CASE SERIES

Improvement of Plagiocephaly & Improved Health Outcomes in Three Infants Following Chiropractic Care to Reduce Vertebral Subluxations: A Case Series

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Abstract

Objective: To describe the positive health outcomes following reduction of vertebral subluxation in three infants with plagiocephaly and related health concerns. Research has suggested that plagiocephaly (skull deformation) in infants is now being linked to developmental delay.

Clinical Features: Three infants under the age of 3-months-old with plagiocephaly had upper cervical and sacral subluxations.

Intervention & Outcomes: All three infants were managed utilizing sustained contact upper cervical adjustments, Logan Basic Technique, and cranial work. In 12 weeks or less of chiropractic adjustments each baby was found to have improvements in symmetry in the cranial bones with associated reduction of other systemic symptoms.

Conclusion: This case series supports the effectiveness of chiropractic care for infants with plagiocephaly. More research is needed in this area.

Keywords: *Plagiocephaly, deformational plagiocephaly, cranial asymmetry, chiropractic, vertebral subluxation, pediatric, adjustment, developmental delays, spinal manipulation, Logan Basic, sustained contact, cranial work*

Introduction

The malleable skull of an infant forms and changes as a baby grows and develops. When the overall shape of the skull becomes asymmetrical as a result of direct pressure it can be termed deformational plagiocephaly.[1] According to the International Society for Pediatric Neurology, 20% of infants at 2 months old have plagiocephaly and as many as 29.5% have it at 2 years old.[2]

This number has increased in the last few decades due to the introduction of the "Back to Sleep" program in 1992 that suggested infants should sleep on their backs to reduce the risk of Sudden Infant Death Syndrome (SIDS).[2]

The SIDS incidence was successfully decreased, however, due to the pressure to the back of the skull in supine sleeping, plagiocephaly has become more prevalent.[2] Other risk factors for plagiocephaly include intrauterine constraint, multiple births, torticollis, lower activity levels, and supine sleeping position.[3,4] Plagiocephaly used to be universally accepted as simply cosmetic, but more recent research suggests that it may be associated with developmental difficulties including cerebral dysfunction and learning disorders during the school-age years.[5]

One of the most mainstream treatments for plagiocephaly right

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now is orthotic helmet treatment. With helmet treatment, the baby's head is measured and fit with an approximately $2000 helmet that is worn 23 hours a day for 2-6 months depending on the case.[6] The helmets are not without adverse effects some of which include pressure sores, skin irritation, and/or infection.[7]

There are a variety of case reports and clinical studies available revealing resolution of plagiocephaly and infantile torticollis following chiropractic care.[4,5,8-13] The purpose of this case series is to outline the improvement of plagiocephaly in 3 infants with the use of chiropractic care, and by doing so add to the growing body of research to support the effectiveness of chiropractic care in the management of children with plagiocephaly.

Case Series

Three babies presented for chiropractic evaluation. All three babies were 2.5 months old and were brought in by parents who were concerned with the shape of their baby's head and the possible consequences of leaving them untreated. See Table 1 for patient description and details of care rendered.

The chiropractic techniques utilized in this series were Logan Basic Technique (LBT), sustained-contact upper cervical adjusting, and cranial work. According to The Chiropractic Resource Organization (CRO), LBT is a specific chiropractic technique in which light pressure is applied to the ligaments of the sacrum.[14] Light force is simultaneously applied to various spinal levels to restore muscle balance. The CRO definition of upper cervical adjusting is a focus on joint dysfunctions in the upper cervical spine.[14] The theory is that treatment of this area may also address problems throughout the entire body. Cranial work is defined by the CRO not as a specific chiropractic technique, but possibly several techniques using the application of chiropractic manipulation/adjustment to joints of the skull.[14]

The outcomes for baby 1 are see in Figures 1 and 2. The outcomes for baby 2 are seen in Figures 3 and 4. Baby 3 does not have before and after photos, however he did see leveling of his frontal bones after his 20 visits as well as improved quality of life; from a failure to thrive infant to a healthy flourishing one.

Discussion

Conventional non-surgical methods for treating plagiocephaly include counter-positioning, supervised prone time, and for more severe cases, orthotic molding.[15] More extreme measures can be taken in the most severe cases such as Botox injections into the sternocleidomastoid muscle, and even surgery.[16] With helmet treatment, the baby's head is measured and fit with an approximately $2000 helmet that is worn 23 hours a day for 2-6 months depending on the case.[6] Some of the complications that can arise from orthotic helmet use include skin irritation, that if left unaddressed, can lead to pressure sores, infections, and even abscess in rare cases.[7] Humphris et al suggest that although a cranial helmet may cosmetically change the shape of the head, it may not address the central nervous system dysfunction or any other underlying dynamics such as torticollis or limited head rotation, commonly associated with plagiocephaly.[4]

Most of the literature available, outside of case studies, about the treatment of plagiocephaly does not involve chiropractic care.[1-3,5,6,15-26] This deficit in literature is important because of the increasing body of research showing that deformational plagiocephaly in children is much more than a cosmetic problem and chiropractic care addresses the biomechanical issues as well as the neurological ones. According to Miller and Clarren in 2000, 39.7 percent of 254 infants with plagiocephaly required special education and assistance.[6] In a population of 110 infants with plagiocephaly, there were significant delays in both mental and psychomotor development and no child with plagiocephaly showed signs of accelerated development.[17]

In a 2008 study, Fowler et al found a statistical difference in muscle tone in infants with plagiocephaly versus those without.[18] Speltz et al discovered through a case-controlled study that plagiocephallic infants also had neurodevelopmental disadvantages.[19] A follow up of the Speltz study found that those same children continued to receive lower developmental scores than the unaffected control when they reached pre-school age.[20] Special attention needs to be given to these developmental consequences due to the fact that plagiocephaly rates have increased since the introduction of the "Back to Sleep" program in 1992, which recommends that babies be put to sleep on their backs for the prevention of SIDS.[21] Posterior plagiocephaly, also known as brachiocephaly has especially increased as a result from infants sleeping in the supine position.[21]

According to a consensus report of best practice recommendations, chiropractic care is an effective, non-invasive, low-risk care alternative for several pediatric conditions such as plagiocephaly.[27] Chiropractic care can affect plagiocephaly is several different ways. First, chiropractic can manage symptoms of plagiocephaly through the use of the tonal work (in these 3 cases LBT), since life is the expression of tone according to D.D. Palmer, by affecting the tone of the nervous system the function of that system will also be affected.[28] Second, biomechanically in accordance with the segmental model of subluxation (in these 3 cases through cranial work) the bones of the skull are evaluated and adjusted to restore proper alignment as well as movement, especially in the developing skull of an infant.[29] The dysafferentation model is also a player (in these cases through sustained-contact upper cervical adjusting) because proper motion in the neck is not only important for the development and shape of the skull, but also for the development of the brain and nervous system.[29]

There are inherent limitations to this case series, the most obvious being the small sample size. There was also limited objective data available, especially for baby 3.

Conclusion

The results of this case series show the improvement of plagiocephaly in three infants following subluxation-based chiropractic care. This suggests that chiropractic care may be underutilized as a conservative management for children with plagiocephaly. This topic is becoming of more relevance as more children are found to have plagiocephaly and it is

established that it may have more than just cosmetic consequences. More research is warranted to further evaluate the efficacy of chiropractic care as an effective option for patients with similar presentation.

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Table 1

Baby	Birth Age	Initial Presentation	Previous Chiropractic Care	Technique Utilized	Care plan
1	Vaginal delivery 2.5 months old	Normal healthy baby, over time her head began to grow asymmetrically.	Yes, upper cervical sustained contact adjustments since birth	At 2.5 months old Logan Basic and cranial work were added to the baby's upper cervical care.	2x/week for 12 weeks
2	Vaginal delivery 2.5 months old	Presented for chiropractic care specifically for plagiocephaly. Right head tilt and left head translation. Favoring right side.	No	Logan basic, cranial work and sustained contact upper cervical adjusting.	3x/week for 3 weeks (A Baby Moon Pillow was also suggested to this baby's mother.)
3	Caesarean section 2.5 months old	Failure to thrive, torticollis, vomiting out of nose. Mother couldn't breast feed.	No	Logan basic, cranial work and sustained contact upper cervical adjusting.	3x/week for 20 visits. Sometimes twice a day.

Figure 1. Baby 1 prior to cranial work.

Figure 2. Baby 1 after 12 weeks of cranial work and chiropractic adjustments.

Figure 3. Baby 2 with right frontal bossing prior to chiropractic adjustments.

Figure 4. Baby 2 after 9 weeks.