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CLINICAL EVIDENCE

Colic and infant birth trauma: A case report.

Ian Rossborough and Chris Hart

Abstract: Infants are often presented by their desperate parents to chiropractic clinics with a range of health problems, that in the case of the very young these attendances often appear to arise after a difficult birth. In many cases, these patients are referred by their midwife or infant health care nurse, who while dedicated health delivery professionals, understand the limitations of what they have to offer and have seen many positive results when such infants receive appropriate chiropractic care, particularly when conventional medical protocols do not appear to be effective or offer acceptable symptomatic relief. This collaborative trend is positive, and while the nursing profession often appears to encompass this approach, it is still strongly resisted by medical practitioners. (1) A paediatric condition that does appear to benefit from chiropractic care is colic. (2) This case study presents both a potential birth injury being linked to colic and the efficacy of chiropractic care for this individual.

Indexing Terms: Colic, birth trauma, 5th Thoracic, resuscitation, chest compression, subluxation, infant adjusting, chiropractic, Gonstead.

Introduction

Colic is excessive, frequent crying in a baby who appears under the medical paradigm to be otherwise healthy and well fed. Colic is quite common, affecting about one in five babies, but according to most literature is still poorly understood. Infant crying is often regarded as normal. At six to eight weeks, babies normally cry for approximately two hours a day. However, infants with colic will cry inconsolably for several hours at a time and it's often worse in the evenings. Colic usually begins within the first few weeks of life and peaks at around 6 to 8 weeks. It often stops by the time the baby is 4 months old, and by 6 months at the latest.

'... this case report demonstrates a very low-risk approach to resolving infantile colic using Gonstead Methods.'

The conventional medical view of infants with colic is that they don't suffer from any underlying medical condition, although such symptoms may lead to investigations for gastro-oesophageal reflux disease (GORD) or even eczema, which can be an allergy related condition. However the vast majority of cases have no medical aetiology. (3)

One of the most dramatic issues and potential complications is that colic is very distressing for the parents, where normal sleep patterns expected during the first few months of the infant's life are significantly disrupted to the point where sleep deprivation and anxiety negatively impacts the wellbeing of the primary carers. This is particularly relevant where the mother has elected to breast feed the child as the disturbed sleep patterns can disturb milk production and have been linked to postpartum depression. (4) (5)

Medical treatment is largely based on patient self-care, that includes suggestions for soothing techniques, maternal diet changes for mothers breastfeeding or formula changes when bottle feeding. (6) These limited suggestions often have little direct impact on the condition. Parental stress can lead parents to seek alternative health care, or in some cases encourage infant nursing and health care workers to recommend chiropractic care as this care is often suggested by even reputable clinics, (5). While more research is required into colic by both medical and chiropractic professions, the there is strong evidence developing that chiropractic care is shown to be effective in reducing the symptoms and improving infant sleep patterns. (2, 7, 8)

Common sense leads parents and caring health delivery professions to question such frequent and inconsolable crying. Mothers experience pain and trauma during the birth process, and many believe so does the infant. This distress is the most effective way the infant can express discomfort, and this discomfort can result from complications associated with a difficult or traumatic delivery.

A birth trauma is generally considered a generic term for an injury that might arise during labour. Birth trauma is an all-encompassing term that could entail a small laceration that appears on the infant during delivery, biomechanical stress to the cervical spine, bone fractures in the birthing process, or potentially life-threatening complications involving apnea, anoxia and hypoxia. Ultimately, birth injury as a broad term could range from something very minor that in medical terms requires no treatment such as a caput succedaneum or be serious enough to cause permanent mental and physical deformities or irreversible damage, including death. Birth trauma can occur for many different reasons. However, common factors include prolonged labour and the unintentional improper use of tools, such as forceps, during the delivery process or incorrect handling of the infant during and immediately following the birthing process. (9)

Like every injury type, there are degrees of trauma and resulting injury, and while in the vast majority of deliveries the obstetrical staff are doing their best, factors can conspire that lead to various degrees or injury. Diagnosed more serious injuries remain with the obstetric and hospital staff. Undiagnosed or minor injuries and subsequent symptoms are generally left to the parents.

Case context

This case involves a number of the aforementioned potential traumatic causes and impacts, including vacuum suction assistance, apnea and resuscitation. The authors make the point that to their knowledge, none of these factors involved error by the attending medical staff and acknowledge that each intervention appeared to be necessary for the infant's wellbeing.

Most infant biomechanical injuries at birth involve the upper cervical spine, (10) as this anatomy is most impacted by the compressive forces during contraction, engagement and delivery, or introduced traction and rotational forces associated with the use of forceps or vacuum suction. However, in this patient case, the upper cervical spine did not present findings of dysfunction, it was the mid-thoracic spine, which is less common. The authors can see two biomechanical pathways for this unusual injury in this particular case.

Once the head is born, external rotation or restitution of the head must occur so that the infant's anterior shoulder can move out from under the mother's pubic bone and expulsion can occur. (11) The authors postulate that at rotation, biomechanical stresses can be transferred to the lower cervical and upper thoracic spine. Additionally, as the shoulder rotates and is forced under the pubic bone, it is conceivable that these biomechanical lateral stresses could extend to the mid-thoracic spine.

The second cause of trauma may relate to the treatment for apnea, where emergency resuscitation was required. Resuscitation treatment protocol uses the acronym ABCD, (12) airway, breathing, circulation and drugs:

1. Airway: Open the airway.
2. Breathing: Start the infant breathing by providing adequate ventilation.
3. Circulation: Obtain a good heart rate and circulation with chest compressions.
4. Drugs: Give adrenaline to stimulate the heart and naloxone to reverse pethidine and morphine

Step 3 involves chest compression, which may focus biomechanical stresses deep into the sternum and through the rib cage to the mid-thoracic spine. It is common in children and adults for chest compressions to fracture the sternum or fracture and/or dislocate ribs, and while chest compression used for the adult involves considerably greater force that what is expected for a neonate, guidelines recommend that the infant be placed supine on a hard surface and the chest is compressed three times followed by a '*rescue breath*', involving approximately 100 compressions and 30 breaths per minute. The compressions are to a depth of 4 cm, or approximately one third of the infant chest thickness. (13, 14, 15)

Figure 1: demonstration of neonatal resuscitation, where the initial contact on the sternum is shown followed by an indication of the depth of each chest compression.

This procedure can be viewed on the video link: https://www.youtube.com/watch?v=mItAnx0vgcM. The authors are unaware if this procedure was employed and to what extent, but this component would be the normal neonatal resuscitation procedure and was in all probability utilised with this infant. If so, the chest compressions may have contributed to a biomechanical injury to the mid-thoracic spine of the child.

Case Report

History

Both parents brought their 4 day old female infant to the chiropractic clinic suffering from prolonged periods of inconsolable crying, difficult sleep patterns and feeding. The crying went for most of the day and all night from 9pm-5am and the crying was accompanied by continuous frequent night feeds and regurgitation of food with wind and bloating. The birth weight was within normal limits.

The infant health community care nurse had told the parents their child was suffering from colic and that the infant's crying was very abnormal. The parents confirmed that the birth process was induced, difficult and protracted, requiring vacuum suction assistance. The second stage of delivery was described by the mother as extremely painful and stressful. A few minutes after the birth, the infant stopped breathing. The parents advised that full emergency resuscitation procedures were applied. Once breathing and heart rate returned to acceptable parameters, the infant was carefully monitored in an observation section of the ward for 1-2 hours. A day later, mother and baby were discharged without a re-assessment appointment. The baby was re-assessed at home by the community nurse.

Examination

The examination of the newborn must commence with a detailed assessment of the baby's delivery, the baby's physiology, the mothers experience and perception of both of these, and the environment surrounding the infant.

In consideration of the presenting symptoms and history, the following initial considerations were incorporated into the examination:

- Occipital plate damage and cranial dysfunction
- Upper cervical biomechanical joint dysfunction (BMJD) with related change in nervous system tone
- Undiscovered birth trauma pathology i.e. clavicle or humeral fracture, humeral dislocation
- Any form of meningococcal presentation
- Gut motility problems including food sensitivity and gastrointestinal disease.

Each of the above conditions was ruled out by the practitioner. Initial physical examination involved a check for musculoskeletal injury, primitive reflex testing and observation of muscle tone and physical appearance. This examination confirmed the following:

- all primitive reflexes present
- good extremity muscle tone, but slightly decreased trunk muscle tone
- cranial nerve exam; no abnormality discovered NAD
- no visual aversion to light
- tongue tie check NAD
- mouth/palate NAD
- all extremity joints and long bones NAD-including clavicles and humeral heads
- all skin folds NAD
- no skin rashes or abrasions
- no signs of systemic illness
- normal skin colour and oxygenation
- no face, neck or head lesions
- no signs of cerebral irritability
- no obvious signs of hip dysplasia
- respiration even and non-laboured

Gonstead and Davies infant protocols were employed in the chiropractic examination of this infant (16, 17, 18, 19). Skin temperature differential analysis (nervoscope) was not utilised with the examination as the infant was too restless.

The case history confirmed that the infant had experienced a difficult delivery where vacuum suction was required to assist with restitution and expulsion as the shoulders created a degree of restriction. It was also likely that the patient had also received chest compressions as part of the standard resuscitation procedure. Most types of birthing trauma generally impact the upper cervical spine, and occasionally the sacroiliac joints of the pelvis, so the initial examination looked to these areas.

Cautious motion palpation of the cervical and sacroiliac joints revealed that biomechanical function in the cervical spine and sacroiliac joints were all deemed to be within normal limits. Given the resuscitation, the possible reduced muscle trunk tone and the clinician's previous nursing experience with the possible impacts of resuscitation, the thoracic spine was then carefully examined, both with static and motion palpation.

It quickly became apparent that the infant was noticeably sensitive in the mid-thoracic spine, particularly at the T5/T6 levels. This articulation was motion palpated and it clearly presented with reduced flexion/extension range of mobility (ROM) as compared to the segmental joints above and below this level. A general increase in extension ROM was noted in the rest of the thoracic and lumbar spine Significant swelling and oedema was noted around the T5/T6 level and particularly very strong palpable oedema at the right superior lateral aspect of the T5 spinous. Right paraspinal muscle guarding focused at T5/T6 but extending from T4 to T7 was noted. Skin colour changes and blanching around T5 and extra vascularity with vasodilation and heat of the right lateral margin of T4 to T6 were observed.

Differential chiropractic diagnosis

Segmental biomechanical spinal dysfunction of T5 in relation to T6. Possible gut motility problem, especially potential enteric causation of pain. No significant signs of abdominal pathology but referral to the child care nurse or medical doctor for further assessment would be recommended if results of treatment were unsatisfactory.

The practitioner and authors are fully aware of the rudimentary formation of all the components of the vertebral segments and ribs in the mid-thoracic spine, but these segments are sufficiently formed to both suffer a specific biomechanical injury from either the compressive forces of the birth or the chest compression that extends one third into the chest cavity. On this basis, the practitioner deemed it acceptable to deliver careful corrective thrust where the contact considered the extent of neonate spinal development.

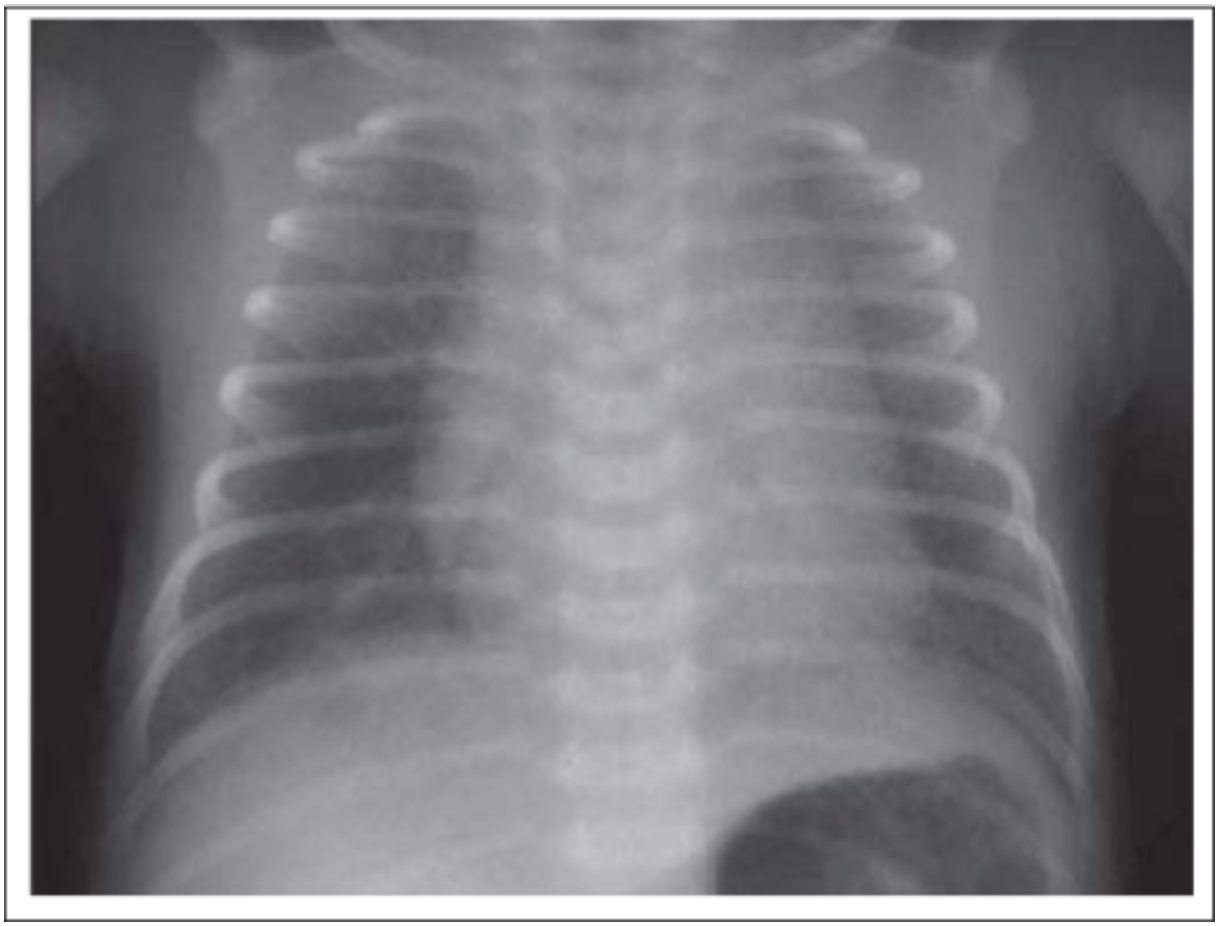
The neonate x-ray (Figure 2) is not of this particular patient as it not usual to acquire a film at such a young age, but is provided to demonstrate the extent of the basic structure that would exist in this patient. Ossification begins in the vertebral arches at eight weeks gestation. At birth, ossification of the centrum (embryologic vertebral body) and neural arch is complete to the extent of the lateral margins of the future spinous processes before the child is born. (23, 24)

Chiropractic treatment

In this case the practitioner initially adopted the standard prone adjustment setup for a newborn, but given the restlessness of the child, this was achieved with the patient placed over the thighs of the parent as described by Plaugher, Andrig, Herbst and Davies. (16, 17, 18, 19)

Very early in the correction preparation, the practitioner sensed the need to use a modified set-up in order to more appropriately control positioning to address the specific nature of the mechanical dysfunction and adapt the adjustment to the physiology of the patient. Instead of placing the newborn across the thighs of the parents or prone on the pelvic bench, the practitioner elected placement of the newborn across his own thighs.

Figure 2: chest x-ray of a neonate. Note the formation of the each basic thoracic segment and extent of the intervertebral disc structure between the vertebrae.



Ten years prior to this presentation, the practitioner needed to develop a slight modification to the standard protocol he followed in having the child lie across the parent's lap to establish more suitable way to correct the mid thoracic spine of a very distressed and frantic infant. The practitioner utilised a slight modification of the paediatric prone adjustment with this earlier patient with excellent results and has from time to time needed to employ this modification with other infants.

In this case, the infant was in significant discomfort from spinal dysfunction and attempts to lay him over his mother's lap was not providing adequate stabilisation for the patient and it was causing considerable distress to the parent. However, after resting the baby on his knee, the practitioner gently settled the patient in to the adjusting position. In this position, the practitioner was better equipped to fully control the positioning of the infant and accurately gauge the amount of spinal extension to overcome the gross mobility of the thoracic spine to a point of mild resistance. In this way, the adjustment was delivered in a very comfortable manner for the infant and the practitioner was able to control all aspects of the depth of the corrective setting.

The adapted baby adjusting posture is deemed to be indicated when the infant is very distressed, irritable, aggravated by their symptoms, moving unpredictably, experiencing a lot of pain at the site of the vertebral motion segment dysfunction. These presentations are common when babies have been dropped or involved in various traumatic events, including delivery.

Spinal adjustment variation

A Chiropractic adjustment is performed very specifically to each patient. To achieve the right adjustment every aspect of the correction has to be precisely married to every circumstance. This can only be judged by the individual practitioner when the hand is contacting the segment and relative to the practitioners experience. It is not simply a matter of being on the right bone with the technically correct contact. The optimum correction is about vectors, degrees and millimetres of amplitude. The exact line of correction and depth of correction comes from the feedback from the sensations coming back in to the fingers of the experienced adjuster. There is an optimal depth, detection and force of the correction which is all patient response dependent. If these factors are incorrect, the adjustment will be incomplete or ineffective, and the process will need to be repeated at the same visit or a subsequent visit. With neonates, it is particularly preferable to achieve a optimum correction with the minimum number of adjustments.

When spinal adjustments are made with the vertebra in the neutral position, the ideal depth of correction would include a specific amount of pre load followed by sufficient force and depth of a gentle thrust to overcome the inertia of the fixation while keeping within the normal physiological range of motion of the vertebral segment.

One of the main considerations with spinal adjusting is to achieve optimal stabilisation of the patient, the dysfunctional or subluxated vertebra, the adjacent functional vertebra and the spine generally. Subluxation is a term used by the Chiropractic profession describing a situation in the spine where a kinesiologic dysfunction is associated with some form of neurologic involvement.

Adjusting the neonate across the practitioner's thighs provides support to the pelvis and lumbar spine of the patient on one thigh of the adjuster, and the thorax and upper body of the patient on the other thigh. The practitioner's thighs are able to be subtly modified in position through any vector to support the patient optimally using feedback from the patient's body tone, posture, motion and pain indicators.

The benefit is the interactive nature of modifying patient position with feedback from the adjuster, while palpating the relevant components of the subluxation and assessing the optimal line of correction. The foundation of support is assisting with subtle cues and palpatory information derived from the contact fingers and providing a custom made stable base for the adjustment while assisting the correct line of correction.

Line of drive is assisted by this adjusting position in that the forearm of the adjusting finger lies naturally in line with the patient's spine. The forearm and digit angle of the adjuster therefore is naturally positioned in an optimal biomechanical position to correct the vertebra in the plane line of the disc. The forearm angle can also be altered very easily within any practitioner's comfortable range of motion because of the biomechanical advantage.

Depth of correction or force is also managed by this adjusting position. With the practitioner seated and only the one or two fingers primarily contacting the vertebra at the spinous process. Although the second finger used for this patients contact and setting was primarily stabilising positioning and helping to reduce tissue slack. The practitioner's full mass is not directly over the patient, only the weigh and mass of the adjusting forearm.

While it is possible for the force and depth of the adjustment to be controlled with adjusting postures where the baby is over the parents thighs, the practitioner is typically standing over the patient and must take careful steps to control his/her own total body mass when applying pre-tension and delivering the final thrust.

Control of extraneous patient movement can be achieved a variety of ways with the practitioners stabilising hand, in line with the patients needs. The stabilising hand can be

placed under the belly of the patient if abdominal counter stabilisation is required. The hand can be placed flat superior to the adjusting hand to stabilise the superior functional segments and rib cage, and check the extension caused from the thrust. It can also be placed closer to the vertebra being adjusted and used for the duel function of limiting the effects of extension above the contact when there is more extension than usual from the adjustment set up. This approach can also assist with the control of extra tissue above the dysfunctional vertebra in order to maintain a specific contact. If necessary, a parent or Chiropractic Assistant can provide any additional support or stabilisation.

Modified adjusting contact and thrust

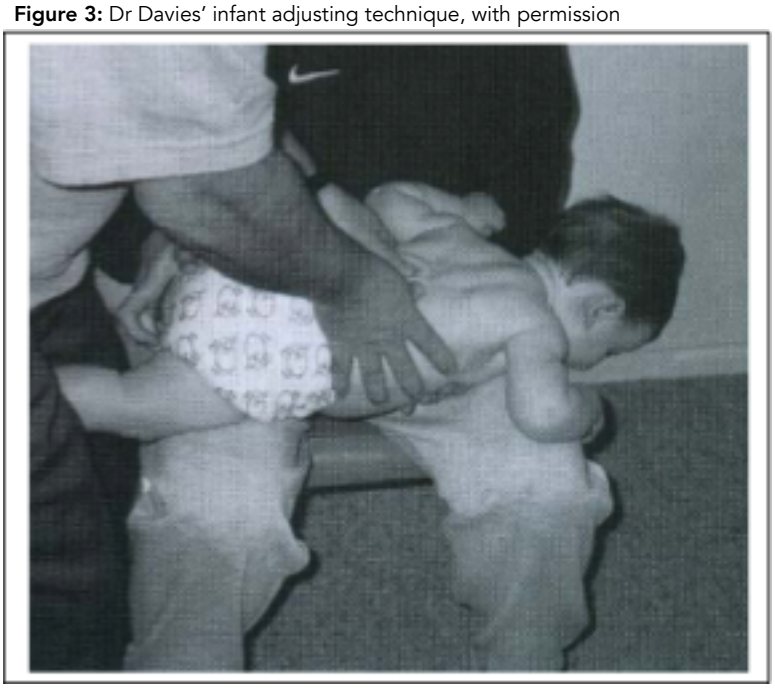
The initial contact on the vertebra was taken very specifically before the patient was fully positioned into the adjusting position. Tissue pull and pre-tensioning are vital components of the set up when adjusting a baby or younger spine and occurs in the direction of the thrust. The amount of tissue that was required to be contacted is determined through palpation. The aim was to take the most specific contact on the spinous process, and maintain the contact with the assistance of the second adjacent finger.

Pre-tension is also vital especially in a baby with a very flexible spine. Pre-tension is a subtle and controlled contact with the vertebra that assists the vertebra towards its neutral position and prevents the need for extra force to reach the end range of the correction. Pre-tension, (described by some as extension), is usually greater in the paediatric spine due to its flexibility but decreases the amount of force and amplitude required to make the adjustment.

The stabilisation via the superior, (left), hand was extremely important in this case. It was not passive in that it must actively follow the spinal changes in the set up, in order to palpate the precise moment that the adjusting finger will set the vertebra and the stabilisation also had to actively support the superior spinal segments.

The superior hand is not part of the adjustment thrust and does not have any contact with the vertebra being adjusted. What may look like a two handed, heavy, general contact is actually only one finger making a very specific shallow correction at the end of pre tension to overcome inertia and minimise force. The force being roughly that which a person could tolerate on their closed eye-ball.

Figure 3: Dr Davies' infant adjusting technique, with permission



Before the actual correction takes place, the thighs of the adjuster were used in concert with the adjusting and stabilising hands to assist the patient with the exact amount of extension, tissue pull, pretension and patient relaxation to bring the vertebra into a neutral position and slightly open the anterior disc joint space to allow the correction. Because the line of correction is directed through the disc plane, it is important that only the right amount of extension exists at the site of correction. The dysfunctional spinal segment was corrected over the relevant thigh to support the vertebra and the functional segments. The degree of extension and patient setup is similar to that demonstrated by chiropractic paediatrician, Dr Neil Davies, although the authors are critical of the practitioner position shown in Figure 3 for the reasons explained above relating to control of thrusting force.

Generally a two to three second set and hold of the vertebra would be employed to maximise the effect on the neural components of the tissues. This infant was very flexible but there was a large fixation component to the vertebral segmental dysfunction. It was therefore deemed to be more appropriate by the practitioner to back off the end point of the adjustment earlier and control the deceleration phase of the adjustment.

The primary consideration in the correction is to avoid recoil. When '*set and hold*' is not beneficial to the patient due to the nature of their spinal pathology, careful deceleration at the end of correction can be achieved by slightly altering the thigh posture of the adjuster at the level of the adjustment as the end of the correction is achieved. At this moment an observer would witness body movement in the baby that would seem to exacerbate extension but the specific vertebral level of the adjustment is stabilised. Further, all of the infant's body movement in the first moments post correction occurs well within the normal range of lumbar and thoracic spine extension. Again, this motion is part of the controlled deceleration designed for the patients comfort so that post thrust movement can dissipate throughout the whole system. The unsatisfactory alternative would be to drive a concentrated force into a susceptible vertebral motion segment without respect for the already sprained supporting soft tissues and the effected neural components of the body system.

The specific set up, including the adjustment contact, the posturing of the dysfunctional vertebra to a neutral position without stress or discomfort to the patient. Concomitant relaxation of all associated joint soft tissue structures plus palpatory evidence that the anterior joint space of the affected disc is sufficiently open at the exact point where the correction can be made is critical. These factors, combined with total body relaxation is vital for the patient to benefit for the described technique. All of the above information perceived through the practitioners contact hand, stabilisation methods and any other physical contact that is utilised with the patient, (including the practitioner's thighs in this case), that determines if the correction can be made.

If any aspect of these factors cannot be achieved between the practitioner and the patient then no thrust or setting should proceed. If the adjusting position for any patient is not optimally achieved before the actual adjustment then a different adjusting option will have to be considered.

Specific patient case

Previous analysis determined that the most appropriate contact for this patient's spinal correction was the most superior aspect of the right posterior margin of the T5 spinous process with the distal end of the right middle digit. This would represent 95% of the adjustment contact setting.

The other 5% of contact was by the finger pad of the right index finger lateral to the T5 spinous process. This second digit is adducted to squeeze up to the posterior lateral aspect of the

T5 spinous process as a support for the spinous process contact of the middle finger, or adjusting digit.

This contact was a very slight adaptation of the one finger spinous contact that is more commonly taught for neonates but the practitioner felt that this more specific positioning of the right middle finger pad in this circumstance would be more specifically directed to the primary fixation component of this baby's vertebral motion segment dysfunction. The practitioner deemed that this slight but calculated adaptation was safer and more beneficial to this particular patient, especially given that the patient was prone to irritability and unpredictable movement.

Figure 4: actual adjusting contact, one finger contacting the spinous, the other stabilising

First correction

With both parents' consent, the first adjustment delivered to their infant child was a very gentle and specific adjustment that required an uncommon amount of extension to overcome the general hypermobility of this part of the infant's spine. It liberated a soft audible. The reader should not rely on recorded representations of any cavitation associated with spinal correction as these can be enhanced or distorted. The cavitation in this case was a soft muted sound indicating the successful correction of the fixation of the sprain/strain of the T5/6 vertebral motion segment. An important factor in this adjustment was the practitioner assessed the patient's ability to accept the adjustment by paying special attention to the patient's postural response to the set up.

As the dysfunctional vertebra was assisted into the correct line of correction, extension was introduced at the level of T5 in relation to T6. What was surprising given the general distress and restlessness is that once some pre-tensioning pressure was applied, the patient completely relaxed, almost as though this infant sensed benefit. The authors note the notion both inside and outside of health care that children cannot consent to care but the authors point out that people of all ages either consent or not based on their physiological reactions and willingness to relax and comply. Without this physiological consent it is difficult to proceed and make treatment comfortable for the patient.

The infant was relaxed after the correction and a further appointment was scheduled in a week.

Figure 5: the actual adjusting thrust on the first correction

Second visit

The reassessment of this patient occurred one week later. No adjustment was given on the second visit. All objective components of the subluxation were absent or healing and the infant's symptoms had improved dramatically. A future appointment was scheduled for two weeks later (unless a relapse occurred) to check on the healing progress and general health of the infant. The parents cancelled this appointment because they were very happy with the health and progress of their baby.

Third visit

The third visit occurred four and one half months later. The parents made that appointment because the infant had again become slightly unsettled at night but nothing like her original presentation. They also felt that they may have perceived a slight raise in body temperature of the infant. They had already been to the Medical Doctor for assessment.

On this visit, there was a small nervoscope break at T5/6 disc level. In addition there was a very slight return of muscle guarding and hyperaemia to the right of the T5/6 vertebral motion segment. A very slight fixation of T5 in flexion and extension range of motion was noted. The fixation component of this vertebral segmental dysfunction was very minor compared to the initial presentation.

The practitioner explained to the parents that their child required another adjustment and they consented. This correction was so minimal in depth that it did not require a thrust. The practitioner had confirmed by palpation that the adjustment could occur in a more neutral position. The patient was across the practitioners lap as with the first correction except that it involved much more neutral positioning because the patient was now able to lay comfortably prone.

This correction involved a contact with the end digit of the right index finger at the inferior posterior margin of the T5 spinous process with tissue then raised so that the contact had raised up to the most superior margin of the T5 spinous process, immediately below the inferior margin of the T4 spinous process. Slight pre-tension was applied to direct the T5 vertebra into a neutral position and to open the anterior disc space between T5 and T6. A gentle thrust was delivered

and the T5 vertebra moved very slightly and specifically. There was the smallest palpable clean shift of the vertebra without an audible sound. Palpation confirmed correction of the fixation.

The corrective thrust held the end position of the setting for 2-3 seconds and then the contact was slowly released. There was almost no extension to the spine on this occasion and the baby did not cry or display any signs of stress. The mother said "Is that it? Did you do it?" The practitioner told the parents "That's all that she needs now". The patient has not suffered from colic since this day.

Discussion

The assessment and corrective methodology has been fully described, and resolution of the presenting complaint was achieved with minimal treatment, cost and with no harm to the patient.

We are unable to specifically assign any particular circumstance or injury that contributed to this child's complaint, although it was clearly a biomechanical insult to the T5 vertebra that was sufficient to create joint dysfunction at the T5/T6 disc level. This may have created specific discogenic pain around the region of the injury due to proprioceptor or nociceptor responses to the associated articular inflammation. Such discomfort would obviously distress a child.

As described, colic is a rather vague diagnosis, that largely presents as significant patient discomfort and distress. The symptoms point to a biomechanical problem of the spine, but given the gastric complications, it may also relate to a disturbance to the T5 spinal nerves that pass through the celiac plexus via the Greater Splanchnic nerves providing the autonomic nerve supply (sympathetic) to the stomach. This nerve arises from the T5 to T9 vertebral levels. The colic may have related to a neurological disturbance to the T5 nerve which then created a functional imbalance in the stomach, such as hypo-acidity, which may in turn contributed to the regurgitation of food with wind and bloating.

Conclusion

There are many references that link chiropractic care with improvement in the symptoms of colic, including inconsolable crying, sleep and eating disorders. This case study presents another example of this positive response to chiropractic care, while orthodox medicine refutes the value of chiropractic simply because of a lack of what they regard as acceptable medical evidence. What is clear is the coincidental improvement in the infant's health immediately following a specific spinal correction, which then reduces family stress and improves the parent's wellbeing. This case study is empirical evidence, which is defined as information acquired by observation or experimentation.

The authors make no criticism of the medical staff associated with the birth of this child, but unfortunately their procedures probably contributed to an injury to this child's spine. When given the opportunity to resolve the problems associated with severe colic, medicine was both unable to offer any assistance and yet political medicine continues to denigrate the efforts and success of the alternative approaches that has on this occasion initiated rapid recovery for the condition.

The authors wonder why the medical profession does not appear interested in either investigating the basis of such positive results with colic or referring patients suffering from this condition to registered health practitioners with such an enviable safety record that obviously may be able to help.

The CARE Guidelines for the presentation of a case study were applied to this paper.

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Informed consent to chiropractic care, signed by the patient's parent, is held by the *Journal*.
Signed parental consent to the publication of this case is held by the *Journal*.

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