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Successful Application of CranioSacral Therapy in a Case of Colic in an 8-Week-Old Baby

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Cover Page Footnote

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Case study
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Brief introduction

Infant or infantile colic, when a baby cries with 'no obvious cause, is considered a common problem which usually gets better by 3 or 4 months of age' (National Health Service [NHS], 2024). Colic is described as,

> frequent, prolonged and intense crying or fussiness in a healthy infant. Colic can be particularly frustrating for parents because the baby's distress occurs for no apparent reason and no amount of consoling seems to bring any relief. These episodes often occur in the evening, when parents themselves are often tired (Mayo Clinic, 2024).

Other symptoms while they are crying include fist clenching, face reddening, tummy rumbling, wind, bringing up their knees to their tummy or arching their back (NHS, 2024).

There are no short or long-term complications linked to infant colic, but it is considered a stress factor for parents that can lead to depression and feelings of guilt and anger as well as early cessation of breast feeding (Mayo Clinic, 2024). The causes of colic are unknown, and it may result from numerous contributing factors. Current research has focused on the babies' digestive system not being fully developed, an imbalance of healthy bacteria in the digestive tract, food allergies or intolerances, overfeeding/underfeeding or infrequent burping, early form of childhood migraine and family stress or anxiety (Mayo Clinic, 2024; NHS, 2024). The risk factors for colic are also not well-understood. Research has not shown differences in risk when factors such as sex of child, preterm and full-term pregnancies or formular and breast-fed babies are examined. There is some research suggesting infants born to mothers who smoked during pregnancy or after delivery have an increased risk of developing colic (Mayo Clinic, 2024).

A comparative study into the common interventions of infant colic concluded that the strongest evidence for the treatment of colic was probiotics and preparations containing fennel oil for breastfed infants (Harb *et al.*, 2016), followed by weaker but favourable evidence of manual therapy indicated by a reduction in crying time (Ellwood *et al.*, 2020). Current treatments focus on soothing strategies for the baby; support for the mother; changing feeding strategies and mother's diet if breast fed (NHS, 2024). A commonly used 'over the counter' treatment for colic is Infracol drops which has the active ingredient Simeticone that acts as an antiflatulent.

To date there has been a very little research looking at CranioSacral Therapy (CST) in the treatment of infant colic. An Internet search of PubMed, Google Scholar and the Cochrane Library on 14th May 2024 revealed a small number of research studies that have looked at the manual therapies, including CST. While these studies have not always reached a clear conclusion (Dobson *et al.*, 2012; Ceballos-Laita *et al.*, 2024; Haller *et al*., 2021; Cabanillas-Barea *et al.*, 2023) there have been some positive results (Tanriverdi *et al.*, 2023; Castejón-Castejón *et al.,* 2019). Also some research on crying babies more generally where Osteopathy and CST may help to alleviate symptoms (Parnell Provost, *et al.,* 2019). One trial concluded that babies with infant colic may obtain a complete resolution of symptoms by receiving 2 or 3 sessions of CST (Castejón-Castejón *et al.*, 2019). A small number of studies have looked at manual therapies, but not specifically CST, to alleviate the symptoms of infant colic and birth trauma with favourable results (Hipperson 2004; Alcantara *et al.,* 2011). Hipperson (2004) is one of very few studies that suggests that cervical dysfunction related to birth trauma affects the vagus nerve output and thus gastrointenstinal functions. A further internet search looking specifically at 'vagus nerve annd infant colic' on 19th June 2024 did not reveal any more studies.

Case and timeline

The client was an eight-week-old baby boy at the time of the first treatment. He was brought by his mother who reported that he cried constantly and was a very 'windy, sicky baby'. The baby was breast fed on demand and presented with no problems latching on to the breast, although he favored the left breast over the right. He was feeding at least two-hourly. The mother reported the baby had a mild tongue tie which she was not concerned about. He was having daily bowel movements which were described as normal in color, consistency and smell. The mother had started using Infracol Oral Suspension which she believed was helping to bring up wind but had not tried any other treatments or medications to help with the colic.

The baby was the mother's third pregnancy. He was born at 39 weeks 4 days. The mother reported a normal pregnancy - the regular 12 and 20-week scans and blood tests were all normal. The mother had Covid-19 during pregnancy with no complications. The mother reported she went into labor naturally and went to hospital when contractions were at 8-minute intervals. Her waters broke when she was at 7cm dilation. Contractions remained at 8-minute intervals, and she described them as 'long and hard'. She was in the birth pool at this stage. After several hours of stage 1 labor and over an hour of stage 2 labor the midwife 'pulled him out urgently'. The mother described panic and anxiety at the end of the delivery and there was meconium in the water. She received 'gas and air', a

mixture of gases used as a type of pain relief, when she needed it, but no other form of medication. The mother was not sure if her baby was born occiput anterior or posterior. He had the cord around his neck which was cut while she was still in the pool. He was born at 9lbs in weight. Mother and baby were able to have skin to skin contact after an hour once the baby had been checked over. The mother described bonding as good. The father was also present at the birth and played an active part. Generally, the mother presented as calm and well bonded with her child, and she described a strong family support system.

First treatment, 02.05.2023

Evaluation and treatment

The baby presented with compression around the frontal and nasal bones. He was 'snuffly' and his mother described him as 'noisy' when feeding. The mother reported he had had some facial bruising at birth although there was no evidence of this when the therapist saw him. The therapist considered that he may have presented occiput posterior. The therapist observed a tight pull and perceived 'shortening' through the left cervical spine and his head rotated to the left more easily than the right. The therapist assessed that this was contributing to a flattening around the occiput and parietal on the left-hand side.

The therapist used Upledger CST, a type of light touch bodywork, during the session. CST works with the CranioSacral System - the bones, soft tissues and fluid that surround and support the brain and spinal cord. CST was pioneered and developed by Osteopathic Physician John Upledger in the 1970s and 80s after years of clinical testing and research at Michigan State University where he was a professor of biomechanics (Upledger, 1997).

The therapist palpated his CranialSacral rhythm (CSR) and treated the baby using techniques from the Upledger 10 Step Protocol which is adapted for small babies. This protocol is a sequence of techniques developed by John Upledger which all CST therapists are taught as the basis for treatments. The protocol was carefully devised to ensure all aspects of the CranioSacral system and potential restrictions are addressed (Upledger & Vredevoogd,1983, p.257; Upledger, 1995; Sisco, 2021).

The therapist initially treated the baby's dural tube using the Rock and Glide techniques which she observed had an immediate impact on his cervical spine and the baby's ability to move his head to the right. Dural Tube Rock is a technique to release the transverse rings of the dural tube and enhance rotational range of motion of the occiput and sacrum. Dural Tube Glide is a technique to release spinal nerve roots and dural sleeves and enhace longitudinal range of motion of

the occiput and sacrum. She then used a technique called Frontal Lift, a light decompression of the frontal bone, in order to release the sutures of the frontal bone and the anterior/posterior aspect of the falx cerebri and falx cerebelli. Then a Nasal Bone Release which gently releases the nasal bones in relation to their articulations with the frontal, ethmoid and maxillae bones. Finally she used Vomer Mobilisation and Release techniques to evaluate and release the vomer through the mouth, which she observed deviated to the left. She observed that the baby had a strong suck reflex and was not aware of any limitation caused by the tongue tie.

A second treatment was scheduled for a week's time. In the meantime, the therapist suggested that the mother practice as much 'tummy time' as possible with her baby and to offer him distractions on his right-hand side, encouraging him to turn to the right and extend the left cervical musculature further. Also to encourage the baby to feed on the right breast first while he was still more awake and actively hungry rather than suckling to pacify. Tummy time is the practice of laying a baby on its stomach for brief periods while they are awake to help strengthen their neck and shoulder muscles and improve their motor skills.

Second Treatment, 11.05.2023

Evaluation and treatment

The mother reported an immediate improvement in the baby's symptoms following the first treatment. He was crying less, and she described him as a 'much happier baby'. She said he was more settled in himself and was sleeping better. She said he was still quite 'sicky' but appeared to be less distressed by this.

On examination the therapist observed less flattening across the frontal bone and nasals. There was lengthening through the left cervical spine and better symmetry. The therapist observed the baby was better able to rotate his head to the right than in the first session. The treatment focused on a whole body unwind, torsion movement in both directions, with the therapist placing her hands on the sacrum and occiput. The therapist observed the baby's left shoulder and left hip move medially. The therapist balanced the parietals and mobilised the occiput and frontal bones using Upledger techniques. This included Parietal Lift, a technique that aims to release the temporoparietal suture and to allow for fluid exchange of the superior sagittal sinus. It is adapted for babies and the therapist places two fingers of both hands to make contact on or around the parietal ridge. She also used Frontal Lift, described earlier, and the first part of Occipital Cranial Base which is used to release restrictions and facilitate relaxation in the soft tissues posterior to the atlas. The fingertips of both hands are placed posterior to the atlas, hands together, head of the client resting in the palms of the therapist's hands.

She observed better traction through the whole of the baby's left side at the end of the session.

The mother and therapist agreed that she would continue to offer the right breast first, to continue with 'tummy time' to encourage right rotation and to slightly extend the space between feeds to allow for a rest and digest phase. The mother agreed to call if she felt her baby needed further treatment.

Follow up by text 27.05.2023
Following the second treatment the mother reported that the baby was doing well. She described him as 'so much happier, especially in the evenings' and sleeping well at night. She said that he was still a 'sicky' baby in terms of bring up milk but that he was no longer presenting with the symptoms of colic.

Discussion
The Upledger CST protocol for the examination and treatment of the newborn CranioSacral system is different to the adult due the extreme flexibility of the newborn skull. This is discussed in detail by John Upledger in his book *CranioSacral Therapy* (Upledger & Vredevoogd,1983, p. 256-264). The routine suggests observation of the cranial vault and face for asymmetry, observation of the torso and neck for torsion patterns between head and pelvis, observation of the roof of the mouth for strength of the sucking reflex (ibid.). Upledger includes in the protocol the following: evaluation of cranial base mobility, decompression of occipital condyles, evaluation of head and face for lack of symmetry, balancing the occiput and sacrum and balancing the sacrum and pelvis (ibid.). Significantly, Upledger discusses how hyperextension of the head and compression in an anteromedial direction of the condylar part of the occiput is often the result of obstetric deliveries where there has been some assistance such as forceps or manual traction (ibid, p. 258). Upledger writes, 'this condition occurs as the obstetrical person attempts to hasten the passage of the child's body through the birth canal. These forces of hyperextension and anterior compression must be dissipated for the optimal development of the child. In order to do this, you must move the occiput posteriorly in relation to the atlas' (ibid.).

Upledger also describes how it is important to reduce sympathetic tone with newborn babies (Upledger & Vredevoogd, 1983, p. 256-264). This can be done by giving attention to the dural tube, as described above. It can also be done by giving attention to the vagus nerve. The vagal nerves are part of the Parasympathetic Nervous System (PNS) and play a key role in helping the body manage involuntary functions such as heart rate, breathing and digestion. Furthermore, there is now some research that has explored the relationship

between the vagus nerve and the gut/brain axis (Field et al, 2008; Bonaz et al. 2018; Marlien, 2022). As already stated, Hipperson (2004) suggests that vagus nerve compression at the cervical vertebra in newborn babies may impact their gut health. As the gastrointestinal system is innervated by the PNS through the vagus nerve the relationship between cervical vertebra dysfunction, vagus compression and gastrointestinal problems is indicated. Thus, balancing a baby's autonomic nervous system and relieving any compression at the occipital base should impact the vagus and thus the gastrointestinal system.

This case study provides an example of the use of this treatment protocol to examine and then treat an eight-week-old baby. Following a discussion of the birth and then physical examination, the therapist assessed compression of the frontal and nasal bones as well as a shortening through the left cervical spine. The birth story combined with the therapist's assessment all indicated hyperextension of the head and some compression at the frontal bone and occiput, also possible compression of the vagus nerve. The mother's story indicated some trauma at birth which may have further impacted the baby's nervous system and increased his overall sympathetic tone. When a mother and baby experience trauma at birth the sympathetic nervous system is activated. The assessment allowed the therapist to then focus on very light touch decompression techniques in relation to the frontal and nasal bones. The therapist used the Rock and Glide techniques in relation to the dural tube which, as already discussed, Upledger describes as helpful to decrease hyper-sympathetic tone. Also, Vomer Disimpaction which Upledger said can help with newborns who may have latching problems (Upledger, 1983, Chapter 15). The assessment enabled the therapist to focus on the hyper extension of the right side of the baby's neck and possible compression of the vagus nerve.

The therapist was also able to give time to the mother, listening carefully to her account of her pregnancy and birth experience, as well as discussing with the mother ways to follow up the treatment back at home. The relationship between mother and child and their joint experience during birth and in the immediate weeks after birth are an integral part of the treatment process with pediatric CST. Inherent in Upldeger's work is the connection between birth trauma and the supportive role of CST (Johansson, 2004; Moore, 2015; Hart, 2019). As Hart (2019) outlines, while the delivery process can be uneventful, for some it involves force or trauma and this may lead to fascial restrictions as well as hightened sympathetic tone. Hart outlines how the light touch of CST may assist babies experiencing torticollis, misshapen head, colic, constipation, tongue ties and hip displasia (ibid.). Johansson (2004) discusses how CST, especially cranial base mobilisation, can be an effective intervention for improving cervical posture in an

infant with post-truamatic torticolli. Moore (2015) suggests that twisting, compression and misalignment as a result of the birth process can lead to restrictions that impact gut health in new born babies. The impact of infant colic on the mother and indeed the wider family is always considered in any CST treatment process and so an exploration of the family support systems as well as helpful follow up information are important. A gentle exploration and discussion of the birth and possible trauma for both mother and baby can help to relax the nervous system and improve parasympathetic tone. Enabling the mother to tell her story in a supportive and non-judgmental space can also help to alleviate any residual trauma.

This case study suggests that CST can help alleviate the symptoms of infant colic in as little as two sessions of CST. As a case, it contributes to the increasing evidence, albeit still small, that CST is an effective treatment for newborns. Specifically, it builds on the 2019 research trial which suggests CST can help alleviate the symptoms of infant colic (Castejón-Castejón *et al.*,2019). A randomized control trial with 58 babies (29 in the control group) concluded that babies with infant colic may obtain a complete resolution on day 24 of the symptoms by receiving 2 or 3 sessions of CST (ibid.) It concluded that CST helps reduce crying time and improve sleep hours for babies experiencing colic (ibid.). Another randomized trial in 2023 concluded that treatment with osteopathic manual therapy alleviates the symptoms of infant colic and could be recommended for this purpose from the onset of the condition (Martínez-Lentisco et al., 2023).

The implication within this case study is that there is also a possible link between the birth of the baby and the symptoms of colic. Thereby, this case study suggests that CST may be an effective treatment for birth trauma, though more detailed research would be needed. Interestingly, a study of chiropractic management of infant colic concluded a possible association between birth trauma; the development of cranial and spinal segmental dysfunction and consequential manifestation of symptoms of infant colic (Hipperson, 2004). It also demonstrated chiropractic treatment successfully restoring correct spinal and cranial motion and an associated resolution of symptoms (ibid.).

Conclusion

This case study shows the successful application of CST, as a modified protocol specifically for pediatrics, in treating an eight-week baby boy with colic. While this case focuses on how alleviation of a slight compression of the frontal and nasal bones and cervical tightness, probably related to the birth, helped to alleviate the symptoms of colic, further research is needed to explore if pediatric CST can

more widely alleviate the symptoms of infant colic. Further research is also required to shed more light on the efficacy of CST to alleviate the symptoms of birth trauma - to explore whether there is a direct relationship between birth trauma and infant colic and more specifically to explore whether there is a direct relationship between hyper extension of the neck and compression of the vagus nerve and infant colic.

Patient Consent

Informed consent has been given by the mother of the client.

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