

Effects of osteopathic treatment for generalized anxiety disorders in canines

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Section 1 Introduction

Anxiety-related disorders are similar in canines to those in humans and may also commonly be caused by various factors, including environmental changes, physical and psychological traumas, or underlying health issues. As in humans, various other circumstances may cause anxiety-related behaviors. Researchers revealed in Scientific Reports that 72.5% of all canines showed at least one anxiety-related behavior (Salonen, 2010).

The goal of this paper is to discuss how manual osteopathic techniques can effectively assist in decreasing the sympathetic nervous system, which can therefore aid in reducing symptoms reported in general anxiety disorders. This paper will also touch on the fight or flight mechanisms and their connection to the respiratory system, which commonly results in rapid breathing and possible shortness of breath during anxiety-causing situations in both humans and canines.

Osteopathy is a holistic approach to precise manual therapy that aims to restore the normal function and stability of joints. An osteopath views the body as an interconnected unit and focuses on the interrelationship between structure and function, which can improve the body's ability to self-heal. This full-body approach can have positive effects on overall health and well-being, including emotional and mental health issues like anxiety. Osteoarticular Balancing techniques are long lever movements that assess the joint motion, the tissues surrounding the joints, and joint mechanics. Functional Technique is used whereby movement is in a position of ease to reduce muscle tension and pain. This is tolerated easier in canines due to their relaxed state during treatment. The use of these techniques and others discussed later in this paper will

assist in returning the body to a balanced state and, therefore, decrease the autonomic nervous system, ultimately assisting in the management of anxiety disorders.

General Anxiety Disorder (GAD) is a mental health condition characterized by excessive and uncontrollable worry about various aspects of life, often without a specific cause or reason. It can also affect canines, leading to chronic and excessive worry or fear regarding present or unknown potential threats or situations.

Anxiety disorders in canines can manifest in similar ways as in humans, including an irregular heartbeat, rapid breathing, and increased muscle tension. Symptoms specific to canines include excessive barking, destructive behavior, hiding, or pacing. Anxiety disorders in canines can vary based on several factors, including breed, environment, and individual temperament. (Crowell-Davis, 2009)

The prevalence of GAD in canines generally has limited data, as its diagnoses require subjective information and possible behavioral analysis by canine owners and their veterinarians. There may also be a variance in numbers due to the non-reporting of GAD, whereas separation anxiety occurs in 14–20% (Salonen, 2010). Noise sensitivity was the most common across all breeds, affecting 32% of canines. There is, however, still little research on osteopathy and its effect on human or canine GAD.

Because canine research in osteopathy is limited, the following literature review is based on human research. We can use human research under the assumption that proven concepts in humans can and should be as effective in canines concerning the management of anxiety symptoms because bodily structures and systems in canines are generally comparable to humans.

Both humans and canines have a sympathetic and parasympathetic nervous system, general anatomy, and movement concepts that are all alike. The respiratory system, possible diaphragm overexertion, and restrictions due to labored or excessive breathing during an occurrence of GAD, are affected in canines and humans alike.

This topic is important because a better understanding of the treatment of anxiety disorders in canines is essential to promoting the welfare of the animal, preventing behavioral problems, promoting easier and more effective training, reducing the risk of aggression, and ultimately improving a stronger connection between humans and canines.

Section 2 Generalized anxiety disorder (GAD)

GAD is one of the most common mental health disorders in humans. Up to 20% of adults are affected by anxiety disorders each year (Munir, Sadaf, Generalized Anxiety Disorder, October 2022, National Library of Medicine).

GAD in humans may arise from various causes that may include finances, health, family, future worry regarding potential situations, and other stresses that may arise. The symptoms are commonly described as; fear, worry, sweating, fatigue, nervousness, and more.

GAD in canines is commonly associated with specific stimuli, such as thunderstorms, loud noises, strangers, separation from an owner, or the outdoors in general. Signs that a canine may have anxiety are similar to those in humans, although some behavioral differences are more noticeable. Some include hiding, panting, and other common destructive behaviors (Crowell-Davis, 2009).

2.1 Most Common Types of Canine Anxiety

Separation anxiety in canines is a behavioral syndrome that occurs when the canine cannot tolerate being left alone. Extreme vocalization, house soiling, destructive behavior, and desperate attempts to escape are typical signs of separation anxiety. Although canines of any breed or age are at risk of separation anxiety, risk factors include a history as a stray or shelter canine. The most successful treatment for canine separation-related problems may be behavior modification that focuses on systematic desensitization (Costello, 2008; Sargisson, 2014; Tiira, 2008).

Noise anxiety is most noticeable in canines, who suffer greatly during thunderstorms and fireworks displays and sometimes panic at the sound of pans dropping on the floor or any other noise with which they have had a previous negative experience. For example, a rescued street canine who lives around garbage bins may be afraid of the banging of any garbage bins in the future or general ongoing banging. Noise sensitivity was the most common across all breeds, affecting 32% of canines. Compared to humans, canines have a greater sensitivity to high-frequency sounds, and the amplification process of the canine's ear is greater than that of humans. (Sherman, 2008; Miller, 2022)

Some signs of stress in canines caused by noise include tensing of the body, a firmly closed mouth, a tail tucked, a head lowered, and ears pressed back. They may shrink or lean away from the source of their discomfort. (What causes noise anxiety in canines? AAHA Publication, December 16, 2021). These canines may panic and run away, or they may just shut down, panting and trembling violently.

Section 3 Research with respect to Osteopathy and Anxiety in Humans and Canines

Anxiety is the body's response to stress, perceived stress, or a perceived potential threat and can involve both physiological and psychological components. The general physiological features of anxiety and the systems of the body they affect are briefly discussed here:

The Autonomic Nervous System (ANS) is responsible for regulating involuntary bodily functions such as heart rate, digestion, and respiratory rate. The "fight or flight" response occurs in the ANS when faced with a threat, potential threat, or stressful situation. This, in turn, causes a release of the stress hormones adrenaline and norepinephrine, which increase heart rate, dilate coronary blood vessels, increase blood flow, and increase the availability of oxygen and energy to the heart.

The canine nervous system is comparable to that of humans and canines, where both are complex and include brains, spinal cords, and peripheral nerves. The ANS functions similarly in canines, where symptoms of anxiety can show as the canine being on extremely high alert or increased shedding.

Hypothalamic-Pituitary-Adrenal (HPA) Axis: The HPA axis is a neuroendocrine mechanism that mediates the effects of stressors by regulating numerous physiological processes, one of which is the ANS. During perceived stress, hormones are released, which prompt the adrenal glands to release the stress hormone, cortisol. Chronically elevated cortisol levels can lead to dysregulation of this system, causing long-term physiological effects.

The Cardiovascular System: As mentioned above, anxiety triggers an increase in heart rate and blood pressure due to the release of adrenaline and norepinephrine. This facilitates an immediate

response to potential threats and is known as "fight or flight." Prolonged or excessive anxiety can contribute to chronic hypertension and, therefore, increase the risk of cardiovascular diseases.

The canine and human cardiovascular systems, are similar in both species. However, differences in heart rate, blood pressure, and circulatory adaptations related to their sizes and activity levels are expected.

Respiratory Changes: Severe anxiety can potentially lead to hyperventilation as part of the fight or flight mechanism. This can result in physical sensations such as dizziness, shortness of breath, and sometimes a feeling of suffocation. Humans and canines both have respiratory system anatomy and physiology that function alike to facilitate breathing. The structure is similar, but the proportions and adaptations can differ. For example, some short-snouted canine breeds (pugs) can have respiratory challenges due to their skull shape.

Muscle Tension: Anxiety can also lead to an increase in muscle tension, particularly in the neck, shoulders, and jaw, which can cause physical discomfort and contribute to headaches or migraines in humans. Both humans and canines have muscles that allow for movement and control, and muscle groups are similar, however, the size and arrangement of muscles can vary due to gait function in quadrupedal animals.

The remaining systems are comparable in their function in both humans and canines and are not the focus of this paper. Therefore, a brief mention follows.

Digestive System Effects: The body's stress response can lead to gastrointestinal symptoms such as nausea, indigestion, or stomach aches.

Immune System Impact: Chronic anxiety and stress can weaken the immune system over time, as elevated cortisol levels can suppress immune function.

Neurotransmitter Imbalances: Neurotransmitters like serotonin, norepinephrine, and gamma-aminobutyric acid (GABA) play a crucial role in mood regulation and anxiety. Imbalances in these neurotransmitters can contribute to the development and exacerbation of anxiety disorder symptoms.

3.1 Generalized Osteopathic Treatment and its Effect on General Anxiety Disorders

General therapeutic touch, which is fundamental in manual osteopathy, has been demonstrated to contribute to the release of oxytocin. This release contributes to systemic effects, including decreased heart rate and blood pressure, decreased sensitivity to pain stimuli, and global medicinal effects. Furthermore, studies have reported a reduction in depressive symptoms, situational anxiety, and muscle tension as a result of components of osteopathic techniques, including myofascial work, spinal mobilization, and cranial techniques.

Osteopathic techniques appear to decrease sympathetic tone by improving the mobility of the ribs and spine in the region of the sympathetic ganglions. It may also help facilitate parasympathetic tone by decreasing tension at the cranial base, the region where the cranial nerves are located, and the fascial paths of the vagus nerve branches, as well as the sacrum. Furthermore, decreasing muscle and fascial tension may affect afferent feedback to the brain. (Dixon, 2020).

Body-Mind Connection: Osteopathy emphasizes the interconnectedness of the body's various systems. Practitioners believe that imbalances in the body's structure can affect its function, and

vice versa. By addressing physical dysfunctions, some individuals may experience improved emotional well-being. Additionally, the hands-on approach of osteopathy might facilitate a heightened awareness of the body, promoting relaxation and mindfulness, which can be beneficial for anxiety management. According to one study (Song and Wang, 2022), complementary and alternative therapies, including massage therapy, mindfulness relaxation exercise and others, proved to potentially be effective in the reduction of symptoms of anxiety.

Placebo Effect: Like many alternative or complementary therapies, the placebo effect might play a role in the perceived benefits of osteopathy for anxiety. Believing that a treatment will work can sometimes lead to actual improvements in symptoms. The attentive and individualized care provided by osteopathic practitioners might contribute to a sense of comfort and security, which could positively impact anxiety levels. The canine placebo effect, of course, does not occur, however, a canine's comfort with the practitioner can improve results. For example, through a veterinarian's assessment, a canine may show or express fear (as do humans at an appointment with a medical doctor), as the veterinarian doctor may make them uncomfortable. With osteopathic treatments, the hands-on techniques are more comforting, and with the ability of the practitioner to connect with the canine, the treatment may be more effective as the nervous system calms. (Dixon, 2020)

3.2 Nervous System Regulation: Osteopathic manipulation techniques can influence the autonomic nervous system (ANS), which is responsible for regulating the body's stress response. By targeting specific areas and working with the spine, osteopathic practitioners might help balance the sympathetic (fight or flight) and parasympathetic (rest and digest) branches of the nervous system. This balance could potentially reduce overall stress levels and, consequently,

reduce symptoms of anxiety. Treatments often involve physical manipulation, stretching, and soft tissue techniques aimed at relieving muscle tension, which will have a direct effect on calming the nervous system. The musculoskeletal system has been viewed as having a vital influence on overall body system health and functioning, with impaired mobility of the body potentially disrupting an individual's overall health and contributing to diseases, including mental illness.

Physical tension in the body can also contribute to feelings of stress and anxiety, and therefore, by addressing the ANS, a reduction in muscular tension, and an enhancement of blood flow, osteopathic treatments may promote relaxation and a sense of calm in the patient.

3.3 Respiratory System Regulation: Breathing is an automatic function of the body that is controlled by the respiratory center of the brain. When stress is present in our physical, mental, or emotional bodies, the rate of breathing and breathing patterns change as part of the fight or flight response. Typically, the anxious person takes small, shallow breaths, using their shoulders rather than their diaphragm to move air in and out of their lungs (Dixon, 2020). Shallow breathing, or hyperventilation, can prolong feelings of anxiety by making the physical symptoms of stress worse. Controlling breathing can help to improve some of these symptoms. Rapid breathing in canines, also known as panting, is a normal physiological response to various factors like heat, exercise, excitement, or stress. If your canine is not in any physical distress or is panting due to the aforementioned, then calming of the nervous system will help the canine return to normal breathing.

Unfortunately, canines are not able to voluntarily control their breathing. However, despite that, osteopathic techniques can be used to directly affect the breathing mechanisms and act to reduce rapid breathing during stressful situations.

Section 4 Osteopathic Techniques

Osteoarticular Balancing Technique (OAB) – is a therapeutic approach that restores balance and proper function to the musculoskeletal system. The goal is to improve the function of this system, which can improve various aspects of health, including posture, mobility, and pain management. OAB is also used to also address joint stiffness, joint function, and muscle tension using gentle manipulations, mobilization, and stretching. Results of OAB include improved flexibility and increased range of motion.

Functional Technique (FT) is an indirect technique that uses the position of ease in the affected area, for tissue to allow a better sense of relaxation in the patient. Using Osteoarticular Balancing (above) to assess the barriers in movement before and after using FT gives the practitioner an effective measurement tool that will produce visual and palpable results. By using FT you can avoid activating the pain receptors during treatment, which could increase discomfort and possibly increase anxiety in the anxious canine. (LCAO notes paraphrased)

The mind-body connection, which suggests that physical well-being can influence mental well-being and vice versa, can be altered by engaging in activities that promote relaxation, reduce physical tension, and improve overall physical health. This may indirectly contribute to helping manage symptoms of anxiety.

While spinal mobilizations are not typically considered a direct treatment for anxiety, maintaining overall physical health and engaging in relaxation techniques could potentially contribute to a feeling of well-being that may indirectly help manage symptoms. Improving mobility of the vertebral column and thoracic cage is crucial to facilitating proper breathing mechanics. Expansion of the rib cage can allow improved expansion of the lungs so that inhalation can be done without effort. Mobility in the spine can also help create more space for the movement of the diaphragm (the primary muscle of respiration). Limited spine and rib cage mobility can restrict such movement, which prevents the diaphragm from fully contracting. The functional technique of the diaphragm and other surrounding musculature can also be applied to enhance mobility of the spine and thoracic cage. Treatment of the ANS is treatment protocol to reach homeostasis. A significant change on the ANS is shown in the treatment of the suboccipital region in one study (Rechberger, V., 2019)

Cranial Sacral Therapy (CST) is a gentle, hands-on method of evaluating and enhancing the function of a physiological body system called the craniosacral system. (John Upledger, *Therapies*)

It is a non-invasive treatment technique used to reduce stress levels, as well as assess the autonomic nervous system's function. Osteopathic Craniosacral Therapy involves the use of gentle and specialized techniques to minimize tension in the skull, pelvis, diaphragm, chest, and sacrum (Wójcik, 2023).

Cranial Sacral therapy has a direct effect on the vagus nerve, which plays a role in the autonomic nervous system and is responsible for various bodily functions, including digestion, heart rate, and breathing. CST can shift the body out of the fight or flight mechanism that occurs under

various stressful situations by assisting the body into a deep state of relaxation. In turn, this can increase the body's ability of the body to self-heal.

Section 5 Clinical Application

Osteoarticular Balancing (OAB) is used to improve range of motion (ROM), which can increase the body's ability to decrease muscle tension. When using stretching or general ROM mobility techniques, stimulation of the muscle spindles and Golgi tendon organs sends signals to the nervous system to promote a reduction in increased muscle tension. Increasing ROM can also boost blood flow to the area, which can help oxygen and nutrients get to the muscles, which will also reduce tension in those areas. In addition, pain relief may also occur. With the effects of muscle tension reduction and the coinciding release of endorphins, a direct effect on mood also occurs. Psychologically, all of these effects can contribute to general relaxation.

It is suggested that canines have the same outcome results since they are equipped with the same physiological processes that will reduce heart rate, decrease blood pressure, and decrease muscle tension. They are also are equipped with similar psychological processes in that if mental distraction occurs while performing these techniques, it can divert the canine from what may be causing stress. Because many calming modalities involve touch, OAB is gently utilized for the best outcome.

Functional Technique is similar in some of its methods to Strain-Counterstrain and is utilized to reduce muscle tension and pain. It can be connected to a reduction in anxiety-related symptoms by its connection to sensory input in the body. Sensory input is any response in a sensory organ when it receives stimuli. Touch stimulation, along with nervous system stimuli, can have a

calming effect on the entire nervous system. In addition to a reduction of muscle spasms, pain reduction, and overall soothing of the fight or flight mechanism that occurs in the sympathetic nervous system, Functional Technique can be used for their effect on symptoms of anxiety.

Functional Technique used on canines, is a gentle movement away from the restriction of the tissue and into a position of ease and is, therefore, more comforting to the patient during a treatment session. This will help canines relax more, which could allow the practitioner to spend more time with them for a thorough treatment.

Cranial Sacral Therapy (CST) can help reduce stress and tension through the central nervous system, which can relieve symptoms of general anxiety disorders. CST is also said to improve circulation of the cerebrospinal fluid, which can release tension in the cranial-sacral system. This can enhance the body's self-regulating mechanisms towards optimal function by improving neurological and physiological functions. (Matarán-Peñarrocha, G.A. 2011)

Once a canine is familiar and comfortable with the practitioner and hands-on therapy, CST can be most effective in sedating the autonomic nervous system, which is a key component to improving the reactions to stressors that may arise and the reaction of the nervous system to those stressors.

Osteopathy is available to humans as a holistic manual therapy that has been shown to have positive effects on the nervous system in its entirety. It is reasonable to discuss that because canine anatomy is similar and physiology, as discussed previously, is comparable in its general function to that of humans, osteopathy would be effective in canines as well. It is essential to address symptoms as they appear to avoid an increase in behavioral issues. It is important to

understand that regular use of these techniques helps the canine adapt during treatment, occurs, and over time, anxiety-related symptoms can change in intensity and occurrence.

Subjective information reported by the owner can measure the effects of these techniques and their effect on the nervous system. Possibly, a charting system showing behavioral issues logged by the owner will show subjective results. Suggested appointment times to be closer to stressors that cannot be avoided could have a greater effect on results. Subjective information from the practitioner during each subsequent session may be observed and reported as well.

Section 6 CONCLUSION

This paper aimed to conclude that manual osteopathic treatments can assist in reducing the symptoms of general anxiety disorders in canines by decreasing the sympathetic nervous system output during the fight or flight mechanism within the autonomic nervous system. The importance of this paper for the canine community is to enhance the physical, emotional, and mental health of the canine as well as their connection and bond with their humans. Although the research found for this paper was primarily about the treatment of humans with manual osteopathy, we can assume the results found here can be effective with the canine population as well. We know that manual osteopathy has a positive influence on canine anxiety through nervous system regulation, muscular system tension reduction, joint mobility, and breathing regulation.

In general, noise and separation anxiety are the two most common types of reported anxiety disorders among canines. Both canines and humans can experience similar physiological responses to anxiety, such as increased heart rate, rapid breathing, muscle tension, and

restlessness. Humans can communicate their feelings and thoughts verbally, which allows them to seek help and support more easily. Canines, on the other hand, rely on non-verbal cues, making it challenging for them to express their anxiety directly, but behavioral situations are observable.

In summary, this research paper has contributed to the idea that the reduction of symptoms reported in general anxiety disorders can occur in canines in a comparable way to humans due to the similarities in the anatomy and systemic physiology of both species, and therefore, osteopathic treatments in cranial sacral therapy, osteoarticular balancing techniques, and functional technique, can also produce the same results.

Bibliography

- Cuthbert, S., & Rosner, A. (n.d.). *Physical causes of anxiety and sleep disorders - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/22314717/>
- Sargisson, R. (n.d.). *Canine separation anxiety: strategies for treatment and management - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/33062616/>
- Wójcik M, Siatkowski I. The effect of cranial techniques on the heart rate variability response to psychological stress test in firefighter cadets. *Sci Rep*. 2023 May 13, <https://pubmed.ncbi.nlm.nih.gov/37179419/>
- Sherman, B., & Mills, D. (n.d.). *Canine anxieties and phobias: an update on separation anxiety and noise aversions - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/18672155/>
- Tiira, K. (n.d.). *Prevalence, comorbidity, and behavioral variation in canine anxiety - ScienceDirect*. ScienceDirect.Com | Science, Health and Medical Journals, Full Text Articles and Books. Retrieved September 5, 2023, from <https://www.sciencedirect.com/science/article/pii/S1558787816300569>
- Rechberger, V., Biberschick, M., & Porthun, J. (n.d.). *Effectiveness of an osteopathic treatment on the autonomic nervous system: a systematic review of the literature | European Journal of Medical Research | Full Text*. BioMed Central. Retrieved September 5, 2023, from <https://eurjmedres.biomedcentral.com/articles/10.1186/s40001-019-0394-5>
- Ballantyne, K. (n.d.). *Separation, Confinement, or Noises: What Is Scaring That Dog? - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/29397241/>
- Munir, S., & Takov, V. (n.d.). *Generalized Anxiety Disorder - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/28722900/>
- Dixon, L., Fotinos, K., Sherifi, E., & Lokuge, S. (n.d.-a). *Effect of Osteopathic Manipulative Therapy on Generalized Anxiety Disorder - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/32091557/>
- Tiira, K., & Lohi, H. (n.d.). *Early Life Experiences and Exercise Associate with Canine Anxieties - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/26528555/>
- Matarán-Peñarrocha, G., & Castro-Sánchez, A. M. (n.d.). *Influence of craniosacral therapy on anxiety, depression and quality of life in patients with fibromyalgia - PubMed*. PubMed. Retrieved September 5, 2023, from <https://pubmed.ncbi.nlm.nih.gov/19729492/>

Upledger Institute International. (n.d.). Upledger Institute International. Retrieved September 5, 2023, from <http://www.upledger.com>

Crowell-Davis, S. (n.d.). *VetFolio*. VetFolio. Retrieved September 5, 2023, from <https://www.vetfolio.com/learn/article/understanding-behavior-generalized-anxiety-disorder>

Salonen, M., Sulkama, S., & Mikkola, S. (n.d.). *Prevalence, comorbidity, and breed differences in canine anxiety in 13,700 Finnish pet dogs* | *Scientific Reports*. Nature; Springer Nature. Retrieved September 5, 2023, from <https://www.nature.com/articles/s41598-020-59837-z>

Costello, K. (n.d.). *VetFolio*. VetFolio. Retrieved September 5, 2023, from <https://www.vetfolio.com/learn/article/overview-of-canine-separation-anxiety>

Miller, P. (2022, January 21). *Extreme Anxiety in Dogs - Whole Dog Journal*. Whole Dog Journal; Whole Dog Journal. <https://www.whole-dog-journal.com/training/extreme-anxiety-in-dogs/>

AAHA publications (2021-12) *What causes noise anxiety in dogs?*
<https://www.aaha.org/publications/newstat/articles/2021-12/what-causes-noise-anxiety-in-dogs-not-just-thunder-guns-and-fireworks/>

Effectiveness of an osteopathic treatment on the autonomic nervous system: a systematic review of the literature | *European Journal of Medical Research* | *Full Text*. (n.d.). BioMed Central. Retrieved September 8, 2023, from <https://eurjmedres.biomedcentral.com/articles/10.1186/s40001-019-0394-5#citeas>

Song, K., & Wang, Y. (n.d.). *Complementary and alternative therapies for generalized anxiety disorder: A systematic review* | *Journal of Complementary and Alternative Medicine*. LWW. Retrieved September 8, 2023, from https://journals.lww.com/md-journal/fulltext/2022/12230/complementary_and_alternative_therapies_for.1.aspx