The chiropractor's role in the interdisciplinary care of the infant with faltering growth: two case reports

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ABSTRACT

Background: this case report identifies chiropractic care as one component in the diversified approach to faltering growth in the infant. **Methods:** A literature search was conducted in October 2017 using the journal databases PubMed, Medline, Cochrane Library, Index to chiropractic literature, CINAHL and the AECC library.
Case presentations: Two infants presented separately for care, having not been able to regain their birthweight at three and eight weeks of age, respectively. **Intervention and outcomes:** The chiropractic approach was used to address the biomechanical and musculoskeletal problems in the infants. Other professionals were consulted for other aspects of their care. **Discussion:** An interdisciplinary team approach was needed to address all of the issues of the faltering growth. Chiropractic care was key to improve the baby's use of muscles of mastication and to allow for comfort in supine sleep.

Key Words: pediatrics, faltering growth, failure to thrive, chiropractic, case series.

Introduction

Faltering growth, previously termed failure to thrive, has been defined as a slower rate of weight gain in infants and young children than expected for age and sex.[1] Clinically, concern of faltering growth should be raised when infants with a birthweight below the 9th centile on the UK-WHO growth charts[2,3] fall across 1 or more centiles, when infants with a birthweight between the 9th and 91st centiles fall across 2 or more weight centiles, when infants with a birthweight above the 91st centile fall across 3 of more weight centiles, or when weight is below the 2nd centile for age regardless of the birthweight.[1]

Faltering growth may be caused by organic disease such as celiac disease, urinary tract infection, renal failure and cardiac abnormalities. Organic disease, however, only constitutes a small percentage of infants with faltering growth and is unlikely in an asymptomatic infant who appears well on examination.[1,4,5]

Previously, it was thought that faltering growth was strongly related to deprivation. This theory has recently been challenged by several studies concluding there is no association between faltering growth and social economic factors such as parental occupation, education, maternal eating restraint and alcohol consumption during pregnancy.[6,7,8]

Researchers have attempted to identify risk factors for faltering growth, but evidence is often either inconsistent or of low quality. Prematurity and neurodevelopmental concerns are likely to be related to faltering growth and infants who are small for their gestational age are at risk of persistent small stature.[9,10,11] There is inconsistent evidence for the association of postnatal maternal depression or anxiety with faltering growth.[8,9,12] Moreover, faltering growth may be related to feeding difficulties, including weak sucking, slow feeding, consumption of small quantities of milk, refusal of breastmilk and abnormal appetite.[7,10,13,14,15]

Due to the often unknown etiology, faltering growth has been perceived as a disturbing phenomenon by many clinicians concerned with the pediatric population. To provide an example of how such cases can be managed and which role the chiropractor may occupy within this management, two cases of infants with faltering growth receiving chiropractic care are presented.

Methods

A literature search was conducted in October 2017 using the electronic journal databases PubMed, Medline, Cochrane Library, Index to chiropractic literature, CINAHL and the AECC library. The keywords used in this search were infant growth, failure to thrive, weight faltering, non-organic failure to thrive individually and combined with chiropractic and breastfeeding dysfunction.

CASE PRESENTATION 1 — INFANT J

A 3-week-old male presented to a multidisciplinary midwifery and chiropractic feeding clinic as a result of difficulty breastfeeding, severe maternal breast soreness and slow

weight gain. Breastfeeding was particularly difficult on the left side. A feed would take 45 minutes or longer with a frequency of every two hours in the day and three times during the night. At night he would often stay awake for an hour after feeding. Sleeping supine was problematic and co-sleeping in side lying position occurred therefore most of the time. Moreover being in the car seat would upset him, resulting in continuous crying until arrival. At presentation, the infant had not regained birthweight yet. He had weighed 3,190 grams at birth and was at 2,900 grams at presentation. The mother was determined to continue breastfeeding due to a family history of allergy and eczema.

History and clinical findings

The infant was born by an emergency caesarean section at 38+4 weeks as a result of obstetric cholestasis. Skin-to-skin occurred within an hour and the infant successfully latched onto the breast. Post-surgery antibiotics were administered to the mother for one week. Family history consisted of maternal bicuspid aortic valve, eczema and allergy. Fenugreek and Domperidone were used to increase milk supply.

Midwifery breastfeeding examination showed severe erythema and blistering of the maternal nipples with painful latch. There was occasional clicking and the baby tired very quickly while feeding. The infant repetitively threw his head back without releasing the nipple during feeding causing maternal discomfort.

Hypertonicity of the masseter, temporalis, and suprahyoid muscles and musculoskeletal tension of the upper cervical spine and mid-thoracic spine were found. Digastric activation was insufficient and reduced during breastfeeding compared to during the suck reflex. The palate appeared narrow. A diagnosis of mild musculoskeletal imbalances of the spine and jaw was made.

A tongue tie was detected and was sent for frenotomy within the same week.

On examination the infant was alert, with more than six wet and dirty nappies and no signs of dehydration. Vital signs and primitive reflexes were age appropriate and within normal limits. The remainder of the examination was unremarkable and included posture, cranial nerves, deep tendon reflexes, and muscle tone.

Interventions and outcomes

A few days after presentation, the infant's mother appeared to have breast candidiasis and was treated with anti-fungal medication for one week. Within the same week, congenital heart conditions were excluded by performing an ultrasound scan of the infant's heart.

After breastfeeding examination at presentation, it was advised to see a lactation consultant for additional advice. The lactation consultant suggested the use of the flipple technique (also known as the extended or exaggerated latch technique, where the mother basically indents her thumb into the top of her breast to flick the nipple up before latching baby on) and saddle positioning (also known as straddle or koala hold).[16]

Informed consent was provided by the parents before chiropractic treatment was started. The chiropractic treatment given consisted of low force, low speed pediatric manual therapy (touch and hold) of the first rib and various regions of the spine, in particular the cervical spine. Gentle soft tissue therapy was used to release the suprahyoid, paraspinal and upper trapezius muscles. The occiput was treated using gentle pediatric occipital cranial techniques. No adverse reactions to care were observed by the chiropractor or reported by the parents during or after the course of care.

In the first four weeks of care, breastfeeding and night sleep were slightly improving. Maternal nipple pain reduced and became more manageable. The initial promising weight gain, however reduced and when the infant started to lose weight it was decided to advise on a 24 hours addition of a high calorie formula supplementation (150 ml a day) at 7 weeks of age, which was continued afterwards. Donor breast milk was considered, but was not available.

Weight gain slowly started to improve. The lactation consultant advised to reduce supplementation to 75 ml, while the infant dietician advised to increase supplementation to 200 ml a day. The infant's mother decided to implement the latter at 9 weeks of age.

By 13 weeks of age, fist sucking was noted in between feeds. Moreover, it was always the mother who would end a feed and if she would not, a feed could take up to 2.5 hours. It was therefore decided a further top up of formula (240 ml) was appropriate. Soon after the formula top up, a change of the infant's defecation was noted. Its normal mustard colour changed in to a green/grey colour. The consistency became more viscous and the infant was getting significantly more wind. Both GP and mother were concerned about the disturbance of the infant's digestion by the high calorie formula, which was therefore exchanged for a typical formula and temporarily reduced to 180 ml twice a day. Defecation colour and consistency went back to normal and wind resolved. At 20 weeks it was suggested the mother would use her own judgment regarding any increase of formula depending on the infant's hunger. At discharge at 22 weeks of age, he was having 200 to 240 ml three or four times a day post breastfeeding without digestive upset.

Later we found out the infant's father, his brother and other

males in the paternal family were all slow to put on weight as children. It was suggested this might be an underlying reason for the infant's slow weight gain.

In addition to weight gain improvement, night and daytime sleeping, breastfeeding difficulties and positional comfort were improving progressively and continuously over the course of care. At discharge at 22 weeks, a feed would take 20 to 30 minutes and breastfeeding in cradle position could be resumed without any maternal discomfort or feeding difficulty. The infant was sleeping more hours in the day as well as being able to sleep supine through the night. Being in the car seat was no longer a problem The infant was developing well and could roll over, crawl, and bring his feet to his mouth at discharge. The health care team had felt confident about the baby's slow but steady weight gain from 14 weeks of age, but the mother had preferred to continue with weekly consultations until 22 weeks.

At 9 weeks of age a cyst was found on the infant's head. A referral for a check-up with a pediatrician was made. The pediatrician was seen at the age of 23 weeks and it was concluded the infant was healthy and thriving. No further review of the cyst was needed.

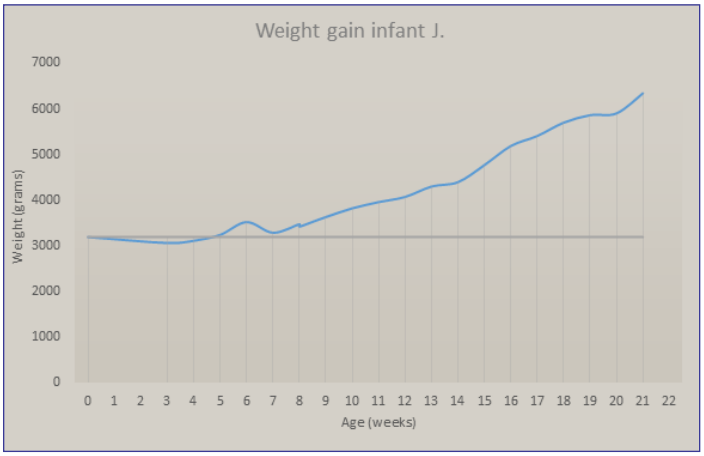

Figure 1. Weight gain of infant J. in grams over time (weeks). The grey line indicates the birth weight.

When the infant was 16 months of age, the mother was contacted for an update. The child was growing and developing well. The last time he was weighed, at 12 months of age, he was between the 75th and 91st centile of weight. At the moment of contact, the infant could walk and could say his first words. Breastfeeding was stopped at the age of 9.5 months due to maternal medical reasons.

CASE PRESENTATION 2- INFANT O

An eight-week-old, full-term female presented to a chiropractic clinic with irregular feeding habits, slow weight gain and discomfort lying supine. At presentation she had not returned to birth weight yet. During the day she would feed nearly continuously, with each feeding session taking between 40 and 90 minutes. Feeding was on the infant's demand. Breaks between feeding were very short and only rarely taking as long as 30 minutes. At night she would sleep, apart from a 60 to 90 minutes feeding session around 1am and 5 am.

History and clinical findings

Infant O. was born at 40+3 weeks with an emergency caesarean section after three failed rounds of prostin gel and a failed balloon pump intervention. There was direct skin-to-skin for a few minutes and the first feed was within an hour. At day three in hospital a loss of 8% of birth weight was noted and it was decided to supplement her breastfeeding with formula. Three days after initiating supplemental feeding, she started to have diarrhea and regurgitation. It was therefore suggested to change to a different formula supplement. The diarrhea and regurgitation, however, did not subside. At five weeks of age, the general practitioner was contacted, who prescribed a hydrolysed formula for milk intolerance. This formula, however, resulted in constipation and gagging and the parents therefore decided to return to exclusive breastfeeding.

The infant's mother was not extremely concerned about the slow weight gain, as the infant's older brother also gained weight very slowly in the first weeks of life. At the infant's brother's birth, a 2 liter maternal blood loss was suggested to explain his above 10% weight loss in his first days. His weight gain improved after supplementing breastfeeding with formula. He is now 5 years old and on the 75th centile for length.

The infant's 44 year-old mother presented with infection of the uterus after birth and was prescribed antibiotics (metronidazole) at week seven for one week. The medical history of her direct relatives included asthma and plaster rashes.

On examination of the infant, a heart shaped tongue, a tongue tie and a tight upper lip frenulum were found. The infant's suck was slightly disorganised with an early gag reflex. Both neck extension and mouth opening were insufficient during feeding. The pre-feeding and post-feeding weights were taken and showed a gain of 20 grams in the first 20 minutes and 35 grams in the 45 minute session. The mylohyoid muscle appeared to be inhibited and moderate musculoskeletal tension of the occiput, upper cervical spine, upper thoracic spine and sacroiliac joint was noted. The infant was therefore diagnosed with musculoskeletal imbalances due to inefficient and/or faulty feeding behavior. The infant was alert, active, with plenty of wet and dirty nappies and did not show any signs of dehydration. Vital signs, primitive reflexes,

and developmental screen were within normal limits for an eight-week-old infant. No abnormalities were found on the remainder of examination including posture, cranial nerves, deep tendon reflexes, muscle tone, and hip screen.

Interventions and outcomes

Over the course of 3 weeks, 4 treatments were given. These included visits in both the chiropractic clinic and a related multidisciplinary midwifery and chiropractic clinic. Informed consent was given by the parents before treatment was started. The upper cervical spine, upper thoracic spine and sacroiliac joints were treated with low force, low speed pediatric manual therapy (touch and hold). The muscles of mastication, in particular the palatoglossus and mylohyoid muscles, were treated with gentle intraoral soft tissue therapy in an effort to improve the infant's efficiency at the breast. The mother was advised to consider pumping after each breastfeed to make sure the infant's inefficient feeding would not lead to a decrease in the mother's milk supply. It was also suggested to discuss the use of galactagogue, Domperidone, with her general practitioner.

Midwifery examination of breastfeeding confirmed findings of insufficient mouth opening and cervical extension. Difficulty achieving a good latch was worse on the left breast. Advice was given on feeding positons such as rugby ball position[17] and biological nurturing.[18]

Domperidone was prescribed by the general practitioner and the mother began to take it when the infant was 9 weeks of age. Moreover, a referral was made to the pediatrician. At 10 weeks of age, the infant presented to the pediatrician who concluded she was healthy and thriving well.

Retained placental remnants were found to be the cause of the mother's infection of the uterus. The midwife suggested these placental remnants could have an effect on milk supply by inhibiting prolactin production. Shortly after discharge the mother underwent a procedure to eliminate these placental remnants.

During the 4-week course of chiropractic care of the infant, improvement was progressive and continuous. Musculoskeletal tension in the spinal areas and muscles of mastication was gradually released and the suck improved. The infant's mother reported breastfeeding to be much more comfortable and efficient. Towards the end of the course of care, there were longer gaps in between feeding sessions during the day, which enabled the infant's mother to do other activities besides feeding her daughter. Moreover, daytime sleep improved, from nearly none to approximately 7 hours a day. At night, the infant would also sleep longer, now only waking up once a night. The initial discomfort lying supine was completely resolved at discharge. The infant's mother also reported that the infant appeared more settled, although 'being unsettled' was not one of the initial reasons for seeking help. Weight gain slowly but steadily improved and birthweight was reached at nine weeks of age. No adverse reaction to chiropractic care was reported by the parents during the course of care. (FIG 2)

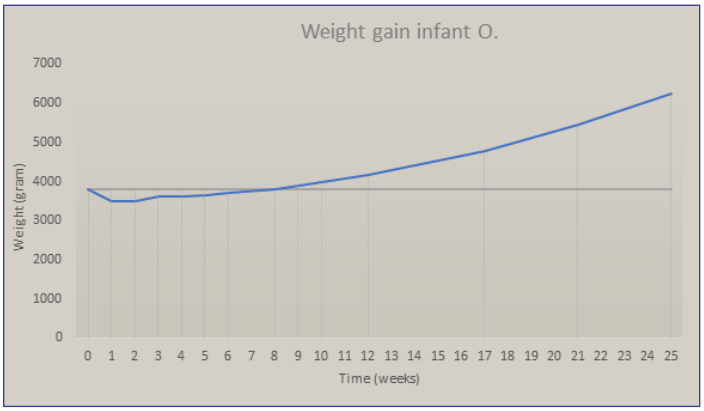

Figure 2. Weight gain of infant O. in grams over time (weeks). The grey line indicates the birth weight.

Fifteen weeks after discharge, the infant's mother was contacted and she wanted to return to the clinic for an update. In this period the infant has been exclusively breastfed without problems. Feeding was still on demand, however, on a much lower frequency then before. In the past eight weeks, an ascent from between the 0.4th and 2nd centile to being between the 9th and 25 centile of weight was seen. The infant was developing well and is now rolling from side to side, front to back and started putting her feet in her mouth.

Discussion

An interdisciplinary approach was used for these infants with faltering growth. Depending on the specific case, it may be helpful to involve a specialist such as a midwife, pediatric dietician, infant feeding specialist, pediatrician, social worker, or clinical psychologist.[5] Moreover, the infant's GP should be informed. A pediatrician should only be contacted if the infant presents with signs and symptoms suggesting organic pathology or in case of severe weight faltering.[1,5] (In the UK, a GP is part of the primary health care services directly accessible by the local community. A pediatrician is a secondary health care professional to who the GP will refer patients if more specialized healthcare is needed.)

If concerns present about faltering growth in an infant, a feeding assessment should be performed. Every effort should be made to continue breastfeeding for the health of the infant and mother. Clinicians should be aware that formula supplementation often leads to the cessation of breastfeeding. In case of supplementation, it is therefore important

to encourage continuation of breastfeeding. Mothers should be advised to feed the infant with the available breastmilk before providing any supplements and to express breastmilk to maintain and promote sufficient milk supply.[1]

Weight should be monitored and measurements should be taken at appropriate intervals depending on age and severity (Table 1). The clinician should be aware that weighing infants too frequently could increase parental anxiety regarding the faltering weight.[1]

Age	Frequency
<1 month	daily
1 to 6 months	weekly
6 to 12 months	fortnightly
>12 months	monthly

Table 1. NICE guidelines on weighing frequency in infants with faltering growth.

Both of the described cases met the criteria of faltering growth produced by the National Institute for Health and Clinical Excellence.[1] Infant J. was between the 75th and 91st centile at birth and dropped down five centiles, whereas infant O. was between the 9th and 25th centile and dropped 3 centiles. The specialists involved in the management of these cases include the chiropractor, midwife, GP, lactation consultant, pediatric dietician, tongue tie practitioner (a midwife and lactation consultant in the above case) and pediatrician. Etiological factors which may have played a role were hereditary slow weight gain and breastfeeding dysfunction for infant J. and hereditary slow weight gain, breastfeeding dysfunction and hormonal influence from placental remnants for infant O.

Although high quality evidence is sparse, chiropractic care may be helpful in breastfeeding difficulties, by resolving musculoskeletal tension and imbalances, particularly in the cervical spine and jaw.[19,20,21,22,23] Feeding difficulties may be an etiological factor causing faltering growth and this therefore creates a potential role for the chiropractor in the care of infants with faltering growth.[7,10,13,14,15]

Both cases show an improved weight gain and resolution of breastfeeding difficulty through multidisciplinary efforts and persistent, motivated mothers. These cases are an example of how chiropractic care can be part of an interdisciplinary approach to infants with faltering growth. Further observation and collection of data in a more rigorous study design may be warranted.

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