

Introduction

Service dogs play an invaluable role in society. They have for many years been credited with tremendous success, including in search and rescue missions, assistance for those with additional needs and in maintaining custom and border security.

While their value to society is tremendous (Lundqvist, M., Alwin, J. and Levin, L.Å.,) (Ng, P., James, M. and McDonald, C.,) the costs associated with their breeding and training are extensive. The Irish Guide Dogs currently lists the cost of training, breeding and caring for a working Guide dog as 53 thousand euro. (irishguidedogs.ie Apr 8th 2023) Developing training programmes to train service dogs appropriately is exceptionally difficult. It is also very challenging to ensure that service dog users are paired with a service dog who is appropriately trained for their needs. Many puppies that are accepted into service dog training programmes don't complete their training due to a mixture of physical issues, or temperament issues. This in turn means that dogs who successfully make it from training and development schools to active service, are even more precious.

It is therefore vital to preserve the established working dog's lifespan for as long as possible, to reduce the burden on the development of replacement service dogs. A longer

life span also allows service dog providers to gather as much information about their service dogs' genetic profile as possible, for both future breeding programmes and genetic assessment strategies.

Due to their pedigree nature, they are at higher risk of breed related illness than mixed breeds which creates a need for even more active, integrated veterinary care. It is also imperative that they receive both a comprehensive diagnosis and treatment plan as quickly and as efficiently as possible, in order to minimize time spent away from active service.

The goal of this paper, is to document the integration of animal osteopathy and veterinary medicine to both treat and prolong the life of a working service dog.

The role of the veterinary surgeon is extensive and comprehensively outlined, by each jurisdiction's veterinary regulatory authority. In general first opinion small animal practice, this role centers around diagnosing and treating accordingly, both medical and surgical diseases in small animals.

Osteopathy is a style of therapy that centers around the musculoskeletal system.

Osteopathic therapy centers around improving blood flow, and balancing structural

biomechanics, to achieve an improved state of health, while allowing the body an opportunity to heal itself where possible.

Osteopathic Articular Balancing techniques are a series of long lever style manipulations, brought from human osteopathy, and applied to animal osteopathy by Proff. S. Mc Gregor.

When these services are combined, a more effective, efficient treatment plan was created, yielding, in this case, a longer working career for a service dog, as well as improved care and quality of life in retirement.

The patient:

The patient was a 9 year old male, entire Labrador, whose primary working role centered around prohibited substance identification. He was specifically required to identify select substances on both people and their possessions. This highly skilled service requires both a strong intellect and a friendly nature, that is appropriate to be around people in loud and somewhat unpredictable surroundings.

He was diagnosed two years prior to this presentation with shoulder arthritis, by a primary care veterinarian. At the time of initial diagnosis, his arthritis was deemed to be in the early stages by his then primary care veterinarian. Osteoarthritis is a chronic, often debilitating disease that affects 25 to 40 percent of the canine population. Its impact on patients is profound, affecting both physical aspects of the patient such as mobility and gait as well as cognition and quality of life. (Felson DT, Lawrence RC, Dieppe PA, Hirsch R, Helmick CG, Jordan JM, et al.) (Lories RJ, Luyten FP)

His then primary care veterinarian prescribed non steroidal anti inflammatories,(NSAIDs) which were administered by his handler on an as needed basis.

He was presented to the veterinary clinic as he had recently fallen on wet, heavy, rough ground. Since the fall his running speed had reduced, Despite rest and the aid of daily non steroidal anti inflammatories (NSAIDs) there was no clear improvement in his running speed.

On examination, the patient was bright, alert and responsive

His physical examination revealed stable vital parameters, however it was noted that his respiratory rate was faster than that noted on past visits, and that the lung sounds didnt project as far caudally as expected. He was noted to have mild shoulder sensitivity, a small

decrease in range of motion and very mild, intermittent biceps tendon sensitivity bilaterally. He was stiff on palpation of his spine in the mid thoracic region. Abdominal palpation and assessment was considered unrewarding due to the patient's strong core strength.

In their review of this patient, the primary care veterinarian noted, that it could be postulated that, the reduced speed was due to a combination of the recent fall and a decline in the established shoulder disease. However their confidence in this working diagnosis was reduced by the noted strong core strength, spinal stiffness and comparatively mild shoulder pain.

As such, the reviewing primary care veterinarian made the decision to pursue a wider work up. He initially collected a hematology and biochemistry sample, while referring the patient for a next day osteopathic assessment.

Global Osteopathic Assessment, showed several key points.

- Bilateral hindlimb short striding at the walk. Note while faster gaits were not possible in clinic, video footage revealed a cranial shift in the center point of gravity, along with bilateral compensatory forelimb short striding

- Some mild shoulder restriction which with gentle articulation was easily released.
- Mild biceps tendon sensitivity which was reduced substantially after treatment
- Spinal stiffness was noted in the thoraco lumbar region which was persistent and did not improve with gentle palpation or movement.
- There was mild tarsal stiffness which improved with gentle balancing therapy.
- Although the abdominal muscles were noted to be well developed, tension was found throughout the diaphragmatic line. Although these trigger points were released during the session, there was little improvement upon repeat auscultation

While the patient appeared to improve from the osteopathy session, the persistence of spinal stiffness remained.

The hematology and biochemistry results were reviewed and noted to show very small subtle elevations in ALT and ALP. No prior hematology or biochemistry tests were available to compare these results to.

Inspired by an incomplete response to osteopathic assessment and treatment, the decision was made to pursue further imaging. Abdominal ultrasound showed a large focal

mass on the head of the spleen, which owing to its density and location was not readily palpable on physical exam.

Splenic masses are considered hereditary in Labradors, Hemangiosarcoma is considered the most common of splenic masses. It is classically metastatic in nature. Given the size of the mass at diagnosis, it was quite possible that the mass has already spread (Eberle, N., Von Babo, V., Nolte, I., Baumgärtner, W. and Betz, D.,) Consequently, the decision was made to pursue active pre operative met checks which included thoracic CT (evaluating for thoracic metastatic lesions) and an abdominal CT evaluating the mass for further information on localisation and vascularisation). While no evidence of metastatic lesions were noted, it was noted that there was a small increase in sternal lymph node size as well as an enlarged prostate that showed evidence of cystic disease.

The mass was deemed to be not possible to biopsy due to its location and vascular nature.

A discussion was held with the patient's handlers, training programme providers and veterinary advisors. It was decided to pursue surgery in the hope of a return to service.

Surgery

Surgery was scheduled, and the entire spleen including the mass was removed. It was noted to have a dense and large weight in close proximity to an abundance of large blood vessels, placing the patient at high risk for complications such as splenic torsion, or cardiovascular compromise. These conditions are quite frequently life threatening and often result in severe cardiac complications.

During post extubation recovery very gentle OAB was applied to the noted shoulder and hock restriction to aid postoperative ambulation.

The patient was discharged with standard post splenectomy home care instructions. This included resting guidelines, instructions wound management and postoperative medications. It was noted that despite a recent coeliotomy the patient was walking quite well and did not exhibit evidence of postoperative abdominal crunching.

Post Operative Assessments

He was re-evaluated at his post operative wound assessment.

It was noted that his diaphragmatic movement had improved substantially and the previously noted shoulder restriction had improved substantially. While some spinal stiffness remained, it was noted to be only a small percentage of its past level. His wound was progressing well however had not yet fully healed.

The decision was made to not pursue further osteopathic adjustment until full healing of the wound occurred.

He was reviewed at his next appointment, and noted to be bright, alert and responsive. His wound had healed very well. A small amount of spinal stiffness was noted, along with a slight reduction in hip and hock mobility. These changes were to be expected given his postoperative resting pattern. These were gently released using OAB.

Return to Work

The patient returned to work 4 weeks postoperatively where he continued to perform his expected duties to the same standard as his pre operative standards.

As a result of this combined intervention, he remained in service for an additional two years. He was subsequently retired due to a combination of pandemic related changes and the development of retinal atrophy.

Retirement

The patient was retired to a family home, where he adjusted to life as a pet very well.

During his retirement his arthritis did, as expected, become worse.

He was represented for repeat veterinary and osteopathic evaluation and was noted to have several issues:

Bi lateral forelimb restriction, with significant restriction in the intercostal muscles and dorsal spinal muscles. Prolonged amount of treatment was required to achieve improvement in this restriction

Poor diaphragmatic movement with noticeable wheezes on auscultation.

Poor hip and hind limb mobility with significant right stifle restriction.

Bilateral retinal atrophy

An enlarged palpable prostate

Poor micturition pattern with infrequent elevation of his hind leg to urinate

Reduced faecal output by comparison to breed and size related expectations.

The combination of these issues resulted in a very poor gait and poor ability to navigate comfortably in his home. He frequently became stuck and struggled to turn in a small circle to return to his bed. He was unable to consistently and independently consume sufficient volumes of water and food without additional help. He was also not able to fully empty his bladder and frequently was unable to lift his leg to urinate. This put the patient at an increased risk of electrolyte anomalies, toxemia, post obstructive renal trauma and urinary tract infections.

Despite the noted issues he remained eager to walk outside, had a strong appetite, and remained exceptionally friendly and affectionate.

The extent of his clinical condition created significant concern for the patient's quality of life. There was significant concern for serious injury due to the extent of his mobility restrictions. The impact of his urinary issues had a significant potential to be fatal

While it was hoped that if treatment were to be successful, the patient would be able to help train in younger replacements, it was also accepted that if there was limited response to treatment, euthanasia on humane grounds would be required.

A comprehensive OAB session was performed, paying particular attention to the aforesaid areas of concern. It was combined with acupuncture of the lumbar muscle region.

This combination of treatments yielded almost immediate improvements. There was a clear increase in natural mobility. While he was stiff and weak when rising from lying, he no longer needed assistance to turn around.

It was noted, however, that his spine remained stiff and he continued to have a respiratory wheeze. His urination pattern remained poor with a poor ability to generate an appropriately high pressure stream.

The decision was made to perform hematology and biochemistry profiles along with an abdominal ultrasound.

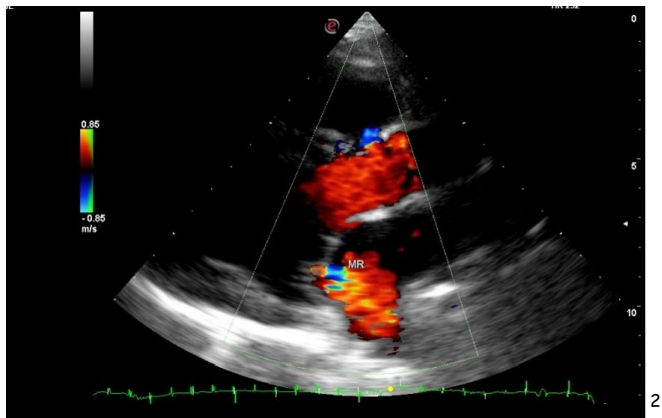
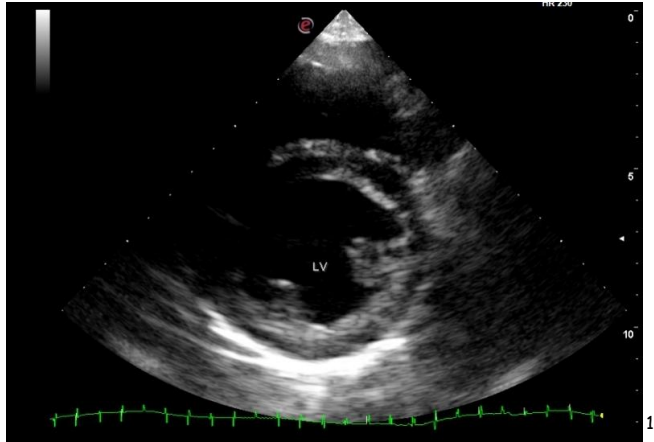
This revealed that the cystic prostate disease had progressed. Marked constipation, likely associated with the prostatic issues was also noted. Prostate disease is relatively common

in intact male dogs, with some studies suggesting a predisposition in American Staffordshire terriers, Labradors and Rottweilers (Freitag, T., Jerram, R.M., Walker, A.M. and Warman, J.). (Barsanti, J.A. and Finco, D.R.,)

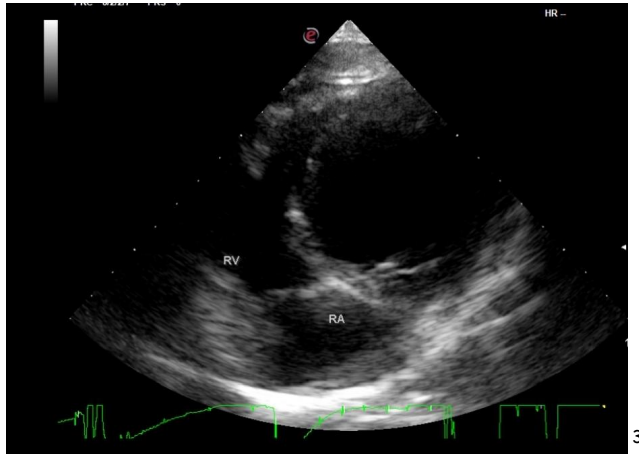
Chest x rays were performed along with an echocardiogram. These showed some bronchitis and poor diaphragmatic movement. The cardiac silhouette appeared distorted on radiographs. This was investigated further with an echocardiogram, where an isolated focal ballooning was observed in the free wall of the left ventricle. No masses or infarcts were associated with this deviation, and as such this was deemed an incidental anomaly, not likely to cause anesthetic restrictions.

Urinalysis showed proteinuria, however no bacteria infection was noted.

Hematology and biochemistry profiles were considered unremarkable.



-
- ¹ Still image from the patient's echocardiogram
² Still image from the patient's echocardiogram

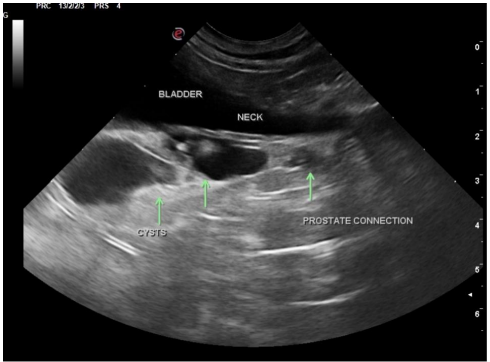
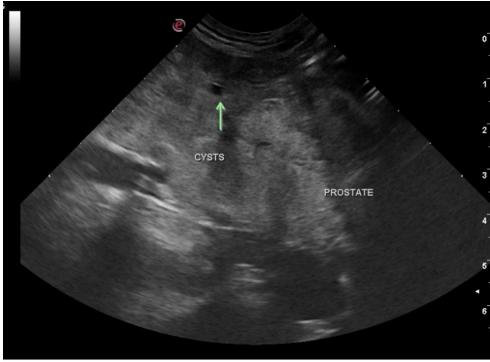


The decision was made to instigate medical therapy of the prostate disease on a trial basis prior to performing surgery.

Medical therapy included 0.1 mg /kg meloxicom orally once daily, maropitant 1 mg /kg once daily along with targeted dietary modification. During this time osteopathic therapy was continued in to aid surgical positioning, and improve anesthetic risk management, should surgery be pursued.

This combination of treatment showed significant clinical improvements, and as such the decision was made to pursue castration in line with recommendations for management of prostatic diseases (Freitag, T., Jerram, R.M., Walker, A.M. and Warman, C.G., 2007).

³ Still image from the patient's echocardiogram



4

⁴ Images of the patient's abdominal ultrasound

Routine open, bilateral orchidectomy was performed under a full general anesthetic. The surgery was considered uneventful, and it was noted that the patient did not experience any anaesthetic difficulty.

In the immediate postoperative period, OAB was applied to both hind limbs to aid mobility during the period of convalescence.

Over a two week recovery period, a noticeable improvement in micturition pattern was achieved, along with a clear reduction in respiratory wheeze. Faecal output returned to breed related size and shape. Exercise tolerance improved greatly, with a clear improvement in stamina noted.

Repeat ultrasonography was performed and showed a reduction in prostate size as well as the size of the prostatic cysts.

A combined geriatric plan was created by which included regular OAB sessions, acupuncture and hydrotherapy, as well as veterinary management including use of NSAIDS as needed and Librella (bedinvetmab Manufactured by Zoetis⁵).

⁵ Zoetis Belgium Rue Laid Burniat 1 1348 Louvain-la-Neuve Belgium

He continued to have a happy and content retirement, due to the combination of the above treatments.

Discussion

This case demonstrates the value in integrating osteopathic treatments with conventional veterinary medicine.

The ability to distinguish between musculoskeletal and abdominal pain is exceptionally challenging in veterinary practice. This is further compounded by the fact that many of animals

will have either established arthritis or radiographic changes associated with age due to the prevalence of osteoarthritis within the canine population.

The primary veterinarian was very much affected by this predicament when deciding how best to manage this patient.

While it might be argued that the veterinarian ought to have pursued abdominal imaging immediately, the vague nature of the presenting clinical signs make it challenging to generate an appropriate diagnostic work up plan. Despite the tremendous advancements in both quality and availability of veterinary services, it is not possible to provide every animal that presents with signs of lameness with a full and intensive work up. It is also difficult to ethically justify the intensive nature of more advanced diagnostics, based on vague, often unclear, clinical signs.

By integrating a targeted, objective and focused osteopathic service, it became clear that this patient required a more extensive work up. By combining osteopathy and veterinary medicine, both the veterinarian and the handler had the confidence to justify both the additional diagnostics, as well as the extent of time away from service. Due to the fact that OAB did not achieve anticipated results, the veterinarian was guided towards abdominal imaging and away from spinal or musculoskeletal imaging.

Throughout the patient's case osteopathy was used to aid and improve anesthetic stability surgical positioning

Geriatric patients are, by the nature of their age, and frequent multisystem issues, at a higher anaesthetic risk. In this case the patient was at a higher risk of ventilation issues associated with poor diaphragm movement and reduced thoracic compliance associated with age and his disease process. Musculoskeletal stiffness and restrictions also make surgical placement more difficult and can impact on issues such as blood pressure monitors and intravenous fluid therapy. It was noted that he did not experience any evidence of respiratory compromise, during anaesthesia, which is thought to be attributed to the frequent OAB sessions prior to surgery.

OAB was applied to the patient in the postoperative phase. During the post operative phase medical anaesthesia limits the quality of OAB. In this case, cautious OAB was applied which led to improved ambulation and stability post operatively. This accelerated the healing process in both cases. It also reduced the intensity of immediate post operative nursing care and the patient's fall risk. It was noted that due to the improved ambulation, the patient also lost less muscle mass than expected in the postoperative period.

It is noted that it is not typical or common for veterinary and osteopathic services to be integrated, nor is it common for these services to be integrated so quickly. In this case it is likely that these services were integrated due to the fact that both the primary

veterinarian, and the person providing the osteopathic services work in the same building.

This facilitated both same day communication, same day referrals and simultaneous assessments. It is also noted that the person providing the osteopathic services, and the acupuncture services is also a veterinarian.

This improved the primary veterinarian's confidence in the use of osteopathic therapies on their patient. The fact that this patient was a service dog, also helped to provide a clear framework of therapeutic goals for both the osteopathic vet and the primary care veterinarian to focus on.

During the pandemic, there was a significant surge in the pet population. This in turn means that there will be a large boom of aging pets in 2 years, which has the significant potential to overwhelm the availability of veterinary resources. This paper shows the potential to explore the use of osteopathy to help veterinary clinics screen patients for urgent diagnostics, scheduled diagnostics and when to delay diagnostics.

Consideration must therefore be given by the Veterinary Council of Ireland and the Irish Council of Osteopaths for the development of care and communication standards between both animal osteopaths and veterinarians.

Crucial to this discussion, is the development of a registrar for animal osteopaths.

Currently there is no clear governing body, which creates significant challenges for discussions to create such communication standards.

Conclusion

Integrating veterinary and osteopathic services resulted in a longer active career and a happier retirement of a working service dog.



⁶ The patient enjoying time on the beach

References

Barsanti, J.A. and Finco, D.R., 1986. Canine prostatic diseases. *Veterinary Clinics of North America: Small Animal Practice*, 16(3), pp.587-599.

Freitag, T., Jerram, R.M., Walker, A.M. and Warman, C.G., 2007. Surgical management of common canine prostatic conditions. *COMPENDIUM ON CONTINUING EDUCATION FOR THE PRACTISING VETERINARIAN-NORTH AMERICAN EDITION-*, 29(11), p.656.

Lundqvist, M., Alwin, J. and Levin, L.Å., 2019. Certified service dogs-A cost-effectiveness analysis appraisal. *PLoS One*, 14(9), p.e0219911.

Ng, P., James, M. and McDonald, C., 2000. Service dogs for disabled children: effects on level of independence and quality of life. *Topics in Spinal Cord Injury Rehabilitation*, 6(Supplement 1), pp.96-104.

Felson DT, Lawrence RC, Dieppe PA, Hirsch R, Helmick CG, Jordan JM, et al. Osteoarthritis: new insights. Part 1: the disease and its risk factors. *Ann Intern Med.* (2000) 133:635-46. doi: 10.7326/0003-4819-133-8-200010170-00016

Lories RJ, Luyten FP. The bone-cartilage unit in osteoarthritis. *Nat Rev Rheumatol.* (2011) 7:43-9. doi: 10.1038/nrrheum.2010.197

Eberle, N., Von Babo, V., Nolte, I., Baumgärtner, W. and Betz, D., 2012. Splenic masses in dogs. Part 1: Epidemiologic, clinical characteristics as well as histopathologic diagnosis in 249 cases (2000-2011). *Tierärztliche Praxis. Ausgabe K, Kleintiere/Heimtiere*, 40(4), pp.250-260.