

Positive outcome from a chiropractic multidisciplinary approach for congenital torticollis in an infant three-weeks of age: A case report

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ABSTRACT

Background: The purpose of this case report was to discuss the care of a pediatric patient with congenital torticollis who was treated by a chiropractor who initiated a multidisciplinary approach. **Methods:** Databases searched were PubMed, Cochrane, Index to Chiropractic Literature, CINAHL and google scholar. Keywords were torticollis, congenital torticollis, pseudotumor, plagiocephaly, spinal manipulation, chiropractic. **Case summary:** A mother brought her three-week-old infant to the chiropractor because she felt a nodule in the upper neck. After a thorough investigation of her history and an age appropriate physical exam, the diagnosis was congenital torticollis with a pseudo-tumor of the left sternocleidomastoid muscle (SCM). The intervention consisted of gentle spinal manipulation of the occipito-atlantal area, soft tissue therapy performed on the SCM, cranial manipulation along with home exercise instruction given to the parents. There was also a referral made to a physiotherapist for a consultation on the case with subsequent recommendations. The observed outcome was the resolution of congenital torticollis. **Conclusion:** This case report records the progress and positive outcome of a chiropractic multidisciplinary approach on pediatric congenital torticollis.

Key Words: Torticollis, congenital torticollis, pseudotumor, sternocleidomastoid muscle, plagiocephaly, spinal manipulation, chiropractic, pediatric, multidisciplinary.

Introduction

Torticollis can develop due to a constrained intrauterine position in the last weeks of pregnancy,^{1,2,3,4,5,6,7,8,9,10} breech lie,^{11,12} birth trauma/forces during delivery^{3,4,5,7,8} and late gestational age.^{7,8} There are three types of congenital torticollis: postural, muscular and a sternocleidomastoid muscle (SCM) mass. The postural type presents as the infant's postural preference but without muscle or passive range of motion (ROM) restrictions.¹¹ The muscular type presents with SCM tightness and passive ROM limitations.¹¹ The most severe form, a SCM mass from congenital muscular torticollis (CMT) presents with a fibrotic thickening of the SCM and passive ROM limitations.¹³ Other causes of torticollis can be a dysfunction in the cranio-cervical junction,¹⁴ Klippel-Feil Syndrome (with or without Sprengel's Deformity),¹⁵ a dysfunction in the upper cervical spine or can be caused by a "Kinematic Imbalance due to Sub-occipital Strain" (KISS).¹⁶ The non-musculoskeletal reasons for infantile torticollis could be ocular, neurological or due to auditory problems.^{14,17}

The pseudotumor of the SCM is related to severe presentations and consists of myoblasts, myofibroblasts, mesenchyme cells and fibroblasts in varied quantity and stage of differentiation or degeneration.¹⁸ In newborns, the prevalence of this pseudotumor ranges from 0.3% to 2%.^{19,20} There are a variety of treatments for the torticollis caused by a pseudotumor such as active positioning, traction, physical

therapy, medication, botulinum toxin injections, mobilization and exercises.¹⁹ If conservative therapies are ineffective after a reasonable period of time (6–12 months), surgery should be considered.²¹ There is also some evidence of consequences of torticollis that is not treated such as transient motor asymmetry, motor delay, and plagiocephaly, which would be reversible if addressed early and correctly.^{22,23} Torticollis is a major risk factor for plagiocephaly. Chiropractic, which is part of complementary and alternative medicine (CAM) care has been found to be safe for children^{24,25,26,27,28} and there is an evidence-based rationale for conservative myofascial and light adjustive techniques for the management of torticollis in both adults and children.^{29,30,31}

Case Presentation

Patient information: The mother presented her infant to the chiropractor because she felt a nodule in the neck of her infant at three-weeks-old. She had not noticed it previously and she was concerned. She also mentioned that her infant had a preferential head position, always rotated to the right side since birth. The baby was bottle fed and only from the right side (based on the baby's preference) The history of the pregnancy was unremarkable. She delivered at 41 weeks gestation. She chose to give birth in a hospital and she received Pitocin and an epidural to facilitate the birth. The second phase of the delivery was a long labor that lasted three hours. The baby presented with shoulder dystocia and the labor failed to progress. The fetal heart rate was

decelerating. They had to apply forceps three times to assist delivery. There was no caput succedaneum, plagiocephaly or nodule in the SCM noted at birth. The chiropractor was the first health professional she consulted for the nodule when she first detected it and no treatment was provided prior to the consultation in a chiropractic office.

Physical exam: During the physical exam, cervical range of motion was found restricted in left rotation and in right lateral flexion. During observation, her head was in right rotation and left lateral flexion. The cranial shape, distorted due to the muscular traction, caused the head to “bulge” at the left occiput (which contrasted with the flatter right occiput) and there was a nodule palpated at the distal part of the SCM near the clavicle. Upon palpation of the cervical spine, there was a restriction palpated at C1 on the right. The eyes were symmetrical but not level and the ears were asymmetric in position with the left ear more anterior than the right ear with a facial distortion. There was no sign of fracture. The scapulae were not fixed ruling out Klippel-Feil Syndrome with Sprengel’s Deformity. The neurologic exam (including infant reflexes) was normal and appropriate for gestational age with negative Ortolani and Barlow’s tests.

Diagnostic assessment: Imaging or laboratory tests were not considered clinically necessary at the initial stage of treatment. Differential diagnoses included spinal tumor, Klippel-Feil Syndrome with Sprengel’s Deformity or hemivertebra. It was determined a priori that if the patient did not respond to conservative measures in a reasonable period of time utilizing techniques modified for the child’s age and size, or if there were any adverse reactions, diagnostic imaging could be ordered. Because there was a palpable nodule, the limited motion was unilateral for rotation on the contralateral side of lateral flexion. There was no lowered hairline. The working diagnosis was a pseudo-tumor (nodule) of the left SCM. The prognosis for a pseudo-tumor is unknown because the type three nodule in congenital torticollis is the most complex type of congenital torticollis. Because the pseudo-tumor is a mix of myoblasts, myofibroblasts, mesenchyme cells, and fibroblasts in varied quantity and stage of differentiation or degeneration, it can take longer to release the nodule in the SCM. Often, it leads to positional plagiocephaly because of the traction of the shortened muscle on the plates of the cranium restricting the head from full range of motion. The goal is full, normal cervical ROM without side preference. A second opinion was recommended by the chiropractor in an attempt to corroborate the diagnosis and to rule out other causes and to seek co-management with a physiotherapist with an appropriate exercise protocol.

Treatment: The intervention began for the infant at three weeks old. The treatment consisted of spinal manipulation of C1 with diversified technique modified for the patient’s

age and size, muscular treatment of the SCM with a fingertip pressure applied for 30 seconds and cranial mobilization of the occiput and parietals bilaterally. Recommendations for the parent at home were to passively rotate the head to the left and laterally flex to the right. The parents were also instructed to perform some massage on the SCM eight times a day as well as consistently positioning the infant prone, in tummy time (Table 1)^{14,32,33} and to stimulate her on the left side by placing themselves or brightly colored objects on that side. The planned frequency of the chiropractic treatment was twice a week for six treatments followed by a re-evaluation to assess progress. After four treatments, the chiropractor added sacro-occipital distraction and lateral flexion traction to facilitate increased range of motion and release tension in the musculature. There was also a recommendation for co-management with a physiotherapist for support with the exercises. She went to physiotherapist once a month to support the exercises that the mother was doing everyday at home. The physiotherapist gave her additional exercise to do at home.

Age	Minutes per day
1 week	5
4 weeks	10
8 weeks	20
12 weeks	45
16 weeks	80

Table 1. Recommended tummy time per day. Miller J, Vallone S. What is Tummy Time: is it necessary for newborns?³⁹

Follow-up and outcomes: After five treatments, the originally restricted ranges of motion were within 90% of full range and she was able to hold her head in a neutral posture for a sustained period of time. After seven treatments, it was noted that the nodule in the SCM began to release. After 13 treatments, the infant started to move her left arm freely and to use it to grab things. After 18 treatments, the nodule was no longer there. Within three months, at twice a week for three weeks and then once a week, the SCM was released and the ROM was within normal limits. Because of the prolonged posturing of the head in right rotation and left lateral flexion, the head shape had become plagiocephalic with flattening of the right occiput. At the 14th treatment, the plagiocephaly was considered mild with a score of 77 on the cranial vault asymmetry index (CVAI).³⁴ At five months old, she was re-evaluated by her medical doctor for her plagiocephaly. In the Argenta classification scale, the patient was type 2.³⁵ The medical doctor offered an orthotic helmet because of aesthetics. The timeline is outlined in Figure 1 (next page). The mother made a comment on her feedback form that she was satisfied with the outcome (Table 2 next page).

1st visit 14/09/2017	Head is rotated to the right side and is in left lateral flexed	
5th visit 03/10/2017	Head is more midline. There is less tension in the SCM and the SCM is lengthened; pseudotumor remains palpable. ROM of cervical spine is 40° in left rotation and 35° in right lateral flexion	
18th visit 19/12/2017	The ROM in the cervical spine is unrestricted and there is no palpable nodule anymore but there's a mild plagiocephaly.	
22th visit 08/02/2018	At 5 months, she had an orthotic helmet with the intent to reduce her mild plagiocephaly.	

Figure 1. Timeline.

“At each treatment, in respect to my daughter’s head posture and her reaction during the treatment, the chiropractic manipulation helped her. We saw great results during the evolution of the treatment. The chiropractor modified the treatment so that my daughter could tolerate it, and it helped to achieve more each treatment. It helped with the pseudo-tumor resulting in less muscular tension and more range of motion.”

Table 2. Maternal feedback after treatment

Discussion

This patient presented with restriction in right rotation and left lateral flexion of the neck with a nodule in the left SCM. The true etiology of the congenital torticollis still remains uncertain, but this baby’s assisted birth with repeated forceps applications was most likely implicated. The routine treatments for her type of torticollis are active positioning, traction, physical therapy, medication, botulinum toxin injections, mobilization and exercises.²¹ In this case, the parent approved a multidisciplinary approach with chiropractic mobilization, physical therapy, and exercises. In the literature, there is evidence that earlier intervention results in the best outcomes.³⁶ In this case, the parent presented the child as soon as the pseudotumor was noticed (when the infant

was three weeks old). Ohman et al provided preliminary evidence of better outcomes when infants are treated by PT versus parents, but the combination of physical therapy and home program is the more frequent intervention plan.³⁷ Kaplan et al stated that there is evidence that intervention started earlier will take less time to resolve ROM limitation; there are greater reductions in SCM thickness and there is less need for subsequent surgical intervention.³⁶ Petronic et al found that when treatment was initiated before one month of age, 99% of infants with CMT achieved excellent clinical outcomes with an average treatment duration of 1.5 months, but if initiated between one and three months of age, only 89% of infants achieved excellent outcomes with treatment duration averaging 5.9 months.³⁸ Kaplan et al state that the presence of a fibrous band and/or mass, particularly a mass that involves more than the distal one-third of the muscle, is correlated with greater severity of the condition.³⁶ Regarding the prognosis, Kaplan et al identified seven factors associated with a longer episode of care including: (1) older age at initiation of treatment, (2) increased restriction of passive neck rotation, (3) increased severity of head tilt, (4) motor asymmetry, (5) increased thickness or stiffness of the involved SCM or higher thickness ratio between the involved and uninvolved SCM, (6) the presence of an SCM mass or lesion, and (7) delivery history including infants with lower birth weight and breech, compared with cephalic presentation.³⁶ For the multidisciplinary approach, Kaplan et al say that throughout the episode of care, the PT should collaborate with the infant’s physician and the family to make a judgment about when to increase the intensity of direct physical therapy treatment or consider alternative approaches.

In this case, it took three months to gain complete ROM with no SCM thickness. Because the first treatment was almost at the end of the baby’s first month and the congenital muscular torticollis was severe with the SCM mass, it can be a reason why it took longer than 1.5 months. However, the case was complex and the multidisciplinary approach was utilized as recommended by Kaplan et al.³⁶ The resolution of the congenital muscular torticollis with a SCM mass was complete. The resolution of the plagiocephaly was not 100% and the use of a helmet was instituted for aesthetics.

Limitations

There were several limitations of this study. The first limitation is the small sample size. It is only one case with this diagnosis, subjective evaluation and follow up. The other limitation is the case management which was multidisciplinary including the treatment by the physiotherapist (and the additional exercises). There were potentially many factors that could have influenced the result such as the parents’ compliance with the recommendations for home care. We were not able to determine whether the treatment “beat” the natural course and history of this disorder.

The strength of the case is the amelioration of the symptoms with objective measures, with a chiropractor leading the care. Physiotherapy and parental implementation of exercises were also part of the treatment plan. The consequence of plagiocephaly from her congenital torticollis occurred in this case and the child went to medical care for orthotic therapy for the mis-shapen cranium at the close of the original treatment plan.

Conclusion

This case report suggests that chiropractic care, combined with physiotherapy and in-home exercises can provide help for the treatment of a nodule in the SCM in a new-born infant. These treatments merit further investigation.

Informed consent has been obtained to share this case report including photographs.

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No funding sources or conflicts of interest were reported for this study

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