CHRONIC MIGRAINE AND CHIROPRACTIC REHABILITATION: A CASE REPORT

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ABSTRACT

Objective: To describe the use of chiropractic rehabilitation, functional assessment methods, and outcome measures in treatment of a single case of chronic recurrent migraine headache.

Clinical Features: A 22-year-old woman had migraine, recurrent duration 2 years. She had no history of trauma and the symptoms persisted despite multiple medical interventions. She had head pain, primarily left frontal retro-orbital, accompanied by nausea and visual aura of "spots" when severe.

Intervention and Outcome: This subject was managed with rehabilitative exercises in combination with chiropractic manipulation. Outcome measures, including the Headache Disability Index, are described.

Conclusion: The chronic recurrent migraine resolved over a 12-week period with use of chiropractic rehabilitation in this patient. More research is necessary to determine whether this approach is consistently reproducible and how it compares with spinal manipulation alone and other forms of treatment. Further investigation of combining rehabilitation with chiropractic manipulation for some migraine patients should be considered. (*J Chiropr Med* 2003;2:55–59)

KEY INDEXING TERMS: Migraine; Headache; Rehabilitation; Chiropractic Manipulation; Cervical Spine; Headache Disability Index.

INTRODUCTION

Chiropractic has a long history of incorporating rehabilitation techniques, although most chiropractors do not utilize it in a methodical manner in their practice. In America, about 23.6 million people have experienced migraine headache (1). The annual cost of migraine is approximately \$13 billion considering only lost produc-

tivity and work (2). Migraine incidence in the general population is 3–16% with female predilection (3). The majority of migraines are treated medically but migraine has been shown to improve with chiropractic manipulation (4–6). Manipulation and active rehabilitation techniques are usually studied independently; however, in clinical practice they are sometimes used together and therefore these 2 combined treatment patterns should be reported.

Goals of combining rehabilitation with manipulation might include sustained improvement as a result of spinal stabilization and reducing treatment duration. Rehabilitation should be considered in case of a patient's condition being unresponsive to manipulative treatment alone, a plateau in progress, or in case of recurrent symptoms. Combining active rehabilitation with passive spinal manipulation may reduce a patient's dependence on outpatient care and encourages self reliance. Active rehabilitation techniques include muscular strengthening, relaxation, stretching, and coordination techniques versus passive modalities such as electrical stimulation, ultrasound and traction. It has been shown that the presence of cervical muscle imbalances can differentiate between those with chronic headaches and those without headache (7).

Liebenson states that "most headache sufferers have chronic or recurrent symptoms and thus rehabilitation should be included in the chiropractic care of any headache patient, regardless of the degree of cervical or myofascial involvement" (8).

CASE REPORT

History

A 22-year old woman had severe chronic recurrent headaches for the previous 2 years. She also was experiencing chronic low back pain since approximately the same time and had some neck soreness, duration about 2 weeks.

She reported that the headaches and back pain insidiously came on during her first pregnancy. Previous unsatisfactory interventions included Tylenol with codeine, 3 months of Paxil as antidepressant, morphine injection, and other unknown prescription medication.

Furthermore, over-the-counter medications were not effective. She presently was taking no medication. She reported that the headache was primarily left frontal retro-orbital. She endured mild nausea, phonophobia, and sometimes had a visual prodrome and aura of "spots" when the headache was severe. The headache was rated at 6 to 10 on a 0–10 numeric pain scale, lasted hours or days, and occurred more than 1x /week. The patient was approximately 8 weeks pregnant. She was a homemaker with 1 daughter about 2 years of age. The patient was a nonsmoker, and had not had chiropractic treatment previously.

There were no upper or lower extremity complaints. No dizziness, dysphagia, or bladder/bowel dysfunction was present. She had no past history of trauma, loss of consciousness, or surgery. Fracture history was not pertinent. The patient's symptoms met the International Headache Society criteria for migraine with aura (9).

Examination

The patient was a small frame female, 5 foot 4 inches in height, and weighing 120 pounds. Radial pulse was 72 and blood pressure 125/80. Oscultation showed no carotid/subclavian bruit. Postural assessment showed mild anterior cranial carriage and mild thoracic hyperkyphosis. Palpation indicated hypertonicity of the suboccipital, posterior cervical, bilateral suprascapular, and lumbo-sacral musculature. There was palpatory tenderness of the suboccipital, posterior cervical, interscapular, and lumbo-sacral musculature. Active cervical range of motion by inclinometer was within normal limits without discomfort. There was no dizziness or nystagmus on George's test (cervical bilateral rotation in extension). Dorsal lumbar range of motion was within normal limits with mild pain at the lumbo-sacral region on flexion. Spinal motion palpation indicated motion fixations at C2/C3, C5/6, T3/T4 and L4/L5 levels. X-rays were not obtained due to the pregnancy. Radiology considerations would include evaluation regarding fracture, bone pathology, congenital abnormalities, degenerative changes, postural deviation (e.g. scoliosis), and intersegmental dysfunction (e.g. flexion/extension studies).

Functional Tests

Shoulder abduction coordination test was positive for early elevation of the scapula in first 30–60° of shoulder abduction indicating tight upper trapezius/levator scapulae and altered glenohumeral rhythm (10). Head/neck flexion coordination test was performed with the patient lying supine and instructed to bring her chin to her chest. This was positive for chin jut, indicat-

ing weak deep neck flexor musculature (11). Pushup test was negative for serratus anterior weakness and scapular winging or elevation. Respiration coordination test for excessive chest breathing or scalene involvement was negative (10).

Outcome Measures

The 0 to 10 numerical pain scale, 0 being no pain, and Headache Disability Index were utilized as outcome measures (12). The HDI was initially rated at 72/100 total composite score. Functional based HDI questions scored 34/48 and emotional-based questions scored 38/52.

Intervention

On initial visit, chiropractic spinal manipulation for intersegmental joint fixation was preceded by cervical moist heat pack for muscular hypertonicity. The chiropractic manipulation consisted of diversified high-velocity low-amplitude manual cervical index contact, and prone and supine diversified thoracic technique. The use of the heat was discontinued after 2 visits in order to encourage patient reliance on active functional rehabilitation. She was seen 3x/week the first week, twice each the next 3 weeks, and weekly thereafter for a total of 12 weeks. Chiropractic manipulation was performed at each visit except on the final 1, when the patient was only re-examined. She was cooperative with this schedule except missing 1 visit at the ninth week and was compliant with the home rehabilitative recommendations. She was seen a total of 17 visits.

The home exercise program mirrored the in office rehabilitation listed in Table 1 including the isometrics, isotonic, and balance sandal neuromuscular re-education. Importance of continuing the home exercise protocols was emphasized in order to maintain stability of her condition. The gradual progressive rehabilitative exercise program encouraging home follow through was incorporated as in Table 1.

Outcome

There were 5 days where the patient complained of headache during the first 2 weeks of treatment. After having been pain free for 3 days during the second week of treatment the patient commented "it's the longest time I've gone pain free." One headache occurred each in the fourth and eighth week after initiating treatment. The patient was released from treatment after the twelfth week of follow up, having had no recurrence. No back or neck pain or discomfort was present. All previously abnormal findings in the initial examination were now negative: Postural assessment

TABLE 1
REHABILITATION INTERVENTIONS AND PURPOSES

REHABILITATIVE INTERVENTION	PURPOSE
ISOMETRIC CERVICAL EXTENSION	RELAX CERVICAL & SUBOCCIPITAL MUSCULATURE
SCAPULAR APPROXIMATION WITH SHOULDER EXTERNAL ROTATION	STRENGTHEN LOWER/MID TRAPEZIUS & IMPROVE & STABILIZE CERVICAL-THORACIC-SCAPULAR POSTURE
CHIN TUCK (CHIN RETRACTION)	STRENGTHEN DEEP NECK FLEXORS TO IMPROVE FORWARD HEAD POSTURE & THORACIC HYPERKYPHOSIS BY AFFECTING THE INTERPLAY OF THE DEEP NECK FLEXORS & SCM. RELAX SUBOCCIPITALS
NEUTRAL CERVICAL & LUMBOPELVIC POSTURAL AWARENESS INSTRUCTION (8, P. 346-8)	REDUCE POSTURAL STRAIN
INSTRUCTION IN PROPER BENDING & LIFTING BODY MECHANICS WITH NEUTRAL CERVICAL & LUMBOPELVIC POSTURE	REDUCE POSTURAL STRAIN
ELASTIC EXERCISE BAND: MID-LOWER TRAPEZIUS PELVIC TILT EXERCISE	STRENGTHENING & SPINAL/SCAPULAR STABILIZATION LUMBOPELVIC AND SPINAL STABILIZATION
NEUROMUSCULAR REEDUCATION: SHORT FOOT EXERCISE, ROCKER & BALANCE BOARD, BALANCE BOARD WITH EXTERNAL PERTURBATIONS BY HAND & SANDBAG TOSS. BALANCE SANDAL TRAINING & BALANCE SANDALS WITH SMALL SANDBAG ON HEAD TO MAINTAIN PROPER LUMBOPELVIC POSTURE (14)	IMPROVE MUSCLE REACTION TIME & POSTURAL CONTROL WITH CHANGES IN BODY POSITION
BRIDGE TRACK LUMBOPELVIC STABILIZATION EXERCISES QUADRUPED WITH NEUTRAL CERVICAL & LUMBO-PELVIC POSTURE (8, P. 293-317)	LUMBOPELVIC SPINAL STABILIZATION CORRECT POSTURAL CONTROL
QUADRUPED ON 4 INCH FOAM CYLINDERS FOR HANDS & KNEES CROSS CRAWL QUADRUPED ON 4 INCH CYLINDERS. THEN ADDING LIGHT SANDBAG TO BALANCE ON HEAD WITH THE PROCEDURE	NEUROMUSCULAR COORDINATION NEUROMUSCULAR COORDINATION WHILE MAINTAINING CORRECT POSTURAL CONTROL AND MUSCLE BALANCE (14,16)
SELF STRETCHES: SUBOCCIPITAL, SCM, PECTORALIS, HAMSTRING, ILIOPSOAS LUNGE (8, P. 253-92)	DECREASE MUSCLE TENSION
BUTTERFLY 1-5# DUMBBELL EXERCISES	MID-LOWER TRAPEZIUS STRENGTHENING & SCAPULAR STABILIZATION
WALL SQUATS	QUADRICEPS STRENGTHENING/PROPER LOWER EXTREMITY MUSCLE BALANCE & PROPER UPRIGHT POSTURE BENDING TECHNIQUE
WALKING, 20 MINUTES PLUS/DAY	AEROBIC CONDITIONING & RHYTHMIC MOTION TO ENCOURAGE PROPER KINESIOLOGICAL FUNCTION ¹⁸

showed anterior cranial carriage and thoracic hyperkyphosis were no longer present. Digital palpation was negative for suboccipital, paraspinal, and suprascapular muscular hypertonicity. Cervical and dorsal-lumbar range of motion was within normal limits without discomfort. Spinal motion palpation showed no segmental dysfunction. Shoulder abduction coordination test indicated that the tight upper trapezius/levator scapulae and altered glenohumeral rhythm had resolved. Head/neck flexion coordination test was negative for weak deep neck flexor musculature. At 12 weeks the numerical pain scale was at 0. The Headache Disability Index was administered after 8 weeks with a total score of 32, of which the emotional score component was 18 and functional 14 as compared to an initial total scoring of 72/38/34. The HDI was 0 in all categories at 10 and 12 weeks.

DISCUSSION

Many migraine victims are susceptible to reoccurring symptoms despite medical or manipulative treatment. It has already been demonstrated that chiropractic treatment alone can remedy some migraines. The unique

point of this case report is that a systematic approach of chiropractic rehabilitation was added to manipulation for a recurrent case of migraine which was related to muscle imbalances and spinal biomechanics. According to Janda, "This pattern of muscle imbalance produces typical changes in posture and motion. This altered posture is likely to stress the cervicocranial and the cervicothoracic junctions" (19). The posterior spinal dura has been shown to be attached by connective tissue to posterior cervical musculature (20). Chiropractic rehabilitation offers a goal of balancing the tight and weak musculature, thus stabilizing posture, and encouraging more efficient joint and neurovascular function. The improved muscular coordination and posture has the potential of stabilizing recurrent migraine symptoms when resistant to treatment of manipulation or medicine alone.

Longer duration of follow-up regarding progress would be ideal, e.g. at 3, 6, and 12 months following last treatment. Her prognosis is excellent, acknowledging that she may yet need occasional to infrequent clinical chiropractic manipulation or rehabilitative management. Of course, the object is to maintain patient inde-

pendence from both symptoms and outpatient care with long term follow through of the home exercise rehabilitation program.

Functional Pathokinesiology

Pathokinesiology of faulty neck flexion and scapulo-humeral rhythm are often associated with headache syndromes (7,8). The presence of muscle imbalances in the cervical region can differentiate between chronic headache and non-headache patients (7). Those with headache, some migraine sufferers, and those with eye pain often have weakness in deep neck flexors and loss of lower cervical extension. These and similar findings certainly offer a realistic treatment approach, with a goal of rehabilitating neck musculature by facilitating the deep neck flexors together with normalizing tonicity in the postural muscles of the neck. Thus, cervical and suboccipital muscular hypertonicity, tightness, or spasm can be related to upper cervical mobility and cervical-cranial coordination and joint dysfunction. Successful outcomes are often not immediate but it has been demonstrated that as cervical-cranial flexion coordination and cervical mobility improve it is likely the headache will decrease (8). Suboccipital and SCM trigger points may result in referred frontal headache pain with a migraine pattern (13). In case of headache with negative orthopedic and neurological tests and pathological signs there may be hypertonicity in the cervical, suboccipital, masticatory and submandibular muscles with deviation of the hyoid. There may be hyperalgesic areas at the cervical region, motion restriction at the cervical, thoracic, temporomandibular joints, or sternoclavicular, and acromioclavicular articulations. The postural fault involving anterior cranial carriage is associated with tight pectoralis, upper trapezius and suboccipital muscles. Anterior cranial carriage is reciprocally associated with weakness in the deep neck flexors, lower to middle trapezius, and the abdominal musculature. Faulty movement patterns due to muscle imbalance, abnormal respiration, and environmental influences such as ergonomics may be contributory. This list of possible clinical findings is certainly not complete but it offers the clinician a sound basis for a rehabilitative strategy. Functional pathology exists as surely as structural pathology. Functional rehabilitation involving correction of tight, shortened, weak, or inhibited musculature and rehabilitation of joint dysfunction is not a single technique, but a more global approach that will lead to proper evaluation, appropriate choice of modalities and successful outcomes (8).

Etiology/Neuropathology

Migraine was in the past thought to be completely vascular in origin, but is now thought to be neurogenic.

Researchers currently indicate that trigeminal afferents and C1-C3 nerve root sensory input merge in the spinal cord trigeminocervical nucleus resulting in a misinterpretation of the pain source and a referred headache syndrome. This may include migraine. Other neurological mechanisms are also suggested in the current research, including trigeminal axons releasing peptides which causes vascular inflammation and results in meningeal nerve irritation. Another is dysfunction of the serotonin-based CNS inhibitory pain system allowing ordinary normal stimuli to become painful (21). A current anatomical research finding may offer some insight into how spinal manipulation and rehabilitation can benefit headaches. It has recently been shown that the posterior spinal dura and the rectus capitus posterior minor muscle are attached by connective tissue. It has been suggested that this may explain increased dural tension from upper cervical dysfunction and result in headache (20). Upper cervical muscular hypertonicity may facilitate joint dysfunction and dural tension resulting in the nerve irritation of neurogenic migraine headache. This muscular association with the spinal dura has significant clinical implications for the use of chiropractic rehabilitation of muscle imbalances and with spinal manipulation of upper cervical intersegmental joint dysfunction and headache patients.

Clinical Features

Migraine patients often present with a unilateral pulsing headache that is sometimes associated with an aura or prodrome. This prodrome can consist of varied visual manifestations including light variations including spots, blurriness, photosensitivity, and blind spots (scotoma) which progresses to the headache which can last 30 minutes to up to 3 days. Often there is nausea or vomiting. The patient often looks for a dark quiet place to rest in solitude. A family history may occur with similar symptoms. Migraine with aura is considered classic migraine. Without aura it is classified as common migraine (22). There are a large number of triggers for migraine, some including food, environment, hormonal, and trauma (23).

Differential Diagnosis

Considerations for differential diagnosis included tension headache, cluster, and cervicogenic headaches, myofascial, metabolic/toxic, hormonal, traumatic, infection, CSF pressure, eye pathology, hypertension, and CVA/aneurism/arteriovenous malformation, and temporal arteritis type headaches. Tumor should always be a consideration, and may be investigated by CT or MRI

if a CNS red flag was to be present or if symptoms did not respond.

CONCLUSION

Further studies including spinal manipulation with rehabilitation are indicated, including controlled clinical trials. Additional study is warranted in comparing treatments of spinal manipulation versus rehabilitative exercise alone and each with manipulation combined with rehabilitation. Also, comparative studies between allopathic intervention versus combined manipulation and rehab would be helpful.

A treatment approach that embraces chiropractic manipulation, muscle balance techniques, facilitation exercises, and postural analysis may have particular implications for migraine sufferers. Muscle imbalances involving migraine should be rehabilitated in order to minimize their contribution to the clinical entity of migraine. There already is strong evidence supporting chiropractic manipulation for migraine, but sometimes success may be delayed since migraine symptoms can tend to be chronic recurrent in nature. Active rehabilitation techniques added to spinal manipulation for migraine is an option worth considering. Based on the results of this case study, it is my belief that a structured program of chiropractic active rehabilitation holds much promise in the treatment of migraine patients.

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