

# Vision induced migraine headaches: A case report

Charles Beck

**Introduction:** A 53-year-old female patient presented with a history of migraine-type, intense headaches, 'dizziness' and 'eyestrain' that began approximately 7 months ago. A relationship was noted between her migraines and vision.

**Methods:** The patient was evaluated utilising osteopathic manipulative therapy (OMT) and cranial therapy for meningeal and sutural stress patterns with glasses on and off, and eyes opened and closed.

**Treatment:** Osteopathic manipulative therapy (OMT) to the full body and cranium was applied with the patient's eyes opened, closed, and glasses on and off. Modifications were made to the optometric prescription and eyeglasses to optimise body and cranial function as well as to reduce headache/migraines.

**Results:** The patient noted considerable relief in her eyestrain and physical tension with the new eyeglass prescription and noticed that her entire body felt relaxed and that the pressure in her head had disappeared.

**Conclusion:** This case study illustrates that a subset of patients may present with a clinical condition that either affects vision or the vision affects the condition called a visual somatic strain. This illustrates how collaborative efforts might be made to develop co-treatment opportunities between osteopaths, chiropractors, ophthalmologists, and other allied professionals.

**Indexing Terms:** Chiropractic, Osteopathy; Cranial; Migraine; vision; visual fatigue

## Introduction

What direct relationship might the eyes or vision play in the causation of headaches or other symptoms related to physical changes in the fascia (both internally and externally) of the cranium? If the eye muscles, visual reflex centres, or other neurologically related circuitry have a direct relationship to sustained myofascial imbalance, this may be an important part of a clinical differential diagnosis.

A series of case reports involving both spinal and cranial manipulative interventions have discussed a relationship between vision and successful treatment. (1, 2, 3, 4)

In a case control study, Monaco et al. found a positive correlation between ocular correction effects on EMG activity of stomatognathic muscles in children (n=320) with functional mandibular lateral-deviation. This showed a relationship between standard prescriptive ophthalmic evaluations and how they could be improved with a functional assessment tool to evaluate any related

... Common 'eyestrain' or visual fatigue cascades into the musculoskeletal system and can lead to headaches and other painful symptoms. An eye assessment is clinically relevant in such presentations ...'



myofascial interrelationship. (5)

Weiner et al. performed the first published case series study (n=6) evaluating the use of cranial manipulative treatment of patients utilising ocular changes for treatment purposes. They found *'significant changes in ocular refraction, corneal curvature, and ocular position noted and measured as a concomitant of the use of dental appliances and/or osteopathic craniosacral manipulations in ongoing therapies for treatment of temporomandibular joint (TMJ) syndrome and other related head, neck, and shoulder problems. The near-immediacy in time of these variations and the absence of other reasonable causes suggest that precise monitoring of these patients before treatment begins and during subsequent therapy can assist the practitioner in quantifying the progress and effects of the treatment of chronic head, neck, and swallowing problems.'* (6)

Their six case histories demonstrated *'significant changes in hypereye, proptosis, corneal astigmatism (and axis), and refractive error. The magnitude of these alterations ranges from 25% to 300% of the pretreatment condition.'* (6) They cautioned that *'while the subjective symptom improvement of these cases would have to be regarded as anecdotal, visual parameter analysis of a large patient population may help to provide predictive cause and effect assumptions.'* (6)

Therefore the purpose of this study is to determine if a relationship can be found between vision and its affect on the cranium, stomatognathic system and posture, and if this relationship can be used to for both assessment and treatment of patients in an interrelated and interdisciplinary manner.

### Case History

A 53y white female patient presented with a history of migraine-type, intense headaches, *'dizziness'* and *'eyestrain'* that began approximately 7mo ago. The patient stated that *'I can read but I cannot see'* and that her *'eyes cannot focus'*. She denied any trauma associated with the onset. The patient also denied any traumatic or pathologic visual problems including: *amblyopia, anisometropia, diplopia, strabismus, glaucoma, ophthalmoplegia, pterygium, retinitis, or macular degeneration.*

The patient had a history of lower back pain that began after a motor vehicle accident in 1983. She said that the eyestrain makes the back pain worse. She had recently gone back to school to study Chinese Medicine and had noticed a significant increase in the symptoms and severity since classes began. The symptoms improved with rest and sleep and worsened with continuous use of her eyes when studying.

Frequent breaks from studying allowed the patient to complete her schoolwork, but interfered with her quality of life and significantly lengthened her study time. She made special arrangements to have extra time for examinations due to the headaches and dizziness brought on by reading. The patient had been to see five different eye doctors prior to her initial visit to the clinic and received and filled six different eyeglass prescriptions in an attempt to alleviate the problem. She had also seen a neurologist who reported no pathology and did not recommend medication or imaging studies. She was referred to the office by her local osteopath for evaluation of visually induced somatic strain. She was wearing corrective lenses with bifocals. She stated that she felt that the clinic is her last hope to be able to continue in school.

Her medical history was remarkable for *Hashimoto's* thyroiditis since 1997, thyroidectomy in 1997, a prescription for *Synthroid* 0.1 mg daily and a blend of 38 Chinese herbs for thyroiditis from her Chinese Medicine practitioner. Physical examination revealed blood pressure 118/70 mmHg and a heart rate of 78 pulses per minute. Her pupils were equal, round, and reactive to light, sclerae were non-icteric and extra ocular muscles were intact. There was no ptosis of the eyelids, no pterygium present, conjunctivas were normal and no cataracts noted visually. Cranial

nerves II-X were intact and normal function was noted. Muscle strength was 5/5 in all extremities and deep tendon reflexes were 2/4.

## Methods

Osteopathic manipulative therapeutic evaluation revealed the cranium to be the area of greatest restriction, with significant tissue texture changes noted at the sub-occipital region. The following additional restrictions were noted: thoracic outlet restricted fascially in right rotation, T1 (Flexed, Rotated and Side-bent-Left) FRSL, right 1<sup>st</sup> rib exhalation restriction with a primary bucket handle component, increased paravertebral muscular tension noted bilaterally between T12-L2, L5 (Extended, Rotated and Side-bent-Right) ERS R, left superior innominate shear, left superior pubic shear, left/right sacral torsion, right anterior innominate rotation, and left proximal fibular head anterior.

The patient was evaluated cranially for meningeal and sutural stress patterns with glasses on and off. Her current eyeglass prescription markedly limited her cranial amplitude and caused a noticeable anterior fluid shift. Her glasses were removed for the remainder of the evaluation and the treatment. She was found to have the following cranial suture restrictions: right maxillary/frontal, left occipital/mastoid, right frontal/parietal, right sphenosquamous, and left premaxilla.

The patient was assessed with acute and chronic headaches, migraine and tension type, possibly secondary to eyeglasses. Somatic dysfunction of the cranium, cervical, thoracic, and lumbar spine, sacrum, pelvis, lower extremity, rib cage and abdominal soft tissue were found.

## Treatment

Osteopathic manipulative therapy (OMT) was performed to all areas listed above utilising functional, balanced ligamentous tension, muscle energy, visceral, and facilitated positional release techniques. The cranium was treated with a combination of indirect and direct sutural manipulation, fluid and visceral (brain parenchyma) techniques. The treatment was tolerated well and the patient reported a complete resolution of the acute headache.

The patient was then evaluated for cranial strain with her eyes closed and covered to occlude any incoming light. The same evaluation was then performed with her eyes open and the results were compared. With her eyes closed and covered the patient was found to have no cranial strains present as she had just undergone treatment to remove all above noted strains. When the cover was removed and the eyes opened the patient's cranium immediately changed with noted strains of cranial extension, a right torsion, vertical strain and a left lateral strain pattern. Due to those findings it was determined that there may be a need to prescribe a modification to her eyeglasses to help neutralise the cranial strains. Utilising ophthalmologic principles as they relate to 'Osteopathy in the Cranial Field' the prescription that removed or significantly reduced her cranial strains was:

OD: -4.37 sphere, -1.25 x 023° cylinder

OS: -4.12 sphere, -1.00 x 177° cylinder

+1.00 reading addition bilaterally

The numbers represent an eyeglass prescription. Note: 'OD' is ocular dexter, latin for the right eye and 'OS' is ocular sinister, latin for the left (or evil) eye. The first minus signifies near-sightedness; the number is the strength of the lens (sphere). The second set of numbers is the astigmatism. The minus being the strength of the lens and the degree number is the axis of rotation of that lens (cylinder). The +1.00 is an addition for bifocal lenses.

The patient noted considerable relief in her eyestrain and physical tension with this prescription in the trial frames. She noticed that her entire body felt relaxed and that the pressure in her head had disappeared. The cranial strain patterns noted above were no longer present with

eyes open or closed and covered. The patient was instructed to have this ophthalmological prescription filled and to return in two weeks.

The patient returned in two weeks with the new eyeglass prescription. When placing the glasses on her face, she noted a feeling of pressure at the frontal bone that was similar to the feeling presenting just prior to her headaches. This was identified as a cranial vertical strain. The frames were then re-fitted to her face using ophthalmologic principles (face form was adjusted until the vertical strain was removed, the frames were 'x'd' with the right lower portion of the lens being adjusted toward the face to remove a small left cranial side-bending rotation, and the pantoscopic tilt was adjusted to balance the muscle tension of the suboccipital muscles). ('x'ing the frames is when one lens is bent forward (the lower part of the lens) and one backward when looked at from the vertical plane.) The patient was instructed in how to care for the glasses and what to expect from the eyeglass treatment. The fitting of the glasses resolved the vertical strain and the patient's feeling of pressure. A brief cranial treatment to further release the frontal area (ethmoid bone and right frontal/nasal suture restriction) and the brain parenchyma was rendered at that time. She left the office symptom free.

The patient phoned the office the next day to say that her headache symptoms were very aggravated. She was instructed to continue to wear the glasses and take 'over the counter' pain relievers as necessary. A return office visit one week later revealed that, after three days of symptom aggravation, the headaches had completely disappeared and her eyestrain was improved, but still present. Additional eyeglass frame adjustment alleviated the feeling of eyestrain (added refinement of face form adjustment). A frontal bone right-sided intra-osseous strain and brain parenchyma release completed this treatment. She was then instructed to return as needed for adjustments of the glasses and for treatment only if symptoms did not improve after seeing her local osteopath.

The patient has been followed for over one year with approximately bimonthly eyeglass adjustments and one revised prescription. Her headaches have completely resolved and she is doing very well in college.

### Discussion

In this case the patient's symptoms appeared to be a direct result of visually induced somatic strain influencing the cranial bones and causing headaches and other complaints. This seems a reasonable explanation due to her unresponsiveness to other forms of care, her response to the OMT and cranial care, ophthalmological prescriptive modification, and then modification of the eyeglasses.

Diagnoses of cranial strain patterns consisted predominately of palpatory tests for the following patterns, which are commonly found in cranial osteopathic examinations 7:

- ▶ flexion
- ▶ extension
- ▶ torsion (left or right)
- ▶ side-bending rotation (left or right)
- ▶ lateral strain (left or right)
- ▶ vertical strain (superior or inferior)
- ▶ compression

Testing for inter and intra-examiner reliability of cranial bone dynamic patterns has been performed with some success. (8, 9, 10, 11, 12, 13) A recent study had particularly significant

findings for intra-observer reliability for cranial strain patterns as were used in this case report. (14)

It can be reasoned that myofascial imbalance caused by her eyestrain resulted in an abnormal tension on the cranial bones that induced the strain patterns which in turn resulted in her headaches. This was deduced by comparing the patient's cranial movement and strain patterns with the eyes closed and covered (no visual input) with the eyes open (visual input). It is surmised that the process of light entering the patient's visual processing system caused cranial strain (visually induced somatic strain or visual somatic strain). This strain was neutralised with eyeglass lenses and frame adjustments giving the patient a cranium that would now accept a treatment and remain stable longer between treatments. Her eyes were able to relax and not place abnormal tensions on the cranium.

This patient's case was complex. The patient's local osteopathic physician treated her well, but her cranial strain pattern continued to return. The suspected cause of this appears to be a possible visual somatic strain. Although each of her previous eye doctors performed the best that he or she could, they were not able to incorporate an osteopathic functional cranial assessment to evaluate the relationship of her eyes or vision to cranial patterns. Also, if optometrists and opticians do not perform thorough eyeglass fittings, this can lead to visual somatic strain. (15) Symptoms related to visual somatic strain are not part of the standard curriculum taught at osteopathic medical schools. [Ed: there is a link at the end of this report to a PDF about how to properly fit eyewear]

Much of the knowledge of osteopathic visual somatic strain has come about in the last ten to fifteen years from Jim Jealous DO, Joe Field DO, Paul Dart MD and others. They have mapped out the effects of visual strain on the cranial system and worked out corrections for these problems. In this case, the patient's eyeglasses were over-prescribed, a common issue with eyeglass prescriptions. (16) This led to a persistent lateral strain (from over-prescribed cylinder), extension lesion (from over-prescribed sphere), torsion (from incorrect cylindrical axis) and vertical strain, side-bending rotation and sub-occipital muscle tension (from the prismatic effect of incorrectly adjusted frames) each time the patient wore her glasses. (17) These effects were present even with her eyes closed, but were increased when she opened her eyes. (17) Lateral and vertical strains, both being non-physiologic patterns, can cause headaches. (18) These strain patterns can restrict motion of the extra-ocular muscles and can lead to ophthalmologic migraines. (19) At a minimum, this contributed but may have been the sole cause of this patient's chronic headache.

A careful application of the known laws of physics as they apply to optics and the principles of osteopathy in the cranial field allowed a precise, unique, objective eyeglass prescription and frame adjustment to neutralise this patient's visual strain. (17) Cranial or brain parenchyma treatment to aid the body in adapting to the change in the mechanism is necessary in most of the cases. This easing of the visual strain with the correct prescription and frame adjustment can result in cranial pattern shifts that can further change the patient's prescription or require eyeglass adjustment as the cranial strain patterns begin to resolve. (20) Thus it is important to develop a good rapport with these patients and follow their progress closely.

### Conclusion

This case study illustrates that a subset of patients may present with a clinical condition that either affects vision or the vision affects the condition. This dynamic interrelationship can be classified as a visual somatic strain.

Functional assessments to evaluate for a visual somatic strain can be used to improve the neuromusculoskeletal head, neck, and postural kinematics where vision plays an important role.

Collaborative efforts can be made to develop interdisciplinary co-treatment opportunities between osteopaths, chiropractors, podiatrists, ophthalmologists, dentists, and other allied professionals so that the sufferers of the effects of visual somatic strain can be helped and their quality of life improved.

Further research into this phenomenon should be undertaken initially with case controlled and practice based studies.

Charles Beck

DO

Private practice of Osteopathy

Indianapolis, Indiana

[drcharliebeck@gmail.com](mailto:drcharliebeck@gmail.com)

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Cite: Beck C. Vision induced migraine headaches: A case report. *Asia-Pac Chiropr J.* 2023;4.1. URL [apcj.net/papers-issue-4-1/#BeckVisionMigraine](https://apcj.net/papers-issue-4-1/#BeckVisionMigraine)

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