Use of Osteopathic Manipulative Treatment in the Pre-Surgical Management of Severe Strabismic Amblyopia: A Case Study

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Abstract
Introduction: The most common cause of monocular vision loss in young children is amblyopia, with strabismus being the most common cause of amblyopia. Treatment consists of corrective lenses, daily patching of the non-affected eye, atropine injections, and in severe cases surgical correction. The purpose of this study was to assess somatic dysfunction associated with strabismic amblyopia and explore the efficacy of OMT as an adjunct to standard treatment of this disease process.

Case Report: The patient is a 4-year old female with severe esotropia strabismic amblyopia who was treated with corrective lenses and daily eye patching. Osteopathic Manipulative Treatment was sought as a treatment option prior to surgery referral.

Treatment: Two Osteopathic Undergraduate Teaching Fellows and two Osteopathic physicians participated in this case study. The patient was treated a total of six times over a nine month course. Treatment sessions were based on findings during the physical examination. Treatment was based on approval of the two Osteopathic Physicians.

Results: The patient experienced subjective improvement in medial deviation as well as improvement of visual acuity over the nine month treatment period.

Conclusion: The role of OMT as an adjunct to standard treatment in strabismic amblyopia should be further investigated for its potential benefits.

Objective
• Primary objective: to assess somatic dysfunction associated with strabismic amblyopia.
• Secondary objective: to explore the efficacy of OMT as adjunct to standard treatment in strabismus amblyopia.

Introduction
• Amblyopia is the most common cause of monocular vision loss in young children.1
• Amblyopia is due to misdirected or absent retinal images during development of the visual system.2
• Strabismus is thought to be the cause of amblyopia in 50% of cases.3
• Strabismus is defined as deviation of one or both eyes.
• Hypotheses for strabismus causes include: anatomic variance, weak musculature, and impaired nervous response.4
• Esotropia strabismus is medial deviation likely caused by under stimulation of the lateral rectus muscle.
• Cranial Nerve VI travels through Dorello’s Canal. The roof of this canal is the petroclinoid ligament which travels from the posterior clinoid process of the sphenoid to the petrous portion of the temporal bone.4
• Current treatment includes corrective lenses. If this approach is unsuccessful the patient will patch the unaffected eye daily for 2 hours per day to strengthen the amblyopic eye. If visual improvement is not attained, patients are referred for surgery.

Case Report Information
• Patient NO is a 4 year old female with worsening symptoms of strabismus presenting for pre-surgical adjunctive therapy. Symptoms began at age 3 1/2. The patient received corrective lenses which alleviated symptoms for a month before returning.
• The patient’s ophthalmologist recommended surgery as the strabismus appeared refractory to standard treatment.
• Birth History: the patient was born via emergent Cesarean section due to patient’s decreasing heart rate at 41 weeks gestation. The patient had early closure of anterior fontanelle.
• PMHx: Paternal grandmother had strabismus corrected with lenses and patching.

Treatment Course
• 6 OMT treatments based on findings in the physical exam occurred over the course of nine months.
• 3 Treatments with an OMT Integrative physician.
• Daily eye patching for 2 hours.

Results
• After nine months including 6 sessions of OMT, nightly eye patching, and three sessions with a Cranial Integrative Physician subjective improvement of medial deviation was noted.
• Visual acuity was improved from 20/140 at worst to 30/35 over a four month interval within our treatment period.

Region | Diagnosis | Technique
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Cranial | Left frontal bone internally rotated, Left 7th nerveBell palsy | BMT and Cranial Manipulation
Head | Left Medial rectus retraction, oblique motor of globe | BMT and Cranial Manipulation
Conival | DA ESSLR, CZ FRPRR | SSL Technique, FPR, ST, MPR, Articular
Thoracic | T2–5 PRLSL | SSL, MPR, BLT, ST, ME
Prls | Superior Left Rbl 1 | SSL, Articular
Lumbar | L1–5 SLR | MPR, BLT, ST, ME
Puska | Rotation of Left Innominate | SSL, MPR, BLT, MPR
Sacrum | Right sacral resection | SSL, MPR, BLT, MPR
Upper Extremity | Thoracic Innert Resection | MPR
Lower Extremity | Extraneum rotated left femur | SSL, FPR, BLT

Table 1 (above): Summary of Common Osteopathic Findings and OMT treatments utilized.

Discussion
• Common somatic dysfunction included internally rotated temporal bone and flexed sphenoid. Together this could stretch the petroclinooid ligament and cause compression of Cranial nerve VI leading to strabismus.
• Improvement of visual acuity over the treatment period can be attributed to the patient continuing to develop conical neural pathways as the strabismic strain was decreased.
• Treatment of patient occurred over a nine month interval. However, between treatment two and three there was a four month period of time in which the patient did not receive treatment. Treatments subsequently occurred at 2 week to one month intervals. The majority of treatment response was seen at this time.

Conclusion
Further investigation is necessary to determine the role of OMT as an adjunct to standard treatment of Severe Strabismic Amblyopia.

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Future Direction
• More frequent treatment sessions.
• Research comparing eye patching and OMT versus eye patching control. Assess improvement in visual acuity over a period of time.

References
2. Farrow, M. Craniofacial Anomalies: Diagnosis, Identification, and Management. consideration for utilization, body positions, and guidance. The Osteopathic Medicine of the Pacific. 2010; 2193-2198
5. The Osteopathic Medicine of the Pacific. 2010; 2193-2198

Figure 4 (left): Patient NO Before treatment. Figure 5 (middle): During treatment, and Figure 6 (right): After Surgical Correction

Figure 1 (Top Left): Strabismic Amblyopia from a patient’s view.
Figure 2 (Top Right): Diagram of Extracranial Muscles and Bony Landmarks
Figure 3 (Bottom Right): Yellow Arrow is Gruber’s Ligament. Blue Arrow is the Trigeminal nerve. Red Arrow is Abducens Nerve as it passes through Dorello’s channel.