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"Remember George, this is no time to go wobbly."

~ Margaret Thatcher

Four Leg News

This is part 2 in my deep dive into 'what's new' in the world of Wobbler Disease… and more importantly non-surgical treatment for this condition. Enjoy the read!! Cheers! Laurie Edge-Hughes, BScPT, MAnimSt (Animal Physio.), CAFCI, CCRT

Non-Surgical Treatment for Caudal Cervical Spondylomyelopathy / Disc-Associated Wobber Syndrome

BACKGROUND

Disc-associated wobbler syndrome (DAWS) is the more typical disorder of a collection of disorders of the cervical vertebrae and intervertebral discs (IVDs), often seen in middle-aged large breed dogs. In DAWS, caudal cervical spinal cord compression results from protrusion of IVDs and generally mild vertebral malformations, often along with dorsal spinal cord compression due to hypertrophy of the ligamentum flavum. Clinical signs range from cervical hyperaesthesia to tetraplegia. Progression to thoracic limb involvement with a short, stilted gait can occur. It is often defined as a progressive disease in which early surgery is necessary, however, there is a high rate of recurrence due to the development of adjacent segment disease.[1]

MEDICAL MANAGEMENT = CONSERVATIVE MANAGEMENT (in current veterinary studies)

De Decker et al (2009) undertook a retrospective study to evaluate the clinical evolution of dogs treated conservatively for DAWS and to assess potential risk factors.[1]

The Study: Review of medical records between 2001 – 2006 looked at imaging, myelogram, and radiographs. Cases with bony anomalies were excluded, and conservative management was defined as no surgery and prescription of corticosteroids (orally administered in a declining dose over a 3-week period) with the advice to restrict exercise and use a harness versus a collar for 4 weeks.

Table 1. Distribution of dogs with disc-associated wobbler syndrome

Variable		Number of dogs (%)
Type of neurological signs		
Group 1	Cervical hyperaesthesia or monoparesis of one front limb (nerve root signature)	7/51 (13–7)
Group 2	Ataxia and/or paresis only affecting the hind limbs with or without cervical hyperaesthesia	13/51 (25–5)
Group 3	Ataxia and/or paresis affecting the four limbs with or without cervical hyperaesthesia	31/51 (60–8)
Number of protruded intervertebral discs		
One		31/51 (60–8)
More than one		20/51 (39–2)
Additional radiographic and/or myelographic abnormalities		
None		24/51 (47–1)
Present		27/51 (52–9)

Follow-up: This information was obtained by recheck examinations or by responses to a telephone questionnaire (of the owner, veterinarian, or both).

DeDecker et al 2009 (continued…)

The dogs were given an outcome score from 1 to 11. A successful outcome was defined as an outcome score of 9 or higher. This definition of success included only dogs that did not show worsening of clinical signs after a diagnosis of DAWS was made.

Table 2. Neurological outcome score and clinical evolution for dogs treated conservatively for disc-associated wobbler syndrome

Neurological outcome score	Clinical evolution	Number of dogs (%)
1	Progressive deterioration with euthanasia within the first six months after onset of clinical signs	4/51 (7–8)
2	Progressive deterioration with euthanasia between six and 12 months after onset of clinical signs	8/51 (15–7)
3	Progressive deterioration with euthanasia between 12 and 18 months after onset of clinical signs	7/51 (13–7)
4	Progressive deterioration with euthanasia between 18 and 24 months after onset of clinical sings	3/51 (5–9)
5	Progressive deterioration with euthanasia after more than 24 months after onset of clinical signs	1/51 (2–0)
6	Progressive deterioration but still alive	1/51 (2–0)
7	Rapid and sustained clinical improvement for minimum 24 months, followed by a rapid and progressive deterioration	2/51 (3–9)
8	Rapid and sustained clinical improvement for minimum 36 months, followed by a rapid and progressive deterioration	2/51 (3–9)
9*	Lack of evolution in clinical signs after diagnosis	1/51 (2–0)
10*	Clinical improvement but not free of clinical signs	22/51 (43–1)
11*	Free of clinical signs	0/51 (0–0)

*An outcome score of 9 or higher is considered as a successful outcome

Outcomes / Findings:

- The Doberman (n=32) was the predominant breed of fifty-one dogs in this study; other breeds included the Bernese mountain dog (n=6), the Rottweiler (n=3), the Bouvier des Flandres and Labrador retriever (n=2 of each breed), the boxer, Bullmastiff, Leonberger, Pointer, Pomeranian and Weimaraner (n=1 of each breed).
- 34 dogs were males and 17 were females.
- Forty dogs received prior treatment from the referring veterinarian. Treatment with corticosteroids before diagnosis was significantly associated with improvement at the moment of diagnosis when compared with the treatment with NSAIDs or a combination of both.
- Euthanasia had been performed in 27 dogs because of progression of clinical signs related to DAWS. The remaining nine dogs died for reasons unrelated to DAWS and their neurological status had improved at the time of death so these dogs were included in the group of clinical-improvement.
- A successful outcome was achieved in 45% of the dogs.
- There was no significant effect of age, number of protruded IVDs, occurrence, type and results of treatment before diagnosis on the outcome scores of dogs treated conservatively for DAWS.
- Dogs with clinical signs obviously affecting all four limbs and additional abnormalities on radiography and/or myelography had significantly lower outcome scores.

PREDICTORS OF OUTCOME FOR CONSERVATIVE MANAGEMENT

De Decker et al (2012) characterized the evolution of clinical signs during conservative medical treatment for DA-CSM and assessed several prognostic indicators.[2]

Their study included 21 client-owned dogs aged between 4 to 10 years: Doberman Pinschers (17); Whippet (2), Dalmatian (1), and Weimaraner (1). There were 9 spayed females, 2 sexually intact females, 3 castrated males, and 7 sexually intact males.

Neurologic status at the time of study enrollment was graded from 0 to 6:

- Grade 0: no apparent neurologic deficits.
- Grade 1: hyperesthesia of the cervical area without neurologic deficits.
- Grade 2: ataxia of the pelvic limbs without noticeable paresis and no appreciable ataxia of the thoracic limbs.
- Grade 3: ataxia with noticeable paresis of the pelvic limbs and no appreciable ataxia in the thoracic limbs.
- Grade 4: ambulatory tetraparesis, generally characterized by broad-based ataxia with paresis of the pelvic limbs in combination with a short, stilted gait of the thoracic limbs.
- Grade 5: nonambulatory tetraparesis; affected dogs were able to stand and take a few steps before collapsing.
- Grade 6: tetraplegia; affected dogs were unable to stand or support their weight independently.

Initial Evaluation: At initial evaluation, 2 dogs had grade 6, 1 dog had grade 5, 4 dogs had grade 4, 6 dogs had grade 3, 6 dogs had grade 2, and 2 dogs had grade 1. Two dogs that had grade 2 also had a nerve root signature of the right thoracic limb. Cervical hyperesthesia, defined as resistance to extension of the neck, was detected in 17 of 21 dogs.

Results: Twenty dogs received conservative treatment. Subjectively, prednisolone had no effect on the clinical condition of 1 dog, had only a temporary beneficial effect on the clinical condition of 3 dogs, and alleviated the clinical signs in 6 dogs, but only at the high dose, such that the dose could not be tapered. Of the 6 dogs in which the prednisolone dose could not be tapered, 4 had surgery and 2 were euthanized after prolonged administration of prednisolone.

Conservative medical treatment was successful for 8 (38%) dogs and unsuccessful for 13 (62%) dogs.

All dogs in which the clinical condition had deteriorated at 1 month after DA-CSM diagnosis had an unsuccessful outcome for conservative medical treatment, whereas all dogs in which clinical condition had improved at 1 month after DA-CSM diagnosis had a successful outcome.

De Decker et al 2012 (continued…)

Most of the dogs with DA-CSM and for which conservative medical treatment was unsuccessful were euthanized within 6 months after DA-CSM diagnosis in the study reported here. This suggests that the neurologic condition of dogs with DA-CSM generally deteriorates rapidly.

Conclusion: The study concluded that lack of improvement or continued deterioration of clinical status at 1 month after diagnosis of DA-CSM was associated with an unsuccessful outcome with conservative medical treatment and provides owners of affected dogs the opportunity to pursue surgical intervention before there is irreversible damage to the spinal cord.[2]

CLINICAL OUTCOMES SURGERY & CONSERVATIVE MANAGEMENT

Earlier studies done by da Costa et al in 2007[3] and 2008[4] compared clinical outcomes of surgery and conservative treatment for dogs with CSM.

The FIRST study: In the first study, 8 dogs were treated medically with dexamethasone for up to 7 days, and one dog received no medication.[3] All dogs had restricted activity for 4 to 6 weeks, with use of a body harness instead of a collar.

In 6 of these dogs, prednisone was given for an additional 3 weeks after dexamethasone was discontinued. In 2 dogs, administration of prednisone was continued for an additional 4 weeks. Surgery was done for 3 dogs with a ventral slot procedure with no implants or grafts. All 3 dogs had been treated with dexamethasone, prednisone, or both prior to surgery, but these were not used after surgery.

Clinical Outcomes: At the follow-up evaluation, 5 of the 9 dogs treated medically had improved clinically (from grade 2 to clinically normal, from grade 1 to clinically normal, from grade 4 to 3, from grade 4 to 2, and from grade 3 to 2), 2 dogs had become clinically worse (from grade 1 to 2 and from grade 1 to 3), and 2 dogs were clinically unchanged (1 dog that was grade 2 and 1 that was grade 4).

Two of the 3 dogs treated surgically had improved clinically (from grade 4 to 3 and from grade 3 to 2). The remaining dog treated surgically had improved during the first 3 months post-surgery, but then markedly deteriorated. At that time, the dog was treated medically, and its condition improved so that at the time of follow-up evaluation, it was clinically unchanged from the preoperative state (grade 4).

Outcomes on Imaging: On follow-up images, 4 of the 9 dogs treated medically had no change in the severity of spinal cord compression. All but one of these dogs had improved clinically, and the remaining dog's status was unchanged. In 2 of the 9 dogs, spinal cord compression worsened, as well as the clinical status. In the remaining 3 dogs, the compression seemed to have regressed on sagittal follow-up images, however, transverse images revealed spinal cord atrophy. Two of these 3 dogs had improved clinically, and the third dog's status was unchanged. None of the dogs treated medically developed new sites of spinal cord compression.

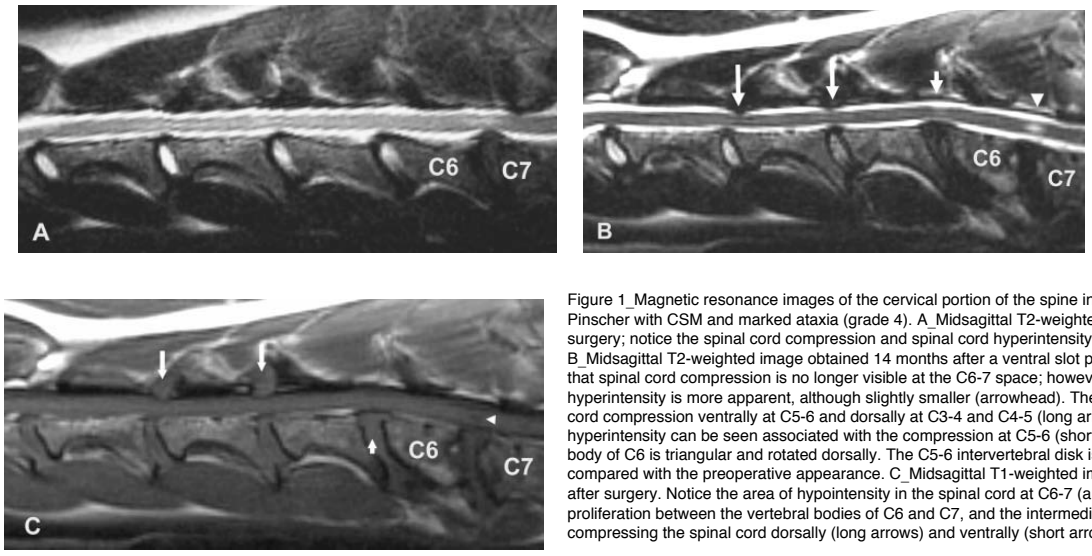

Figure 1_Magnetic resonance images of the cervical portion of the spine in a 7-year-old Doberman Pinscher with CSM and marked ataxia (grade 4). A_Midsagittal T2-weighted image obtained prior to surgery; notice the spinal cord compression and spinal cord hyperintensity at the C6-7 space. B_Midsagittal T2-weighted image obtained 14 months after a ventral slot procedure at C6-7. Notice that spinal cord compression is no longer visible at the C6-7 space; however, the area of spinal cord hyperintensity is more apparent, although slightly smaller (arrowhead). There are new areas of spinal cord compression ventrally at C5-6 and dorsally at C3-4 and C4-5 (long arrows). Mild spinal cord hyperintensity can be seen associated with the compression at C5-6 (short arrow). The vertebral body of C6 is triangular and rotated dorsally. The C5-6 intervertebral disk is also degenerated, compared with the preoperative appearance. C_Midsagittal T1-weighted image obtained 14 months after surgery. Notice the area of hypointensity in the spinal cord at C6-7 (arrowhead), minimal bone proliferation between the vertebral bodies of C6 and C7, and the intermediate signal of structures compressing the spinal cord dorsally (long arrows) and ventrally (short arrow).

The results showed that spinal cord and vertebral changes were more severe in dogs treated surgically than in dogs treated medically.

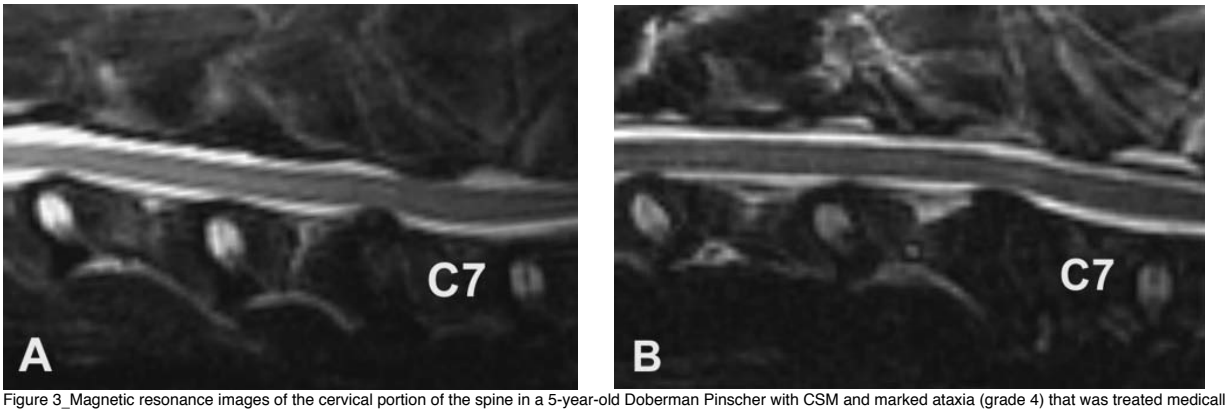

Figure 3_Magnetic resonance images of the cervical portion of the spine in a 5-year-old Doberman Pinscher with CSM and marked ataxia (grade 4) that was treated medically. A_Midsagittal T2-weighted image obtained prior to treatment; notice the spinal cord compression and mild spinal cord hyperintensity at C6-7. B_Midsagittal T2-weighted image obtained 15 months later. The area of spinal cord hyperintensity is still present, and adjacent disks are not dehydrated.

Great tidbit from this study: A large body of experimental evidence has shown a major role for vascular disturbances in the pathogenesis of chronic spinal cord injury.

The 2008 DaCosta et al study[4], reviewed medical and radiology records of cases of CSM that included spinal cord compression caused by intervertebral disk protrusion, bone-related compression, soft tissue compression, or a combination of these factors, with or without visible vertebral canal stenosis.

Of the 104 dogs included in the study, 54 (52%) were Doberman Pinschers and 50 (48%) were either mixed breeding or other breeds. 37 dogs were treated surgically and 67 were treated medically.

Of the 67 dogs treated medically, 31 (46%) did not receive any medications prior to examination at the Ontario Veterinary College, 16 (24%) received NSAIDs over an average of 52 days, and 20 (30%) dogs received corticosteroids over an average of 29.5 days.

Of the 37 dogs treated surgically, 11 (30%) did not receive any medications prior to examination at the Ontario Veterinary College, 8 (21%) received NSAIDs over an average of 136 days, and 18 (49%) received corticosteroids over an average of 20.2 days.

Results: Results of the present study suggested that survival times for dogs with CSM that were treated surgically were not significantly different from survival times for dogs treated medically. In addition, there was no significant difference in outcome between dogs treated surgically and dogs treated medically. However, given the large difference in percentage of dogs that were improved after surgical treatment, compared with dogs that were improved after medical treatment, a significant difference might have been found if more dogs had been included in the study.

In the present study, it was found that 36 of the 67 (54%) dogs treated medically were improved and 18 (27%) were unchanged when owners were contacted to obtain long-term follow-up information, suggesting that medical treatment may be a valuable option for the management of CSM in some dogs.

30 of the 37 (81%) dogs treated surgically were reported to be improved and 1 (3%) was reported to be unchanged.

Table 1—Clinical data for 104 dogs with CSM treated surgically or medically.

Variable	Doberman Pinschers (n = 54)		Dogs of other breeds (n = 50)	
	Surgical treatment (23)	Medical treatment (31)	Surgical treatment (14)	Medical treatment (36)
Age (y)*	6.6 (4.5–11)	6.6 (0.9–10.5)	7 (0.5–11)	4.7 (0.2–11.5)
Sex†				
Male	9 (39)	19 (61)	8 (57)	30 (84)
Female	14 (61)	12 (39)	6 (43)	6 (16)
Duration of signs (mo)‡	1.5 (0.03–36)	2 (0.03–84)	2 (0.03–29)	2 (0.03–84)
Surgical procedure†				
Ventral slot	18 (78)	NA	11 (79)	NA
Dorsal laminectomy	3 (13)	NA	3 (21)	NA
Distraction-fusion	2 (9)	NA	0 (0)	NA

*Data are given as mean (range). †Data are given as number of dogs (%). ‡Data are given as median (range); information was not available for 2 dogs.
NA = Not applicable.

No significant differences in owner-reported percentage of improvement or owner-reported score for quality of life were noted between dogs treated medically and dogs treated surgically.

Thoughts presented on Dexamethasone or Prednisone in this paper:

- Corticosteroids appear to have a neuroprotective function in acute spinal cord injury.
- Corticosteroids may provide protection from glutamate toxicosis and reduction of neuronal and oligodendroglial apoptosis.
- Surviving demyelinated axons may have remyelinated with treatment. Remyelination has been shown in the spinal cords of horses and humans with cervical myelopathy treated medically.

An Actual Paper about Manual Therapy for Myelopathy!

Speciale J et al. (2000) presented 3 case studies highlighting how conservative MANUAL treatments were utilized to manage myelopathy.[5]

Cases of a 9-year-old male Standard Poodle, a 7-year old male German Shepherd, and a 6-year-old female Weimaraner, all with caudal cervical spondylomyelopathy were presented in this paper.

Treatments included:

- Conventional nursing care for paralyzed animals was used, with emphasis on manual manipulations, including massage, sensory integration, range-of motion exercises, stretching, and postural training.
- Traction was applied to each thoracic limb, increasing the force gently and gradually, for 15 to 20 seconds or until resistance to extension was felt. As soon as resistance was detected, the limb was flexed and manipulated through a complete range of motion.
- Massage of the limbs, including petrissage, effleurage, and friction, was performed for 10 to 15 minutes at 4-hour intervals.
- Tellington touch massage was applied to the neck and thoracic limbs every 4 hours. (alternating between massage & the TTouch).
- Hair brushing was performed as often as possible to maintain healthy skin and coat as well as to maximize sensation. Spaces between transverse processes of the cervical vertebra were palpated, and steady digital pressure was applied for 5 to 10 minutes every 12 hours. (Thus, stretching the cervical epaxial muscles)
- The dog was encouraged to stand by having a caretaker support its weight for periods of 5 to 10 minutes every 6 hours.
- No cage rest.

So, now what?

What does this mean for us in canine rehabilitation circles? I think it's great news! To summarize what 's been presented.

- Medical management can result in improvements (go with Corticosteroids).
- You are safe to try a month of conservative care before needing to contemplate surgery.
- Blood flow is likely critical to improvement in cases of Wobbler's disease.
- One paper actually exists regarding manual therapies for Wobbler's disease.

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MY thoughts?

Add in some additional therapies, and why not expect outcomes that exceed that of Medication-only OR even surgery! (My thoughts only… but here's where I'm coming from…) - LEH

Clinical Applications for Rehabilitation Therapy in Canine Wobbler's

At the Canine Fitness Centre Ltd. we have been fortunate to successfully manage several dogs affected with CSM. The treatments prescribed center around traction, gentle mobilizations, and modalities to enhance blood flow in and around the cervical spine and discal herniation or degeneration area.

In humans, it has been found that exposure of herniated disc material in the cervical spine to the vascular environment of the epidural space contributes to its resorption and/or regression. Large extruded discs have wider exposure to resorption mechanisms and tend to regress more rapidly. The response to early therapeutic intervention in cases where there is a large extruded disc is therefore more favourable (Constantoyannis et al 2002; Malanga & Nadler 1999).

Neck traction in lateral recumbency. Note the hand under the chin just stabilizes – but does not push. Relaxation is imperative.

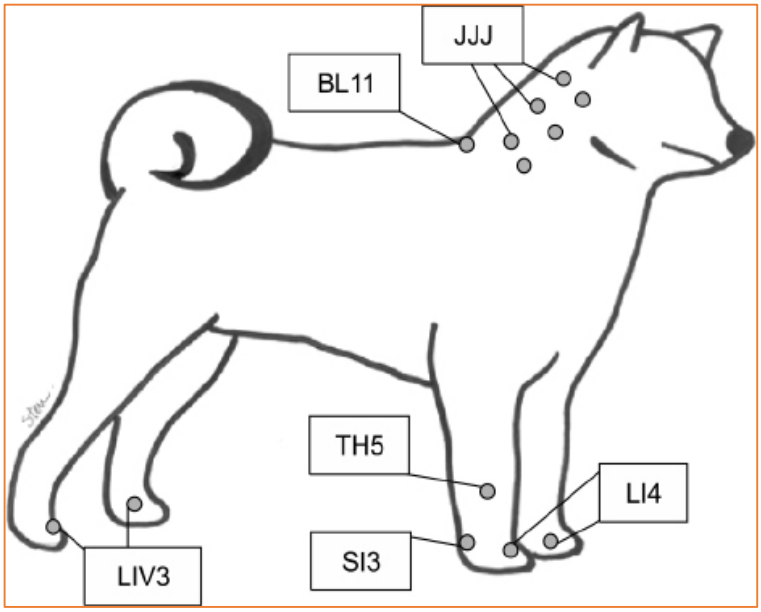
Neck traction in sternal recumbency. Note the dog needs to relax his head down to the floor / bed in order for the traction to be effective.

Utilizing human and animal research, mobilizations have been shown to aid in pain relief for spinal or joint conditions. The neurophysiological effects of mobilizations are reportedly a reduction in acute pain and inhibition of reflex muscle contractions (Zusman 1986; Katavich 1998; Björnsdóttir & Kumar 1997; Zelle et al 2005). The achievement of neurophysiological effects requires repetitive (oscillatory) or sustained manual stimulation which results in a hysteresis effect. The hysteresis effect involves inhibition of low threshold mechanoreceptors (group I & II), inhibition of high threshold nociceptors (group III & IV), both of which result in a reduction of intra-articular pressure and peripheral afferent discharge (Zusman 1986; Katavich 1998; Conroy & Hayes 1998; Sterling et al 2001).

We also utilize laser therapy for its effectiveness with spinal pain. Chow et al (2009) performed a meta-analysis of the existing research and reported the optimal dosages that yield favourable results for pain relief. She reported that the data from the reviewed

trials suggested that positive effects were immediate and could be maintained for up to 3 months after treatment ended. As well, post-operative low power laser irradiation enhances axonal sprouting and spinal cord repair, improves recovery after injury, and when applied directly to the spinal cord can improve recovery of the corresponding injured peripheral nerve (Rochkind et al 2001; Byrnes et al 2005; Rochkind et al 2002).

Acupuncture may also be beneficial in Wobbler dogs (Sumano et al 2000), and has been reported to be effected in IVDD cases in the thoraco-lumber region (Joaquim et al 2010). Another study reported only a 50% improvement in dogs with Wobbler syndrome (Joaquim and Luna 2010). Another study found improvements for dogs with cervical neurological disease treated with acupuncture that targeted / included neck specific points (Liu et al 2016).



At the Canine Fitness Centre, all treatments for dogs with neurologic injuries are done on a pulsed electromagnetic field mat. While literature on this modality is sparse, at least one paper has found that exposure to pulsed magnetic field enhances motor recovery in cats after spinal cord injury (Crow et al 2003).

We have also found microcurrent stimulation to be useful for patients with pain. We find this choice to be justified by the Tan et al (2006) study that found that microcurrent delivered via ear clips (alternately known as cranial electrotherapy stimulation) was shown to significantly decrease daily pain intensity for persons with chronic pain secondary to a spinal cord injury.

Gentle, non-harmful, easy exercise is imperative to healing and re-establishment of neural pathways. Once the animal is no longer painful or minimally painful and has safe motor functioning, then a walking program should commence. Owners are advised to discontinue use of a neck collar in favour of a body harness to control their animal. Walking may be done on land if able, or in a water treadmill if the limbs are weak and buoyancy would be of benefit. When safe to do so, animals can next begin co-ordination retraining to help build balance and proprioceptive function.

Tasks such as walking through weave poles, over obstacles, balancing on a slightly raised plank or bench, backing up, and sideways walking may be incorporated into an exercise regimen to stimulate coordination training when in the dog is no longer acute and has progressed into a recovery stage.

From a long-term perspective, we have seen numerous dogs with presumed caudal cervical spondylomyelopathy with a) neck pain, b) neurological deficits, c) both. We have managed to keep these dogs comfortable and functional for several years after initial referral and presentation for symptoms. Often times, owners are shown how to manage their dogs with traction, and to return for treatment sessions as necessary if symptoms flare over the years. These dogs can be very rewarding to treat conservatively.

Conclusion

Physiotherapy management should be a part of recovery or longer-term management for all dogs with cervical spondylomyelopathy. The latter portion of this newsletter has attempted to give suggestions for a broader selection of conservative treatment options based on evidence within the literature as well as clinical findings in a busy canine rehabilitation practice. Further research is needed to validate the physiotherapeutic / rehabilitative suggestions presented.

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