Use of OMT to Treat Congenital Torticollis and Positional Plagiocephaly in an Infant: A Case Report

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BACKGROUND

Positional plagiocephaly is a cranial asymmetry characterized by occipital flattening in infants (Fig. 1). The most common associated finding is Congenital Muscular Torticollis (CMT) (Fig. 2). CMT is the unilateral twisting of the head due to asymmetry in the length or excessive activation of the sternocleidomastoid (SCM) muscle. Its incidence is as high as 16% in normal newborns, and it is often underdiagnosed in infants with positional plagiocephaly.9

Untreated CMT does not resolve over time in the majority of cases and is associated with delays in gross motor skills, problem solving, personal-social interaction, fine motor control, and communication.7 For example, a recent survey study in Japan found that children with untreated plagiocephaly are more likely to develop language delays than their peers who receive treatment (Fig. 3).1

The CVAI is a simple method of measuring head asymmetry and correlating it to the severity of deformation (3.5% grade I to >11.0% grade V).7 Severity grades 1-3 are treated with conservative therapy (i.e., PT and MFR), while severity grades 4-5 are treated with cranial remodeling orthotics.8 Further studies are needed to determine the effectiveness of OMT at the different levels of plagiocephaly severity.

METHODS

• IRB Exempt Case Study

Primary endpoints: Improvement in head asymmetry and rotation

Secondary endpoint: Motor Skill Development – State evaluation

• OMT: gentle, passive techniques safe for infants.4,5

• 3 sessions: initial visit + 2 follow up sessions 13 and 49 days apart

• OMT: Plagiocephaly

• Bilateral Lagmenous Tension (BLT): Balance point of joint is achieved; CNS reacts to restore "neurologic neutrality" via "afferent reduction".1

• Bilateral Membranous Tension (BMT): BLT applied to cranial strain patterns.4

• OMT: Torticollis

• Myofascial Release (MFR): Passive stretch removes fascial constraints and normalizes blood and lymphatic flow. Cervical stretch resolves cranial asymmetry in 91% of 1091 Hong Kong infants.4 (Fig. 4, 5)

• Head Asymmetry Measurement: CVAI

• Longest and shortest diagonals from the forehead to posterior skull are measured (Fig. 6).4

• Equation predicts a .4% difference correlating with severity of deformation (Fig. 7).1

• Measurements are repeated 5x to minimize user technique error.

• Osteopathic Structural Exam (OSE): Right CVAI, right spinal compression, OM compression, internally rotated right temporal bone, elevated right 1st rib, OMT: MFR, MFR, BMT, BLT, Pelvic Balancing, sacral decompression

Fig. 1: Normal Skull vs. Deformational Plagiocephaly

Fig. 2: Positioning of Casting Helmet

Fig. 3: Helmet induced irritation

Osteopathic Manipulative Treatment (OMT) offers an efficacious, non-invasive, and cost-effective treatment option.4,5 However, additional studies objectively demonstrating the efficacy of OMT in improving head asymmetry are needed. Existing methods of quantifying plagiocephaly severity include plagiogrammetry, video recording, the Cranial Index of Symmetry (CIS), and the Cranial Vault Asymmetry Index (CVAI) (most common).1,2

The OMT goals include improvement in head asymmetry and rotation, improvement in head shape, and improvement in head rotation. Mediterranean Torticollis Society guidelines provide a benchmark for clinical outcomes (Fig. 8).2

OSTEOPATHIC FINDINGS/TREATMENT

Location Somatic Dysfunction Osteopathic Treatment

Cranial/ Head Posterior occipital flattening, B/L anterior frontal sinus compression, anterior dural strain Osteopathy in the Cranial Field (OCF/COMM) including: BMT, Parietal Lift Suboccipital Release

Cervical/ Neck Right SCM Spasms (Fig. 8); Right scalene spasm; C4-C5 ERSs MFR Facilitated Positional Release (FPR)

Thoracic Outlet Thoracic Outlet restriction; superior right clavicle Thoracic Outlet Release

Ribs Ribs B/L 8-12 restriction B/L Rib L-spine L-4 ERS; MFR FPR

Sacrum Right sacroiliac compression; S2 compression Sacraloc (SI) decompression

Hips Right innominate outflare ART

Fig. 4, 6: Cervical MFR technique

Fig. 7: Equation for calculating CVAI

Fig. 8: Right SCM Spasm presents as head rotation left on PE

CASE HISTORY

Session # 1: initial visit

History of Present Illness (HPI): 7 month old female is brought in by her mother with chief complaint of a “misshaped head”. Patient was diagnosed with torticollis at 4 months old and had remarkable findings on MRI and a neurosurgeon consulted recommending conservative management. After 3 months of PT, head rotation and shoulder stiffness improved, but patient continues to experience persistent head asymmetry and motor delays. She is currently at a 4-5 month old level as per state evaluation.

General: awake and alert; well appearing.

HEENT: Asymmetric head shape, no bruising; + tension

Heart: +S1S2, RRO, no murmurs appreciated

Lungs: clear to auscultation B/L, no wheezing appreciated

MSK: Extremities: No clubbing/cyanosis/edema; pulses + 2 B/L; + trunca weakness

Fig. 5: Right SCM Spasm presents as head rotation left on PE

VISUALS

Fig. 6: Deformations of plagiocephaly

Physical Exam (PE):

Vitals: within normal limits

Fig. 7: Deformations of plagiocephaly

RESULTS

Visit # 1: Initial evaluation

1. CVAI = 9% Grade IV (Severe)

2. Improvement noted

3. Decreased Spasm Scores

4. CVAI = 6% Grade II (Mild)

DISCUSSION

• Patient presented with somatic dysfunctions consistent with plagiocephaly and CMT. A repeated clinical examination using gentle techniques including BLT, MFR, and ART indicate an objective decrease in cranial asymmetry was measured via the CVAI index, with a decrease from severe (9%) to mild (6%) on the CVAI severity scale.

• The before and after images were not optimized for measurement when captured; diagonal measurement is a significant source of error minimized by repeating tracings and measurements 5 times.

CONCLUSIONS/ FUTURE DIRECTIONS

• OMT was an effective conservative treatment for this patient, resulting in a 33% decrease in head asymmetry on the CVAI scale.

• Additional studies are needed to assess OMT vs. PT, RT, and cranial orthotics.

• If pre- and post- OMT assessment of plagiocephaly via CVAI is incorporated into standard office procedure, OMT can be directly compared to the standard of care.

• Straining OMT efficacy at each level of plagiocephaly severity can provide a guideline for its integration into current standard of care.

• If superior or inferrior to current standard of care, OMT offers a safe, non-invasive, and widely applicable treatment plan for plagiocephaly and CMT.

REFERENCES


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