specific restriction from normal joint movements.
- b) Correct this, principally through adjustment by hand
- c) Thereby restore normal function to the joint and affect all related neurophysiology - all interference with nerve supply, blood supply, etc." (3).

An early definition of a chiropractic adjustment is "a passive manual manoeuvre during which the three joint complex is suddenly carried beyond the normal physiological range of movement without exceeding the boundaries of anatomical integrity" (25). [Passive in this context refers to the patient not actively moving the joint]. It makes use of a specific force in a specific direction to correct a specific problem. A recent definition of a chiropractic adjustment includes:

1. Controlled force delivered with high velocity
2. A line of drive or specific direction
3. Regulated depth and magnitude that are delivered through a specific contact using muscle power, body weight or a mechanical apparatus (32).

Wight, a chiropractor, in 1978 reported his clinical experience in the treatment of migraine. From 87 patients he found that 85% of the 57 females and 50% of the 30 male patients were greatly improved in common migraine attacks, whilst 78% of females and 75% of males were

greatly improved in classic migraine (8). There was also reported a reduction in severe attacks of 34.5-81.5%, depending on sex and the type of migraine involved. More recently, Milne (26) has reported a 98% success rate with 150 patients in immediately terminating current attacks of migraine by traction and cervical SMT. Similar findings have also been recorded (27 - 29) although some conclusions remain controversial i.e. the statistical interpretation was viewed by some as inconclusive (30).

CONCLUSION

One of the difficulties in attempting to show a positive therapeutic benefit of chiropractic treatment for headache is that headache definition and origins vary widely (33). In addition, measuring improvement subjectively and objectively is very difficult. There are many conflicting theories as to the origin of headaches, and although there appear to be strict clinical guidelines to define them there is often a degree of overlap (7). Furthermore, Vernon and others also challenge the definition of the cervicogenic headache, in which neck pain as a precursor to chronic headache is limited only to the cervicogenic category (6). He proposes that cervical spine involvement is far more relevant to the origin of all headache categories than is previously documented. This is exemplified in the positive outcome of cervical spine spinal manipulative therapy (or adjustment) in treatment of the patient documented in this study.

A subsequent paper is being prepared which will review ten case studies of so called "migraine" for consistency and accuracy in diagnosis.

ACKNOWLEDGMENTS

We gratefully acknowledge the help and guidance provided by Ray Hayek (Neurology lecturer and Head of Research Department). Thank you also to chiropractic student Suzanne Labrie for bringing our attention to this interesting case.

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