Chiropractic Management Using Multimodal Therapies on 2 Pediatric Patients With Constipation

Madhu Mia Iyer, DC, Evangelia Skokos, DC, MS, and Denise Piombo, DC, DACRB

ABSTRACT

Objective: The purpose of this case report is to describe chiropractic management of 7-month-old male twins who had had constipation since birth.

Clinical Features: Identical male twins presented with the chief complaint of constipation and bloating. Both patients were born premature after 29 weeks of gestation and had invasive abdominal surgeries in the right lower quadrant resulting in healed postsurgical scars. Patient A underwent ileostomy for a perforation in his ileum. Patient B underwent surgery to repair an inguinal hernia. Motion palpation restrictions indicated bilateral sacroiliac, cervical, and thoracic joint restrictions.

Intervention and Outcome: The treatment plan included chiropractic manipulation, acupressure stimulation, and dynamic neuromuscular stabilization. Manipulation of the sacroiliac, cervical, and thoracic spine joint restrictions was performed using minimal force. Cross-frictional massage and myofascial manipulation and scar tissue mobilization of the abdominal scar in the right lower quadrant were performed. Acupressure stimulation was performed on both patients' feet. Both patients had improved bowel movements after the first treatment. Patient A had 5 weeks of treatment (2 visits per week). Patient B had 4 weeks of treatment (2 visits per week). The patients' clinical progress improved, and once the goal of regular bowel movements was reached, as confirmed by their mother, follow-up visits were reduced to once a week and gradually to once a month.

Conclusion: Both pediatric patients with constipation responded to chiropractic care using multimodal therapies. (J Chiropr Med 2017;16:340-345)

Key Indexing Terms: *Chiropractic; Constipation*

INTRODUCTION

Constipation and bloating are common conditions seen in all age groups, including infants and children. It is estimated that more than 60 million people in the United States experience constipation.¹ The prevalence of childhood constipation is estimated at 29%.² Furthermore, 25% of visits to the pediatric gastroenterologist include a chief complaint of constipation.² Therefore, it is important to explore options for treating children with constipation.³

The pathophysiology of constipation is unclear, which makes it difficult for health care professionals to treat.³ In some cases, treatment of constipation is initiated using nonpharmacological treatment methods.³ Conservative treatment methods may include abdominal massage, chiropractic treatment, and

rehabilitative exercise therapy.³ Case reports have described the successful use of chiropractic care of pediatric patients with constipation.³⁻⁶ The purpose of this case report is to describe 2 infants receiving chiropractic care for constipation.

CASE REPORT

Case I

Health History and Examination. Patient A was a 7-month-old 20-lb male infant who had had difficulty with bowel movements since birth. The patient's mother reported that his bowel movements occurred every 2 days, the feces had a toothpaste-like consistency, and defecation sometimes required straining by the patient. Patient A's diet consisted mainly of breast milk, but he had been introduced to formula daily since birth. Patient A's mother denied any family history of constipation.

On the first visit, patient A was a thriving, smiling, and happy infant. Passive range of motion of the lumbosacral region was symmetric and within normal limits. Ortolani's test, Barlow's test and infant reflexes were unremarkable. Healed right lower quadrant scarring was noted to the midline (up to the umbilicus). The healed scar was notably

Department of Clinical Practice, National University of Health Sciences, Lombard, Illinois.

Corresponding author: Madhu Mia Iyer, DC, 1356 Woodcutter Lane, Unit C, Wheaton, IL 60189. Tel.: 224-795-3663. (e-mail: dr.miaiyer@gmail.com).

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Table 1. Summary of Treatment Protocol for Twin 7-Month-Old Boys

	Patient Description	Baseline Measure	Treatment	Treatment Frequency/Length of Care	Outcome Measure
Patient A	Age: 7 mo Weight: 20 lb	BM every other day with associated bloating noted by patient's parent; unsuccessful medical treatment of ingestion of probiotics Baseline BM frequency: 3 in 7 d	Full spine Scar tissue mobilization Acupressure on foot Dynamic neuromuscular stabilization	2 times/wk for 5 wk Total length: 5 wk Total visits: 10	6 BMs/wk—Almost 1 BM a day after 5 wk of treatment Parent reported that patient did not seem to be in distress because of bloating Parents also did not report any adverse reactions to the chiropractic care provided
Patient B	Age: 7 mo Weight: 18 lb	BM every other day with associated bloating noted by parent; unsuccessful medical treatment of ingestion of probiotics Baseline BM frequency: 4 in 7 days	Full spine Scar tissue mobilization Acupressure on foot	2 times/wk for 4 wk Total length: 4 wk Total visits: 8	BM every day after 4 wk of treatment Parent reported that patient did not seem to be in distress from bloating Parents also did not report any adverse reactions to the chiropractic care provided

BM, bowel movement.

uneven, deep, hypertonic, and not easy to move and manipulate. Patient A exhibited aversion to gentle percussion and palpation of the lower quadrants of the abdomen. Normal bowel sounds were heard on auscultation. Static and motion palpation of the spine revealed dysfunctional motion and mild joint stiffness of the sacroiliac (SI) joints bilaterally. Dysfunctional motion was also noted at the L1-L4 and C2-C3 functional spine units. Patient A's movement pattern was inspected, and it was noted that patient was unable to roll into the normal 3-month prone position.

Treatment and Outcome. Treatment for patient A included the use of gentle acupressure stimulation on the feet, scar tissue mobilization, and gentle manipulation technique followed by dynamic neuromuscular stabilization (DNS) to correct his movement patterns and improve level of function. The magnitude of the thrust and the forces used was adapted to the patient's age and neuromusculoskeletal maturity.

On the first visit, gentle manipulation was applied to the cervical and lumbar segments and SI joints, with the line of drive being posterior to anterior and lateral to medial. Acupressure stimulation was provided for 5 minutes by applying slight pressure on the plantar aspect of both feet using a thumb contact. Scar tissue mobilization to the abdomen was performed for 5 minutes, with gentle cross-frictional movement along the scar aimed at relaxing abdominal musculature. Patient A did not tolerate scar tissue mobilization well during the first visit; however, tolerance to this treatment improved from the second visit. For the next 3 visits, the patient was cared for with chiropractic manipulation, acupressure stimulation, and scar tissue mobilization. The DNS protocol was not introduced until the patient's fifth visit. The first DNS treatment entailed a right mastoid contact with light traction

and left fourth intercostal space (ICS) contact with a vector toward to the opposite shoulder. After the very first treatment, patient A was able to turn toward the right into a prone position. During the next few visits, the DNS protocol included contacting the mastoid process and fourth ICS on the left and the right sides, to have the patient engage in turning to a prone position from both sides. After the third DNS treatment, patient A was able to turn prone from both sides without difficulty or any assistance. The scar tissue mobilization seemed to loosen the scar, allowing the patient to engage in trunk movement more easily. Patient A was seen in the clinic twice per week for 5 weeks (10 treatments in total), where we treated him using the above-mentioned treatment modalities (Table 1). Patient A's mother reported that he had a bowel movement (BM) an hour after the appointment. No adverse reactions were reported. After a total of 10 treatments, patient A consistently had 6 BMs per week (Table 1).

Case 2

Health History and Examination. Patient B was a 7-month-old 18-lb male infant with constipation since birth. Patient B had approximately 5 BMs per week; however, the patient's mother reported that feces had a toothpaste-like consistency, and defecation rarely required straining by the patient. Patient B's diet consisted mainly of breast milk, but he was introduced to formula since the time of birth.

On the first visit to the office, patient B was a thriving, happy infant. Passive range of motion of the lumbosacral region was symmetric and within normal limits. Ortolani's test, Barlow's test, and infant reflexes were unremarkable. A healed right lower quadrant scarring was noted to the midline (up to the umbilicus). The abdominal scar tissue

was even, loose, and easy to move and manipulate. Normal bowel sounds were heard. Static and motion palpation of the spine revealed dysfunctional motion of the left SI, cervical, and thoracic spine. Patient B's movement pattern was inspected, and no aberrant movement patterns were noted.

Treatment Plan. Treatment protocol for patient B included the use of gentle acupressure stimulation along his feet and scar tissue mobilization followed by gentle chiropractic manipulation. Because no aberrant movement patterns were noted, dynamic neuromuscular stabilization was not incorporated into his treatment plan.

Treatment Description and Outcome. On the first visit, scar tissue mobilization was performed with gentle cross-frictional movement along the scar to loosen up tightness of the abdominal musculature. Following the tissue mobilization, acupressure treatment was provided on the plantar aspect of the patient's feet. Gentle chiropractic manipulation was applied to the SI joint and cervical and lumbar spine. The next few office visits included gentle chiropractic manipulation of the SI joint and midthoracic spine. Patient B was seen twice a week for only 4 weeks (8 treatments in total) (Table 1). No adverse reactions were reported. Patient B tolerated treatments well, and his mother reported that he had at least 1 BM every day after a total of 8 treatments (Table 1).

During the treatment period, no changes were made in the patients' lifestyle. Since the time of birth, their diet included breast milk and formula milk; supplements (since they were 2 months old) included ferrous sulfate and probiotics. The parent provided consent for the health history of both patients to be published in this case report.

DISCUSSION

The North American Society for Pediatric Gastroenterology, Hepatology and Nutrition defines constipation as "a delay or difficulty in defecation, present for 2 weeks or more."⁷ In addition, the National Institute of Diabetes, Digestive and Kidney Diseases defines constipation on the basis of BM frequency. According to the National Institute of Diabetes, Digestive and Kidney Diseases, constipation in children is defined as fewer than 3 BMs per week.⁸ Other sources define constipation as diminished large intestine peristalsis resulting in slow movement of feces.⁴ Constipation resulting from diminished gut motility may be caused by a myriad of factors including suboptimal input from the nervous system, hormones, diet, and medications.⁴ Atonic rectal muscles, a spastic colon, or an obstructed colon can also cause constipation.⁶ Lastly, obstructive constipation can be a result of adhesions from a surgery.⁶ In our case report, both patients had undergone extensive abdominal surgeries. It is possible that the surgery could have altered the intrinsic abdominal musculature and fascia that help stabilize the lumbopelvic region.⁶

For these patients, I chose 4 treatment modalities: scar tissue mobilization, acupressure stimulation, dynamic neuromuscular stabilization, and chiropractic manipulation. The first component of the treatment was scar tissue mobilization and acupressure stimulation. Scar tissue mobilization was accomplished by performing gentle cross-friction movements that created short- and long-axis traction along the patients' scars. Gürsen et al explained this method in a randomized controlled trial in which connective tissue manipulation was 1 of the conservative methods of care for constipation.³ It is theorized that this conservative treatment method causes "vasodilation by local mechanical effect on mast cells in the connective tissue."³ The increase in vasodilation is believed to increase parasympathetic activity, thus improving circulation and healing processes around the scar tissue.³ Gürsen et al reported that there was a significant improvement in the intervention group compared with the control group.³ The study also indicated that the patients in the intervention group not only had reduced symptoms of constipation, but also had improved quality of life.³

The acupressure portion of the treatment protocol included stimulation of skin in the feet. This was added as an adjunct to the scar tissue mobilization. Both treatment methods are *reflex therapies* that stimulate the mechanoreceptors and nerve endings in the skin.^{3,9} An experiment conducted by Sato using anesthetized rats found specific autonomic responses of gastrointestinal tract linked to somatic sensory stimulation.^{9,10} The study stated that pinching the abdominal skin of the rat increased sympathetic activity and pinching the skin of the hind paw increased parasympathetic activity.^{9,10} The increase in gastric motility from hindpaw pinching was explained as an increase in vagal efferent nerve input causing cutaneous intestinal reflex facilitation.^{9,10} It was further elucidated by Sato that the pinching of the rat skin was a form of acupuncture-like stimulation that activated the somatogastrintestinal reflexes.¹⁰

Another component of the treatment protocol in both patients was the chiropractic manipulative treatment. The techniques used were adapted and diversified for the patient using *specific spinal and pelvic adjustments* explained by Anrig and Plaugher.¹¹ Numerous studies have explained the neurophysiological effect of spinal manipulation. In a review article by Pickar in 2002,¹² changes in reflex neural outputs to visceral organs from spinal manipulative therapy were explained. Pickar theorized that a "structural dysrelationship" could cause altered paraspinal muscle tone, aberrant vertebral movement, and abnormal reflex responses that include both somatosomatic and somatovisceral reflexes.¹² Sato explained aberrant somatovisceral reflexes and their effect on gut motility as an alteration in vagal efferent input to the nervous system.^{9,10} The nervous system innervates the gastrointestinal system in 2 ways. It provides sympathetic innervation via preganglionic fibers from T5-L2 spinal levels. Stimulation of the sympathetic nerve fibers inhibits gastrointestinal activity.

Pickar theorized that noxious chemical stimulation, particularly to the midthoracic region, inhibited gastric motility. It can be theorized from this that the gentle spinal manipulations provided to both patients in this case report might have contributed to relaxation of the paraspinal tissues surrounding the midthoracic vertebral segments and, therefore, decreased any somatosympathetic reflexes.^{12,13} The gastrointestinal system receives parasympathetic input from the brainstem via the vagus nerve and the S2, S3, and S4 sacral nerve roots. Korr theorized that somatic segmental dysfunction could cause trophic changes to the nerve at that segmental level. These trophic changes can be mechanical, such as compression, stretch, and torsion of the nerves, which may affect axonal transport and proper nerve conduction.¹⁴ The vagus nerve exits the skull via the jugular foramen and traverses in close proximity to the occiput and upper cervical vertebrae. Therefore, segmental dysfunction at the cranial and upper cervical levels can create trophic changes to the vagus nerve and, thus, cause a suboptimal parasympathetic input to the gut. Similarly, a segmental dysfunction at the SI joint may cause trophic changes to the pelvic splanchnic nerves: S2, S3, and S4. It is possible that spinal manipulation at these levels provides the adequate biomechanical changes and somatovisceral reflex input needed for optimal parasympathetic function that promotes gut motility.¹²⁻¹⁴

Dynamic neuromuscular stabilization was incorporated only into patient A's treatment protocol to correct aberrant movement patterns. The DNS treatment protocol included contacting the mastoid process and fourth ICS on the left and the right sides, to have the patient engage in turning to a prone position from both sides. After the third DNS treatment, patient A was able to turn prone from both sides without difficulty or any assistance.¹⁵ The literature on DNS and the basis of developmental kinesiology have taught us that during the first year of life, central nervous system motor control evolves and matures. This maturity occurs mainly at the subcortical level.¹⁶ It is crucial that functional musculoskeletal milestones be achieved during the first year of life as they correlate directly with visceral and physiological development. Postural locomotion function including movement of the head, neck, and extremities, along with the ability to use the core muscles, develops during the infant stage.¹⁶ According to Kobesova and Kolar, muscle synergy needs to exist between pelvic floor, abdominal wall, and spinal extensor muscles. The stability of the low back results from an increase in intraabdominal pressure produced by this muscle synergy.¹⁶ This synergy is also essential for the development of proper reflex-locomotion patterns, as well as viscerosomatic patterns.¹⁶⁻¹⁸ It is possible patient A's abdominal surgery had affected the muscle synergy. Altered gastrointestinal tract dysfunction, pelvic floor dysfunction, and aberrant breathing patterns can cause several changes that include joint dysfunction, soft tissue dysfunction, and aberrant movement pattern.¹⁶⁻¹⁸ The DNS rehabilitative protocol

was incorporated to correct patient A's movement patterns providing biomechanical changes for improved somato-visceral and viscerosomatic input for optimal gut function.

Several case studies have reported how chiropractic manipulative therapies may have helped resolve various gastroenteric conditions in the pediatric population. In 2007, Gürsen et al reported the use of abdominal massage and chiropractic manipulative therapies to resolve constipation in an 8-year-old pediatric patient.³ In a 2010 case report by Kamrath, chiropractic management of a 5-year-old boy with urinary and bowel incontinence proved to be successful.¹⁹ A pilot study conducted on children with cerebral palsy with chronic constipation used osteopathic treatments such as fascial release and bowel mobilization and reported that these manual techniques were as relevant as medical care for constipation.²⁰ A few studies conducted by Alcantara suggested that there is a significant clinical outcome following chiropractic treatment for pediatric patients with constipation. The chiropractic techniques used vary among clinicians; however, most chiropractic physicians use diversified techniques to manipulate the spine.^{20,21}

For any intervention, the safety and efficacy of the treatment are always in question, especially when treating pediatric patients. In a review of the literature on adverse effects of chiropractic treatment of children, Todd et al stated that 3 deaths have been attributed to manual therapies.²² Quality of life is significantly affected in children with chronic constipation compared with children with other childhood gastrointestinal ailments, such as inflammatory bowel disease and gastroesophageal reflux disease.²³ A case-controlled study by Youssef et al indicated that 67% of the patient population were males, 89% of these patients had abdominal pain, and 100% of these patients had fewer than 3 BMs per week.²³ If symptoms can be reduced and quality of life can be improved with chiropractic care in the pediatric population, then controlled clinical trials and further research may be warranted to determine the efficacy of such treatments.

Limitations

There was a lack of objective measures of BM changes in both patients. Because the patients were nonverbal minors under the care of their mother, the only way to measure the number of BMs was through the mother's observation and tally. The patients' progress with the treatments was monitored using the parent's recollection of the number of BMs. The results in this case report indicate that conservative treatment methods may be effective in treating constipation in infants.

CONCLUSION

Both patients in this case report exhibited improvement in symptoms for constipation. The patients' mother reported improvement after the first treatment. Patient A

exhibited improvement with a BM frequency/pattern of 2 days on and 1 day off. It is important to note that patient A had an ileostomy only a few weeks after birth in which a portion of his colon was resected, and this may have contributed to suboptimal bowel function. Patient B exhibited the most improvement when his BM frequency stabilized to 1 BM a day. This BM frequency was maintained throughout the course of treatment and during follow-up visits as well. Chiropractic spinal manipulation along with gentle reflex therapy (which included acupressure stimulation and scar tissue mobilization) seemed to provide improvement in both patients. The treatments were tolerated well by both patients, and there were no adverse effects.

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

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): M.M.I.

Design (planned the methods to generate the results): M.M.I.

Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): E.S., D.P.

Data collection/processing (responsible for experiments, patient management, organization, or reporting data): M.M.I.

Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): M.M.I.

Literature search (performed the literature search): M.M.I.

Writing (responsible for writing a substantive part of the manuscript): M.M.I.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): M.M.I., E.S., D.P.

Practical Applications

- The 2 patients described responded to chiropractic manipulative therapy and reflex therapy.

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