CHIROPRACTIC MANAGEMENT OF A PATIENT WITH MIGRAINE HEADACHE

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ABSTRACT

Objective: To describe the use of chiropractic care for a patient with migraine headache.

Clinical Features: A patient suffered from migraine headaches after an automobile accident. Neck disability scores, visual analog score, and algometry scores were used to track patient progress.

Intervention and Outcome: The patient's range of motion, flexibility, and strength improved following a regimen of spinal manipulation and active and passive therapeutic care. After 12 weeks of treatment, the duration, frequency, and intensity of her migraines decreased.

Conclusion: This case offers an example of the potential effects of chiropractic and rehabilitative treatment for migraine headache sufferers. (J Chiropr Med 2005;4:25–31)

Key Indexing Terms: Migraine; Manipulation, Chiropractic; Musculoskeletal Manipulations; Exercise Movement Techniques

INTRODUCTION

It is estimated that chiropractors in the US perform between 18 and 38 million cervical spine manipulations annually for neck pain and headache.[1] Results of a survey by the National Board of Chiropractic Examiners indicate that most chiropractors treat patients who have headaches daily,[2] and chiropractic is the most common alternative treatment of those who suffer from headaches.[3] Freitag[4] recommends that the treatment for migraine headaches be "deep inhibitory pressure mobilization and high-velocity, low-amplitude corrective techniques applied to the cervical and upper thoracic areas."

Other treatments for migraine headache includes palliative medications such as sumatriptan, ergotamine, caffeine, opiates, phenothiazines, amitriptyline and non-steroidal anti-inflammatory drugs (NSAID). Negative side effects of such medicines may include sedation, dry eyes, blurred vision, constipation, hypotension, photosensitivity, dizziness, vertigo, dermatological tingling, burning sensations, sinus tachycardia, intermittent claudication, myocardial infarction, nausea, vomiting, abdominal pain, diarrhea, polydipsia, and myalgia.[5–11] Side effects of chiropractic manipulation may include neck soreness and stiffness. A randomized study comparing effects of manipulation, medication, or both treatments. They found significant difference favoring the cervical manipulation group compared to others,[12] thus there is potential for use of chiropractic care in migraine cases.

While some believe that tension and migraine headaches vary only in intensity,[13] the Headache Classification Committee of the International Headache Society (IHS) differentiates migraines from other types because of the accompanying nausea, vomiting, photophobia, and/or phonophobia.[14] 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.[15] Furthermore, a migraine with aura causes transient visual, sensory, motor, or other focal neurological symptoms.[14] Migraines with or without aura may occur periodically and last several hours or even days.[4]

In addition to the debate about whether migraine headaches are a separate and distinct type of headache, there is also controversy about the cause of migraines. Some argue that the cervical spine is not a factor,[16] but others believe there is evidence that it

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can be a source of migraine pain because of the intracranial vascular changes that may be effected by cervical dysfunction.[4,12,17] Other theories propose that the origin of pain is in the intra- and extracranial blood vessels[18] or caused by musculoskeletal conditions.[19–22] Exact etiologies are unknown. Current concepts of pathogenesis of migraines focus on three mechanisms of anatomical regions. The vascular theory, proposed in 1938 by Graham and Wolff, attributes migraines to an intracranial arterial vasoconstriction, resulting in reduced blood flow to the visual cortex, followed by an extra-cranial vasodilitation.[23]

Moskowitz's unified theory involves the trigeminovascular complex, which links aura and the cephalgia of migraine.[24] It is thought that trigeminovascular neurons release substance P and other inflammatory neuro-transmitters in response to various stressors. Substance P is associated with vasodilatation, mast cell degranulation, and alterations in vascular permeability. Excessive trigeminal discharge is thought to directly affect blood flow, resulting in migraine headaches. Lance et al[25] proposed the idea of migraine threshold which is determined by a dynamic balance between excitation and inhibition at various levels in the central nervous system. Hormonal influence, environmental and physiologic stressors, low blood sugar, and fatigue are all thought to determine this threshold. Once the threshold is exceeded, trigeminovascular discharge is thought to be responsible for inducing a migraine.

Platelets became an important concern in migraines as they contain over 90% of the serotonin in the blood. Once they aggregate, platelets release serotonin, and other vasoactive chemicals causing a potent vasoconstrictive effect. Platelet aggregation is shown to be altered in migraine patients, and raises the possibility that platelet activating factor may be involved in the pathogenesis of migraine.

In one study, a majority of patients cited stress as a trigger of their migraines.[26] Other triggering mechanisms include menses, oral contraceptives, bright sunlight, exercise, fatigue, hunger, head trauma, changes in the weather, and foods with nitrates, glutamates, or tyramine.[4]

Estimates of the number of adults who have been diagnosed with migraine headaches vary from 8% to 15%.[27] Females are 2 to 4 times more likely to experience migraines; affecting 18% to 27% of females but only 6% to 14% of the male population.[27,28] Most individuals with migraines experience the first attack before age 40.[4] Attacks are usually worse for individuals between 22 and 55 years old.[29]

Improved diagnostic and treatment strategies could reduce the economic costs of migraine headaches.[30] In the United States, $5 to $17 billion dollars are spent each year on health care because of decreased productivity because of migraines.[31] In Australia, migraines cost society more than $750 million [Australian dollars] annually.[32]

Studies have shown that by restoring muscle relaxation and normal joint function in the neck and upper back area, manipulation has a prophylactic effect.[13] Chiropractic treatment has also been reported to reduce the frequency and intensity of migraines.[30] For example, one trial showed the mean number of migraines reduced from 7.6 to 4.9 episodes per month after treatment with manipulation.[32] Another trial found that patients who received 8 weeks of spinal manipulation had better results for pain intensity, disability score, duration, and frequency of attack than treatment by medical physicians and physical therapists.[33,34] When spinal manipulation was compared to amitriptyline over an 8-week period, significant differences were found during post-treatment follow-up.[35] Spinal manipulation therapy has also had better effects in trials than massage.[4,35] Although these studies have contributed to a better understanding of patient reponse to care, still more information is needed. The purpose of this paper is to report the response of one patient with migraine to chiropractic care.

CASE REPORT

History

A 49-year-old female presented with a chief complaint of severe headaches with aura that began after she was involved in an automobile accident 17 years prior. After her car was hit from behind by another vehicle, she experienced neck pain, decreased cervical range of motion (ROM), swelling, and debilitating migraines. She reported that monosodium glutamate and changes in the barometric pressure triggered her migraines. Her headaches were a sharp, relentless, pounding pain that radi-

ated from the cervical spine to the temporal areas, occipital regions, and retro-ocular regions. She compared the pain to a stabbing ice pick. She said that sometimes the pain was so intense that it felt like her head would "explode." The migraines and accompanying symptoms such as blurred vision, intermittent facial numbness, vomiting, nausea, and difficulty with speaking, would leave her bedridden for days and unable to care for her family, groom herself, or continue full-time employment.

Prior to the collision, the patient had a history of intermittent, minor, non-migraine headaches. Immediately after the accident, she went to an emergency room where doctors took x-rays, prescribed medication, and gave her a cervical collar. Six months later, she received prescriptions for other medications from her family doctor. Three-and-a-half years after the accident, another general practitioner prescribed different medications for her. Six years after the accident, she had an MRI of her brain, and a neurosurgeon suggested that a cranial nerve be cut to prevent the facial pain that accompanied her migraines. The patient had sought occasional chiropractic treatment which gave her temporary relief.

Except for the car accident, the only head trauma the patient recalled was an incident, two years prior to her car accident, in which she tripped and hit her head on a bedpost as she fell. She had been taking hydrocodone and promethazine to treat the pain and nausea of her headaches plus loratadine for allergies.

The patient rated her pain as 7 out of 10 on a numeric pain scale (NPS) for pain at the time of examination. She stated at her best the rating is a 3 and at worst a 10. Neck disability index measured a score of 26%, which is mild neck disability. A Beck's depression index score of 24 indicated moderate depression.

Examination

The patient had decreased cervical ranges of motion: flexion 30°, extension 25°, bilateral rotation 60°, bilateral lateral flexion 35°. Palpation revealed moderate hypertonicity in the cervical paraspinal musculature, bilateral trapezius muscles, suboccipital muscles and pectoralis musculature. With overpressure of manual muscle testing the following musculature was found to be weak on the right: serratus anterior, teres minor, lower trapezius, lower rhomboid muscles. Weaknesses to the deep neck flexors were noted. This was evaluated by placing her supine head 1cm off the table with chin tucked in. She was instructed to hold her head in this position without raising or lowering her head. The test is positive if after a 10 second period the chin 'pokes,' raises or lowers, or demonstrates pronounced tremor of the head and neck, all of which occurred. This is congruent with upper kinetic chain dysfunctions and occurs in the body when certain musculature is too tight or weak, causing a physiologic counter effect to other muscle groups. Active range of motion (ROM) was more limited than passive ROM. Resisted ROM also showed cervical weakness, especially of the deep neck flexors.

Cranial nerves I-XII were intact; however, pupillary dilation was observed during migraines that occurred during office visits. Reflexes were normal (2^+) in the upper extremities bilaterally. Manual muscle testing showed normal 5/5 for all upper extremities. The pinwheel test revealed hypersensitivity at the C5 dermatomes on the left when compared to the right, indicating possible nerve involvement. The symptoms of migraine pain were also predominant on the left side. The patient did not have any signs of paresthesia or radiculopathy.

Valsalva's maneuver was negative. O'Brien's test was positive for shoulder instability on the right. The Soto-Hall test was positive pain in the posterior cervical spine indicating ligamentous sprain. Jackson's test showed nerve root compression by eliciting a response of pain on the left side.

Over the posterior paraspinal muscles of the C5–6 region, the algometer pressure gauge registered a 2–3 kg/cm^2 and this region was especially sensitive. Waddell's signs for non-organic pain were negative.

When motion and static palpation were performed, restricted motion and pain was elicited between C2-C3 and C5-C6. Headaches were not reproduced during physical examination procedures. Bilaterally there was pinpoint tenderness over occipital and upper trapezius musculature. Her complete blood count (CBC), blood pressure, lung sounds, and heart sounds were normal.

A weight-bearing study of radiographs was performed including an anteroposterior lower cervical, lateral, oblique, and AP open mouth views. Mild degenerative joint disease was noted in the C5–6 region. Vertebral height was well maintained, mild or moderate straightening of the cervical lordosis

and moderate or good bone density were visualized. A previously completed MRI of the brain without contrast was normal. The patient history and exam findings confirmed the patient's chief complaint of migraine headache.

Management

The patient received a total of 20 chiropractic manipulation therapy treatments over 12 weeks with the treatment performed with decreasing frequency. Her treatment was 3 times a week for the first 4 weeks, twice a week for the fifth and sixth weeks, and then once a week for the last 6 weeks. With the patient supine, the practitioner performed diversified technique by contacting the articular pillar of the cervical spine (C2-C3 and C5-C6) with the second phalange and provided a thrust into rotation to the right.

Passive care was given in the form of moist heat and high volt electrical muscle stimulation (EMS) to decrease muscle spasms and increase circulation. Weekly therapeutic massage was performed to decrease trigger point pain and scar tissue formation in the cervical and upper thoracic spine.

Rehabilitative treatment was completed during the same 12-week period as the chiropractic treatment. Rehabilitation was initiated at 3 times a week for 6 weeks in the office with supervision, and then continued at home for at least 6 more weeks, being monitored by the patient's reports. Typical rehabilitation protocols were implemented to treat problems in the upper kinetic chain: weakness of the rhomboid muscles, latissimus dorsi muscles, and deep neck flexors, as well as hypertonicity of the trapezius, pectoralis, and suboccipital muscles. Rehabilitation care included strengthening, range of motion, endurance, neuromuscular re-education, biomechanical education, and activities of daily living education.

The patient was placed on an active program consisting of stretches, therapeutic exercises, stabilization exercises, proprioceptive exercises, and cardiovascular exercises. Her rehabilitation treatment comprised the list of exercises in Appendix 1. The cardiovascular, stretching, and stabilization exercises remained the same throughout the program, but there are three stages of strengthening exercises. The exercises performed by this patient included only those of the upper extremities and upper kinetic chain. The purpose of the active rehabilitation treatment plan was cardiovascular reconditioning, increased flexibility, increased endurance, increased strength, improved spinal stabilization, and proprioception.

The patient spent 2 weeks in stage I of rehabilitation. To move from stage I to stage II, she had to meet the following four criteria:

- Pain-free ROM was at least 75% of the arc of an angle (75% of normal range of motion).
- Computerized muscle testing utilizing J-Tech instrumentation as a base line indicated less than 30% deficit of normal isometric strength.
- Perform 5 repetitions of isometric exercises through pain-free ROM with minimal strength loss.
- Perform at least 5 sessions in stage I.

After fulfilling those requirements, the patient began stage II and continued the strengthening exercises from stage I. She remained in stage II for 3 weeks. Then, to progress from stage II to stage III, she accomplished these goals:

- Perform 10 repetitions without pain and without appreciable strength loss.
- Computerized J-Tech muscle testing indicated less than 20% deficit from normal strength.
- Her ROM improved with less than a 10% strength deficit.
- Perform stage II exercises for at least 5 sessions.

Before the patient advanced from the stage III exercise under office supervision to an at-home program with her own ball and therapy band, she achieved the following objectives:

- She had a full, pain-free ROM.
- Computerized J-Tech muscle testing indicated less than 10% deficit from normal strength.

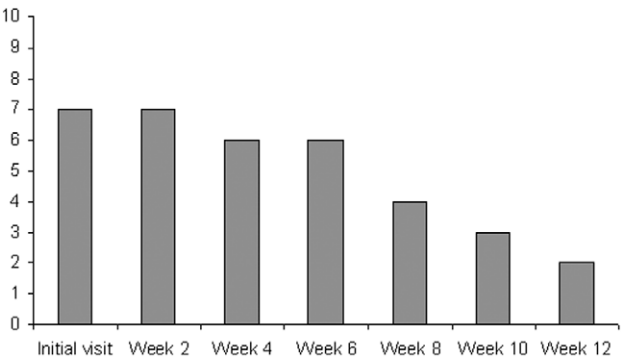

Figure 1. Pain severity scores.

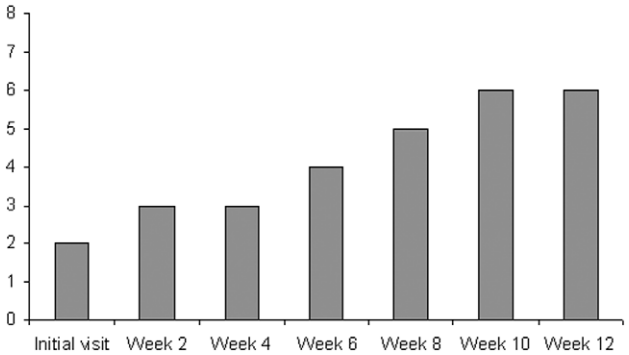

Figure 2. Changes in algometer readings during care.

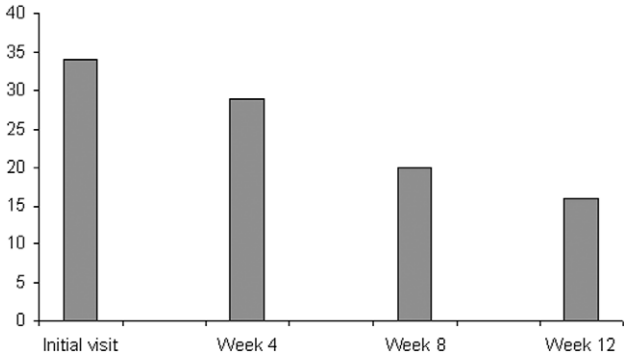

Figure 3. Neck disability index scores.

This percent level is comparative, and represents from one side to the other.

- Activities of daily living for work- or sport-related activities were managed or restored.

Although the patient continues to experience migraines, the frequency and intensity have decreased. She performs the activities of daily living at a higher level; she meets the demands of a full-time job, and no longer has to spend full days resting in bed because of headaches. The VAS scores improved from 7 to 3 (Fig 1). Cervical ranges of motion showed normal flexion and extension of 45°, right and left rotation of 70°, right lateral flexion of 35°, and left lateral flexion of 40°. Jackson's compression test, the Soto Hall test, and O'Brien's were negative after treatment. The sensory exam was normal.

The tenderness over the cervical paraspinal musculature that the algometer pressure gauge had originally registered as 2 or 3 kg/cm^2 at levels C5–6, increased to 5 or 6 kg/cm^2 (Fig 2). Neck disability scores improved from 34 to 16 (Fig 3). Beck's depression index score changed from 24 moderate to 15, mild depression.

The patient is no longer as sensitive to weather changes, and she is consistently able to perform activities of daily living. Strength in upper muscle groups increased with therapeutic activities in rehabilitation (Table 5). Overall, cervical ROM was improved after treatment.

DISCUSSION

This case study suggests the possibility that the combination of chiropractic and rehabilitation may be effective treatments for migraine. Doctors of chiropractic should consider the use of rehabilitation in addition to chiropractic care alone. In addition, chi-

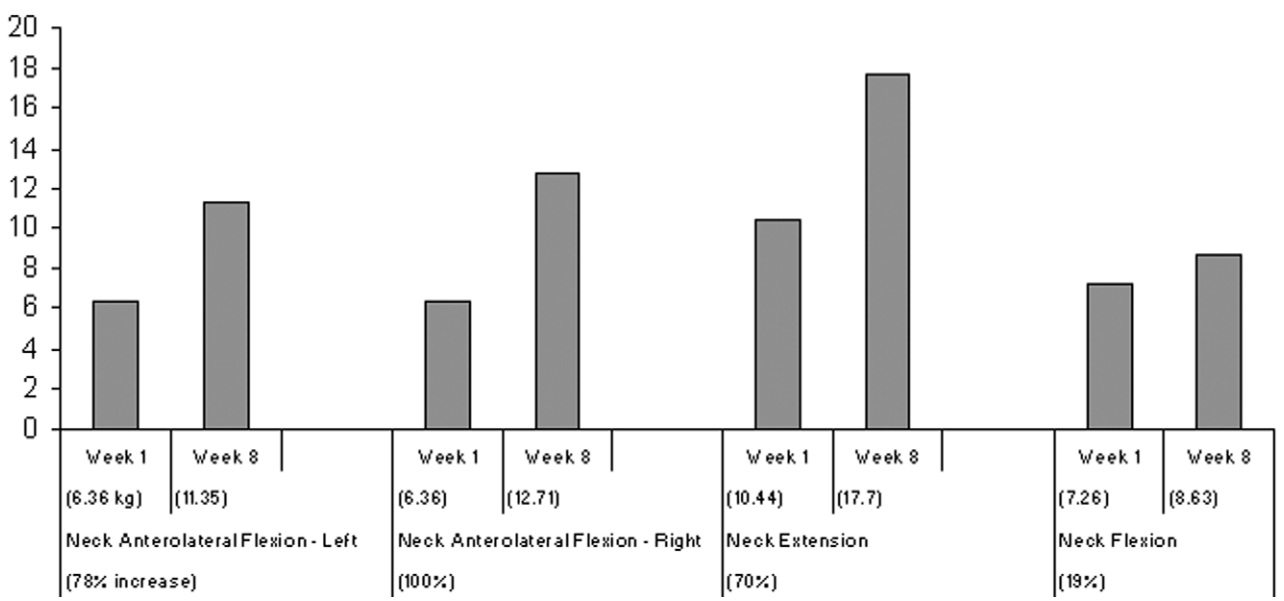

Figure 4. Changes in computerized muscle testing strength over time.

ropractors could educate their patients on the use of active rehabilitation that could be done at home. Functional testing can determine which musculature is too weak or too tight;[36] an individual rehabilitative goal can be set for each patient. The correction of the subluxation complex in addition to helping to correct the muscular system that has been adversely affected through trauma, postural, or repetitive motion disorders should be a consideration for primary health care physicians.

CONCLUSIONS

Combining chiropractic and rehabilitative care can restore functionality and improve the body's structure. The patient in this case study had previously tried to treat her migraines with medication and with chiropractic care alone; however, chiropractic and rehabilitation together seemed to be the most beneficial. Perhaps cervical manipulation and rehabilitation provided simultaneously may offer even more long-term relief.

There is little knowledge of the mechanisms of spinal manipulation on migraine headaches, thus more research is needed to investigate these effects. Clinical trials should be performed to compare results of chiropractic care alone with chiropractic care and rehabilitation for migraine headaches, and to compare the effects of active care, passive care, and the combination of both. Once the causes of migraines are better understood, finding a treatment that is consistently successful will be easier.

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Appendix 1. Rehabilitation exercises.

Cardiovascular		Recumbent Bicycle Treadmill Elliptical Trainer Stair Stepper
Stretching		Neck Mid-Back Lower Back Upper Extremity Lower Extremity
Stabilization		Dead Bug Arms Dead Bug Legs Dead Bug Both Superman Swimmer Bridging Balance Board A-P Balance Board Lat
Strengthening	Stage I	Shoulder Extension Standing Rows Front Raises Exercise Ball: Sit & Bounce Marching Sit & Reach Sit & Arch Kneel & Bow Psoas/Arm Stretch Wall Squats
	Stage II	Tubing: Chest Press Seated Rows Shoulder Press Supine Flies Reverse Flies Wall Rocker Board Floor Rocking Knee Push-ups Knee Push-ups Rocker
	Stage III	Tubing: Arm Lift with Twist Floor Lift with Twist Standing Row with Twist Pull Down with Twist Machine/Free Weights: Squats Lunges Knee Extensions Knee Flexions Leg Press Chest Press Butterflies