

Canine

Resolution of Constipation, Polydipsia and Generalized Weakness in a 14-year-old Canine Following Chiropractic Adjustment: A Case Report & Review of the Literature

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Abstract

Objective: This paper presents the chiropractic management and care of a spayed 14-year-old female Boston terrier canine with constipation, polydipsia, generalized weakness, and vertebral subluxation complex.

Clinical Features: Patient presented with 6-day history of constipation, polydipsia, and generalized weakness, and an examination utilizing static and motion palpation was conducted. Patient also has a history of impacted anal glands, xerosis, and obesity. On presentation, the dog could not stand or walk and multiple vertebral subluxations were identified.

Intervention and Outcomes: Patient was seen for chiropractic evaluation and treatment twice to remove vertebral subluxations and restore optimal function of the nervous system. After one chiropractic adjustment the ability to walk independently improved and the patient experienced a significant bowel movement immediately after the adjustment.

Conclusion: Chiropractic may be an effective approach for the management of functional constipation in canines and further research evaluating treatment protocols for animals is needed to optimize benefits of care. Spinal adjustments were performed using manual technique, and chiropractic treatment was administered under referral from a veterinarian.

Key Words: *chiropractic, animal chiropractic, vertebral subluxation complex, adjustment, constipation, canine*

Introduction

In the United States, constipation is said to be one of the most common conditions diagnosed among domestic dogs.^{1,2,3} However, there has been limited research performed to establish exact prevalence and incidence rates of gastrointestinal dysmotility among the estimated 69.9 million dogs in the United States.⁴ Interest in the study of canine gastrointestinal conditions and diseases is usually out of concern for public health. As a result, numerous studies examining incidence and prevalence rates of infectious diseases among dog populations have been conducted internationally.⁵⁻⁷ Other research is concerned with the prevalence of overweight and obesity among domestic dogs, especially in relationship to other diseases. In 2006, Lund et al determined that overweight and obesity have a combined prevalence of 34.1% among the adult dog population in the United States. This study also determined that gastrointestinal diseases diagnosed by veterinarians are prevalent in 6.6% of

obese and 7.3% of both overweight and normal weight adult dogs.⁸

These statistics are valuable for understanding how many dogs in the United States are at risk for developing musculoskeletal and cardiovascular disorders, glucose intolerance and diabetes mellitus, and bladder and mammary cancer.⁸ Further research also suggests canine obesity as a risk factor for hypertension and immune dysfunction, which is closely related to gastrointestinal function.⁸ Banfield Pet Hospital is a large privately owned company that publishes the State of Pet Health® Report annually.⁹ The first report was published in 2001, and it is the first report of its kind to prioritize optimization of animal health and welfare. The 2016 report estimates a 79.7% increase in canine diabetes since 2006, which is a risk factor for constipation due to chronic dehydration.^{9,10} A study conducted by Rakha et al. found that

digestive problems are the most common health problem among dogs in Cairo, Egypt with a prevalence of 56.5% in a population of symptomatic dogs.³ The same study found that constipation was the least common digestive problem with a prevalence of 0.89% among the same population. Prevalence of digestive problems may be strongly affected by feeding management, type of feed, and owner education regarding food quality. The most significant risk factors for constipation are diet and eating habits, which may also be affected by stress.^{1,2,11} Additional risk factors for developing constipation include recent surgery, history of pelvic trauma, and radiation therapy.^{1,2}

Gastrointestinal motility is a complex physiological process involving coordinated neuromuscular functions including reflexes within the gut.¹²⁻¹⁵ Coordinated contraction and relaxation of the smooth muscle in the wall of the bowel produces peristaltic waves that move fecal matter along the length of the colon.¹² Disruption results in dysmotility, and hypomobility causes constipation.^{11,12,15} Constipation is defined as infrequent or difficult evacuation of feces from the gastrointestinal tract.^{1,2,16} Intraluminal transport slows or ceases and normal gastrointestinal absorption is interrupted causing distention of the gastrointestinal tract, increased intraabdominal pressure and delay of nutritional delivery as well as possible bacterial overgrowth, fluid sequestration and hypovolemia.^{11,12} Primary symptoms of constipation in dogs include straining to defecate and passing hard, dry feces.^{1,2} Severe symptoms include lethargy, depression, anorexia, emesis, and abdominal discomfort.^{1,2}

Gastrointestinal motility is controlled by the enteric nervous system (ENS), which communicates with the central nervous system through sympathetic and parasympathetic pathways.^{12,13} Intrinsic pathways modulate inhibitory reflexes in the gut while extrinsic pathways control long and short reflex pathways.¹⁵ Defecation is controlled by sensorimotor coordination of the colon, rectum, and anus, and abnormal contractility of the colon may subsequently disrupt transit times and defecation frequency.¹⁴ When transit time increases, fecal material becomes drier, harder, and more difficult to expel resulting in constipation, which is characterized by infrequent, difficult or the absence of bowel movements.^{1,2,10}

The neuroanatomy and physiology of colorectal function has been poorly understood until relatively recently because the colonic and rectoanal regions have been studied separately and the proximal colon is difficult to access for investigation.^{12,13,15} Functional gastrointestinal disorders like constipation are also difficult to study because bowel habits are inherently private and affected by clinical observation.¹⁷ Nonhuman animal models are the basis for understanding of normal colorectal function in humans.^{12-15,18} Interestingly, canine colorectal anatomy and fecal properties are relatively similar humans, so dogs are often used as models for normal colorectal motility.¹²⁻¹⁵

The most common clinical findings of constipation in dogs is tenesmus and passage of hard, dry feces.^{1,2,10} If a dog has not experienced a bowel movement within two days and is observed straining, crouching, or crying when attempting to defecate, the animal should be examined by a veterinarian.¹⁰ Constipation may be a symptom of another condition such as

hypothyroidism, dysautonomia, hypokalemia, hypercalcemia, spinal cord lesions, prostate or lymph node enlargement, intraluminal tumor, pelvic fracture, colonic stricture, or megacolon.^{1,2} Some medications like opioids and antihistamines also cause constipation.^{1,2} Mild cases of constipation may resolve without intervention, documentation or known, but moderate to severe cases may become chronic, interfere with normal gastrointestinal function and affect overall health of the animal.^{1,2,10} If unresolved, constipation may result in intraluminal obstruction, which is a life-threatening condition requiring immediate medical attention.^{1,2,10} An animal with an obstruction may exhibit unproductive straining behavior, lethargy, anorexia, or vomiting.¹⁰

Treatment recommended by a veterinarian may include administering laxatives, prescribing medication to increase contractile strength of the large intestine, enema administration, manual extraction.^{1,2,10} In severe cases, surgery may be necessary. Surgery is expensive and sometimes does not resolve the problem.¹⁹ Increasing dietary fiber and physical exercise may help resolve mild cases of constipation and will help prevent reoccurrence.^{1,2,10}

Animal rehabilitation is a growing field, and it has expanded to include chiropractic.²⁰⁻²² Manual therapies are considered complementary and alternative veterinary medicine (CAVM), and all manual therapies are intended to facilitate healing within the neuromusculoskeletal system.^{21,23} Many animal owners report using CAVM without consulting their veterinarian, so increased popularity of CAVM may be due to increased demand from animal owners or changing attitudes of physicians.^{21,22} In 2015, Banfield Pet Hospital published an insight report for veterinarians instead of the State of Pet Health® Report, which suggests that animal owners and veterinarians define preventative care differently.²⁴ For veterinarians, preventative care includes vaccination, spaying/neutering, and parasite control while animal owners are asking questions about diet, exercise, and emotional well-being.²⁴ Chiropractic offers an approach to animal healthcare that is congruent with animal owner concerns. The purpose of presenting this case report is to demonstrate how chiropractic addresses the root cause of a non-musculoskeletal condition and may serve as an alternative to traditional treatment options.

Case Report

A spayed 14-year-old female Boston terrier mix presented for chiropractic evaluation and treatment with a six-day history of constipation, polydipsia, and generalized weakness. The owner was referred by the treating veterinarian who also provided spinal, right forelimb, and abdominal radiographic series.

Upon presentation to veterinary practice five days prior, the dog exhibited lameness in the right forelimb with no crepitus, moderate neck stiffness, polydipsia, light colored stool, and very thick anal sac discharge. The dog weighed 46.10 lbs. Results of a comprehensive complete blood count (CBC) were within normal limits except monocytes were decreased. Blood chemistry revealed elevated alkaline phosphatase (ALP), alanine aminotransferase (ALT), and creatine kinase as well as

decreased blood glucose and chloride. Fecal testing was negative for ova or parasites including *Giardia*. Urinalysis of a free-catch sample revealed yellow, clear urine with specific gravity of 1.034 and pH of 6. Urine was also negative for glucose, bilirubin and blood and positive for trace amounts of ketones. The treating veterinarian noted possible liver disease, but laboratory test results were inconclusive. Radiographic examination of the spine and right forelimb were performed. The patient was prescribed half of a tablet of Previcox 227, a non-steroidal anti-inflammatory, daily as well as two capsules of Body Sore, a traditional Chinese veterinary medicine herbal blend for back pain, twice daily.

The dog was re-examined two days later by the treating veterinarian with no change in her condition and without defecating for at least two days. The dog was prescribed four capsules of JT Bu Zhong Yi Qi Tang twice daily to support liver function as well as one capsule of milk thistle (400mg capsules) per day.

The dog was seen again the following day with acute onset of generalized weakness and absence of defecation for at least three days. Re-examination revealed decreased conscious proprioception (CP) in both hind limbs with normal deep pain and spinal reflexes. The dog was treated with dexamethasone injection (4 mg/ml), subcutaneous fluids, and radiographic examination of the spine.

The dog was re-examined again the follow day with no defecation for at least four days but exhibited improved locomotion. The veterinarian prescribed three capsules of JT Dang Gui Cong Rong (0.5g capsules) twice daily to lubricate the large intestine.

The dog was re-examined and hospitalized another three days later after continuing to eat but not defecating for at least six days. Re-examination revealed significant abdominal distention while digital rectal exam showed an absence of stool. Upon admission, an enema was administered and an abdominal radiographic series obtained. Radiographic examination revealed marked accumulation of fecal material in the intestines. The veterinarian recommended diagnostic barium impregnated polyethylene spheres (BIPS) to evaluate the patient for possible gastrointestinal obstructions or motility disorders. The owner of the dog declined testing and was referred for animal chiropractic evaluation.

The dog was brought to the animal chiropractic clinic fully supported in a wagon because she was unable to walk independently. The dog was lifted out of the wagon and placed on the floor where she was unable to stand without her hind limbs collapsing. Chiropractic examination revealed bilateral hind limb weakness and decreased CP with normal deep pain and spinal reflexes. Static palpation revealed increase tone in the paraspinal muscles throughout the lumbosacral and cervical regions. Motion palpation revealed vertebral subluxations at the spinal segmental levels of C1, T13, L1, L6, L7, and sacrum. The dog received chiropractic adjustments at these levels as well as C1 traction using manual adjusting technique. The dog was taken outside immediately after her adjustment to evaluate for changes in posture and gait. The dog could stand and walk a couple of steps without assistance and experienced a bowel movement of significant volume. At

follow-up one week later, the dog was moving better and received a second chiropractic adjustment at the spinal segmental levels of C1, T13, L1, L6, and L7 with better resultant motion.

Discussion

Gastrointestinal disease is difficult to diagnose in dogs because many conditions cause the same symptoms including emesis, anorexia, and weight loss.^{1,2,10} A complete history and physical examination performed by a veterinarian is necessary to rule out conditions requiring immediate medical intervention such as a foreign object obstructing the lumen of the intestine. Veterinarians may perform diagnostic testing including fecal examination, blood testing including a blood chemistry panel with a complete blood count, urinalysis, abdominal x-rays, abdominal ultrasound, and species specific testing like canine parvovirus.^{1,2} Abdominal palpation and digital rectal examination may confirm the presence of retained fecal material while endoscopy and exploratory surgery are more invasive diagnostic procedures sometimes used when other testing is inconclusive.^{1,2} Spinal examination by an animal chiropractor begins with a detailed medical history, history of chief complaint, and observation of the animal for conformational and postural abnormalities including lameness.²³

Gait Analysis

Gait analysis involves evaluation of characteristic limb movement, balance and fluidity of movement using observation and objective biomechanical analysis.^{23,25} Dogs exhibit symmetric and asymmetric gaits, and one gait cycle is defined by the pattern of movement required to include one stride for each of the four limbs.²⁵ Lameness is defined as a change in gait due to limb pain while bearing weight.²⁶ Understanding the experience of pain in animals is challenging because it is only possible to observe pain behaviors, and observation of lameness is difficult because animals compensate to hide the degree of their lameness.^{27,28} Research suggests that observational gait analysis has low inter-observer reliability unless lameness is absent or severe while force plate analysis is more sensitive in the detection of lameness depending on size, range and sensitivity of the model.^{28,29} Each gait is characterized by a specific ground reaction force pattern, and a force plate measures orthogonal ground reaction forces.^{25,28} Numerical rating scales (NRS) and visual analog scales (VAS) are subjective scoring systems that have been used to quantify observation but shown to correlate poorly with force plate gait analysis.²⁸ As more research has been conducted to understand normal gait patterns and the effects of lameness on force distribution in dogs, force plate gait analysis is becoming a more useful clinical diagnostic tool.^{29,30}

Palpation

Light static palpation helps detect swelling or atrophy while deep static palpation including manipulation of the visceral organs may elicit a painful response in an animal.²⁶ Intersegmental motion palpation is a passive manual examination technique used to evaluate segmental loss of normal range of motion.^{31,32} Normal joint end feel begins as

gentle restriction and becomes steadily more restrictive until end range of motion is reached.²³ Abnormal joint end feel is detected as a sudden, hard restriction earlier in normal range of motion.²³ Motion is evaluated in the six degrees of freedom and deviation from normal range of motion suggests joint dysfunction.^{23,31,32}

Neurological Isolation Tests

The panniculus reflex (PR) is a unique extensor response in quadrupeds involving the cutaneous trunci muscle (CTM), which is a thin skeletal muscle covering the dorsal and lateral walls of the abdomen and thorax controlled by ventral and ventrolateral nuclei in the ventral horn at C8 and T1 spinal levels as well as the lateral thoracic nerve originating at the brachial plexus.^{26,33} Reflexive contraction of the CTM moves the overlying skin and functions to remove irritants like insects and increase heat production.³³ The PR is tested with the animal standing or in straight lateral recumbent position.²⁶ Starting in the lumbosacral region and moving cranially one vertebral segment at a time, the skin immediately lateral to the spine is lightly pinched.^{26,33} A normal response is bilateral contraction of the CTM causing a twitch in the overlying skin, and the PR is normally absent in the cervical and sacral regions.²⁶ Absence of the PR at a specific level indicates a lesion 1-4 vertebral segments cranial, and brachial plexus involvement may induce loss of the PR ipsilaterally while leaving the contralateral response intact.²⁶

Spinal reflex testing evaluates the function of sensorimotor pathways, and spinal deep tendon reflexes (DTR) tested in a dog include bicipital, tricipital, and patellar tendon reflexes. If a DTR is weak or absent, it indicates a lesion at the level of the peripheral nerve, spinal nerve roots, spinal segments, neuromuscular junction, and/or muscle.²⁶ A crossed-extensor reflex is abnormal and indicates an upper motor neuron lesion.²⁶

The withdrawal reflex evaluates spinal nerves C6-T2 when tested on the thoracic limb and L6-S2 when tested on the pelvic limb. On the thoracic limb, the efferent component of the withdrawal reflex is controlled by the musculocutaneous, axillary, median, ulnar, and radial nerves depending on the dermatomal region stimulated. On the pelvic limb, the sciatic nerve mediates the withdrawal reflex exclusively.²⁶ The withdrawal reflex is elicited by pinching between the toes of each limb. It is a protective reflex, and a normal response is flexion of the limb away from painful stimuli.²⁶ The withdrawal reflex helps localize the site of a lesion and does not indicate the presence or absence of conscious perception of pain.

The perineal reflex evaluates S1-S3 and caudal spinal nerves as well as perineal and caudal rectal branches of the pudendal nerve.²⁶ It is elicited by lightly touching the perineum on the left and the right sides separately. A normal response is for the dog to contract the anal sphincter and flex the tail.

Conscious proprioception (CP) refers to position sense, which is neurologically transmitted via the dorsal column and medial lemniscus pathways to the contralateral cerebral hemisphere.³⁴ Transmission follows the fasciculus cuneatus tract for the thoracic limb and the spinomedullary tract for the pelvic

limb.³⁴ CP is tested with the dog supported in the standing position. The examiner lifts one paw at a time and places the dorsal surface back into contact with the floor or exam table.²⁶ A normal response is for the dog to immediately flip their paw back into the neutral position. Delay or failure to return the paw into the neutral position indicates neurological involvement. Initial loss of CP indicates injury to the superficial myelinated nerve fibers, which may progress to loss of motor function followed by loss of pain perception.³⁵

Radiographic Analysis

X-rays are commonly utilized in chiropractic practice to assess alignment and structural integrity of osseous structures. In veterinary practice, diagnostic x-rays are used to visualize osseous structures and large body cavities while assessing for the presence of foreign objects. In the case of constipation, abdominal x-rays may be useful for visualizing retained fecal matter and foreign material in the gastrointestinal tract such as bones or inorganic matter.^{1,2,10}

Chiropractic Adjustment

A chiropractic adjustment most often involves a high-velocity, low-amplitude (HVLA) application of a force to the spine.³⁶⁻³⁸ The AVCA certification training programs teaches manual adjusting techniques, but some chiropractors and veterinarians also utilize instrument adjusting techniques, which will not be described here. A chiropractic adjustment is applied in the line of correction, which is a three-dimensional vector opposite the position of a misaligned vertebral segment described using the Cartesian coordinate system.³⁹

Pathophysiological Mechanisms

Historically, the effects of a chiropractic adjustment have been explained by the nerve compression theory.^{40,41} According to this theory, an abnormal biomechanical relationship between two vertebrae compresses spinal nerve roots, which causes pain and disease.^{40,41} This relationship between bone and nerve is identified as a vertebral subluxation complex (VSC), and it is corrected by inputting a specific force into the tissue.^{40,41} Chiropractic is founded on the principle of the VSC, but it has been defined using numerous models over time.^{38,41} Increased demand for evidence-based healthcare has led to more research examining VSC components and documenting chiropractic treatment outcomes. Currently, five theoretical models of vertebral subluxation have been substantiated by research.⁴¹

In his paper, Kent outlines five modern theoretical models of vertebral subluxation: subluxation complex, subluxation degeneration, nerve compression, neurodystrophic, dysafferentation, and segmental facilitation models.⁴¹ The subluxation complex model has five components: spinal kinesio-pathology, neuropathology, myopathology, histopathology, and biomechanical changes. A vertebral subluxation complex (VSC) is defined by specific tissue changes including osseous and neurological components, connective tissue involvement, altered biomechanics, and progressive complications often observed as symptoms.⁴¹ In the subluxation degeneration model, spinal degeneration is described as a progressive process resulting from abnormal

biomechanics. Spinal degeneration has five neurological consequences of spinal degeneration: spinal cord compression, nerve root compression, local irritation, vertebral artery compromise, and autonomic dysfunction.⁴¹ Modern research supports the nerve compression theory whether compression is the result of VSC and/or spinal degeneration. It has shown that as little as 10 mmHg of pressure on a nerve causes decreased action potentials.⁴¹ Research has also shown that nerve compression may cause neurological dysfunction without causing pain. Instead, modern nerve compression theory postulates that nerve compression causes neurological dysfunction and pain is the result of the resultant cascade of physiological changes including circulatory and inflammatory changes.⁴¹ Similarly, VSC is associated with increased activity of the sympathetic nervous system, paraspinal muscle tone, and changes in organ and tissue function according to the neurodystrophic model.⁴¹

In the dysafferentation model, biomechanical dysfunction of the intervertebral motion segment results in abnormal nociception and mechanoreception, or changes in afferent input to the CNS. Mechanoreceptors are found in the intervertebral discs, articular joint capsules, and the ligaments attached to the spine; therefore, changes in mechanoreceptor function may substantially affect proprioception, sensation, and postural tone.⁴¹ Again, the result of dysafferentation is a cascade of physiological reactions leading to dysponesis, or a reversible pathological state characterized by errors in energy expenditure.^{41,42} Lastly, segmental facilitation theory suggests that decreased thresholds in efferent neurons originating from the anterior and lateral horn cells increases neurological activity to the target tissue of these neurons exhibited as dysfunction and pathology.

The theoretical model of vertebral subluxation most applicable to the discussion of this care report is the dysafferentation model because constipation results from the inability to adapt to the environment, or maintain homeostasis.^{41,43} Abnormal visceral sensory perception, inappropriate information integration in the CNS, and/or abnormal efferent output to the gastrointestinal tract interrupts the normal coordinated contraction and relaxation of the bowel causing retention of fecal matter that is difficult to expel.^{11,12} Whether the inciting condition is a primary gastrointestinal condition or a secondary pathophysiology, gastrointestinal hypomobility is the result of biomechanical dysfunction within the body and disruption of homeostatic balance.¹¹ A musculoskeletal dysfunction like VSC increases sympathetic tone, which decreases peristalsis and increases vasodilation.^{41,44} An HVLA chiropractic adjustment applied at the level of the VSC in the plane of the joint and in the direction of normal anatomical position changes sensorimotor processing and integration as well as motor control.^{36,38}

Gastrointestinal motility may be affected by numerous factors including diet, level of physical activity, neurological communication, hormones, disease, medication, and stress.⁴⁵ A chiropractic adjustment has a direct influence on the gastrointestinal system through the nervous system, which may significantly affect gastrointestinal motility. In the present case, the patient exhibited significant improvement in symptoms of constipation immediately after a single chiropractic adjustment.

Neurology of Constipation

The literature suggests an association between the neuroanatomy and physiology of the large intestine and the central nervous system.^{12,15,46,47} The ascending colon is controlled by the vagal parasympathetic nervous system and the descending colon is controlled by the sacral parasympathetic nervous system.^{13,14} Colonic transit scintigraphy studies demonstrate that the process of defecation requires coordinated movement of the colon, rectum, and anal canal, which is controlled by the sacral nerves.¹³ There are several gastrointestinal reflexes that affect these coordinated movements, and current research suggests that a long intestinointestinal inhibitory reflex controlled by extrinsic sympathetic pathways exists between the proximal colon and the rectum.¹⁵ Rectal distention due to fecal stasis is understood to cause gastrointestinal dysmotility by activating inhibitory reflexes, impairing colonic contractions, and delaying gastrointestinal transit time.⁴⁸ Fecal stasis resulting in constipation in a dog may be caused by excessive or insufficient dietary fiber, inadequate exercise, blocked anal sacs, enlarged prostate gland, trichobezoar, ingested inorganic material, tumor, medication, pelvic trauma, neurological interference, or dehydration.^{1,2,10}

Chiropractic Literature

There is limited research examining chiropractic care for patients with constipation, and the only known reports about chiropractic care for nonhuman animals with constipation are case observations.^{22,49-51} A review of the literature revealed several case studies, a case series, and a systematic review on chiropractic care for infants and children with constipation as well as a case study on chiropractic care for a senior patient with chief complaints of chronic constipation. Additionally, Hawk et al.⁴⁹ published a systematic review examining chiropractic care for non-musculoskeletal conditions, and Rome and McKibbin²² compiled a collection of anecdotal accounts of chiropractic care for nonhuman animals from responses to an informal newsletter.²² The efficacy of accepted treatments for constipation have been called into question with reports that 30-50% of children continue to have symptoms years after initial diagnosis.^{45,52} The results of this literature review support the application of chiropractic care as an alternative therapy for managing constipation when organic pathological causes have been excluded.

Quist and Duray⁴⁵ reported resolution of chronic constipation in an eight-year-old male patient after one treatment, which included a chiropractic adjustment to the sacrum using a Thompson 220 drop table and manual abdominal massage. The patient reported having a bowel movement the same day as his first chiropractic adjustment and again two days later, which had never happened before. His mother also reported that his bowel movements were easier and with less pain.

Rosado and Rectenwald⁴⁶ reported resolution of constipation in a nine-month-old female patient who had recently stopped breastfeeding. The patient was adjusted using full spine Diversified technique at the levels of sacrum and C1 when indicated by technique protocol. The mother of the infant reported occasional constipation after three weeks of weekly care and resolution after five months. This case report also

includes a review of the literature.

Kim et al.⁵³ reported a three-week-old breastfed male presenting with chief complaint of constipation since birth. The patient received chiropractic adjustments using Diversified technique at the levels of sacrum, T5, and C1. The mother reported that the patient experienced a bowel movement the day after his first adjustment and subsequently after each feeding. The mother also reported that the infant started sleeping longer during the night with less waking, crying, and general irritability.

Mills and Alcantara⁵⁴ reported resolution of chronic constipation, daily vomiting, and “growing pain” in a six-year-old male patient after receiving chiropractic care and probiotic supplementation. The patient was adjusted using Diversified technique to the sacroiliac and upper cervical spinal regions. The mother of the patient reported that he was having daily bowel movements by the third visit. His appetite improved, and he gained four pounds of weight by the eighth visit. The patient discontinued care after three weeks and ten visits because both his gastrointestinal symptoms and leg pain resolved. Follow-up with the patient’s mother 15 months later revealed that the patient had gained 56 pounds and missed only two days of school compared to 45 missed days the previous year.

Horkey⁵² reported on a six-year-old female patient presenting with neck pain, gastrointestinal pain, and constipation. The patient was checked weekly for VSC and received HVLA adjustments at the levels of sacrum, L3, T6, T4, T2, C2, and C1 over the course of her care. During a re-physical examination at the thirteenth visit, the patient’s mother reported that gastrointestinal pain and constipation had resolved, bowel movements occurred daily. Additionally, neck pain had resolved after two months of care.

Eulitt and Giannakakis⁵¹ reported on an eight-year-old male patient experiencing constipation since birth with fecal incontinence and abdominal pain. The patient received HVLA adjustments using Diversified technique in the cervical, thoracic, lumbar, and sacral spinal regions at a frequency of three times per week for two months. Paraspinal thermography was used to evaluate overall autonomic function and identify abnormalities by showing skin temperature patterns. The initial scan revealed mild to severe dysautonomia throughout the cervical, thoracic, and lumbar spinal regions while the follow-up scan after twelve visits showed only a mild left deviation from normal at the level of L3. The patient’s mother reported the patient to be experiencing daily bowel movements without associated abdominal pain or fecal incontinence. This case report also includes a review of the literature, which produced seventeen chiropractic cases reports on constipation. Two of these cases also experienced associated fecal incontinence, and an additional two case reports on fecal incontinence only.

Davis and Alcantara⁵⁵ reported resolution of chronic constipation in an eleven-week-old male following chiropractic care. He received medical care prior to presentation for chiropractic evaluation, which included laxative suppositories, leg exercises, abdominal massage, gripe water, Mylicon, and change in infant formula.

Symptoms worsened after changing the infant formula, and the infant experienced only five bowel movements in eight weeks. The patient received HVLA chiropractic adjustments using Gonstead technique at the levels of sacrum and C1. The mother of the patient reported that he experienced his first unassisted bowel movement the same day of his first adjustment and bowel movements on the third and fourth days following. The patient was adjusted fourteen times over the course of ten weeks, after which he was experiencing multiple bowel movements per day like a normal child of his age and sleeping better.

Davis and Alcantara⁵⁰ also reported on a seven-year-old male presenting with chronic constipation since age three, headaches, and neck pain. The patient was evaluated and received HVLA chiropractic adjustments using Gonstead technique. The patient was seen ten times over the course of six weeks with an interruption in care for ten days between the sixth and seventh visits. He showed initial improvement having bowel movements 5-6 times per week then experienced a decrease in frequency during his absence from care. Bowel movement frequency increased again when care was resumed, and the patient has continued to be monitored through “wellness care.”

A case study by Ryan and Rollette⁴⁴ describes the chiropractic management of a nine-year-old female who showed improvement of symptoms related to chronic sinusitis, constipation, and pharyngitis over the course of twelve office visits in three months. The patient reported improved bowel function by the fourth visit and was experiencing daily bowel movements by the fifth visit.

Batte⁵⁶ reported resolution of colic, constipation, and sleep disturbance in a two-week-old male patient after receiving chiropractic adjustments using the Logan Basic technique in the pelvic, lumbar, and cervical spinal regions. The patient experienced a bowel movement immediately after his first adjustment and was experiencing more regular bowel movements by the fifth visit. The mother of the patient reported increase in his distress if they missed an adjustment but quick resolution of symptoms after an adjustment. By the sixteenth visit, the mother reported resolution of colic and constipation as well as better sleep quality.

A case series reported by Mills and Alcantara⁵⁷ describes resolution of constipation in two children after a course of chiropractic care. A three-year-old male attended eleven chiropractic office visits over the course of ten weeks, and a three-year-old female attended six visits over the course of six weeks. Both patients received HVLA chiropractic adjustments using Diversified technique and experienced resolution of their constipation.

An integrative review of the literature on chiropractic care for infants with constipation performed by the brothers Alcantara⁵⁸ produced fourteen case reports, one case series, and one review of the literature advocating chiropractic care for children with constipation. Their search also produced five manuscripts describing cases of constipation as a secondary complaint. Primary complaints in these cases included colic, Rett Syndrome, facial asymmetry, intussusception, and nocturnal enuresis.

Rédly⁵⁹ reported increased regularity, size, and consistency of bowel movements in a 64-year-old female patient who reported experiencing chronic constipation since she was a child. The patient experienced zero to three bowel movements per week, which were small, hard and pellet-like. She always strained to defecate and felt a sense of incomplete evacuation. Her medical doctors ruled out organic pathological causes of constipation and prescribed fiber, calcium, and vitamin D supplements with increased water intake and an elimination diet. The patient received HVLA chiropractic adjustments using Diversified technique during twelve office visits over the course of ten weeks with a six-week gap in care between the eleventh and twelfth visit. At the twelfth visit, the patient reported experiencing five or more bowel movements per week with softer consistency as well as a higher overall sense of well-being.

Hawk et al.⁴⁹ conducted a systematic review of the literature examining chiropractic for non-musculoskeletal conditions, which generated five case reports supporting chiropractic care and/or spinal manipulation for patients with constipation. Four of these case reports examine chiropractic care for infants and children, and the fifth case report is the paper by Rédly discussed above.

Rome and McKinnin²² published an informal newsletter soliciting anecdotal reports of chiropractic care for nonhuman animals and report that “the response was remarkable.” The results of their query include a story about a fifteen-year-old Australian cattle dog with chronic constipation that received a chiropractic adjustment at the level of C1 and immediately experienced bowel movements. Another story describes an eight-year-old female dog with dyspnea, bowel and bladder incontinence, and inability to wag her tail that received two chiropractic adjustments and experienced relief of her symptoms. In total, thirty-eight stories involving a range of conditions and a variety of species are recounted in the literature. The value of these stories lies in the pattern that emerges, which suggests that animals are healing with chiropractic care.

Nonhuman animals have often been used as research subjects for understanding vertebrogenic disorders because it is generally believed and accepted that non-human animals cannot experience or benefit from a placebo effect.²² However, there is a relatively small amount of research examining the efficacy of chiropractic care for spine-related disorders in nonhuman animals.^{22,23,36,60,61}

Thude⁶¹ published a case series about 22 dogs presenting to a veterinary clinic with urinary incontinence or urinary retention. The author suggests that data from this case series supports an association between hypomobility in the lumbar spinal region and urinary incontinence and/or retention. Sullivan et al.⁶² compared nociceptive thresholds among 38 asymptomatic horses concluding that spinal manipulation increases spinal mechanical nociceptive threshold in horses without indications of low back pain. Haussler et al.⁶³ performed a randomized crossover study with ten apparently healthy horses and found that HVLA chiropractic adjustments increased regional dorsoventral displacement of the spine, which was measured as an indication of increased vertebral flexibility following treatment. Gomez Alvarez et al.⁶⁰

conducted a clinical trial examining the effects of chiropractic adjustments on flexion-extension range of motion in 10 Warmblood horses. The authors conclude that chiropractic adjustments decreased thoracic extension, reduced pelvic inclination, and improved symmetry of pelvic motion, but further research is necessary to understand the benefits of these changes over time.⁶⁰ McDonald⁶⁴ reported on a Pomeranian dog presenting with a grade 2 recurrent luxating patella. Examination revealed restricted motion at the sacroiliac joint and hypertonicity of the ipsilateral sartorius and iliopsoas muscles. The dog experienced decreased incidence of luxation after receiving a course of chiropractic adjustments to restricted joints and myofascial release to hypertonic muscle. Faber et al.⁶⁵ examined the effects of spinal manipulative treatment on a horse with diagnosed right-convex scoliosis from T10 to L2 causing asymmetrical movement throughout the thoracolumbar spine. Thoracolumbar range of motion was measured before and after treatment with spinal manipulation. The horse demonstrated increased thoracolumbar range of motion with more symmetrical motion after two spinal manipulations, which was maintained at follow-up eight months later.

Animal Chiropractic

Animal rehabilitation is a growing field, and it has expanded to include complementary and alternative veterinary medicine (CAVM) like chiropractic.^{20-23,66} Many animal owners currently report using CAVM without consulting their veterinarian, so researchers are striving to understand if the increased popularity of CAVM is due to increased demand from animal owners or changing attitudes of physicians.^{21,22} Interest in complementary alternative medicine (CAM) for humans has not been limited to treatment of musculoskeletal disorders. It has been found that almost 40% of parents with a child suffering functional gastrointestinal disorders admitted to using CAM to alleviate symptoms.⁵⁷ Because many people are seeking chiropractic care for themselves and their families, it follows that people would also be interested in chiropractic care for their animals. The efficacy of chiropractic has been questioned throughout its 122-year history, but a growing body of scientific research has continued to support it.^{22,36,38,40,41,63} If nonhuman animals are receiving chiropractic care, the research should expand to include them and practitioners should seek appropriate training.

The American Association of Equine Practitioners (AAEP) adopted guidelines regarding the chiropractic care of horses in 1992, and the American Veterinary Medical Association recognized the validity of chiropractic for animals in 1998.⁶⁷ Animal chiropractic is currently practiced by both licensed veterinarians and chiropractors in the United States, and animal chiropractic training has been incorporated into chiropractic and veterinary programs internationally.⁶⁷ Scope of practice is determined by state licensing boards, but most states require chiropractors to obtain referral from a licensed veterinarian or work under the direct supervision of a licensed veterinarian.^{66,67} The American Veterinary Chiropractic Association (AVCA) is a national organization, and AVCA certified training programs are offered throughout the United States. Upon completion of an AVCA program, licensed chiropractors and veterinarians are eligible to sit for an AVCA certification examination offered annually. Many states do not

currently require AVCA certification to practice animal chiropractic, but it sets a precedent for animal chiropractic to evolve into an evidence-based practice that is proven both safe and effective.

Limitations

Case studies are low in the hierarchy of research because cause and effect cannot be established without a control for comparison. A study with a larger sample size and a control is necessary to establish assessment and treatment guidelines. It is also recognized that the principle of time may have contributed to the resolution of constipation symptoms in this case.

Conclusion

At a critical moment in history, ancient wolves discovered advantages to living with humans, and through processes of selective breeding, humans domesticated wolves and shaped them into the modern breeds.⁶⁸ In contemporary society, dogs serve humans as companions, guardians, and laborers, so it is only appropriate that we provide them with the highest quality of care. Historically, veterinary medicine was practiced by animal owners caring for their own livestock, and the first veterinary schools were founded in response to devastating outbreaks of disease that also threatened public health.^{69,70} Today, healthcare for animals considers animal welfare in addition to public health and environmental impacts.⁷⁰ The demand for CAVM is increasing among animal owners, and evidence-based practice is the ethical and practical way of ensuring safe and effective treatments consistently utilized. Case reports like the one presented here are a starting point, and additional studies will only benefit animal chiropractic and the recipients of care.

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