

Resolution of non-synostotic plagiocephaly following chiropractic care: a case report

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ABSTRACT

Objective: To present the case of a 6-month-old child's functional outcomes with non-synostotic plagiocephaly resulting from infant torticollis with concomitant vertebral subluxations following chiropractic care. **Clinical Features:** A 6-month-old female presented with classic signs of a mild non-synostotic plagiocephaly and infant torticollis. Additional complaints included failure to latch and feed on the right breast, unsettled sleep patterns and regurgitation after breast-feeding. At the 3-month pediatrician checkup, all reflexes, growth and milestones were reported normal. **Interventions and Outcomes:** Diversified technique was utilized to address vertebral subluxation findings. Static and motion palpation revealed indicators of vertebral subluxation at C1, C3 and sacrum. Following the first adjustment to C1, immediate improvement of global and segmental range of motion was noted. No signs of patient irritability remained with passive motion. Instantaneous engagement in active head rotation to the less favored side was also observed following the adjustment. Sleeping regularity, lack of irritability and competently latching onto the right breast without regurgitation was reported upon the second visit. After 3 months, the patient and mother returned for the third visit. The resolution of non-synostotic plagiocephaly, infant torticollis and vertebral subluxations following chiropractic care was noted. **Conclusion:** This case study suggests that correction of vertebral subluxations in this child may have had a positive impact on her torticollis and deformational plagiocephaly. Further research is warranted to assess the outcomes of chiropractic intervention in patients with similar presentations, and to contrast against the efficacy and safety of current treatment methods.

Key words: chiropractic, cranial asymmetry, deformational plagiocephaly, flat head syndrome, non-synostotic plagiocephaly, torticollis, vertebral subluxation.

Introduction

Positional plagiocephaly is an acquired deformation from excessive or sustained extrinsic forces on an intrinsically normal infant skull.¹

The incidence of infant plagiocephaly has not been widely studied, one study from Canada reported that in a hospital setting 45.6% of the 440 subjects were diagnosed with plagiocephaly and 21.7% had a more severe form.² Although uncertainty exists about incidence rates, plagiocephaly is thought to have become more common since the introduction of the back to sleep program in 1992.³ Of particular concern is the rise in incidence of brachycephaly, also known as posterior plagiocephaly, resulting from resting infants in the supine position.³

A consensus report of best practice recommendations suggested that chiropractic care is an effective, non-invasive, low-risk care alternative for several pediatric conditions such as plagiocephaly.⁴ Conventional non-surgical approaches to addressing plagiocephaly include counter-positioning, supervised prone time and for more refractory

cases, orthotic molding.⁵ External forces thought to commonly contribute to non-synostotic plagiocephaly include intrauterine constraint resulting in compression, congenital muscular torticollis and sleeping position. This is in contrast to craniosynostosis, which results from intrinsic factors and is more likely to require a surgical intervention.⁶ Non-synostotic craniosynostosis, being a morphological abnormality, is not known to spontaneously resolve and the common assumption is that the deformation will gradually continue if the external causative factor is not addressed.⁷

One study that measured the cosmetic and cognitive outcomes of non-synostotic plagiocephaly reported that left-sided plagiocephaly was related to poorer language development and academic performance; with expressive speech abnormality being twice as common in those with left sided plagiocephaly compared to right. It was also associated with a three-fold greater requirement for special education compared to right-sided plagiocephaly.¹

The purpose of this case study is to report on a 6-month-old female with left-sided cranial asymmetry, and the subse-

quent resolution of symptoms following chiropractic care. This case study adds to the small but growing body of research that suggests that chiropractic care may be beneficial for individuals with plagiocephaly.

Case Report

A 6-month-old female was presented by her mother for chiropractic care. The mother was concerned about the child's persistent favored left head rotation and ipsilateral flattening of her posterolateral cranium. The mother reported no abnormalities were noted at a check-up with the pediatrician three months prior. At this examination, growth, reflexes, and milestones were considered to be normal. However, the mother noticed the favored side of rotation and hypertonic right sternocleidomastoid muscle the week following the check-up. After informally consulting a midwife about treatment options, the mother decided to consult with a chiropractor as she wanted to avoid the midwife's recommendation of the conventional intervention utilizing a cranial molding helmet due to the large time commitment of this form of treatment. Additional complaints at the time of the infant's initial chiropractic assessment included frequent regurgitation of breast milk immediately after feeding with an inability to feed from the right breast, and unsettled sleep patterns.

The baby was delivered via vaginal birth with the use of an epidural in a hospital setting after 14 hours of labor. APGAR scores were 9 and 10 with the mother reporting no abnormal incidents throughout the pregnancy. There was no history of congenital conditions on the maternal or paternal side of the family.

The infant was calm throughout the chiropractic examination, presenting with a occipito-parietal flattening on the left resulting in a parallelogram-like contour, with no bony ridges at the sutures palpable. She was resting with persistent left head rotation. Upon passive head rotation to the right the infant appeared to be in mild discomfort with an immediate return of the head to the left.

Objective indicators of vertebral subluxation at C1, C3 and sacrum were identified through static and motion palpation during a spinal examination.

Intervention

After obtaining informed consent, the patient was checked by the chiropractor for a total of 3 visits over a 4 month period. The level of subluxations were each adjusted once using Diversified technique with a light, modified, high velocity, low amplitude impulse.

C1 was adjusted utilizing a modified Diversified technique on the initial visit only; sacrum on the second, and C3 on

the third visit. Chiropractic spinal adjustments were the only intervention utilized throughout the duration of care. Advice was given to the mother to encourage utilization of the previously less favored side with toys, sleeping and breast-feeding. No other cranial interventions, exercises or soft tissue modalities were administered throughout this time.

Outcomes

Immediately following the first adjustment, the chiropractor and mother noted willing and active motion towards the less favored side of rotation. The mother reported on the second visit that regular sleep patterns had been established and no episodes of regurgitation or fussiness with breast feeding had occurred. By 9 months of age there was no cranial shape abnormality detectable with all presenting complaints resolved. No adverse events were reported or observed.

Discussion

Asymmetries of the head have been reported to occur in as many as 61% of healthy newborn infants.⁸ The incidence of plagiocephaly is thought to peak at around 4 months of age and then diminish with advancing age. Detrimental outcomes associated with plagiocephaly are linked to limited head rotation, lower activity levels and supine sleeping position.⁹

Various methods are utilized in conventional treatment for infants with non-synostotic plagiocephaly. The most widely used intervention is helmet therapy; otherwise head repositioning, botox injections into the sternocleidomastoid muscle, and surgery are more extreme treatments.⁸ However, in regards to helmet therapy, it is recommended that the helmet be worn for more than 20 hours a day for almost 8 months on average for an optimal outcome.⁸

In consideration of the outcomes, the intervention of applying cranial molding helmets 20 hours a day may apply enough external pressure to correct the contour, however may not necessarily resolve potential underlying factors involved described above such as torticollis or limited head rotation. There have been many case reports with the observation of resolved non-synostotic plagiocephaly, and infant torticollis (known to exacerbate plagiocephaly) and cervical spine range of motion following chiropractic care.^{10, 11, 12, 13, 14} The observations from this case study add further weight to the possibility of a potential relationship between chiropractic care and improvements in plagiocephaly.

In neonates, enhanced neuroplasticity is well established with the developing nervous system being known to be much more plastic in nature compared to an adult in both development and response to trauma. Activity in neu-

ral pathways is a vital component for consolidating connections, whether normal or compensatory.¹⁵ Therefore addressing any potential dysfunction within the central nervous system would be a logical approach in order to prevent maladaptive neurology. By influencing the somatosensory processing and sensorimotor integration, the influences over the muscle spasm and increased global and segmental range of motion could alone potentially compliment the management of non-synostotic plagiocephaly, torticollis and other sustained trauma during the birth process. If chiropractic adjustments reduce nervous system interference, this may have a positive effect on the body's ability to coordinate, control and self regulate functions through the somatosensory processing and sensorimotor integration systems. This is consistent with the model espoused by Haavik, Holt and Murphy which explores the neuromodulatory effects of vertebral subluxation and chiropractic care.¹⁶

In this case report, the restoration of global and segmental range of motion within the cervical spine was restored immediately after the correction of subluxations, which appeared to result in decreased hypertonicity of the sternocleidomastoid muscle. The infant was then able to engage in the full normal range of motion expected at her stage of growth. Due to the cranial bones being so mobile and malleable at the young age, it could be hypothesized that the return of normal contour was enhanced through increased mechanical and neurological control of the cervical spine; allowing passive and active motion throughout the infant's daily living activities such as feeding, laying and sleeping. Further research is warranted to assess the credibility of this hypothesis.

Conclusion

The chiropractic care of newborns could potentially be a key component in addressing the integrity of an infant's nervous system, in a safe and conservative way. If chiropractic care decreases muscle spasm and increases global and segmental range of motion it could potentially be a beneficial component of the management of non-synostotic plagiocephaly, torticollis and other trauma associated with the birth process.

This case study suggests chiropractic care may be beneficial for at least some infants with deformational plagiocephaly. However, further research is warranted to determine the efficacy of chiropractic care with similar case presentations in contrast to current conventional therapies.

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