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The value of case reports

By Sharon A. Vallone, DC, FICCP

Once more, welcome to the second online edition of the *Journal of Clinical Chiropractic Pediatrics*. Our goal is to provide a forum for clinicians to follow current research and learn from shared clinical reports. We also hope this will encourage others to design and conduct research, publish their findings and clinical experiences to facilitate recognition of chiropractic protocols and the chiropractic adjustment as a viable option for both musculoskeletal and non musculoskeletal complaints for pregnant women and children.

We are grateful to the academic institutions, governmental and chiropractic organizations that support our researchers allowing them to conduct and publish research that adds to the foundation of evidence medicine. We are proud to be the journal of choice for some of those authors who feel that their information will reach the desired audience most involved with the care of the pregnant and pediatric patient.

Although many journals limit the number of case reports they publish so as to not reduce the public impact of the journal (the quality of a journal is often measured by the number of citations that result from any given publication¹), our goal is to support our field practitioners with case reports and case series as they may provide guidance in different aspects of patient care. This may include the components of taking a thorough history, the performance of a physical examination, description of advanced diagnostics employed, review of records, differential diagnosis, epigenetic factors, pharmacologic, psychosocial or socioeconomic influences on the chief presenting problems as well as chiropractic protocols and collaborative treatments, their effectiveness and reporting of possible adverse events and hypothesis of the mechanisms of the patient's complaint and their response to treatment (be the outcome positive or negative)².

Case reports are most easily undertaken by the field clinician who maintains complete and accurate records. Both remarkable and "unremarkable" cases need to be written and published because each can offer an intrinsic value ranging from orienting the new practitioner to the "daily traffic" of pediatric patients to supporting a practitioner who faces a more unusual presentation. Case reports that contain an extensive review of the relevant literature also serves as a springboard for the reader to readily access additional information pertinent to the case.

Case reports and case series have been deemed valuable in all of the healthcare professions for not only the purpose of educating the field clinician, but also in helping in research design and the formulation and ultimately, evaluation, of clinical guidelines. Internationally, there are organizations developing reporting guidelines to "facilitate greater transparency and completeness in the provision of the relevant information for individual cases."³

It behooves our profession to stay current with these guidelines and to write and publish in support of the chiropractic premise providing a firm foundation for generations of chiropractors and chiropractic patients to come. We invite you to participate!

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A survey of parent satisfaction with chiropractic care of the pediatric patient

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ABSTRACT

Introduction: Chiropractic is a common parental choice as a therapeutic intervention for numerous pediatric conditions. No studies investigating parent satisfaction with pediatric chiropractic care have been published to date. **Method:** All infants aged 0-36 weeks and presenting to a chiropractic teaching clinic on the south coast of England between January 2011 and October 2013 were eligible for inclusion. Parents completed questionnaires, which rated their own and their infant's characteristics prior to, and at the end of, a course of chiropractic care. Non-parametric tests were used to analyze before and after care scores. **Results:** A total of 395 results were collected in this study. Satisfaction scores of 10/10 ("completely satisfied") were reported by 75.1% (n=295) of the parents. There was a significant improvement in parental distress (*Median*=5.0 before care, *Median*=2.0 after care, $Z=-13.7$, $p<.001$, $r=-.49$) and infants' sleep quality (*Median*=5.0 before care, *Median*=3.0 after care, $Z=-10.5$, $p<.001$, $r=-.38$). Satisfaction scores were found to have a small correlation with sleep quality ($r_s=-.21$) after care, as well as a moderate correlation with distress ($r_s=-.31$) and improvement scores ($r_s=.42$), $p<.01$. **Conclusion:** The parents in this study appear to be satisfied with the care their infant received. However, the satisfaction scores and improvement scores are only moderately correlated, which indicates that there are other factors influencing the level of satisfaction.

MeSH terms: chiropractic, complementary therapies, infants, pediatrics

Key words: pediatric, satisfaction, parent, chiropractic, complementary alternative medicine

Introduction

Satisfaction with chiropractic care for pediatric patients is currently an unexplored area in the literature. Measuring outcomes of care is essential in evidence-based healthcare, and satisfaction is a key concept in assessing patients' perception of care. Studies of satisfaction can be useful in determining how well patients' hopes and expectations are met when they receive a form of treatment.^{1,2} There is substantial agreement in the literature about satisfaction measures being valid in assessing quality of care. They allow patients to express their personal evaluation of health care services and practitioners.³⁻⁷

The concept of satisfaction is difficult to grasp, and even harder to define. The literature does not provide one clear definition, but some general components can be identified. It is often an emotional or cognitive response; pertaining to a particular focus or goal.^{8,9} Satisfaction has been described as the fulfillment of expectations, needs, or desires.⁶ Ygge and Arnetz investigated parent satisfaction with hospital

care for the pediatric patient. They found that parents were most satisfied with staff attitudes, care processes, and medical treatment. Accessibility and staff work environment received the lowest satisfaction scores.¹⁰ It has been suggested that patient satisfaction is dependent on the patient feeling empowered, in control of one's life, and the establishment of an empathetic therapeutic relationship. Hope, communication, respect, and trust were the four main themes associated with the therapeutic relationship.¹² Good Communication stands out as a consistent determinant of overall satisfaction in several studies.^{1,6,11-16}

However, in the care of the pediatric patient, the patient has no say in the matter, only the parent or guardian. Hence, satisfaction may take on a unique character in this domain. We hypothesize that parents might be most satisfied with improvement in the child's condition. A survey was developed to test this theory, and investigate parental rating of satisfaction and other factors in patient care.

Method

A cohort of parents presenting their infant to a chiropractic teaching clinic, located on the south coast of England, were followed through the course of care for their infant. All infants between the age of one day up to 36 weeks who pre-

sented between January 2011 and October 2013 were eligible for inclusion if the parents had completed both pre- and post-treatment questionnaires. No further exclusion criteria were used. A total of 395 valid results were collected and analyzed for this study.

Data were collected using two, practitioner-administered, questionnaires. The first was done prior to initiation of care, and the second on the day of discharge. In the first questionnaire, parents were asked to rate their level of distress due to the infant’s behavior. These metrics were measured using a 10-point scale, with 1 being the most positive (e.g. not at all distressed) and 10 being the most negative response (e.g. extremely distressed). The parents were asked to indicate the numerical value that best represented their perception of the questions asked. On the day of discharge, the parents were asked the same questions using the same methods. In addition, they were asked to rate the degree of improvement in their infant’s condition, and their satisfaction with the care received. The scale ranged from 1 (not at all) to 10 (completely better). Data on age, gender, number of treatments, and time frame of treatment (in weeks) were also collected.

All statistical analyses were conducted in IBM SPSS Statistics 20.¹⁷ Measures of central tendency were calculated. Kolmogorov-Smirnov and Shapiro-Wilks tests were used to test the data for normality. Non-parametric tests were used as the data were not normally distributed, but also to account for the ordinal nature of the majority of the data. The Mann-Whitney *U* test was performed to assess for differences between two independent groups. Wilcoxon’s signed-rank test was used to compare scores before and after care. Spearman’s rank correlation coefficient (Spearman’s rho) was calculated to assess the relationship between variables. According to Cohen, a correlation coefficient of 0.1-0.3 is defined as small, moderate if 0.3-0.5, and high if greater than 0.5.¹⁸

The Anglo European College of Chiropractic (AECC) ethics panel approved the study, and data from all patients were anonymous.

Results

A summary of the sample characteristics can be found in Table 1. The sample consisted of 11.8% (n=47) more males than females. Mann-Whitney *U* tests were performed to assess for differences between genders, but no significant differences were detected. The main reasons for presenting to the clinic were “crying/colic” (41%), “difficulty feeding” (18.1%), and “check up” (12.7%). Reasons mentioned under “other” included: “birth trauma” (5.1%), “will not lie supine with comfort” (5.3%), “cannot turn head equally” (5.1%), “positional head deformity” (3.8%), “sleep” (3.6%), “axial

musculoskeletal” (2.5%), and “appendicular musculoskeletal” (3%).

Table 1. Characteristics of the pediatric population in the sample (N=395)

Characteristic	Count/mean	Range
Gender		
Male	221	(55.9%)
Female	174	(44.1%)
Reason for presenting		
Crying/colic	161	(41%)
Difficulty feeding	71	(18.1%)
Check-up	50	(12.7%)
Other	111	(28.2%)
Mean age (SD) in weeks*	6.7 (5.8)	0-32
Mean number of treatments (SD)*	4.7 (1.7)	1-16
Mean time frame for treatments (SD) in weeks*	3.0 (1.9)	1-14
<i>*Means with standard deviations in parentheses where specified. Counts with percentages in parentheses otherwise.</i>		

Participating parents were asked to rate their level of distress on a 1-10 scale, with 1 being “not at all” and 10 being “extremely distressed”, before and after care (Table 2). Distress scores of 5 and below were reported by 56.0% before care, and 92.6% after care. This was further investigated through a Wilcoxon signed-rank test, and there was a significant decrease in distress from before care (Median=5.0) to after care (Median=2.0), $Z=-13.7$, $p<.001$, $r =-.49$.

Sleep quality before and after care was assessed on a 1-10 scale, with 1 representing “sleeps deeply and restfully most of the time” and 10 representing “restless, difficult to settle or stay asleep or does not sleep deeply.” Scores of 5 or lower were reported by 50.6% before care, and 78.6% after care. Wilcoxon’s signed-rank test revealed a significant improvement in sleep scores from before care (Median=5.0) to after care (Median=3.0), $Z=-10.5$, $p<.001$, $r =-.38$.

The amount of over-all improvement was investigated through a 1-10 scale, where 1 represented “infant’s condition is worsened” and 10 represented “completely better.” The lowest score reported was 2, indicating “no change,” and 8.7% reported scores of 5 and lower. Scores from 8 to 10 (indicating good or total recovery) were reported by 69.1%. Parents were also asked to rate their level of satisfaction with the care on a scale from 1-10, with 1 being “not at all” and 10 being “completely satisfied.” Scores below 7 were reported by 1.3%, and a total of 75.1% responded that they were completely satisfied (Table 2).

All correlations between improvement, satisfaction, distress after care, and sleep quality after care were statistically significant at the .01 level (Table 3). The positive correlations indicate that high scores in one group are associated with high scores in the other group, and that low scores

quality after care (-.37), between improvement and distress after care (-.39), as well as between satisfaction and distress after care (-.31). Furthermore, a high positive correlation was revealed between distress after care and sleep quality after care (.53).

Table 2. Distribution of scores regarding distress, sleep quality, improvement, and satisfaction

Categories	Distress before care	Distress after care	Sleep quality before care	Sleep quality after care	Improvement	Satisfaction
Response	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1-3.5	150 (38.6)	303 (77.3)	114 (29.3)	214 (54.5)	8 (2)	1 (.3)
4-6.5	110 (28.3)	76 (19.4)	122 (31.4)	118 (30)	50 (12.8)	4 (1)
7-10	129 (33.2)	13 (3.3)	153 (39.3)	61 (15.5)	333 (85.2)	388 (98.7)
Total	389	392	389	393	391	393

**Distress and sleep quality: 1-3.5 = Good. 4-6.5 = Moderate. 7-10 = Poor.
Improvement and satisfaction: 1-3.5 = Poor. 4-6.5 = Moderate. 7-10 = Good.*

in one group are associated with low scores in the other group. The negative correlations, however, indicate that high scores in one group are associated with low scores in the other group. Distress and sleep quality scores are better the lower they are, whereas satisfaction and improvement scores are better the higher they are.

The Spearman's rho revealed a small negative correlation between satisfaction and sleep quality after care (-.21). A moderate positive correlation was found between satisfaction and improvement scores (.42). Moderate negative correlations were found between improvement and sleep

Discussion

The parents in this study reported high levels of satisfaction, and improvement of the presenting condition. Parents reported a decrease in their distress levels, and an improvement in the infant's sleep quality after an episode of care. For example, lower levels of parental distress correlate with higher parental satisfaction. Analysis of the data revealed a moderate positive correlation between satisfaction and improvement scores. A moderate negative correlation was found between satisfaction scores and parents' level of distress. Satisfaction and sleep quality after care demonstrated

Table 3. Correlation coefficients (Spearman's rho) between improvement, satisfaction, distress after care, and sleep quality after care

Spearman's rho	Improvement	Satisfaction	Distress after care	Sleep quality after care
Improvement				
Satisfaction	.416**			
Distress after care	-.389**	-.305**		
Sleep quality after care	-.366**	-.214**	.526**	

**** Correlation is significant at the 0.01 level(2-tailed).
The correlation coefficient was evaluated as small if 0.1-0.3, moderate if 0.3-0.5, and high if greater than 0.5.*

a small negative correlation. This is suggestive of high improvement scores, improved sleep quality, and lower levels of parental distress being associated with high levels of satisfaction (Table 4). However, these correlations were not strong enough to account for the high satisfaction levels reported in this study. This suggests that other factors, not investigated in this study must influence parent satisfaction. The literature suggests that satisfaction is a multidimensional concept, and thus other possible factors should be investigated. Suggestions of such factors include practitioner's communication skills and interpersonal manner, time spent with the patient, and time allowed for questions. In addition, sociodemographics and treatment cost could play a role.¹⁴⁻¹⁵ It should be noted that parents pay for care at this clinic, whereas medical care is free in the UK.

Table 4. Variables with high positive correlations with each other

High parent satisfaction and good infant sleep quality scores (after care)
Good improvement scores and improved parent distress (after care)
Good improvement scores and improved infant sleep quality scores (after care)
*High parental distress and poor infant sleep quality (before care)
*Low parental distress and good infant sleep quality (after care)
<i>*highest correlations</i>

According to Jackson et al., satisfaction levels obtained at the end of the treatment course provide more information on treatment success than those obtained early in the course of treatment.¹⁹ Satisfaction scores obtained early on are thought to provide an evaluation of factors such as the clinician, the clinic, and patient-practitioner interaction. Clinical outcome and satisfaction have been found to be positively linked.²⁰ However, a study by Williams et al. suggests that high satisfaction rates do not necessarily mean high quality of care; it could also be that no situations leading to dissatisfaction were encountered.²¹ It appears that while efficacious therapeutic techniques are important, other variables may have a greater impact on reported satisfaction. These include communication, practitioner's technical skills and interpersonal manner, time spent with practitioner, accessibility and availability of services, and the financial aspects through the course of treatment.^{8, 15, 19-21}

While satisfaction studies can be an effective tool in gathering patients' perceptions of health care environments, they are challenging to execute. Satisfaction is a multidimen-

sional concept, making it difficult to measure accurately.²² Satisfaction studies have been criticized for demonstrating a lack of standardization, low reliability, and uncertain validity of results due to generally high reported satisfaction levels and lack of variability in responses. This caused Haggerty to question whether satisfaction is a flawed way of evaluating practice performance.²³ It has been suggested that dissatisfaction might be a more valuable concept. Negative findings will give feedback of areas requiring improvement, and it is thought to give a greater understanding of what patients expect from their treatment.^{2, 6, 21}

The questionnaires utilized in this study were presented to the parents in the treatment room, and placed in the chart upon completion. Interviewer-administered questionnaires tend to yield responses in a socially desirable direction.²⁴ The parents might have felt embarrassed to give a low score, which may have resulted in unrealistically high satisfaction scores. The validity of a survey depends on subjects' honesty in their responses.²⁴ Additionally, some evidence suggests that non-responders tend to be less satisfied than responders.²⁵

An unknown number of pediatric patients seen at the clinic may never have been included in this study. There can be various reasons for this; their practitioner did not provide the questionnaire for completion, the parents were not willing to submit it, or the patient never returned to complete the care regime. One can only speculate if these outstanding responses, which leave an unfilled gap in the results, could be due to dissatisfaction regarding their experience. Handling paper questionnaires versus electronic is a time and resource consuming process. The data were entered manually, which is associated with data entry errors, although 10% were checked for accuracy. It also results in very slow feedback, thus delaying the actions on problems identified.²⁶

Although no studies have been published on the topic of parent satisfaction with chiropractic pediatric care, a pilot study was carried out at a private clinic in France in 2012. This was a much smaller study than the one carried out at the UK clinic, but the results were similar, showing high levels of satisfaction with care.²⁷

Conclusion

This study showed that parents generally were very satisfied with chiropractic care of their child. Correlations between high satisfaction and improvement of the infant's presenting complaint, improved sleep quality, and lower levels of parental distress were observed. As these correlations were not strong enough to account for the high satisfaction levels reported, additional research is needed to identify other factors influencing parent satisfaction with

pediatric chiropractic care.

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A case report of improved behavior and a reduction in violent outbreaks in a 10-year-old boy with chiropractic care

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ABSTRACT

Objective: To present a single case study in which a reduction in violent behavior with a 10-year old boy was achieved when the patient underwent chiropractic treatment. **Design:** A case report. **Setting:** Private chiropractic practice. **Subjects:** This case involved a 10-year-old male who presented with behavioral issues, including dramatic changes from a calm manner, to suddenly becoming violent. He was also reported to have difficulty sleeping due to emotional detachment disorder and frequently suffered from panic attacks. His mother also reported that he had difficulty noticing when he was sufficiently full following eating. His behavioral changes caused him to be suspended from school. Upper cervical, thoracic and lumbopelvic dysfunction were recorded in this case. **Methods:** The patient received diversified low-force chiropractic manipulation to the spinal areas noted, including toggle-recoil and drop piece technique. His changes were recorded through the Measure Yourself Medical Outcome Profile (MYMOP) questionnaires over the course of his treatment. Treatment was provided over a 4-week, twice weekly period, with a MYMOP questionnaire being filled out after his 3rd, 6th and 8th adjustment. **Results:** A reduction in a MYMOP score of 6/6 to 1.6/6 for behavior and violent outbreaks after 8 chiropractic adjustments. Further improvements were noticed with sleep and anxiety, as well as a dramatically improved awareness of feeling full after eating. **Discussion:** This case suggests a possible association between the development of spinal segmental dysfunction and consequential manifestation of behavioral disorders. It also highlights the use of the MYMOP questionnaire in cases outside of musculoskeletal pain syndromes, especially where evidence may be limited or where there may not be an existing tool to measure change.

Key words: chiropractic, pediatrics, behavior, violence, spinal manipulation.

Introduction

Previous research into the relationship between behavioral problems and chiropractic has focused on children diagnosed with behavioral disorders such as autism and ADHD. There appears to be no previous research amongst the literature that involves children that are yet to be diagnosed, or who have been shown not to be suffering from autism or ADHD, but still have behavioral problems. A search of *PubMed* and *Index to Chiropractic Literature (ICL)* was carried out using the keywords in various combinations: *chiropractic, pediatrics, behavior, violence, adhd and autism*. As of September 2014, there were no previous studies of any evidence level that were similar to this case.

In general, chiropractic research in pediatrics has been focused on the younger child, under 12 weeks of age, with most common presenting complaints being that of a musculoskeletal origin, and excessive crying¹. Even in this demographic, research was previously criticized as being weak, but further developments including a single blind pragmatic RTC on excessive crying helped bolster this evidence². Furthermore, there is an apparent dearth of clinical

trials related to chiropractic and pediatrics, with many existing studies being of low evidence³.

Karpouzis⁴ systematic review of chiropractic care for children with ADHD illustrated the lack of evidence in support of chiropractic care, with most of the studies used being of low evidence. However, the patient in this case report had not been diagnosed with ADHD or other conditions. It is therefore prudent to report on this case, where behavior and violent outbreaks improved, seeing as there seems to be no prior published articles that highlight this relationship.

Autism is characterized by severe and pervasive impairment in reciprocal socialization, qualitative impairment in communication, and repetitive or unusual behavior⁵. ADHD is then characterized by inappropriate, chronic levels of inattention, hyperactivity and impulsivity⁶. There is also an association with difficulties in academic achievement, and behavioral control, and as a consequence, they have difficulty in establishing positive relationships with family, authority figures and their peers⁶.

Currently pharmaceutical management is the mainstay of care for many children with ADHD⁴. Medication of youths has a common side effect of weight gain⁷, as in the following case, and may be a reason behind poor adherence to medication. There is growing research with regards to the use of non-pharmaceutical management of symptoms. 28.9% of youths with mental health disorders are reported to be using CAM therapy, compared to 11.6% of youths without mental health disorders⁸. Research also indicates that 10% of the US population use chiropractic care for non-musculoskeletal conditions and up to 14% of all visits is for pediatric care⁴.

It can be difficult to effectively measure change in patients presenting symptoms, especially when there are no standardised tests to measure change. Due to this, in the UK, The Royal College of Chiropractors recommend the Measure Yourself Medical Outcome Profile questionnaire (MYMOP)⁹. MYMOP measures patient-perceived changes in symptom severity, wellbeing and ability to undertake a key activity. These measures are combined to provide a 'profile' that is quantified before and at one or more intervals during a course of treatment.

A demonstration of positive change among patients through use of such a tool does not unequivocally prove the clinical effectiveness of the intervention, but it does show that important aspects of a patient's health status improve during the period they are receiving care⁹. Patients are invited to choose one symptom which they are most concerned about on a scale of 0-6, where 0 is a good as it can be, and 6 being as bad as it could be. They then choose an optional second symptom. This is then followed by an optional activity that the symptom affects, plus a rated general feeling of wellbeing question, again rated 0-6.

Case report

A 10-year old male patient presented to a chiropractic clinic with behavioral issues, including a change from a calm relaxed manner, to sudden outbreaks of violence. His mother reported that he suffered from frequent panic attacks and periods of anxiety. These behavioral issues affected his schooling, and he was suspended from several schools, and was only allowed to attend school for 50 minutes a day. Due to being suspended from schools, he had not started the "statementing process" and was not diagnosed with a specific condition.

The Local Education Authority carries out the Statementing Process in the UK. The Statement of Special Educational Needs is a legal document that sets out the learning and educational needs of an individual child. These are usually issued to children who find it significantly harder to learn than other children of the same age, through medical, com-

munication or behavioral problems and where the school is unable to meet the needs of the child through its own resources¹⁰.

The patient was previously diagnosed with Emotional Detachment Disorder, and was unable to sleep alone, and reported poor, unrefreshing sleep. His health history revealed a difficult birth, being born in an occiput posterior fetal position, which had to be corrected during labor. He suffered from several bouts of otitis media as a child, with three operations to fit grommets. The mother did not recall whether or not he was prescribed antibiotics for these bouts. His mother reported that he was often clumsy and had poor fine motor skills. His bowel habits were described as being variable, between bouts of constipation and diarrhea. His mother also explained that he had difficulty noticing when he was sufficiently full following eating. He had been medically prescribed Aripiprazole, which helped improve his behavior, but the side effects of increased weight gain caused him to stop taking this medication.

The patient appeared above average size for his age. Cervical, thoracic and lumbar active and passive ranges of motion were full, painless and unrestricted. Palpation of segmental motion revealed restriction of the upper cervical, mid thoracic and lumbar spinal segments, accompanied by significant tenderness of the left sub occipital muscles. Sensory, motor and reflex (SMR) neurological tests were unremarkable.

The patient's mother completed a MYMOP questionnaire, which is a validated patient-reported outcome measurement tool. It is helpful in identifying whether, from the patient's perspective, certain aspects of their health status change over time⁹.

On the initial consultation the mother highlighted the patient's violent behavior as being the symptom that concerned her the most, rating it as 6/6. Her second most important symptom was the patient's poor sleep, which again she rated as 6/6. Overall, she rated her son's overall health and sense of wellbeing as being 6/6. This gave a MYMOP 'profile' score of 6/6.

The patient was recommended a course of chiropractic care. The schedule included a twice-weekly schedule over a 4-week period. Chiropractic care consisted of diversified, Thompson drop technique and toggle-recoil adjustments, with gentle soft tissue therapy. His mother also completed a follow up MYMOP questionnaire after his 3rd, 6th and 8th adjustment.

The patient responded positively to his chiropractic adjustments, and by the 4th adjustment his MYMOP profile score

dropped to 4.6/6, then to 3.3/6 by the 7th adjustment and finally to 1.6/6 by the review stage of his care on the 9th visit. His mother reported that his violent behavior had decreased. Furthermore, when his outbursts did occur, it was easier and quicker to ease him out of the violent episodes. She also noted that his behavior was more settled, and noted that he was becoming generally more positive with his outlook. At this review stage she also mentioned that he was sleeping better and was able to sleep in his own bed, by himself. She also reported that since starting care, he had no panic attacks. In addition, she reported that he was more aware of when he was full following eating.

No adverse events were reported or noted as a result of chiropractic care. The patient was not receiving any other care at the time of the study.

Discussion

This was a unique case presentation of an improvement in violent behavior in a male child with chiropractic care. Previous studies have focused on children with medical diagnoses of conditions such as ADHD and autism. The search of the literature indicated no previous studies that have shown a similar link.

As stated in the introduction, children with mental health problems are using complementary medicine, including chiropractic care as a tool to improve their overall health. Studies have shown that 28.9% of children with mental health are using CAM⁸.

It is important that patients and families of those affected by mental health are aware of the alternative and complementary forms of treatment, which may improve their health and wellbeing. However, as this case indicated, the research that is being produced by chiropractors is either not being reported or not being published. Although case studies are low-level evidence they are useful in indicating possible responses to chiropractic care and provide details regarding many different aspects of a patient's medical situation, which is missed or undetected by clinical studies¹¹.

Traditional pharmaceutical treatment of behavioral problems may include prescription for Aripiprazole, such as in this case. Aripiprazole is an anti-psychotic medication, which commonly produces side effects, including weight gain in children⁷. Side effects such as these may result in a high non-compliance rate¹². Owing to this, chiropractic care may be an attractive alternative to family and patients concerned with side effects of medication, especially as chiropractic care with children has shown to be safe and effective¹³.

There is a large amount of research that represents patients' responses to musculoskeletal conditions. This is likely to

be due to the plethora of standardised outcome measures such as the Bournemouth Questionnaire. However, many conditions are hard to measure and quantify. The MYMOP questionnaire has been shown to be practical, reliable and sensitive to change¹⁴⁻³⁰. It is evident that questionnaires such as MYMOP allow us to quantify, in the patient's experience, the change that may have occurred through chiropractic care. This will then hopefully generate interest in the relationship between chiropractic care and behavioral changes, and then lead to future high-level studies.

Conclusion

This case report demonstrates that chiropractic spinal adjustments, the only treatment being rendered, were effective in improving the child's behavior. This study suggests that chiropractic care helped to reduce violent outbreaks as well as to improve the patient's sleep, with additional improvements to satiety and frequency of panic attacks. Chiropractic care may be an effective tool that children with behavioral and other mental health problems may be able to use to improve their health and wellbeing. This study has illustrated a dramatic improvement with chiropractic care, without any adverse reactions or side effects to care. In children who have reactions or side effects to medication for their behavior, chiropractic care can be a safe and effective alternative.

Current research highlights possible hypotheses that may explain the improvements noted in this study. One potential mechanism is that "altered afferent feedback from a vertebral subluxation alters the afferent milieu into which subsequent afferent feedback from the spine and limbs is received and processed, thus leading to altered sensorimotor integration of the afferent input, which is then normalised by high-velocity, low-amplitude adjustments"^{31, 32}. It is thought that if a vertebral subluxation creates neuroplastic changes in the central nervous system due to altered afferent input, its impact on the sensorimotor integrative system may have neurological manifestations far beyond the mechanical local site of the vertebral subluxation³².

A second hypothesis suggests that chiropractic care may improve brain function by increasing cerebral blood flow, resulting in a restoration of normal cerebral function^{33, 34}.

It is clear that further research needs to be carried out in order to assess the benefits of chiropractic care for children with behavioral problems. In addition, more research into the neurophysiology of spinal adjustments may help our understanding of why these changes occur.

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

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Resolution of non-synostotic plagiocephaly following chiropractic care: a case report

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ABSTRACT

Objective: To present the case of a 6-month-old child's functional outcomes with non-synostotic plagiocephaly resulting from infant torticollis with concomitant vertebral subluxations following chiropractic care. **Clinical Features:** A 6-month-old female presented with classic signs of a mild non-synostotic plagiocephaly and infant torticollis. Additional complaints included failure to latch and feed on the right breast, unsettled sleep patterns and regurgitation after breast-feeding. At the 3-month pediatrician checkup, all reflexes, growth and milestones were reported normal. **Interventions and Outcomes:** Diversified technique was utilized to address vertebral subluxation findings. Static and motion palpation revealed indicators of vertebral subluxation at C1, C3 and sacrum. Following the first adjustment to C1, immediate improvement of global and segmental range of motion was noted. No signs of patient irritability remained with passive motion. Instantaneous engagement in active head rotation to the less favored side was also observed following the adjustment. Sleeping regularity, lack of irritability and competently latching onto the right breast without regurgitation was reported upon the second visit. After 3 months, the patient and mother returned for the third visit. The resolution of non-synostotic plagiocephaly, infant torticollis and vertebral subluxations following chiropractic care was noted. **Conclusion:** This case study suggests that correction of vertebral subluxations in this child may have had a positive impact on her torticollis and deformational plagiocephaly. Further research is warranted to assess the outcomes of chiropractic intervention in patients with similar presentations, and to contrast against the efficacy and safety of current treatment methods.

Key words: chiropractic, cranial asymmetry, deformational plagiocephaly, flat head syndrome, non-synostotic plagiocephaly, torticollis, vertebral subluxation.

Introduction

Positional plagiocephaly is an acquired deformation from excessive or sustained extrinsic forces on an intrinsically normal infant skull.¹

The incidence of infant plagiocephaly has not been widely studied, one study from Canada reported that in a hospital setting 45.6% of the 440 subjects were diagnosed with plagiocephaly and 21.7% had a more severe form.² Although uncertainty exists about incidence rates, plagiocephaly is thought to have become more common since the introduction of the back to sleep program in 1992.³ Of particular concern is the rise in incidence of brachycephaly, also known as posterior plagiocephaly, resulting from resting infants in the supine position.³

A consensus report of best practice recommendations suggested that chiropractic care is an effective, non-invasive, low-risk care alternative for several pediatric conditions such as plagiocephaly.⁴ Conventional non-surgical approaches to addressing plagiocephaly include counter-positioning, supervised prone time and for more refractory

cases, orthotic molding.⁵ External forces thought to commonly contribute to non-synostotic plagiocephaly include intrauterine constraint resulting in compression, congenital muscular torticollis and sleeping position. This is in contrast to craniosynostosis, which results from intrinsic factors and is more likely to require a surgical intervention.⁶ Non-synostotic craniosynostosis, being a morphological abnormality, is not known to spontaneously resolve and the common assumption is that the deformation will gradually continue if the external causative factor is not addressed.⁷

One study that measured the cosmetic and cognitive outcomes of non-synostotic plagiocephaly reported that left-sided plagiocephaly was related to poorer language development and academic performance; with expressive speech abnormality being twice as common in those with left sided plagiocephaly compared to right. It was also associated with a three-fold greater requirement for special education compared to right-sided plagiocephaly.¹

The purpose of this case study is to report on a 6-month-old female with left-sided cranial asymmetry, and the subse-

quent resolution of symptoms following chiropractic care. This case study adds to the small but growing body of research that suggests that chiropractic care may be beneficial for individuals with plagiocephaly.

Case Report

A 6-month-old female was presented by her mother for chiropractic care. The mother was concerned about the child's persistent favored left head rotation and ipsilateral flattening of her posterolateral cranium. The mother reported no abnormalities were noted at a check-up with the pediatrician three months prior. At this examination, growth, reflexes, and milestones were considered to be normal. However, the mother noticed the favored side of rotation and hypertonic right sternocleidomastoid muscle the week following the check-up. After informally consulting a midwife about treatment options, the mother decided to consult with a chiropractor as she wanted to avoid the midwife's recommendation of the conventional intervention utilizing a cranial molding helmet due to the large time commitment of this form of treatment. Additional complaints at the time of the infant's initial chiropractic assessment included frequent regurgitation of breast milk immediately after feeding with an inability to feed from the right breast, and unsettled sleep patterns.

The baby was delivered via vaginal birth with the use of an epidural in a hospital setting after 14 hours of labor. APGAR scores were 9 and 10 with the mother reporting no abnormal incidents throughout the pregnancy. There was no history of congenital conditions on the maternal or paternal side of the family.

The infant was calm throughout the chiropractic examination, presenting with a occipito-parietal flattening on the left resulting in a parallelogram-like contour, with no bony ridges at the sutures palpable. She was resting with persistent left head rotation. Upon passive head rotation to the right the infant appeared to be in mild discomfort with an immediate return of the head to the left.

Objective indicators of vertebral subluxation at C1, C3 and sacrum were identified through static and motion palpation during a spinal examination.

Intervention

After obtaining informed consent, the patient was checked by the chiropractor for a total of 3 visits over a 4 month period. The level of subluxations were each adjusted once using Diversified technique with a light, modified, high velocity, low amplitude impulse.

C1 was adjusted utilizing a modified Diversified technique on the initial visit only; sacrum on the second, and C3 on

the third visit. Chiropractic spinal adjustments were the only intervention utilized throughout the duration of care. Advice was given to the mother to encourage utilization of the previously less favored side with toys, sleeping and breast-feeding. No other cranial interventions, exercises or soft tissue modalities were administered throughout this time.

Outcomes

Immediately following the first adjustment, the chiropractor and mother noted willing and active motion towards the less favored side of rotation. The mother reported on the second visit that regular sleep patterns had been established and no episodes of regurgitation or fussiness with breast feeding had occurred. By 9 months of age there was no cranial shape abnormality detectable with all presenting complaints resolved. No adverse events were reported or observed.

Discussion

Asymmetries of the head have been reported to occur in as many as 61% of healthy newborn infants.⁸ The incidence of plagiocephaly is thought to peak at around 4 months of age and then diminish with advancing age. Detrimental outcomes associated with plagiocephaly are linked to limited head rotation, lower activity levels and supine sleeping position.⁹

Various methods are utilized in conventional treatment for infants with non-synostotic plagiocephaly. The most widely used intervention is helmet therapy; otherwise head repositioning, botox injections into the sternocleidomastoid muscle, and surgery are more extreme treatments.⁸ However, in regards to helmet therapy, it is recommended that the helmet be worn for more than 20 hours a day for almost 8 months on average for an optimal outcome.⁸

In consideration of the outcomes, the intervention of applying cranial molding helmets 20 hours a day may apply enough external pressure to correct the contour, however may not necessarily resolve potential underlying factors involved described above such as torticollis or limited head rotation. There have been many case reports with the observation of resolved non-synostotic plagiocephaly, and infant torticollis (known to exacerbate plagiocephaly) and cervical spine range of motion following chiropractic care.^{10, 11, 12, 13, 14} The observations from this case study add further weight to the possibility of a potential relationship between chiropractic care and improvements in plagiocephaly.

In neonates, enhanced neuroplasticity is well established with the developing nervous system being known to be much more plastic in nature compared to an adult in both development and response to trauma. Activity in neu-

ral pathways is a vital component for consolidating connections, whether normal or compensatory.¹⁵ Therefore addressing any potential dysfunction within the central nervous system would be a logical approach in order to prevent maladaptive neurology. By influencing the somatosensory processing and sensorimotor integration, the influences over the muscle spasm and increased global and segmental range of motion could alone potentially compliment the management of non-synostotic plagiocephaly, torticollis and other sustained trauma during the birth process. If chiropractic adjustments reduce nervous system interference, this may have a positive effect on the body's ability to coordinate, control and self regulate functions through the somatosensory processing and sensorimotor integration systems. This is consistent with the model espoused by Haavik, Holt and Murphy which explores the neuromodulatory effects of vertebral subluxation and chiropractic care.¹⁶

In this case report, the restoration of global and segmental range of motion within the cervical spine was restored immediately after the correction of subluxations, which appeared to result in decreased hypertonicity of the sternocleidomastoid muscle. The infant was then able to engage in the full normal range of motion expected at her stage of growth. Due to the cranial bones being so mobile and malleable at the young age, it could be hypothesized that the return of normal contour was enhanced through increased mechanical and neurological control of the cervical spine; allowing passive and active motion throughout the infant's daily living activities such as feeding, laying and sleeping. Further research is warranted to assess the credibility of this hypothesis.

Conclusion

The chiropractic care of newborns could potentially be a key component in addressing the integrity of an infant's nervous system, in a safe and conservative way. If chiropractic care decreases muscle spasm and increases global and segmental range of motion it could potentially be a beneficial component of the management of non-synostotic plagiocephaly, torticollis and other trauma associated with the birth process.

This case study suggests chiropractic care may be beneficial for at least some infants with deformational plagiocephaly. However, further research is warranted to determine the efficacy of chiropractic care with similar case presentations in contrast to current conventional therapies.

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Mama, please stop crying: lowered postnatal depression scores in mothers after a course of chiropractic care for their infants

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ABSTRACT

Objective: The objective of this study was to investigate postnatal depression scores in mothers during a course of chiropractic care for their infants. **Methodology:** A prospective non-randomized case series of maternal depression scores was undertaken in a chiropractic teaching clinic in the UK. A convenience sample of 117 mothers, whose infants were enrolled in chiropractic care, were recruited over a one year period for this study. Maternal EPDS scores on intake were compared with EPDS scores on discharge. **Results:** Overall, a statistically significant decrease in postnatal depression score of 2.26 ($P < 0.0001$) was noted at the discharge visit. **Conclusion:** Reductions in postnatal depression scores in mothers occurred during a course of chiropractic care for their infant. The reasons for these reductions are not known but it may be considered a clinically significant change, although further research is indicated to validate these ideas.

Key words: postnatal depression, Edinburgh Postnatal Depression Scale, chiropractic, infants, mothers.

Introduction

Postnatal depression (PND) has the potential to be a destructive, damaging and even fatal condition. The effects of PND are known to go beyond the mother, affecting the partner and the child; it can be deemed a public health problem.¹ PND is defined as “the first occurrence of psychiatric symptoms severe enough to require medical help occurring after child birth and before the return of menstruation.”² Symptoms include despondent mood, feelings of inadequacy as parent, sleep and appetite disturbances, and impaired concentration. It can last for several months, and if left unaided, for several years.³

Approximately 13% of women will experience this condition within the first 12 weeks postpartum, and a period prevalence has been assessed at 19.2% within first postpartum year.⁴ Women who have suffered from PND are twice as likely to experience future episodes of depression.⁴ As such, screening for depression by all clinicians who encounter mothers of newborns is important.⁵

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item questionnaire aimed at identifying whether or not the mother is at risk of PND. The EPDS was designed to be easy to administer and an effective screening tool for PND.⁶

A variety of characteristics are associated with high EDPS: past history of depression, being divorced, birth partner

overseas and assisted delivery.^{7,8} Of great importance now are women who report having had a traumatic delivery (this includes all delivery types, and is related to the woman's experience of her delivery and is linked to pain, feeling of loss of control and powerlessness and the fear she experienced) who may have increased risk of PND but also increased risk of developing post-traumatic stress disorder which may mimic PND.⁸

It has been theorised that PND has a deleterious effect on child development including a direct impact on the child of exposure to the parental disorder and indirect impact via the effect of the parental disorder on interpersonal behaviour in general and parenting.⁹

The impact of depression on the postnatal period is of particular importance due to the infant's extreme dependency on their caretaker, their sensitivity to interpersonal contacts, and the fact that, in the great majority of cases, the mother constitutes the infant's primary environment in the first postnatal months.¹⁰ It is evident that PND poses a risk for the mother-infant relationship and infant developmental outcome. The adverse effects of PND appear to be mediated through its association with maternal cognitions and parenting. In turn, children of depressed mothers are more likely to have delayed psychological, cognitive, neurological, and motor development, and are at higher risk of avoidance and distressed behaviour.¹⁰

Chiropractic is a safe, popular modality of manual therapy used worldwide for treatment of neuro-musculoskeletal problems for all ages.¹¹ With regard to pediatric treatment, the chiropractor is well-placed to assist the parent and infant in identifying contributing factors and controlling the problem, with crying, feeding and sleeping problems being most common.¹²⁻¹⁴ Chiropractors use treatment primarily aimed at correcting biomechanical and musculoskeletal imbalance.¹³

Methods

This prospective non-randomized case series used data collected from mothers of infant pediatric patients at new and discharge visits in an out-patient public chiropractic teaching clinic on the south coast of England. The Edinburgh Depression Scale was given on the first examination visit and again at the discharge visit. The Edinburgh Depression Scale is a 10-item questionnaire with each question scoring between 0-3; these were subsequently summated to give a final score out of 30 for each mother and these scores were compared before and after treatment of the infant. No cut-off scores to diagnose depression or not were used in this study, but the scores were used as a continuum, since this has been considered an appropriate use of this screening tool.¹⁵

Inclusion criteria were all mothers who presented an infant for care. Exclusion criteria were inability to read English and refusal to complete the survey. Participants were of a convenience sample and there was no recruitment beyond those who voluntarily presented their child to the clinic for treatment. There was no treatment of the mothers, only of the infant.

The forms for the study were reviewed by the projects ethics panel prior to beginning the use of the forms in the clinical file of the infants who were presented to the clinic. These forms were considered a routine part of clinical practice. However, mothers could refuse at any point to complete the questionnaires and all participants that agreed to take part gave signed consent. All data were anonymous. For assurance of accuracy, 10% of the data were checked at specific data points during the collation process.

All the data were plotted onto an Excel Spreadsheet by number (not name) and analysed using Statistical Product and Service Solutions (SPSS v.20). The EPDS scores on intake were compared with the EPDS score on discharge. Wilcoxon matched pair testing was undertaken. The Wilcoxon matched pairs test was used as it compares two paired groups of non-parametric data.

Results

The subjects studied were a consecutive sample of 117

mothers who presented their infant to this clinic for care. No eligible mothers refused to participate. The average overall EPDS change score from first to last visit was a decrease of 2.26 points. The change score ranged from a decrease of 12 points to an increase of 4.

The EPDS change score was lower at the end of an episode of care to a highly statistically significant degree with a p value of <0.0001 after an episode of care. The level of significance of change of EPDS score was calculated using Wilcoxon matched pairs test.

Table 1 demonstrates the average age of the infants and average time they spent in care. Table 2 shows the average EPDS score of the mother at intake and discharge of the infant and the overall change score (n=117).

Average age on first visit (weeks)	5.4
Average time spent in care (weeks)	2.9

Average EPDS score on first visit	7.3
Average EPDS score in last visit	5.04
Change score	2.26 (decrease)
<i>EPDS: Edinburgh Post-Natal Depression Score</i>	

Discussion

It is reasonable to think that mothers would feel better when their baby is better. The EPDS is considered a good surrogate measure for anxiety in mothers and therefore, should be used as a continuum and any lowering of scores is a benefit.¹⁵ At least one previous study has demonstrated that maternal stress levels went down as they reported fewer crying and sleeping problems in their infants.¹⁶

However, it cannot be declared that chiropractic care of the infant was the only, most significant or even part of the reason for the improvement in maternal mental health. Whilst a change score of 2.26 is highly significant, it may be attributable to several factors. There are a myriad of potential confounding factors in this type of study. Strong predictors of a high EPDS score are reported night awakenings disturbing mothers sleep alongside frequent infant crying.⁷⁻⁹ Therefore, anything that helped the infant sleep may have affected the mother in a positive way. Time itself may be a factor in change. Infant sleep is sporadic and transient in nature and there can also be unrealistic parental expectation about how the child should be sleeping.^{18, 19} It is possible that as infant's sleep improves naturally over time, a

mother's stress and anxiety levels decrease as they are also able to sleep more themselves and become more adapted to life as a mother. Rosentrom and colleagues suggest complaints of poor sleep quality are estimated to occur in 50% to 90% of diagnosed cases of depression for which sleep problems often precede the onset of a depressed mood.¹⁸ There is evidence to suggest that chiropractic treatment improves infant sleep¹² which in turn could lead to improvements in the mother's sleep. Some infants may be more difficult to settle and may wake more frequently. Infants who have not learned to settle independently or self-soothe may disrupt their mother's sleep resulting in maternal sleep deprivation and report of symptoms similar to depression. It can therefore be suggested that infant temperament mediates the relationship between maternal sleep disruption and depression.¹⁸ However, after a series of chiropractic treatments parents reported that their infants settled more quickly and easily, and fewer had difficulty settling to sleep.¹²

The change found in our study may be considered more meaningful in light of another current study which found that, without intervention, there was no change between the early (first trimester) infant and maternal stress levels and later levels at six months of age.¹⁷ Their study clearly showed that these problems for the mother and infant are long-term. That said, they didn't report any interventions for either the mother or the baby.

Another factor to consider which may go some way to explaining the positive results is the psychological impact of visiting a healthcare professional. Miller proposed that the most effective help for parents is from a supportive healthcare professional and the chiropractor is in a position to provide that support.¹⁴ The mothers in this study presented infants to the clinic with a multitude of problems. It is natural for mothers to experience anxiety about their child's condition. Mothers may gain confidence from receiving a diagnosis and explanation of their child's condition in a chiropractic setting. Listening to the parents' concerns and reassurance that the child is healthy and thriving may also be useful, although not curative,¹⁶ both of which could be contributing factors in reducing the EPDS score. The chiropractor, if required, treats with mild touch to restricted barriers, restoring musculoskeletal balance, resulting in comfort for the infant and reassurance for the parent.^{12-14, 16} It is therefore understandable that this might have a positive impact on PND risk factors in the mother as they will be less anxious and worried if their child is in good health.

Increased incidence of assisted deliveries in recent years has led to an epidemic of minor birth trauma to the infant of which musculoskeletal (MSK) problems dominate.²¹ Many infants present to chiropractors after traumatic deliveries; a risk factor for PND.^{8, 9, 12-14, 21} Chiropractors treat MSK prob-

lems in neonates and infants.²¹ Therefore it might be postulated that as the child's condition improves, the mother's anxiety improves, the overall EPDS score may lessen.

Assisted births are also associated with poorer sustained breastfeeding.^{21, 22} The presence of breastfeeding problems may influence the onset of depression in vulnerable women, by reducing levels of self-esteem and confidence in their ability to be effective mothers.²⁰ Dennis and McQueen found that breastfeeding was associated with lower levels of depressive symptomatology.⁴ Vallone found that chiropractic therapy was helpful in solving breastfeeding problems.²² These ideas suggest that chiropractic treatment of MSK related breastfeeding complaints may reduce feelings of frustration and increase self-esteem leading to a reduction in these risk factors for PND. More research investigating the link between poor breastfeeding and onset of PND is required to validate these ideas.

Limitations

This study exposed several limitations. First, it recorded only the time spent in care (<3 weeks) not the total number of treatments each infant received. This could have varied depending on the duration of treatment, the infant's natural progression, development and symptom relief could be accountable for the decrease in EPDS score. The average number of treatments per infant is 4 in this clinic.^{12, 16}

As there were no inclusion or exclusion criteria for the infant, a wide range of conditions were seen and treated. Therefore some situations may have been more serious than others depending on the nature of the condition thus affecting the EPDS score of the mother. However, this clinic accepts only infants with the types of musculoskeletal conditions^{16, 23} that can be treated with manual therapy and it is unlikely that any child with illness was part of the study. This is a routine chiropractic practice and it is unlikely that the cases varied from those reported throughout the research literature.^{23, 24}

Another limitation of this study is that the ages of the mothers are unknown. However, Ghosh and Goswami investigated PND risk factors using the EPDS in 6000 patients, and found that age and parity showed no relationship with developing PND.²⁵

The rapid nature of infant development suggests possible outgrowth of conditions, for example, normalization of sleeping patterns. A way to further investigate such factors would be to observe mothers who do not utilize any therapy compared to those who use chiropractic care to investigate if the same trend in reduction of EPDS scores is noticed over the same period of time. However, these developmental changes in sleep time normally take considerably lon-

ger than the average treatment episode in this clinic, which was less than three weeks. As a case series, this research is the lowest level of investigation and further, more well designed studies are required to validate or refute these ideas.

Conclusion

This study into PND scores of mothers whose infants underwent chiropractic care showed statistically significant reduction in scores when concluding a course of chiropractic treatment. No deductions can be made to the broad spectrum of PND. However, it brings to light the need for further well-designed studies, with control groups, to ascertain whether chiropractic care for the child has any scope in reducing a mother's post-natal depression score.

Clinical Bottom Line: Significant reductions in post-natal depression scores in mothers were noted during a short course of chiropractic treatment for their infant.

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Improvement in a pediatric patient with Autistic spectrum disorder (ASD) following a trial of chiropractic care: a case report

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ABSTRACT

Objective: To report positive outcomes in a pediatric patient diagnosed with Autistic spectrum disorder (ASD) who was receiving chiropractic care. **Clinical Presentation:** The 7-year-old boy diagnosed with ASD presented for chiropractic care with chronic diarrhea and nocturnal enuresis. **Intervention and Outcomes:** The patient received full spine adjustments utilizing Diversified Technique and Drop Table Technique. After three months of care the patient had resolution of nocturnal enuresis and chronic diarrhea. **Conclusion:** This case study provides supporting evidence that individuals with ASD suffering from nocturnal enuresis and chronic diarrhea may benefit from chiropractic care. More research is warranted in this area.

Introduction

Autistic spectrum disorder (ASD) affects 1 in 100 people in New Zealand.¹ It is a behaviorally defined disorder, characterized by qualitative impairments in social communication, social interaction and social imagination, with a restricted range of interests and often stereotyped repetitive behaviors and mannerisms.² The pathophysiology is unknown and diagnosis is based on clinical observations using criteria established in *The Diagnostic and Statistical Manual of Mental Disorders*.³ The focus of diagnostic inquiry is on the patient's developmental history, systematically inquiring about their core behaviors and observations in several settings.² Those affected with ASD have problems with sensorimotor integration and motor planning which results in altered motor behavior.⁴ There are no effective pharmacological interventions for this disorder. Prescribed medications address comorbid symptoms such as attention deficit hyperactivity disorder, obsessive-compulsive disorder and clinical depression.⁵

In a survey of parents with a child diagnosed with ASD, over half reported using at least one complementary and alternative medicine (CAM) therapy for their child. Seventy-five percent of the parents reported that their child benefited from CAM use.⁶ Reasons cited by parents for choosing CAM for their autistic child were related to concerns with the safety and side effects of prescribed medications.⁷ Of the various CAM therapies for children, chiropractic is the most popular and most commonly used CAM approach.⁸ The following case study describes improvements in a child with ASD following a trial of chiropractic care.

Case Report

A 7-year-old male diagnosed at 14-months of age with ASD presented for chiropractic care. History examination revealed the patient had daily chronic diarrhea and nocturnal enuresis. Despite being verbally reluctant and having limited receptive language, the patient maintained good eye contact with a noticeable exotropia of the right eye. He also had various self-stimulatory behaviors such as hand flapping which turned into temper tantrums. At age two he began applied behavioral analysis treatment (ABA) for his toe walking. After three years of this therapy little improvement had occurred. He appeared to be unaware of his environment and the emotions of people around him and did not tolerate other children in his physical space. He also displayed fixative behaviors associated with Obsessive, Compulsive Disorder, watching the same movie multiple times and sleeve chewing. The patient was allergic to pollen, dust mites, horses, cats and dogs. He also suffered from asthma, which was managed by daily medications, namely Ventolin®, Severent® and Becotide®.

The initial chiropractic examination entailed observation, static palpation, motion palpation, postural evaluation, and pelvic deficiency testing. The examination was augmented with the TyTron-C3000 (Titronics, Tiffin, IA) paraspinal digital infrared imaging. TyTron-C3000 thermal imaging revealed significant areas of paraspinal cutaneous heat differential throughout the thoracic and lumbar spinal regions. Neurological examinations of both upper and lower extremities (i.e., dermatomes, myotomes, muscle stretch reflexes) and cranial nerve examination were unremarkable.

At the initial examination the cumulative examination findings indicated vertebral subluxations at the C₁, T₄ and T₇ vertebral levels. A trial of chiropractic care was initiated with the consent of his guardian. The patient received full spine chiropractic care 18 times during a 12-week period using Diversified and Drop Table Techniques consisting of a high velocity, low amplitude thrust. Adjustments addressed vertebral subluxations at the C₁, T₄ and T₇ vertebral levels.

The patient's response to chiropractic care was monitored by his parents, in addition to clinical observations made during his visits to the chiropractor. Within 6 visits, spanning a period of 4 weeks, the patient's right eye exotropia had normalized, his nocturnal enuresis had reduced from 6 nights a week to 2 nights per week and he had consistent and regular bowel movements at 8am every morning. Within 2 months of beginning chiropractic care the patient went to the toilet by himself for the first time, his sleeve chewing and toe walking had also resolved. His parents noted several other positive behaviors including more awareness and reduced incidents of temper tantrums.

Discussion

Based on the active surveillance system Autism and Developmental Disabilities Monitoring Network, the prevalence of ASDs in 2008 was 11.3 per 1000 for children aged 8 years. In comparison to earlier surveillance years, this was an indicated increase of 23% in ASD prevalence between 2006 and 2008 from 9.0 per 1000 in 2006 to 11.3 per 1000 in 2008. There is an estimated increase of 78% when the 2008 data is compared with the data from 2002 from 6.4 per 1000 in 2002 to 11.3 per 1000 in 2008.⁹ In New Zealand where the clinical scenario took place, it is estimated that 1 in 100 people are diagnosed with ASD and with a population of 4 million people; this translates to approximately 40,000 individuals.¹⁰

In terms of its pathophysiology, ASD is multifactorial and involves genetic, environmental and biological factors, reflecting the heterogeneity of the disorder. We caution here that despite the genetic component (i.e., 70-90% concordance for ASD in monozygotic (MZ) twins versus 10 in dizygotic (DZ) twins), environmental factors cannot be dismissed given that the incidence of ASD in identical twins is not 100%.¹¹ Maternal lifestyle and environmental factors such as toxic exposures, teratogens, perinatal insults and prenatal infections such as rubella and cytomegalovirus account for few cases.¹² In addition, ASD is frequent in tuberous sclerosis complex and fragile X syndrome.¹³ Despite the complexity in pathophysiology of the disorder, it is evident that there is a problem with sensorimotor integration and subsequent motor behavior.^{4,14} Research suggests selected aspects of the temporal, parietal, frontal lobes and portions of the amyg-

dala play a part in the pathobiology of autism. The frontal lobe functions in executive brain function involving regulation of working memory, organization, planning, problem solving, environmental monitoring, self-awareness, attention, mental flexibility and abstract reasoning. The orbitofrontal cortex has deep connections with the basal ganglia, which is responsible for behavioral regulation. The medial cortex links to the limbic system, which is responsible for emotional regulation by modulating emotional arousal, mood expression and self-soothing strategies. The concept of developmental disconnects in the aforementioned neural connections fits cohesively with the neurobehavioral features seen among ASD children.¹⁵ Behaviors that are repetitive and obsessive may be due to the individual's inability to modify ones behavior to fit social contexts.

In the case presented, the child suffered from chronic diarrhea and nocturnal enuresis. Parents report significantly more gastrointestinal (GI) problems in children with familial ASD, especially those with full autism, than in their unaffected children. The two most common GI problems in children with ASD are constipation and chronic diarrhea.^{16,18} In children with ASD maladaptive behaviors such as irritability, social withdrawal, stereotypy and hyperactivity correlate with a history of GI symptoms, suggesting these comorbidities require attention.¹⁷

With respect to the child's presenting complaint of NE, one article was found that described the chiropractic care of a 6-year-old boy who presented for chiropractic care with a history of nocturnal enuresis and ASD.¹⁹ The child experienced a traumatic birth and at the time of chiropractic care was following the Defeat Autism Now! (DAN!) protocol. The child received upper cervical chiropractic care over a 15-week period. Overall, there was a reduction in the patient's pattern of atlas subluxation concomitant with resolution of his nocturnal enuresis and significant improvements in both his social interactions and learning difficulties at school. To the best of our knowledge, this is the first reporting in the scientific literature on the chiropractic care of a child with ASD with co-morbid conditions of nocturnal enuresis and chronic diarrhea.

The use of alternative therapies is prevalent in children with developmental disorders. In a survey of parents, Huang and colleagues²⁰ found that 82% of children with ASD used some form of alternative therapy. No pharmacotherapeutic agents are effective for treatment of the core symptoms of autism.²¹ Prescribed medications are provided to ASD children to treat co-morbid symptoms to provide relief of associated symptoms and allow the autistic child to benefit more optimally from educational, vocational and community-based programs. In a survey of Turkish parents of children with ASD on their use of CAM treatments, Senel²²

found that communication, learning, health and behavior were the main four areas rated as “improved” after CAM treatment.

In 2011, Alcantara and colleagues²³ performed a systematic review of the literature on the chiropractic care of children with autism, Asperger’s Syndrome, PDD-NOS, or ASD. The authors discussed the possibility that based on preliminary somatosensory evoked potential studies, chiropractic adjustments may alter sensorimotor integration and filtering. At the heart of the core symptoms of autism (i.e. impaired social interactions, deficits in communication and repetitive or restricted behavioral patterns) is abnormal sensory processing. It is possible that the abnormal sensory processing that occurs in children with ASD may be improved by chiropractic care.²⁴⁻²⁶ If this is the case it may explain a potential link between the chiropractic care that was provided and the improvements observed in this case. There is however a paucity of basic science or clinical evidence to explain or support the link between chiropractic adjustments and the improvements in ASD, nocturnal enuresis or diarrhea that are reported in this case.

As with all case reports the lack of a control group, the potential for spontaneous remission, self-limiting course and natural history of various disorders, subjective validation and expectations for clinical resolution on the part of the patient challenges our ability to make causal inferences with respect to the effectiveness of the care provided. Therefore the reader should consider the generalizability of this and similar reports with caution. Conversely, empirical evidence dominates the chiropractic evidence-based practice. Historically, clinical scenarios such as the one reported here have provided for us with the basis for generalization in clinical practice. In addition to informing higher-level research designs, case reports further provide for clinicians and patients an understanding of their clinical experiences that may lead to an increase in their conviction that chiropractic can “help” a patient. The purpose of case reports is to describe the clinical encounter and challenge notions and unsubstantiated claims about patient care.

Conclusion

We described a child with ASD who experienced improved outcomes in nocturnal enuresis and chronic diarrhea while receiving chiropractic care. We recommend continued research in both the clinical and laboratory setting to fully characterize the effects of the chiropractic adjustment and to enhance our understanding of the potential role for chiropractors in helping patients with ASD, nocturnal enuresis and diarrhea.

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Outcomes of pregnant patients with low back pain undergoing chiropractic treatment: a prospective cohort study with short term, medium term and 1 year follow-up.

Peterson CK, Mühlemann D, Humphreys BK.

ABSTRACT

Background: Low back pain in pregnancy is common and research evidence on the response to chiropractic treatment is limited. The purposes of this study are 1) to report outcomes in pregnant patients receiving chiropractic treatment; 2) to compare outcomes from subgroups; 3) to assess predictors of outcome. **Methods:** Pregnant patients with low back or pelvic pain, no contraindications to manipulative therapy and no manual therapy in the prior three months were recruited. Baseline numerical rating scale (NRS) and Oswestry questionnaire data were collected. Duration of complaint, number of previous LBP episodes, LBP during a previous pregnancy, and category of pain location were recorded. The patient's global impression of change (PGIC) (primary outcome), NRS, and Oswestry data (secondary outcomes) were collected at 1 week, 1 and 3 months after the first treatment. At 6 months and 1 year the PGIC and NRS scores were collected. PGIC responses of 'better' or 'much better' were categorized as 'improved'. The proportion of patients 'improved' at each time point was calculated. Chi-squared test compared subgroups with 'improvement'. Baseline and follow-up NRS and Oswestry scores were compared using the paired t-test. The unpaired t-test compared NRS and Oswestry scores in patients with and without a history of LBP and with and without LBP during a previous pregnancy. Anova compared baseline and follow-up NRS and Oswestry scores by pain location category and category of number of previous LBP episodes. Logistic regression analysis also was also performed. **Results:** 52% of 115 recruited patients 'improved' at 1 week, 70% at 1 month, 85% at 3 months, 90% at 6 months and 88% at 1 year. There were significant reductions in NRS and Oswestry scores ($p < 0.0005$). Category of previous LBP episodes number at one year ($p = 0.02$) was related to improvement when analyzed alone, but was not strongly predictive in logistic regression. Patients with more prior LBP episodes had higher 1 year NRS scores ($p = 0.013$). **Conclusions:** Most pregnant patients undergoing chiropractic treatment reported clinically relevant improvement at all time points. No single variable was strongly predictive of, 'improvement' in the logistic regression model.

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Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems.

Hofmeyr GJ, Lawrie TA, Atallah AN, Duley L, Torloni MR.

ABSTRACT

Background: Pre-eclampsia and eclampsia are common causes of serious morbidity and death. Calcium supplementation may reduce the risk of pre-eclampsia, and may help to prevent preterm birth. **Objectives:** To assess the effects of calcium supplementation during pregnancy on hypertensive disorders of pregnancy and related maternal and child outcomes. **Search Methods:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (28 March 2013) and contacted study authors for more data where possible. We updated the search in May 2014 and added the results to the 'Awaiting Classification' section of the review. **Selection Criteria:** Randomised controlled trials (RCTs) comparing high-dose (at least 1 g daily of calcium) or low-dose calcium supplementation during pregnancy with placebo or no calcium. **Data Collection and Analysis:** We assessed eligibility and trial quality, extracted and double-entered data. **Main Results:** High-dose calcium supplementation (≥ 1 g/day). We included 14 studies in the review, however one study contributed no data. We included 13 high-quality studies in our meta-analyses (15,730 women). The average risk of high blood pressure (BP) was reduced with calcium supplementation compared with placebo (12 trials, 15,470 women: risk ratio (RR) 0.65, 95% confidence interval (CI) 0.53 to 0.81; $I^2 = 74\%$). There was also a significant reduction in the risk of pre-eclampsia associated with calcium supplementation (13 trials, 15,730 women: RR 0.45, 95% CI 0.31 to 0.65; $I^2 = 70\%$). The effect was greatest for women with low calcium diets (eight trials, 10,678 women: average RR 0.36, 95% CI 0.20 to 0.65; $I^2 = 76\%$) and women at high risk of pre-eclampsia (five trials, 587 women: average RR 0.22, 95% CI 0.12 to 0.42; $I^2 = 0\%$). These data should be interpreted with caution because of the possibility of small-study effect or publication bias. The composite outcome maternal death

or serious morbidity was reduced (four trials, 9732 women; RR 0.80, 95% CI 0.65 to 0.97; $I^2 = 0\%$). Maternal deaths were not significantly different (one trial of 8312 women: calcium group one death versus placebo group six deaths). There was an anomalous increase in the risk of HELLP (haemolysis, elevated liver enzymes and low platelets) syndrome (two trials, 12,901 women: RR 2.67, 95% CI 1.05 to 6.82; $I^2 = 0\%$) in the calcium group, however, the absolute number of events was low (16 versus six). The average risk of preterm birth was reduced in the calcium group (11 trials, 15,275 women: RR 0.76, 95% CI 0.60 to 0.97; $I^2 = 60\%$) and amongst women at high risk of developing pre-eclampsia (four trials, 568 women: average RR 0.45, 95% CI 0.24 to 0.83; $I^2 = 60\%$), but no significant reduction in neonatal high care admission. There was no overall effect on the risk of stillbirth or infant death before discharge from hospital (11 trials 15,665 babies: RR 0.90, 95% CI 0.74 to 1.09; $I^2 = 0\%$). One study showed a reduction in childhood systolic BP greater than 95th percentile among children exposed to calcium supplementation in utero (514 children: RR 0.59, 95% CI 0.39 to 0.91). In a subset of these children, dental caries at 12 years old was also reduced (195 children, RR 0.73, 95% CI 0.62 to 0.87). Low-dose calcium supplementation (< 1 g/day). We included 10 trials (2234 women) that evaluated low-dose supplementation with calcium alone (4) or in association with vitamin D (3), linoleic acid (2), or antioxidants (1). Most studies recruited women at high risk for pre-eclampsia, and were at high risk of bias, thus the results should be interpreted with caution. Supplementation with low doses of calcium significantly reduced the risk of pre-eclampsia (RR 0.38, 95% CI 0.28 to 0.52; $I^2 = 0\%$). There was also a reduction in hypertension, low birth weight and neonatal intensive care unit admission. **Authors' Conclusions:** Calcium supplementation (≥ 1 g/day) is associated with a significant reduction in the risk of pre-eclampsia, particularly for women with low calcium diets. The treatment effect may be overestimated due to small-study effects or publication bias. It also reduces preterm birth and the occurrence of the composite outcome 'maternal death or serious morbidity.' We considered these benefits to outweigh the increased risk of HELLP syndrome, which was small in absolute numbers. The World Health Organization recommends calcium 1.5 g to 2 g daily for pregnant women with low dietary calcium intake. The limited evidence on low-dose calcium supplementation suggests a reduction in pre-eclampsia, but needs to be confirmed by larger, high-quality trials. Pending such results, in settings of low dietary calcium where high-dose supplementation is not feasible, the option of lower-dose supplements (500 to 600 mg/day) might be considered in preference to no supplementation.

Update of: *Cochrane Database Syst Rev.* 2010;(8):CD001059.

J Clin Med Res 2014 Oct, 6(5): 374-8. doi: <http://dx.doi.org/10.14740/jocmr1883w>

Validation of the Edinburgh Postpartum Depression Scale in a Population of Adult Pregnant Women in Mexico

Alvarado-Esquivel C, Sifuentes-Alvarez A, Salas-Martinez C

ABSTRACT

Background: The Edinburgh postnatal depression scale (EPDS) is useful for screening depression in puerperal women as well as women during pregnancy. However, such instrument should be validated in a given language before it can be used. There is not validated Mexican version of the EPDS for use in adult pregnant women. Therefore, we sought to validate a Spanish translated Mexican version of the EPDS in a population of adult pregnant women. **Methods:** One hundred fifty-eight adult women (mean age: 28 ± 6.8 years; range: 18 - 45 years) within their 2 - 9 months of pregnancy attending routine prenatal consultations in a public hospital in Durango City, Mexico were studied. All pregnant women submitted a Spanish translated Mexican version of the EPDS. In addition, participants were assessed for major and minor depression by using the DSM-IV criteria. **Results:** Of the 158 pregnant women studied, 11 had major depression and 26 had minor depression by the DSM-IV criteria. The best EPDS score for screening combined major and minor depression in adult pregnant women was 9/10. This threshold showed a sensitivity of 75.7%, a specificity of 74.4%, a positive predictive value of 50.8%, a negative predictive value of 94.7% and an area under the curve of 0.89 (95% confidence interval: 0.71 - 1.06). **Conclusion:** The Mexican version of the EPDS can be considered for screening depression in Mexican adult pregnant women whenever a cut-off score of 9/10 is used.

Imaging of musculoskeletal disorders related to pregnancy

Proisy M, Rouil A, Raoult H, Rozel C, Guggenbuhl P, Jacob D, Guillin R.

ABSTRACT

Objective: This article provides an overview of the typical appearance of biomechanical and physiologic changes in pregnancy and an update on related pathophysiology. Conditions occurring during the childbearing, delivery and postpartum periods will be reported separately. **Conclusion:** Pregnancy causes biomechanical and physiologic changes that may be responsible for a wide spectrum of musculoskeletal disorders in the mother.

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Gluten-free and casein-free diets in the treatment of autism

Reissmann A, Hauser J, Makulska-Gertruda E, Tomsa L, and Lange KW.

ABSTRACT

Background: Autism is a complex psychiatric disorder characterized by three core symptoms, i.e. impairments in social interaction, restricted patterns of behavior and impairments in communication. In the framework of the “opioid excess theory”, the disorder symptoms are compared to the behavioral effects of opiates. Based on this, a possible nutritional basis of autism has been proposed, hypothesizing that certain food proteins such as gluten and casein can be transformed to opioid peptides during digestion. These peptides might eventually be able to enter the blood stream and act upon the central nervous system. As a consequence, a diet low in such proteins has been hypothesized to ameliorate the behavioral symptoms of autistic children. **Objective:** The scope of this review was to analyze the effects of gluten-free and casein-free (GFCF) diets on children with autism, as well as to provide information concerning additional aspects related to the GFCF diet in autism. **Methods:** A literature search was conducted including scientific publications up until December, 2013. Search results were screened for any kind of GFCF dietary intervention as well as surveys dealing with GFCF as a treatment for autism. **Results:** A review of survey data shows that up to 25% of parents of affected children report on current use of a GFCF diet. The majority of identified studies evaluating GFCF diet outcomes failed to meet basic methodological standards of interventional science. Comparison of study results did not show any clear-cut results, with a substantial proportion of studies failing to show any positive dietary effect. The results of more sophisticated trials were far from equivocal and the studies differed by many methodological aspects. Some variables such as information source and trial duration seemed to affect outcome. **Conclusions:** Evidence for the effectiveness of the GFCF diet in the treatment of autism is sparse. Rigorous scientific evaluations partly failed to confirm therapeutic effects of the GFCF diet. These and other negative results related to the opioid excess theory weaken the underlying rationale for GFCF diet use. Nevertheless, more sophisticated investigations should be conducted in order to identify possible benefits and harms of such a dietary approach.

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Probiotics as regulators of inflammation: A review

David W. Lescheid

ABSTRACT

A substantial and increasing body of clinical evidence supports the role of specific strains and mixtures of probiotics in the prevention and treatment of certain diseases. Several general mechanisms of action have been proposed, including supporting repair of hyperpermeable epithelial barriers, interfering with infection by pathogens, and restoring a healthful balance of commensal microbes to affect metabolism. Emerging evidence supports an additional role of probiotics as important modulators of immune system responses, including inflammation, at mucosal surfaces. In particular, by preventing or repairing 'leaky' epithelial barriers, probiotics can indirectly affect the inflammatory response by negating the source of pro-inflammatory stimuli associated with low-grade endotoxemia. They also enhance production of short chain fatty acids with anti-inflammatory properties (e.g. butyrate) as well as increase synthesis of antimicrobial peptides that influence inflammation resolution pathways in the mucosa. Furthermore, probiotics and some of their secreted metabolic products can act as ligands for innate immune system receptors, directly influencing key pro-inflammatory pathways. They also stimulate the differentiation and activity of important immune cells (e.g., dendritic cells, T cells), and subsequently increase production of important regulatory cytokines, including interleukin-10 (IL-10) and transforming growth factor-beta (TGF- β). Finally, there are limited but increasing animal studies and clinical trials demonstrating probiotics do affect common biomarkers of inflammation, including C-reactive protein, as well as signs and symptoms of the associated diseases suggesting they can have therapeutic benefit in the treatment of chronic inflammatory disease.

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The effects of dietary omega-3 polyunsaturated fatty acid supplementation on attention and impulsivity in an animal model of attention deficit/hyperactivity disorder (ADHD)

Makulska-Gertruda E, Hauser J, Sontag TA, and Lange KW.

ABSTRACT

Background: Attention deficit/hyperactivity disorder (ADHD) is one of the commonest psychiatric disorders in children and adolescents. The main symptoms of ADHD are hyperactivity, inattention and impulsivity. Both etiology and neurobiological basis of ADHD are unknown. In this context, long-chain polyunsaturated fatty acids (LC-PUFAs), especially omega-3 (n-3) PUFAs, have become a focus of interest. The symptoms of ADHD have been suggested to be associated with a deficiency of n-3 PUFAs. In addition, the impact of a supply of dietary n-3 PUFAs in the treatment of ADHD has frequently been discussed. **Objective:** The aim of the present study was to examine the influence of n-3 PUFA supplementation on attention and impulsivity in the spontaneously hypertensive rat (SHR) which has been proposed to be a valid genetic animal model of ADHD. **Methods:** Seven-week-old male SHRs were randomly divided into two groups of 15 rats and fed one of two experimental diets (n-3 PUFA-enriched or n-3 PUFA-deficient) prior to and during behavioral testing. Attention and impulsivity were assessed using a three-choice-serial-reaction-time-task (3CSRTT) which is based on the five-choice-serial-reaction-time-task. The experiment was performed with three-month-old rats. **Results:** Our findings demonstrate a marked difference between groups regarding impulsivity but not attention. The n-3 PUFA-enriched diet significantly reduced impulsivity in SHRs compared with rats fed with the n-3 PUFA-deficient diet. **Conclusion:** The present data show a decrease in impulsivity following a dietary n-3 PUFA supplementation, but no changes in attention. A possible explanation for these results is that the attention displayed by SHR may not be linked to n-3 PUFA supply. It is important to note that inattention and impulsiveness are two of the main symptoms of ADHD. Our results regarding dietary n-3 PUFA supply may support the positive findings in human studies demonstrating that n-3 PUFA administration can improve the cognitive or behavioral symptoms in children with ADHD.

Kre-Celazine® as a Viable Treatment for Juvenile Rheumatoid Arthritis/Juvenile Idiopathic Arthritis – A Pilot Study

Golini Jeff and Jones Wendy Lou

ABSTRACT

The purpose of this study was to ascertain whether an oral, non-prescription, nutritional supplement compound composed of a proprietary alkali-buffered creatine monohydrate and cetylated fatty acids mixture (Kre-Celazine®) was efficacious in reducing or eliminating refractory pain and inflammation, without untoward effects, in Juvenile Rheumatoid Arthritis (JRA), which is also called Juvenile Idiopathic Arthritis (JIA). JRA/JIA is a patho-physiologically complex, chronic childhood autoimmune inflammatory disease of unknown etiology. Numerous studies have unsuccessfully attempted to pinpoint a possible common initiation event. Officially considered an affliction of children below the age of 16 years, an initial diagnosis has been confirmed in infants less than 1-year old, to individuals older than 17 years. In this study, sixteen juveniles, ages 7 through 16 years, experiencing long-standing, unremitting pain and inflammation despite previous use of prescription anti-inflammatory drugs and NSAIDs, were enrolled in a 30-day, open-label clinical study and treated with Kre-Celazine®. Efficacy of this nutritional supplement was determined by the juvenile's personal physician and based on observations of the following: (1) significant reduction or elimination of palpable signs of inflammation; (2) renormalization of range of motion; (3) reduction or absence of perceived pain as reported to the physician by the patient; (4) renormalization of C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) values. In addition, the individual's previous steroid or non-steroidal anti-inflammatory medication(s) were reduced or eliminated in a stepwise progressive fashion during the study.

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Clinical effectiveness of manual therapy for the management of musculoskeletal and non-musculoskeletal conditions: systematic review and update of UK evidence report.

Clar C, Tsertsvadze A, Court R, Hundt GL, Clarke A, Sutcliffe P.

ABSTRACT

Background: This systematic review updated and extended the “UK evidence report” by Bronfort et al. (*Chiropr Osteopath* 18:3, 2010) with respect to conditions/interventions that received an ‘inconclusive’ or ‘negative’ evidence rating or were not covered in the report. **Methods:** A literature search of more than 10 general medical and specialized databases was conducted in August, 2011 and updated in March, 2013. Systematic reviews, primary comparative studies and qualitative studies of patients with musculoskeletal or non-musculoskeletal conditions treated with manual therapy and reporting clinical outcomes were included. Study quality was assessed using standardized instruments, studies were summarized, and the results were compared against the evidence ratings of Bronfort. These were either confirmed, updated, or new categories not assessed by Bronfort were added. **Results:** 25,539 records were found; 178 new and additional studies were identified, of which 72 were systematic reviews, 96 were randomized controlled trials, and 10 were non-randomized primary studies. Most ‘inconclusive’ or ‘moderate’ evidence ratings of the UK evidence report were confirmed. Evidence ratings changed in a positive direction from inconclusive to moderate evidence ratings in only three cases (manipulation/mobilization [with exercise] for rotator cuff disorder; spinal mobilization for cervicogenic headache; and mobilization for miscellaneous headache). In addition, evidence was identified on a large number of non-musculoskeletal conditions not previously considered; most of this evidence was rated as inconclusive. **Conclusions:** Overall, there was limited high quality evidence for the effectiveness of manual therapy. Most reviewed evidence was of low to moderate quality and inconsistent due to substantial methodological and clinical diversity. Areas requiring further research are highlighted.

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Perception and attitudes: breastfeeding in public in New York City

Mulready-Ward C, Hackett M.

ABSTRACT

Background: In the United States, 76.9% of women initiate breastfeeding but only 36.0% breastfeed exclusively for three months. Lack of support for public breastfeeding may prevent women from breastfeeding in public, which could contribute to low rates of breastfeeding exclusivity and continuation, despite high rates of breastfeeding initiation. **Objective:** This study aimed to determine whether residents of New York City, New York, were supportive of and comfortable with public breastfeeding. **Methods:** A population-based public opinion telephone survey of non-institutionalized New York City residents 18 years and older was conducted by the New York City Department of Health and Mental Hygiene. **Results:** Overall, 50.4% of respondents were not supportive of public breastfeeding. In the multivariable analysis, there was significant variation in support by race/ethnicity, age, and education. There were no significant differences in support by sex, receipt of food stamps, nativity, or the presence of children younger than 12 years in the home. One-third (33.2%) of respondents were uncomfortable with women breastfeeding near them in public. There was significant variation by education in the multivariable analysis. Lack of comfort was highest among those with a high school education or less (39.9%) and some college (33.8%). **Conclusion:** New York City residents are conflicted about whether breastfeeding is a private act or one that can be done in public. For women who want to continue with their intention to breastfeed exclusively, the negative opinion of other residents may cause them to breastfeed only in private, thereby limiting the opportunity to breastfeed for the recommended time.

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Breastfeeding and Later Psychosocial Development of Children at Six Years of Age

Lind JN, Li R, Perrine CR, Schieve LA

ABSTRACT

Objective: To examine the association of breastfeeding duration with psychosocial development at six years of age. **Methods:** We analyzed data from the 2005—2007 Infant Feeding Practices Study II and its 2012 Year 6 Follow-Up (N = 1442). Our breastfeeding duration variable combined overall and exclusive breastfeeding reported during infancy (never breastfed, breastfed <6 months, breastfed ≥6 months + exclusive breastfeeding <3 months, and breastfed ≥6 months + exclusive breastfeeding ≥3 months). Maternal responses to the Strengths and Difficulties Questionnaire were used to create our child psychosocial outcome domains (emotional symptoms, conduct problems, hyperactivity, peer problems, prosocial behavior, and total difficulties). Separate multivariable logistic regression models controlling for maternal sociodemographic characteristics, maternal mental health, and child characteristics were used to assess the likelihood of having difficulties on the 6 domains based on breastfeeding duration. **Results:** Compared with children who were never breastfed, those who were breastfed for ≥6 months and exclusively breastfed for ≥3 months had decreased odds of difficulties with emotional symptoms (odds ratio [OR]: 0.52; 95% confidence interval [CI]: 0.27—0.99), conduct problems (OR: 0.24; 95% CI: 0.10—0.54), and total difficulties (OR: 0.39; 95% CI: 0.18—0.85) before adjustment. These associations were no longer significant after adjustment. **Conclusions:** Although in our unadjusted analyses we observed significant associations between breastfeeding duration and later psychosocial development, including decreased odds of emotional, conduct, and total difficulties at 6 years of age, these findings were no longer detectable after adjusting for the many potential confounding factors that play a role in psychosocial development.

Lingual Frenotomy for Breastfeeding Difficulties: A Prospective Follow-Up Study

Dollberg S, Marom R, Botzer E

ABSTRACT

Introduction: Breastfeeding difficulties are sometimes attributable to tongue-tie with short-term relief after frenotomy. Limited follow-up is available, and predictors for unsuccessful frenotomy have not yet been found. **Patients and Methods:** We recruited 264 mother-infant dyads who underwent lingual frenotomy for breastfeeding difficulties. Data regarding the indications, anatomy of the tongue, and the response of the infant were noted by the physician. Mothers were contacted by telephone at 2 weeks, 3 months, and 6 months after frenotomy to answer a questionnaire. **Results:** Two weeks after frenotomy, 89% of mothers were still breastfeeding. An improvement in breastfeeding was reported by three-quarters of the mothers, but, unexpectedly, 3% reported worsening. At 3 and 6 months after the procedure, 68% and 56% of mothers were still breastfeeding, respectively. We could not find any predictor to indicate those infants in whom breastfeeding would not improve. **Conclusions:** There are favorable long-term effects of frenotomy on breastfeeding. Lingual frenotomy does not always alleviate breastfeeding difficulties, and rarely worsening ensues. We could not find any predictor for successful breastfeeding after frenotomy. We speculate that because the procedure is minor, in the event of breastfeeding difficulties, lingual frenotomy should be considered as an effective tool to assist in long-term breastfeeding.

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Outcomes of Care for 16,924 Planned Home Births in the United States: The Midwives Alliance of North America Statistics Project, 2004 to 2009

Cheyney M, Bovbjerg M, Everson C, Gordon W, Hannibal D, Vedam S.

ABSTRACT

Introduction: Between 2004 and 2010, the number of home births in the United States rose by 41%, increasing the need for accurate assessment of the safety of planned home birth. This study examines outcomes of planned home births in the United States between 2004 and 2009. **Methods:** We calculated descriptive statistics for maternal demographics, antenatal risk profiles, procedures, and outcomes of planned home births in the Midwives Alliance of North American Statistics Project (MANA Stats) 2.0 data registry. Data were analyzed according to intended and actual place of birth. **Results:** Among 16,924 women who planned home births at the onset of labor, 89.1% gave birth at home. The majority of intrapartum transfers were for failure to progress, and only 4.5% of the total sample required oxytocin augmentation and/or epidural analgesia. The rates of spontaneous vaginal birth, assisted vaginal birth, and cesarean were 93.6%, 1.2%, and 5.2%, respectively. Of the 1054 women who attempted a vaginal birth after cesarean, 87% were successful. Low Apgar scores (< 7) occurred in 1.5% of newborns. Postpartum maternal (1.5%) and neonatal (0.9%) transfers were infrequent. The majority (86%) of newborns were exclusively breastfeeding at 6 weeks of age. Excluding lethal anomalies, the intrapartum, early neonatal, and late neonatal mortality rates were 1.30, 0.41, and 0.35 per 1000, respectively. **Discussion:** For this large cohort of women who planned midwife-led home births in the United States, outcomes are congruent with the best available data from population-based, observational studies that evaluated outcomes by intended place of birth and perinatal risk factors. Low-risk women in this cohort experienced high rates of physiologic birth and low rates of intervention without an increase in adverse outcomes.

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Development and Validation of a National Data Registry for Midwife-Led Births: The Midwives Alliance of North America Statistics Project 2.0 Dataset

Cheyney M, Bovbjerg M, Everson C, Gordon W, Hannibal D, Vedam S.

ABSTRACT

Introduction: In 2004, the Midwives Alliance of North America's (MANA's) Division of Research developed a Web-based data collection system to gather information on the practices and outcomes associated with midwife-led births in the United States. This system, called the MANA Statistics Project (MANA Stats), grew out of a widely acknowledged need for more reliable data on outcomes by intended place of birth. This article describes the history and development of the MANA Stats birth registry and provides an analysis of the 2.0 dataset's content, strengths, and limitations. **Methods:** Data collection and review procedures for the MANA Stats 2.0 dataset are described, along with methods for the assessment of data accuracy. We calculated descriptive statistics for client demographics and contributing midwife credentials, and assessed the quality of data by calculating point estimates, 95% confidence intervals, and kappa statistics for key outcomes on pre- and postreview samples of records. **Results:** The MANA Stats 2.0 dataset (2004-2009) contains 24,848 courses of care, 20,893 of which are for women who planned a home or birth center birth at the onset of labor. The majority of these records were planned home births (81%). Births were attended primarily by certified professional midwives (73%), and clients were largely white (92%), married (87%), and college-educated (49%). Data quality analyses of 9932 records revealed no differences between pre- and postreviewed samples for 7 key benchmarking variables (kappa, 0.98-1.00). **Discussion:** The MANA Stats 2.0 data were accurately entered by participants; any errors in this dataset are likely random and not systematic. The primary limitation of the 2.0 dataset is that the sample was captured through voluntary participation; thus, it may not accurately reflect population-based outcomes. The dataset's primary strength is that it will allow for the examination of research questions on normal physiologic birth and midwife-led birth outcomes by intended place of birth.