

# Original Research

## Reversal of Paraplegia Secondary to Intervertebral Disc Disease in 24 Canines with Vertebral Subluxation: A Retrospective Analysis of Outcomes Following Chiropractic

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### Abstract

**Objective:** The objective of this article is to explore the role of animal chiropractic in helping canines suffering from hind end paralysis secondary to vertebral subluxation and intervertebral disc disease. This retrospective case series evaluates 24 canines that were managed in our practice.

**Clinical Features:** Each of the 24 canines was diagnosed with intervertebral disc disease by their veterinarian. The veterinarians suspected that the hind end paralysis was related. In most cases they recommended an MRI and surgery. The owners wanted to explore a different route before going through with surgery. There were numerous reasons for this, but the predominant issue was the cost of the MRI, surgery, and rehab.

**Interventions and Outcome:** Each canine was evaluated and adjusted using techniques taught by Options for Animals and approved by the International Veterinary Chiropractic Association. Vertebral subluxations were found throughout the spine but were concentrated in the lower thoracic and upper lumbar spine which correlated with the location of intervertebral disc disease. Each canine that presented for care eventually regained the ability to walk. The amount of time needed to recover varied by the presenting prognostic symptoms of each canine.

**Conclusion:** It appears that chiropractic care may be beneficial for managing canines suffering from hind end paralysis related to intervertebral disc disease and vertebral subluxation. Further controlled studies are needed.

**Keywords:** *chiropractic, subluxation, adjustment, paralysis, paraplegia, canine, alternative health, intervertebral disc disease, disc herniation*

### Introduction

The demand for manual therapy, acupuncture, and alternative medicine is increasing among canine owners.<sup>1</sup> This increase in alternative care for pets parallels the trend worldwide with humans utilizing these services.<sup>2</sup> Another major reason for the increase in complementary procedures for animals, such as chiropractic, is an inability to afford surgery and additional costly therapies such as rehabilitation.

Chiropractic care for humans is not a new phenomenon. In fact, evidence suggests spinal manipulation was employed in China as early as 2700 BC.<sup>3</sup> However, it is a relatively new modality in the animal world. The origins stem from D.D. Palmer's desire to disprove critics' claims that the positive effects of chiropractic care seen in humans was due to a placebo effect. Animal chiropractic education was eventually

formalized in the late 1980's by Dr. Sharon Willoughby, who held degrees in veterinary medicine as well as chiropractic.<sup>4</sup> This post-graduate program became known as Options for Animals.<sup>5</sup>

Chiropractic addresses vertebral subluxations in the spine via the adjustment. A subluxation, in terms of animal chiropractic, is defined as a shift in the normal structure of one vertebrae compared to those above and below, causing a biomechanical change that can interfere with the nervous system. An adjustment is a short lever, high velocity, controlled thrust done by hand or instrument.<sup>3</sup>

Unfortunately, there are few studies available evaluating the effectiveness of chiropractic care for canines. In this case

series we will review care for patients presenting to our practice with paresis secondary to intervertebral disc disease (IVDD) and vertebral subluxation.

Intervertebral disc disease is a substantial clinical problem, with a lifetime prevalence of 3.5% and an overall mortality of approximately 1%.<sup>6</sup> The typical patient is prescribed pain killers, muscle relaxers, anti-inflammatories, and/or steroids to help manage the condition. In addition, an MRI is frequently recommended with surgery to follow. These can be an expensive proposition for a canine owner and unfortunately, surgery does not have a 100% success rate.

Animal chiropractic may be an effective alternative for those who elect not to follow the traditional model of care. This paper discusses 24 cases from our practice.

### **Clinical Features**

This paper reviews the cases of 24 canines that presented to our practice. Each canine was diagnosed with intervertebral disc disease by their veterinarian. Additionally, each of these canines also suffered from varying degrees of hind end paralysis secondary to their disc pathology. This paper discusses one case in detail and utilizes a chart to describe the remaining cases.

### **Intervention and Outcomes**

A six-year-old German Shepherd (Case #4, Table 1) presented to our practice for chiropractic evaluation one day after being diagnosed with intervertebral disc disease by her veterinarian. She was suffering from partial paralysis of the hind end secondary to disc disease. Upon taking her history, we were told she had never experienced any serious traumas and had never had anything similar happen before. At the time of her paralysis, she had simply been walking around the house. She began to experience some wobbling and unsteadiness, which her owners recognized. Over the course of the next several hours the unsteadiness transformed into partial paralysis of the hind end.

Her owners immediately took her to their veterinarian at which point radiographs were taken. Radiographs revealed some decreased spacing between multiple vertebrae in the lower thoracic and lumbar region. She was then diagnosed with intervertebral disc disease due to the apparent decrease in disc space and subsequent arthritic changes. Her owners were told she would require an MRI and surgery to release pressure on the spinal cord that was causing her paralysis. She was sent home with medication that included steroids and anti-inflammatories.

After this visit, her owners decided to try an alternative method of treatment before going through with surgery. During her initial visit to our practice, she was unable to move her hind legs. They dragged behind her and she could not maintain an upright stance when placed in an upright position. Her mid-back was roached up and her paraspinal muscles were in severe spasm. She did not have full control of her bowel and bladder at the time of her first visit. She did have a response when she was pinched between her back toes, indicating that she had not lost her deep pain perception. She

had significant heat radiating off her lower back indicating inflammation.

In accordance with her radiographs and our findings, it was determined that she was subluxated at multiple levels throughout her spine. However, the thoracolumbar region contained the highest concentration of subluxations. For our analysis and intervention, we utilized the methods taught by Options for Animals and the International Veterinary Chiropractic Association.

She was adjusted at T10, L2, L4, L5, and her sacral base. We applied some light traction and did some gentle exercises on her hind limbs post-adjustment. We advised that her owners utilize ice over the inflamed areas for the next forty-eight hours and keep a watchful eye on her activity. They were also instructed to do the same light traction and hind end exercises a few times each day to help with the inflammation and decompression of her spine.

Her second visit was three days later where she was once again examined and adjusted. During her second visit, it appeared that the heat had begun to dissipate, and her muscles were not nearly as guarded along the spine. Also, she had begun to stand and was no longer taking any medications. At this visit, laser therapy was also performed for ten minutes. Her third visit was six days later. On this visit, she was able to walk into the office, though still favoring one leg. The heat had mostly been removed and was localized over her sacral area, which is where the laser therapy was focused. She had regained full control of her bowel and bladder at this time. In addition, the roaching in her mid-back had decreased significantly.

Upon her fourth visit, she was able to walk in steadily. Subluxations were found between her shoulder blades and at her thoracolumbar junction. It is not uncommon for the shoulder blade area to become restricted in patients with hind end paralysis. We suspect this is due to compensations secondary to the issues occurring in the lower back and pelvis. During her fifth and sixth visits she continued to receive laser therapy, though she did not require the amount of time she had originally. She was able to stand throughout each adjustment and her top-line had flattened. Over the next three months she was seen 1-2 times per month. Her symptoms were no longer present, and she has returned to a normal life without surgery. Throughout her four months of care there was no other therapy applied aside from chiropractic adjustments and four laser treatments.

The additional 23 patients were treated with the same protocol and all had very similar outcomes. Each was evaluated initially by their veterinarian and diagnosed with some degree of disc disease. The majority were then recommended to have an MRI done and follow up with back surgery. Each of the 24 presented to our practice with varying degrees of paralysis. All 24 patients had significant inflammation and hunching in their mid-backs. Some were experiencing pain while others did not. Some were incontinent while others were not. Though the symptoms varied, each had subluxations that were found and subsequently adjusted. All the owners were given exercises to perform at home to assist with recovery. The 24 canines all had the same outcome with the only difference being the

amount of time and the number of adjustments required. These canines returned to “normal”. We define normal as regaining the ability to ambulate and correct any foot faults such as knuckling.

## Review of Literature

Currently, the authors are aware of one paper regarding subluxation and a link to paraplegia in canines. It was a case report written about a four-year-old bichon mix that regained the ability to ambulate after chiropractic care.<sup>7</sup> A paper written by Thude shows a potential link between structural abnormalities in the lumbar spine and urinary incontinence.<sup>8</sup> In addition, a study by Lane and Hill appeared to show that a combination of acupuncture and manual therapy provided short term relief for musculoskeletal complaints.<sup>9</sup> Beyond these studies, there are very few scientific papers on subluxation and specific conditions outside of anecdotal evidence. There is more research available regarding equine chiropractic. However, the anatomy between large animal and small animal is different enough that the research may not be generalizable.

## Discussion

In the canine spine, the juncture of the immobile thoracic and mobile lumbar spine is the region with the highest incidence of disc herniation.<sup>10</sup> Disc disease in this region can have a profound effect. This is because the spinal cord extends to the last two lumbar vertebrae in canines, whereas in humans it terminates between the first two.<sup>11</sup> Therefore, disc bulges and herniations in this region for humans mainly effects nerve roots, whereas they compress the spinal cord in canines.

In addition, the spinal canal of the thoracolumbar spine in the canine is almost entirely filled with the spinal cord. Therefore, there is very little extradural space available to accommodate the abnormal disc position, which is why herniations here are so debilitating.<sup>12</sup> In fact, lesions seen in a canine disc herniation resemble those found in humans suffering from traumatic myelopathies.<sup>13</sup> There is a breed predisposition as well. The most commonly affected breeds are the dachshund, pekingese, shih tzu, lhasa apso, and the beagle.<sup>6</sup>

The clinical presentation of thoracolumbar disc herniation in canines can be severe with profound paralysis of their pelvic limbs from the resulting spinal cord damage.<sup>14</sup> In addition, disc herniation is the most common cause of neurological deficits in canines that unfortunately results in one of the most common reasons for euthanasia under the age of 10.<sup>15,16</sup> It is a pathological condition that results in profound consequences.

Degeneration of the intervertebral disc (IVD) is the fundamental process that lies at the root of most IVD displacements. Due to this degeneration, the nucleus pulposus (NP) loses the ability to absorb and maintain water and thereby to function as a hydraulic cushion.<sup>17-21</sup> Consequently, more of the compressive load bearing, which is normally resisted by the hydrated NP, is transmitted to the annulus fibrosus (AF).<sup>22-24</sup> Because of these sequelae, the AF becomes stiffer and weaker leading to structural failure that impedes the ability of the AF to resist tensile forces and to contain the NP.

Eventually, these degenerative changes result in outward bulging of the IVD when subjected to physiological loading.<sup>17</sup>

The typical initial treatment for intervertebral disc disease is a combination of pharmaceuticals to help manage the pain and inflammation. Some veterinarians will evaluate the response to these drugs. If no progress is seen, an MRI to locate the disc herniation is recommended and is followed with surgery. The success rate of surgery is linked to multiple prognostic indicators including the age, presence of deep pain sensation, urinary incontinence, and time since the injury.<sup>25</sup>

A surgical approach may be addressing a symptom of spinal dysfunction rather than the primary issue, however. As early as 1970, Funkquist reported that recurrent signs of disc herniation were at least as frequent in patients that had undergone a laminectomy alone as in patients that had been treated conservatively.<sup>26</sup> This may be an indicator that herniation is a consequence of spinal dysfunction rather than being the primary issue.

Chiropractic provides a means to maintain spinal mobility, mobility in joints of the extremities, and function in healthy athletic and working animals. In animals experiencing clinical problems such as pain and lameness, chiropractic addresses spinal dysfunction.<sup>27</sup> The chiropractic adjustment involves a specific, small-amplitude, high-velocity, controlled thrust to restore motion through a specific vector by moving the joint surfaces to the anatomical limit of joint play.<sup>28</sup> It is the specificity of the adjustment, in both location and direction, which differentiates the chiropractic adjustment from other less-specific tissue manipulation.<sup>27</sup>

Specifically, chiropractic adjustments address vertebral subluxations. A subluxation, in terms of animal chiropractic, is defined as a shift in the normal structure of one vertebrae compared to those above and below, causing a biomechanical change that can interfere with the nervous system.<sup>3</sup> This interference can lead to a variety of symptoms depending on where the subluxation is found in the body. For instance, a study showed a correlation between lumbar subluxations and incontinence in canines.<sup>4</sup>

With respect to intervertebral disc disease, vertebral subluxations may contribute to pathological loading in the thoracolumbar region that results in progressive degeneration and eventual disc bulging and herniation. This area is already under tremendous strain due to the transition from an immobile thoracic spine to a more mobile lumbar spine.<sup>10</sup> Vertebral subluxations in the thoracolumbar region directly enhance the stress on these discs. Additionally, subluxations in other areas of the spine can also increase the pressure on these discs as they alter the mechanics of the entire spinal column.

The underlying mechanisms of IVD degeneration are better described in humans than in canines. However, it is likely that the degenerative pathways are similar in the two species.<sup>29</sup> Since this is the case, we can extrapolate some of the available human literature and apply it to canines.

Adjacent segment disease is an example of the consequences of pathological motion in one area of the spine transmitting

stress to another.<sup>30</sup> It was found that the areas next to a surgically fused segment degenerated as well. Additionally, this was confirmed to occur in the cervical spine.<sup>31,32</sup> From a mechanical perspective, it is a reasonable hypothesis that after motion is eliminated from a spinal level, to achieve the same range of motion, the remaining spinal levels would be required to take on a greater load.<sup>33</sup> Therefore, an approach that addresses the entire spine for stability and mobility rather than strictly treating the location of disc herniation may be preferential in addressing intervertebral disc disease cases.

As mentioned previously, chiropractic provides a means to maintain spinal mobility and address spinal dysfunction.<sup>27</sup> Many of the patients that presented for care had vertebral subluxations throughout the entire spine. These areas were addressed in addition to the area of intervertebral disc disease. By correcting subluxations throughout the entire spine and restoring normal motion and stability, pressure was removed from the affected vertebral discs. This took pressure off the spinal cord allowing the paralyzed canines to progressively recover from varying levels of paralysis secondary to IVDD. As shown by Olby et al., functional recovery is still possible despite loss of up to 90% of ascending and descending axons in the affected spinal cord segment.<sup>34</sup>

There are limitations to this case series. The evidence is anecdotal in nature and there is no definitive way to know if the animals would have recovered without chiropractic care. Furthermore, the patients that presented for care were diagnosed by their veterinarian with IVDD and suspected disc herniation but did not have an MRI to confirm. Future studies are necessary to prove the effectiveness of chiropractic care for animals suffering from paralysis secondary to IVDD.

## Conclusion

Twenty-four canines diagnosed with hind end paralysis secondary to intervertebral disc disease were evaluated and cared for in our practice. Every canine that began care eventually regained the ability to walk again. This indicates that chiropractic care may be an effective treatment to address biomechanical pathology that results from dysfunction of the spine. More controlled studies need to be carried in the future to assure a cause and effect relationship.

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Case ID #	Age	Breed	Time Since Injury	Deep Pain Y/N	Incontinent Y/N	Primary Subluxations Adjusted	Number of Adjustments until Ambulatory	Pain Present Y/N	Muscle Wasting? Mild, mod, severe
1	6	Dachshund	3 weeks	Y	Y	L1, L3, L5, sacrum	4	N	Moderate
2	11	Dachshund	1 week	Y	Y	T12, L3, L5	2	Y	Moderate
3	14	Spaniel	1 day	Y	N	L2, L5, Sacrum	2	N	Mild
4	6	German Shepherd	1 day	Y	Y	T10, L2-L5	4	N	Mild
5	9	Dachshund	2 months	Y	Y	T12, L2, Sacrum	4	Y	Severe
6	4	Maltipoo	1 day	N	Y	T12, L1 L6, Sacrum	16	N	Moderate
7	6	Dachshund	2 days	Y	Y	T12, L1, L3	3	Y	Mild
8	8	Coton de tular	1 week	Y	N	T10, T13, L2, L6	2	Y	Mild
9	7	Labrador	10 weeks	Y	Y	L2-L7, sacrum	5	Y	Severe
10	8	Shih tzu	1 day	Y	Y	L3, L5, sacrum	4	N	Mild
11	4	Chihuahua	1 year	Y	Y	L4, L7, sacral base	10	N	Severe
12	6	French bullcanine	2 weeks	Y	Y	L3, L4, L7	1	N	Moderate
13	14	Dachshund	1 month	Y	Y	L1, L2, sacral base	5	N	Moderate
14	13	Cockapoo	1 month	N	N	T12, T13, L2, L6	16	N	Severe

15	4	Shih tzu	2 months	N	Y	T12, L1, L3, Sacrum	16	N	Severe
16	9	Weimerainer	3 days	Y	N	T10, L2, L4	1	N	Mild
17	7	Rottweiler	1 week	N	N	T12, L1, L4, L5, Sacrum	6	N	Moderate
18	5	Shih tzu	1 week	N	Y	L1, L4, L6, Sacrum	5	Y	Moderate
19	9	Chihuahua	4 days	Y	Y	T13, L5-L7	3	N	Mild
20	7	Maltipoo	1 week	Y	N	T12, L1, L3	3	N	Moderate
21	11	Dachshund	4 weeks	Y	Y	T12, L1, L3	11	N	Severe
22	10	Chihuahua	1 day	Y	N	T10, T12, L1, L3	2	N	Mild
23	3	Dachshund	4 days	Y	Y	T13, L4, L6	5	N	Moderate
24	17	Border Collie	5 days	Y	Y	L1, L6, Sacrum	2	N	Moderate

**Table 1.** Chart of 24 canines