

**THE ROLE OF CANINE
OSTEOPATHY IN THE
MANAGEMENT OF CANINE
OSTEOARTHRITIS**

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Canine osteoarthritis (OA) is identified as one of the most common chronic musculoskeletal disorders in dogs, especially older ones, or with a history of joint trauma or developmental orthopaedic disease (Roberts et al., 2022). It was typified by progressive erosion of articular cartilage, bone remodeling beneath the joint, synovial inflammation and progressive loss of joint function. Most of these pathological alterations frequently led to persistent pain, stiffness, loss of movement, and a very poor quality of life of afflicted dogs (Malkani et al., 2024). According to the veterinary literature, osteoarthritis is a disease with a significant number of dogs of the canine population, and it is estimated that it happened to as many as 20 percent of adult dogs (Anderson et al., 2020). The disorder was prevalent mostly among big dogs and elderly animals.

The historical ways of managing canine osteoarthritis under the traditional veterinary treatment revolved around pharmacological and surgical interventions. The use of non-steroid anti-inflammatory drugs (NSAIDs), corticosteroids, analgesics, and disease-modifying osteoarthritis drugs was common in reducing inflammation and pain management (Magni et al., 2021). Moreover, weight management, exercise change, and physiotherapy were also regularly suggested as the support measures. Whereas these methods tend to offer symptomatic help, they did not necessarily respond to the larger biomechanical malfunctions that were comorbid to chronic joint disease (Davies, 2025). There were also threats of long-term pharmacological treatment, and it included gastrointestinal, renal and hepatic complications.

Due to this, there was a growing interest in complementary and integrative modes of therapeutic intervention that could be used to enhance musculoskeletal activity and reduce dependence on medication. Out of such options, osteopathy turned out to be a developing field of

interest in the field of animal rehabilitation and manual therapy. Canine osteopathy was based on the concepts of osteopathic medicine created by Andrew Taylor Still in the late nineteenth century. It stressed the relationship of the structure and functioning in the body (Bordoni and Escher, 2021). The osteopaths were of the opinion that the normal movement of the joints, fascia, muscle and visceral structures would aid in the self-regulation and healing ability of the body (Anderson et al., 2020).

In the veterinary and animal manual therapy, osteopathic methods were pursued more in terms of injecting them as additional therapies to musculoskeletal conditions such as osteoarthritis. Examples of manual techniques used by the practitioners included soft tissue, myofascial release, joint articulation, craniosacral, and functional techniques (Carterpt, 2025). The methods were designed to enhance joint mobility, lessen the compensatory biomechanical strain, augment circulation, and decrease the pain in relation to degenerative joint disease that is chronic.

In spite of anecdotal clinical reports that osteopathic treatment has the potential to enhance mobility and comfort in dogs with osteoarthritis, there was a lack of scientific literature exploring the effect of osteopathic treatment on dogs with osteoarthritis (Mosley et al., 2022). There has been a significant amount of research done in the field of osteopathy, which was originally human in nature, with research in the field of veterinary or dog application pending. This scenario raised the need to critically review the current literature, clinical findings, and theoretical models in order to gain a greater insight into the role that osteopathy may play in the treatment of canine osteoarthritis.

1.2 Rationale for the Study

The rising cases of osteoarthritis in the canine population created a great challenge on the side of the veterinary professionals and animal rehabilitation experts. Dogs were living longer with

the increase in veterinary care and diet, leading to the increase of degenerative conditions, including osteoarthritis (Musco et al., 2019). Therefore, it was necessary to have long-term management plans to ensure mobility, relieve pain, and quality of life. Despite the fact that pharmacological interventions like non-steroidal anti-inflammatory drugs were common, a large number of the dogs still reported sustained pain and functional disability. Moreover, the use of medication in the long term was not always appropriate option because of the adverse effects and contraindications (Tariq et al., 2024). These constraints prompted the effort to understand the use of supplementary and non-invasive methods of therapy in veterinary care. Osteopathy was becoming more topical in the rehabilitation of dogs since it was a holistic method in musculoskeletal health. Studies specific to the field of veterinary-based research implied that the secondary dysfunctions were caused by the compensatory biomechanical adjustments to osteoarthritis in dogs to the aspect of the spine, musculature, and the surrounding joints (Zegarra-Parodi et al., 2023).

The osteopathic theories hypothesized that the limited movement in a particular area may be related to the functioning of the whole body via fascial, neurological, and biomechanical interrelationships (Bordoni and Escher, 2021). Osteopathic manual therapy methods, including myofascia release and joint articulation, soft tissue manipulation, and craniosacral therapy, were used on dogs, which, in turn, restored mobility, reduced tissue tension, and enhanced functional balance (Roberts et al., 2022). Such methods were also proposed to increase the circulation and regulate pain on neurophysiological mechanisms. Although there was increased use osteopathy, there was limited and scattered evidence on the effectiveness of this technique in the treatment of canine osteoarthritis. Many of the prevailing knowledge remained based on extrapolation of human osteopathy demonstrating a research gap in veterinary studies. As such, the purpose of the research

was to critically analyze the existing data on the application of osteopathic procedures in the treatment of canine osteoarthritis with special attention to its ability to improve locomotion, decrease pain, and promote overall functional performance.

1.3 Aim of the Study

The primary aim of this thesis was to examine the role of canine osteopathy in the management of osteoarthritis and to evaluate how osteopathic manual therapy techniques may support the treatment and long-term care of dogs affected by this condition.

1.4 Research Objectives

In order to achieve the overall aim, the thesis pursued the following objectives:

1. To examine the pathophysiology and clinical presentation of canine osteoarthritis.
2. To review the principles and theoretical foundations of osteopathy as applied to animals.
3. To analyse existing literature regarding the use of osteopathic and manual therapy techniques in the management of musculoskeletal disorders.
4. To evaluate the potential benefits and limitations of osteopathic treatment for dogs suffering from osteoarthritis.
5. To discuss the role of osteopathy as a complementary approach within multidisciplinary veterinary care.

1.5 Research Questions

1. What are the causes, pathophysiology, and clinical manifestations of osteoarthritis in dogs?
2. What are the fundamental principles and therapeutic techniques used in canine osteopathy?
3. How can osteopathic manual therapy contribute to the management of pain, mobility, and joint function in dogs with osteoarthritis?

4. What evidence exists in the current veterinary and osteopathic literature regarding the effectiveness of osteopathy in the management of canine osteoarthritis?

1.6 Structure of the Thesis

To explore the research topic in a systematic manner, the thesis was divided into a number of chapters. After the introduction, Chapter Two provided an extensive literature review of the subject of canine osteoarthritis, its occurrence, development, and traditional treatment methods. Chapter Three discussed osteopathic principles and methods and how they were used in animal care. Chapter Four examined the possible use of osteopathic manual therapy in the treatment of canine osteoarthritis based on the available research and clinical attitudes. Lastly, Chapter Five was a conclusion of the major findings of the thesis and the implications of these findings on clinical practice in the area of animal osteopathy.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature review will focus on critically analysing the existing literature on the topic “canine osteoarthritis (OA) and discussing the possible application of osteopathy as a complementary treatment method”. It is necessary to analyse the existing and emerging treatment options to understand the therapeutic efficacy in detail. The review evaluates the literature that focuses on the prevalence, pathophysiology, and clinical presentation of OA, pharmacological, surgical, non-pharmaceutical interventions, including manual therapies.

2.2 Canine Osteoarthritis: Definition and Epidemiology

Canine osteoarthritis is a long-lasting degenerative disease of synovial joints, which is characterised by the progressive loss of cartilage, inflammation of synovia, and structural alterations of joints (Gabai, Bakin et al., 2025). According to Mille, McClement and Lauer (2022), osteoarthritis is a multifactorial disease, and these structural and biochemical changes cause pain, loss of mobility, and quality of life. Monteiro et al. (2024) and Otis, Nitulescu and Troncy (2024) also elaborate that the formation of osteophytes, the subchondral bone sclerosis, and the thickening of the joint capsule, which increases the disease progression. One of the most widespread chronic musculoskeletal diseases in dogs is osteoarthritis, which is more common among old dogs as well as large breeds. According to Anderson, Zulch, O’Neill, Meeson and Collins (2020), the risk factor that contributes to the onset of the disease include age, obesity, genetic predispositions, and abnormalities during joint development, including hip or elbow dysplasia. Pye et al. (2024) insist that joint trauma and rupture of the cruciate ligament are also contributing factors to canine OA as they cause instability in the joint and activate the inflammatory process, which is multifactorial in nature. According to Radke, Joeris and Chen (2022), detailed information about prevalence and

disease mechanisms can be used to create specific interventions, whereas this knowledge is especially useful when considering such a complementary method as osteopathy. The aim of which is to enhance the functioning of the joints and decrease the compensatory strain on the musculoskeletal system.

2.3 Pathophysiology of Canine Osteoarthritis

The destruction of articular cartilage, resulting in the loss of the natural cushioning and shock-absorbing abilities of the joint, characterises canine osteoarthritis as progressive. Mille, McClement and Lauer (2023) elaborate that cartilage degeneration causes the smooth movement of synovial joints, which enhances friction and structural degeneration. Maki et al. (2020) also elaborated that the degeneration of the cartilage is one of the factors that facilitates the formation of chronic pain and functional deficit. Because it exposes the underlying subchondral bone to mechanical forces, which stimulate nociceptive pathways, which further evoke pain and limit movement. Pathophysiology of OA focuses on the inflammatory events whereby, synovial inflammation leads to cytokines and prostaglandin release, which causes pain perception but accelerates cartilage erosion. Brioschi et al. (2020) emphasise that the inflammatory mediators play a central role in creating a self-perpetuating process of joint degeneration. Such biochemical changes not only impact the affected joint, but they can also spread into nearby tissues to cause compensatory musculoskeletal dysfunction. Normal joint biomechanics are changed by structural changes such as osteophytes, subchondral bone sclerosis, and joint capsule thickening. Barale et al. (2020) report that such changes reduce the amount of movement, and they also lead to unnatural gait patterns. Catarino et al. (2020) also indicate that structural changes further increase mechanical stress on the joint, causing pain and restricting the normal functioning of the dog. The functional

consequences are such aspects as chronic pain, decreased mobility and compensatory gait changes, which do sufficiently warrant therapeutic measures to restore joint function and enhance quality of life.

2.4 Clinical Signs and Diagnosis of Canine Osteoarthritis

Canine OA is clinically manifested by lameness, pain in the joints, decreased activity, and behavioural changes, including irritation or uncooperativeness. Mille, McClement, and Lauer (2023) note that the first symptoms may be mild, such as difficulty getting up early, a slow pace on the stairs, and temporary stiffness after sleep, which makes early diagnosis difficult. As Maki et al. (2020) point out, the owner's observations must reveal the first changes since dogs might adjust to them in a manner that cannot be immediately noticed during the examination in the veterinary clinic. Diagnosis is based on physical exam, orthopaedic exam, radiographic tests and gait examination. Brioschi et al. (2020) define palpation and joint manipulation as the procedures necessary to evaluate the pain, crepitus, and limited mobility, and imaging methods as those that provide the possibility to visualise the osteophytes, subchondral bone alterations, and cartilage degeneration. As noted by Monticelli, Raviola and Adami (2020), the outcome measures, such as objective gait measurements and owner-reported measurements, should be included to measure functional impairment and track people over time. Brookes, Payne and Lea (2024) point out that the effective use of clinical symptoms and diagnostic evidence will allow a veterinarian to develop an effective intervention plan, combining pharmacological, surgical, and non-pharmaceutical treatment to alleviate pain and enhance functioning. Mille, McClement and Lauer (2023) observe that proper diagnosis and continued monitoring are the key to testing the effectiveness of new treatments like osteopathy, so that the intervention can target the affected joint and compensatory musculoskeletal changes.

2.5 Conventional Treatment Approaches

The traditional approach to the treatment of canine osteoarthritis is aimed at the alleviation of pain, enhancement of mobility, and delaying the occurrence of the disease. The pharmacological treatment process, especially non-steroidal anti-inflammatory drugs (NSAIDs), has been at the centre of treatment, where it helps both pain and inflammation in the joints affected. Mosley et al. (2022) also note that the use of NSAIDs, which can be used as an adjunct to the pain management effect, is associated with some gastrointestinal, renal, and hepatic risks, but can offer measurable advantages in the form of lameness and comfort.

When the degeneration of the joints is superficial or when the conservative management is not adequate, surgical interventions are indicated. According to Anderson, Zulch, O'Neill, Meeson and Collins (2020), the purpose of procedures such as total joint replacement, arthroscopic debridement, and cruciate ligament repair is to recover biomechanical activity and reduce chronic pain. These interventions notwithstanding, surgery is invasive, expensive and may require much longer rehabilitation, and this may not be a possibility for every patient.

Rehabilitation therapies are used along with pharmacological and surgical procedures but are aimed at mobility restoration and musculoskeletal health maintenance. According to Pye et al. (2024), physiotherapy, hydrotherapy, controlled exercise programs, and weight management can successfully decrease the stress on the joints, increase muscle support, and increase functional outcomes. Another addition to the rehabilitation toolbox, Huels et al. (2020) emphasise the use of emergent modalities that involve nuclear magnetic resonance therapy to minimise pain and improve the functionality of the joints. Although traditional therapies prove useful in managing the symptoms, there are still restrictions. Prolonged use of medications will have side effects, surgery will not have a complete effect on restoring joint integrity, and rehabilitation will require

long-term dedication on the part of owners (Mosley, Edwards et al., 2022; Mille, McClement and Lauer, 2022). The presence of these challenges has led to a growing interest in the compatibility therapy as an adjunctive or alternative therapy to the treatment and management of canine osteoarthritis, such as manual therapy and osteopathy.

2.6 Supplementary and Manual Therapy in Veterinary Medicine

There has been a significant increase in integrative veterinary medicine over the past few years as a reaction to using holistic treatment methods, integrating conventional and complementary techniques. According to Pye et al. (2024), non-pharmaceutical treatments, such as physiotherapy, massage, chiropractic therapy, and osteopathy, are being increasingly adopted to enhance the performance of osteoarthritic dogs in terms of enhancing the functionality of the joints and decreasing the pain. Mille, McClement and Lauer (2022) emphasise that manual therapies focus on the compensatory musculoskeletal adaptations along with the affected joints, considering the large-scale functional implications of chronic disease. The most common and the most frequently used type of manual intervention is physiotherapy, which implies therapeutic exercise, stretching, and hydrotherapy to improve the strength, flexibility, and joint support. According to Huels et al. (2020), adjunctive modalities, including low-level laser therapy and manual manipulation of particular areas, also help in analgesia and increased mobility of tissues.

Anderson, Zulch, O'Neill, Meeson and Collins (2020) claim that such interventions are complementary to pharmacological treatment as they minimise the use of medications and eliminate their adverse effects, but, at the same time, these approaches enhance the quality of life of dogs with these conditions. The effectiveness of manual therapies is evidenced in terms of improvement of joint mobility and reduction of pain, as well as in the overall musculoskeletal functioning. Mosley et al. (2022) underline that crucial standardised outcome measures are to

assess the efficacy of new treatment strategies and individualise the treatment strategies, making osteopathy a promising supplementary option in the treatment of canine osteoarthritis.

2.7 Osteopathy in Veterinary Practice

Veterinary osteopathy is based on the principles of considering the body as a whole, self-regulated, where the structuring and functioning of the body are closely related. Christian and Torsten (2020) discussed the Osteopathy in dogs with osteoarthritis should target pain relief, resolving dysfunction, and enhancing the mobility of joints and counteracting the compensatory dysfunctions caused by permanent degeneration of the joints. In veterinary osteopathy, palpation, gait, postural and joint mobility test is crucial in the demonstration of assessment.

According to Esteves et al. (2022), such techniques are required in order to identify the subliminal dysfunctions that are not directly located in the affected joint, but Castagna et al. (2021) also emphasize the importance of considering a range of diagnostic models in the planning process of the treatment process. With the integration of local joint pathology and global musculoskeletal interactions, osteopaths are able to provide interventions that are specific to the individual dog hence addressing the biomechanical and neuromuscular consequences of osteoarthritis. Osteopathic medicine encompasses numerous types of manipulation (manual techniques) of the body, including soft tissue work, myofascial work, articulatory work and craniosacral work. Steel, Foley and Redmond (2020) believe that these modalities could improve the circulation, decrease muscular tension, and increase the range of movement of the joint, whereas Zegarra-Parodi et al. (2021) insist that the holistic approach can contribute to the management of compensatory musculoskeletal strain and secondary dysfunctions. Practically, osteopathy is a complementary method which is compatible with conventional and rehabilitation therapy to offer a multimodal approach to the management of canine osteoarthritis.

2.8 Theoretical Framework

The theoretical explanation of osteopathy in canine osteoarthritis uses several theories that are all related to each other and that explain how manual therapies can influence the musculoskeletal well-being. According to the philosophy of osteopathy, a malfunction in a certain component of the musculoskeletal system can affect the rest of them, resulting in the formation of compensatory movement patterns, which increase stress on joints (Christian and Torsten, 2020). Esteves et al. (2022) also suggest that osteopathy might be viewed as an active inference, in which the structural adjustments promote adaptive self-regulation and better functional results. The Biomechanical theory is the basis of the rationale for restoring normal joint motion. Osteoarthritis disturbs the distribution of loads and joint kinematics, and as a result, decreases mobility and causes chronic pain.

Osteopathic methods could alleviate the load on affected joints and tissues, potentially preventing the progression of the disease (Gabai, Bakin et al., 2025). Sampath et al. (2020) covered that neuromuscular and circulatory processes also contribute to osteopathic care. Taken collectively, these theoretical approaches aid in stimulating the interrelationship of body systems, which supports interventions that could target any compensatory functions of the muscles, fascia and joints other than the main topography of pathology. All these theoretical perspectives form the basis of the suggestion of understanding the benefit of osteopathy in the treatment of canine osteoarthritis.

2.9 Evidence for the Role of Osteopathy in Osteoarthritis Management

Studies that assess osteopathy as a treatment of canine osteoarthritis are inadequate but, in some way, offer preliminary evidence of its potential usefulness. According to clinical findings, manual therapies, such as soft tissue methods, myofascial release, and articulatory treatments, have the

potential to positively impact the joint mobility, alleviate pain, and improve functional outcome in dogs with musculoskeletal conditions (Mille, McClement and Lauer, 2023). These results are in agreement with those of veterinary physiotherapy, which show that there were improvements in lameness, gait symmetry and activity levels when the manual interventions were incorporated with the conventional therapies. Evidence provided by human trials on osteopathic treatment can also shed more light, as it seems that carefully planned osteopathic treatment of musculoskeletal imbalances can lead to a reduction in pain levels, better range of movement, and the promotion of adaptive neuromuscular control (Esteves, Cerritelli et al., 2022). Even though these studies are not directly applied to the canine, they give an ideal ground on which osteopathic principles can be applied to other species, especially osteoarthritis conditions, which entail chronic pain, degeneration of the joints, and changes of posture as a compensatory mechanism. Although such positive results are possible, studies in the field tend to be less representative in terms of sample size, the methods used are not always homogeneous, and the studies are based on case studies or pilot testing (Sampath et al., 2020). There are few standardised outcome measures and randomised controlled trials, and therefore, it is not possible to come up with conclusive results on the effectiveness of osteopathy in canine osteoarthritis. However, the evidence at hand indicates that osteopathy, as an aspect of a multimodal treatment approach, can be used to improve the quality of life and functional mobility in affected dogs.

2.10 Current Research Gaps in Animal Osteopathy

A critical review of the literature indicates that there are a number of gaps in the literature on the use of osteopathy in veterinary practice. There is a lack of empirical research specifically focusing on the osteopathic interventions in dogs, and the number of randomised clinical trials or longitudinal studies is small. The available evidence is based on either case reports or small cohort

studies, which limit the generalisability of their findings. Also, there is inconsistent data on standardised outcome measures of functional improvements, pain reduction and the quality of life, which also supports the need to conduct systematic, controlled studies to determine evidence-based guidelines in applying osteopathy in the management of canine osteoarthritis and also studies on how osteopathy can be administered alongside conventional pharmacological and rehabilitation measures.

2.11 Chapter Summary

This chapter has examined the existing literature about canine osteoarthritis and how osteopathy can be applied in veterinary practice. Osteoarthritis is a common degenerative disorder that is associated with pain, loss of mobility, and compensatory musculoskeletal changes in dogs. The traditional methods of treatment, especially the pharmacological, surgical, and rehabilitation methods, mostly handle the symptoms without restoration of full joint functionality, which presents the necessity of conducting additional research. Complementary therapies, especially the osteopathy approach, provide a holistic approach that addresses the structural, neuromuscular and circulatory factors.

CHAPTER 3: Osteopathic Principles Applied To Canine Osteoarthritis

3.1 Introduction to Osteopathic Philosophy in a Canine Context

The four principles of osteopathy are: it treats the body as a whole, structure and function are related, there are self-regulatory and self-healing mechanisms in the body, and rational treatment is based on the integration of these principles (Bordoni and Escher, 2021). These principles have been evolved in human practice but translated into veterinary practice and animal rehabilitation. Applying osteopathy to dogs should involve a species-specific approach, especially in the fact that dogs cannot communicate verbally their pain or dysfunction. Thus, gait assessment, behavioural assessment, palpation, and functional testing are used in assessment (Anderson et al., 2020). Clinical presentation is further complicated by quadrupedal locomotion, which puts biomechanical forces on four limbs and the spine. It will, therefore, cause compensation in other joints and parts of the body (Lee et al., 2020). It is another reason for the need for a whole-body approach in canine osteoarthritis because chronic joint degeneration will impact overall movement patterns and functional balance, creating the foundation for osteopathic management strategies.

3.2 Principle 1: The Body as a Unit

It states that the body is a whole with regard to structure and function, meaning that all of its parts are connected and influence each other (Bordoni and Escher, 2021). This is especially important in the case of canine osteoarthritis, as degenerative changes within one synovial joint do not usually just occur there. The body's reaction to pain, inflammation, and decreased movement begins at the site and spreads throughout the musculoskeletal system. A dog that has hip osteoarthritis, for example, will tend to shift its weight away from the OA-affected limb to avoid distress and will put more weight on the other hindlimb and forelimbs. This unusual distribution

of load can result in abnormal stress on joints and soft tissues away from the primary lesion (Anderson et al., 2020).

These compensations over time end up causing muscle imbalance, fascial strain, and secondarily, altering joint function. Also, abnormal pelvic mechanics that occur with hip OA can affect lumbar spine movement, making it less flexible and causing ongoing tension in paraspinal muscles. Gait analysis suggests that dogs with osteoarthritis have large changes in weight distribution, posture and stride length (Mosley et al., 2022). The findings emphasise the osteopathic concept that proper management should focus on the entire biomechanical chain and not just on the involved joint.

3.3 Principle 2: Structure and Function Are Interrelated

The second is that structure and function are inseparably connected, which is defined as any change in one affecting the other (Bordoni and Escher, 2021). Osteoarthritis in dogs is a prime example of this because as a progressive disease it directly affects the efficiency of movement and functional capabilities of the synovial joints. There are four stages of pathological cascade in OA, namely cartilage breakdown, subchondral bone remodeling, synovial inflammation and osteophyte formation, which all lead to pain, stiffness and decreased range of motion (Anderson et al., 2020). When mobility is reduced, dogs often compensate for that loss by changing their gait so as to reduce the discomfort, which may include shifting some weight away from the affected limb.

Initially protective mechanisms, they often lead to secondary musculoskeletal strain in other areas. Further limitation of movement occurs because of the joint capsule fibrosis and periarticular soft tissue contracture, muscle atrophy and decreased stabilisation of the joint due to

decreased activity. This loss of support puts extra mechanical stresses on affected structures, promoting further degeneration and creating a vicious cycle of dysfunction (Malkani et al., 2024). An Osteopathic approach to the body sees these changes as being present with palpatory findings of tissue texture abnormalities, lack of elasticity, and joint restriction (Roberts et al., 2022). The principle highlights the importance of treating structural and functional defects when managing canine OA.

3.4 Principle 3: Self-Healing and Self-Regulation

One of the main principles of osteopathic medicine is the ability of the human body to continuously adapt to its internal and external environment by maintaining homeostasis, which is achieved through physiological mechanisms of self-regulation and self-repair, as well as physiological mechanisms of adaptation to stressors (Bordoni and Escher, 2021). However, in canine osteoarthritis, if this inflammation and chronic pain are persistent and these adaptive processes can be overwhelmed by the biomechanical dysfunction, functional decline can occur. Articular cartilage does have some regenerative properties, but there is some remodeling and adaptation potential in the surrounding tissues, including muscles, fascia, ligaments and synovial tissues, which may be altered over time (Mosley et al., 2022). Therefore, osteopathic treatment focuses on facilitating these remaining healing mechanisms by removing physiological barriers like impaired circulation, soft tissue restrictions and lymphatic congestion. Better tissue mobility can positively impact perfusion, metabolic exchange and functional movement efficiency (Roberts et al, 2022). However, osteopathy will not correct existing degenerative joint changes but can help treat secondary dysfunction. Although there is theoretical reason to believe that self-healing

mechanisms can affect veterinary populations, it is hard to determine the clinical effect of these mechanisms.

3.5 Principle 4: Rational Treatment Based on the Above

The fourth osteopathic principle is the unity of the body and how structure relates to function, as well as the mechanisms of self-regulation, which will guide treatment (Bordoni and Escher, 2021). When it comes to canine osteoarthritis, it is not sufficient to only treat the affected joint; the overall pattern of dysfunction needs to be addressed. Examples of this include a dog with hip OA presenting with stiffness in the lumbar spine, asymmetric pelvic placement, compensation (overloading) of the forelimbs, and muscle tension (Malkini et al, 2024). Thus, rational osteopathic treatment is directed not just at the hip joint but also at primary and secondary dysfunctions. Treatment plans are tailored to each assessment finding and can differ a great deal among patients with similar radiographic diagnoses. This is a patient-centred care approach where clinical decision-making is based on functional evaluation, palpatory findings, and quality of life (Bergna et al., 2022). Thus, osteopathic management is aimed at balancing the musculoskeletal system overall, and not just at treating individual pathological lesions.

3.6 Somatic-Visceral Interactions in Canine OA

There is a complex interaction between the musculoskeletal system and visceral function, mediated by neurological and autonomic pathways, which has been noted in the osteopathic theory (Zegarra-Parodi et al., 2023). Canine osteoarthritis is a chronic pain condition which has the potential to cause physiological changes outside of the locomotor system that may involve a

prolonged activation of the sympathetic nervous system. Sympathetic activation has been linked to changes in gastrointestinal motility, vascular regulation and respiratory function. It can be expected that chronic pain in dogs can lead to a decrease in appetite, changes in bowel movements or changes in breathing as a result of the pain and stress (Malkani et al., 2024). Further, the postural changes that can occur with OA could limit the movement of the diaphragm and decrease thoracoabdominal mobility.

The findings are supportive of the consideration of somatic-visceral relationships when evaluating and treating from an osteopathic context. While the scientific basis for using visceral osteopathy in veterinary care is still relatively weak, the idea is that enhancing the mobility of associated tissues can help promote autonomic balance and general well-being (Wójcik et al., 2025). However, the potential mechanisms still need to be validated in scientific studies before firm clinical conclusions can be made.

3.7 How OA Disrupts Biomechanical and Neurological Integration

The joint structures and neurological systems are damaged by Osteoarthritis, which controls movement and pain. DJD can affect proprioception, affecting the sensory feedback from affected tissue, and result in altered coordination and postural stability (Anderson et al., 2020). Neuroplastic changes of the central nervous system also occur as a result of chronic pain. Central sensitisation occurs when there is repeated nociceptive input that increases the sensitivity of pain pathways (Mosley et al., 2022). This process may account for the fact that some dogs still have rather moderate structural abnormalities and yet are quite painful.

In context to osteopathy, when fascia, muscle and connective tissue become restricted it can affect neural mobility and sensory processing (Tozzi, 2012). Manual techniques are therefore designed to optimise biomechanical function and at the same time decrease abnormal neural tension and augment more efficient neuromuscular integration (Roberts et al., 2022). While the evidence is still coming in, these neurological effects are consistent with the osteopathic focus on mechanical and neurophysiological factors in chronic disease.

3.8 Chapter Summary

The chapter discussed some of the basic osteopathic principles applied to canine osteoarthritis. The osteopathic philosophy of OA is a whole-body condition with biomechanical, neurophysiological and neurological adaptations that are not limited to the affected joint. These principles form the theoretical basis for the practical osteopathic methods used in the rehabilitation of the dog, which are explored in the next chapter.

CHAPTER 4: Key Osteopathic Manipulative Treatment (OMT) Techniques For Canine Osteoarthritis

4.1 Introduction to Technique Selection in Canine OA

Anatomy, severity of the disease, and patient tolerance are important factors to take into account when choosing osteopathic manipulative techniques (OMT) in canine osteoarthritis (OA) and should not be standardised. Dogs are unable to verbalise pain, and decision-making is based on palpation, behavioural assessment and functional assessment (Brookes et al., 2024). This presents clinical uncertainty and further emphasises the importance of using conservative, low-force approaches. OA is a progressive degenerative disease, and multi-modal treatment is supported by evidence over single-modality treatment of the disease (Mosley et al., 2022). Osteopathy is therefore usually combined with pharmacological and physiotherapeutic measures. The evidence base for manual therapy in veterinary OA, however, is relatively small with small sample sizes and subjective outcome measures, which limits the reliability (Pye et al., 2024). This indicates the continued clinical and empirical validation gap. Considering the above restrictions, the treatment should focus on safety, tissue tolerance, and modulation of the neurophysiology rather than structural correction. Low force techniques are crucial because of the high nociceptive sensitivity and low adaptive capacity of osteoarthritic joints (Monteiro et al., 2024). Treatment needs to therefore continue to be personalised, and continually re-evaluated.

4.2 Soft Tissue Techniques

In canine OA, it plays an important role because of its safety and systemic effects. The thoracolumbar fascia, paraspinal muscles and compensatory structures like the iliopsoas are the

most common areas for myofascial release, typically due to gait mechanics being altered (Mille et al., 2022). There is some conflicting evidence about the mechanism, however, with some suggesting a neurophysiological mechanism instead of one that is structural (Christian and Torsten, 2020). Peri-articular fibrosis in joints like the stifle, hip and elbow is treated by cross-fibre friction. Although fibrosis can be a factor in stiffness, excessive force can exacerbate inflammation, so it is important to use clinical judgment. Stretching techniques aim to stretch compensatory shortening of hamstrings, quadriceps and pectorals, but may be less effective in more advanced OA because of pain inhibition. The use of lymphatic pump techniques could help reduce oedema and the drainage of fluid, although there is very little evidence that has been extrapolated from human studies (Pye et al., 2024) and therefore is evidence-based on translation of data rather than veterinary data.

4.3 Articular Techniques and Joint Mobilisation

Those of passive joint movement within the physiological range are articular techniques and are useful in cases of stiffness in OA. Chiefly employed for pain relief is low-grade oscillatory mobilisation (Grades I-II), and Grade III may be cautiously utilised for mobility restriction (Mille et al., 2022). Because of the potential stress on the cartilage, the concept of risk–benefit analysis is important in degenerative joints. The most frequent sites of involvement are the hip, stifle, elbow, carpus, and tarsus (Anderson et al., 2020). The potential to increase synovial circulation, decrease stiffness and increase neuromuscular feedback is provided by mobilisation, but there is not a strong enough body of evidence to support this. With high velocity, thrust techniques are usually contraindicated, as they can cause pain to worsen and joint damage, which is a change in approach to OA management from structural correction to functional preservation. The current

guidelines are in favor of conservative mobilisation and against aggressive manipulation in degenerative cases (Mosley et al., 2022). McGregor's Osteopathic Articular Balancing (OAB) approach is consistent with these principles, using gentle balancing of articular and periarticular tensions to improve joint function while minimising stress on degenerative tissues. Functional techniques similarly position tissues toward ease to encourage neuromuscular adaptation rather than forceful correction (McGregor, 2022).

4.4 Muscle Energy Techniques (MET)

They are the active-assisted techniques where the patient actively contracts the muscles to resist the resistance. For dogs, MET is a beneficial technique to use to treat secondary muscle spasm that may occur with joint pain and biomechanical changes. For instance, the iliopsoas spasm is frequently seen in dogs with hip OA as a result of compensatory gait alterations (Mille et al., 2022). The main benefit of MET is that it is a controlled exercise, with the muscle tone being modulated but not overstimulated from a nociceptive perspective. But it needs patient cooperation (Komalasari and Handayani, 2024), which is difficult in anxious and very painful animals. Even though many uses of MET have been applied in human musculoskeletal medicine, there is limited evidence on which to base its use in veterinary populations. It leads to concerns about the evidence-based versus tradition-based use of this in osteopathic practice. In veterinary osteopathy, Functional Technique principles described by McGregor may provide an alternative for patients unable to actively participate in MET, as treatment is guided by passive positioning and tissue balance rather than voluntary muscular effort (McGregor, 2022).

4.5 Strain-Counterstrain

It is a passive positioning technique that aims to relieve tenderness in hyperirritable tissue points (Fritz et al., 2026), especially recommended for geriatric dogs who have chronic OA as they are painless and non-invasive. When tissues are placed in a position of maximum comfort, muscle spindle activity is minimised, and tissue relaxation is enhanced, while reflexive guarding is decreased. In OA patients, strain-counterstrain may be used on the area of compensatory strain including the lumbar spine, pelvis and contralateral limbs (Ahmed et al., 2021). Yet its usage remains largely theoretical with limited veterinary-specific clinical trials. It has been argued by Christian and Torsten (2020) that its effects could simply be due to central pain modulation and not be a true correction of somatic dysfunction. However, its safety profile makes it a valuable addition to multimodal OA management.

4.6 Visceral Osteopathy Techniques

The movement and performance of internal organs and their connections with the fascia are improved by visceral techniques. These are taken into account when chronic pain causes postural changes which restrict diaphragmatic function or change the mechanics of the thoracoabdominal wall in a dog (Wójcik et al., 2025). Medullary bone disease for example, can be a result of kyphotic posture in the hindlimbs, which can lead to decreased mobility of the liver and stomach, thus impacting respiratory efficiency. Visceral osteopathy is a part of osteopathy theory, yet the use of the technique in veterinary OA is controversial because of its lack of empirical validation. Theoretically, there is a possibility that increasing visceral mobility could affect the autonomic balance and systemic inflammation, although this is speculative (Zegarra-Parodi et al.,

2021). Thus, visceral techniques are to be used in addition to other more effective methods of OA management and not as a primary focus.

4.7 Cranial and Sacral Approaches

Such techniques rely on very subtle movements of the cranial rhythmic motion and dural membrane tension. Their role in canine OA is mainly theoretical and there is limited evidence of clinical efficacy. The use of these techniques has been proposed to affect the central sensitisation and pain perception in neurophysiological pathways (Esteves et al., 2022). But the absence of measurable outcomes and reproducible clinical evidence has sparked considerable controversy among the osteopathic profession. However, Ceballos-Laita et al. (2024) state that craniocervical techniques are hard to scientifically validate and are likely related to the beliefs of the practitioner. These techniques are thus mostly viewed as supportive, and should not be used instead of evidence-based interventions for OA management.

4.8 Technique Selection by OA Stage

The choice of osteopathic techniques should be differentiated based on the severity of the disease. Articulatory techniques, MET and gentle myofascial release can be used in mild OA, where the stiffness is intermittent, as it may help to keep the joints moving without causing pain (Paul and Selvabharathi, 2019). OAB and Functional Techniques may also be appropriate at this stage because they use low-force, patient-specific approaches that aim to optimise joint mechanics while respecting tissue tolerance (McGregor, 2022). For moderate OA (persistent lameness), soft tissue techniques, low grade mobiles and strain counterstrain may help relieve symptoms and

maintain function. If the structural damage is extensive, as in severe OA, the treatment should focus on comfort, circulation and quality of life. Generally, lymphatic drainage techniques, gentle myofascial work and positional release approaches are preferred and painful or forceful intervention is avoided. This approach is a staged care as recommended in consensus guidelines for advanced musculoskeletal disease (Mosley et al., 2022) which focuses on conservative, patient-centred treatment.

4.9 Safety Considerations and Contraindications

Veterinary osteopathic treatment always involves safety. Absolute contraindications are acute fractures, septic arthritis and neoplastic involvement of joints, in which manual therapy could aggravate the damage or delay the appropriate medical treatment (Haussler et al., 2022). Severe uncontrolled pain is a relative contraindication, as the animal should be stabilised by veterinary intervention prior to manual stabilisation. Clinicians should also watch for behavioral cues of distress, such as withdrawal, vocalization or muscle tension, as these can be signs of treatment intolerance. In the absence of verbal feedback in canine patients, the need to monitor and adjust treatment is paramount (Pierantoni et al., 2022). Because of the variation in the progression of OA and in how quickly people notice pain, it is important to use a careful and sensitive approach to treatment.

4.10 Chapter Summary

The treatment of canine osteoarthritis with osteopathic manipulative techniques should be based on clinical reasoning, not on a strict protocol. Soft tissue, articular and functional

techniques are potentially beneficial, but the evidence base is sparse, and much is drawn from human medicine. So osteopathic treatment must be conservative, individualised and part of a multimodal veterinary care program.

5.0 Introduction

Anderson et al. (2020) found that osteoarthritis in the dog is caused by a combination of conformation, age, obesity and predisposing arthropathies, not by any one lesion. This is important for osteopathic analysis because the "problem" is not necessarily limited to the cartilage surface, but also to the nervous system, muscle guarding, altered breathing and decreased willingness to put weight on the affected leg during standing or walking (Belshaw et al., 2020). This chapter thus suggests that visceral and neural osteopathy is not a substitute for orthopaedic treatment but rather provides insight into how to explain the persistence of chronic pain following the establishment of structural damage.

5.1 Why neural and visceral approaches matter in canine OA

Cachon et al. (2023) stated that treatment of canine osteoarthritis should be staged and multimodal as there is no single treatment that can reverse the degenerative change or normalise function. Pye et al. (2024) suggested that non-pharmaceutical interventions are most useful when they are chosen to address the mechanisms that perpetuate disability, particularly pain avoidance, weakness and inactivity. The capacity of the owner and the clinical stage are important factors affecting real-world outcomes as noted by Mosley et al. (2022). In this respect, visceral and neural approaches are clinically appealing as they are based on the concepts of regulation, mobility and load transfer, rather than a lesion-centred approach which often underestimates the complexity of chronic pain.

5.2 Neural sensitisation, autonomic imbalance, and pain persistence

In a large multisite study, Corral et al. (2021) demonstrated that the treatment of pain with bedinvetmab was superior to placebo, strongly indicating that nerve-growth-factor mediated nociception is a significant contributor to pain in dogs. Dogs with OA responded to CBD treatment with a reduction in pain in some, but not others, while the study by Mejia et al (2021) did not

demonstrate a linear relationship between structural severity and subjective pain. Patikorn et al. (2023) noted that the evidence for cannabidiol is still uncertain, and that this uncertainty is clinically relevant because chronic pain in dogs is challenging to differentiate from fear, inactivity and movement avoidance. Kronenberger (2023) also found the long-term evidence related to the effectiveness of bedinvetmab is still limited. These findings are based on several limitations of the literature, including a small number of long-term studies, a limited number of studies with relatively short follow-up, and an inability to fully assess objective sustained functional improvement, largely due to owner-reported outcome measures. In addition, bedinvetmab is able to inhibit nerve growth factor (NGF) and reduce signals for pain, but it cannot stop the underlying structural loss of cartilage in the joints or the progression of disease. Thus, the improvements in mobility may not be due to genuine changes in the osteoarthritic process but rather to alleviating the symptoms. This distinction is clinically relevant since it may lead to increased use of the limb without necessarily improving the joint integrity and may be interpreted with caution when considering the long-term benefits of treatment.. From a practical osteopathic perspective, ongoing guarding, changes in posture and decreased thoracic excursion may then become a component of the pain loop.

5.3 Osteopathic neural techniques and expected effects

While Mille et al. (2022) find that pain reduction and muscle preservation as well as the restoration of joint function are important goals for rehabilitation, the study did not provide direct evidence for osteopathic manipulation. It is therefore important not to overstate the evidence for neural osteopathy, making these conclusions solely on the basis of these results. Likewise, studies investigating low-level laser therapy (Barale et al., 2022), transcutaneous electrical nerve stimulation (Pedersen et al., 2024) and pulsed electromagnetic field therapies (Leung et al., 2024;

Sprunks et al., 2024) reveal that these techniques appear to have an effect on mobility, gait or quality of life via neuromodulatory mechanisms, but they are quite different from osteopathy. So caution must be used when extrapolating their findings to validate neural osteopathy. These studies, however, offer indirect evidence of the biological plausibility of changes in sensory input and autonomic activity to affect pain processing and movement. Neural osteopathy should accordingly be considered as a complementary technique that can help to support the rehabilitation process, and not as a treatment that is proven to be effective in treating canine osteoarthritis.

AOB (Applied Osteopathic Biomechanics) Functional Technique of Professor Stuart McGregor offers a clinical model that can be used to understand altered neural function, fascial tension, and biomechanical compensation in the body as a whole, and not just the symptomatic joint. Mille et al. (2022) stated that the goal of rehabilitation is to return to quality movement and functional capacity, not just pain reduction, and Pye et al. (2024) emphasized that NPM is more successful when movement quality is improved. In this context, the AOB Functional Technique is a helpful tool in the osteopathic arsenal as it prompts the practitioner to examine the entire functional chain and to uncover any restrictions that could be causing compensatory movement.

5.4 Visceral dysfunction, posture, and load distribution

Theyse et al. (2024) suggest that a purely local joint interpretation is too simplistic and that a translational approach – including adipokines, inflammation and systemic metabolic stress – is more appropriate. Stevens et al. (2024) noted that associations between the gut microbiome and OA-related pain indicate that inflammatory signalling in the periphery could influence pain severity and recovery potential. Dias et al. (2021) suggested that mesenchymal stem cell therapy should be considered a clinically contextual orthopaedic adjunct, meaning that logic is helpful in this context as it considers the dog as a whole biological system and not just a hinge joint. The

same applies to the mechanics of the fascia and diaphragms: if the thoracoabdominal mobility is limited, the dog may compensate by changing its trunk rotation, shortening its stride, etc. and increasing the loading asymmetry on its limbs. Gildea et al. (2024) reiterated the need to measure quality of life, as systemic comfort is a crucial link between pain reduction and improved movement.

5.5 Evidence base, contradictions, and limitations

Barbeau-Grégoire et al. (2022) took it one step further and showed that collagen alone was marginally effective, while the chondroitin-glucosamine blends were definitely not effective. However, Stabile et al. (2022) and Dobenecker et al. (2024) found that collagen related products did result in mobility improvements, but not for every dog, and the improvements are not fully understood. In a similar fashion, Kampa et al. (2024) also found that meloxicam was superior to some supplement strategies on objective measures; this is a helpful reminder that comfort and gait change is not a result of a non-pharmacological therapy. The lesson for osteopathy is that there's scant evidence of benefit, and claims should be matched to evidence.

5.6 Clinical value in multimodal care

Wright et al. (2022) indicate that owner reported questionnaires and functional mobility tests are helpful as they can detect change which radiographs cannot. Bruns et al. (2024) and Schroers et al. (2024) observed inconsistent gait responses with stromal vascular fraction, highlighting the need to be cautious of assuming biologic plausibility equals clinical success. Enomoto et al. (2024) reported clinically meaningful improvement when grapiprant was added to a standard treatment, and Talsma et al. (2024) indicated that CBD could be administered with NSAIDs in mobility-impaired dogs without causing any adverse effects. Alves et al. (2024) also showed that mesotherapy can have an effect on the signs of hip OA, further supporting the concept that a multi-

modal approach is best for canine OA. In a practical sense, when osteopathy is recorded, timed with exercise, and evaluated by changes in function, it is best defended. This integrated approach also demonstrates the principles of Professor Stuart McGregor's AOB Functional Technique, which focuses on reassessment of functional movement pre and post intervention, rather than just relying on subjective palpatory findings. Wright et al. (2022) showed that functional mobility testing can offer objective evidence of clinical change; and Gildea et al. (2024) showed that quality of life measures should be used alongside clinical assessment. Therefore, it is appropriate to document measurable functional outcomes as this is in line with the evidence-based rehabilitation approach and the principles of osteopathy that underlies the AOB Functional Technique. In terms of practicality, when osteopathy is documented, timed with exercise, and assessed by changes in function rather than by vague impressions of “looseness” or “release”, it is best defended.

5.7 Future research and practitioner caution

Several biological systems move together once treatment has begun, as even weight loss interventions can impact microbiota, hormones and activity patterns (Oba et al., 2023). Gildea et al. (2024) offered a more telling reminder that owner experience and the quality of life of the dog must be assessed explicitly as it is not the same as visible improvement and it is not the same as measured improvement. This is important for osteopathy because the dog's walking, resting and climbing may feel better in the room, but the true measure of the outcome is how he walks, rests and climbs over weeks, not hours. Objective gait data, blinded outcome assessment and more precise case selection are thus needed for future studies. This is also why it is important to compare direct to conventional care – if there is no measurable change in movement, then osteopathy could become a convincing story instead of a proven treatment. It must continue to be accountable and transparent.

5.8 Conclusion

It is from the perspective of these visceral and neural osteopathic approaches as complementary tools for chronic pain modulation, compensatory load management and systemic regulation that they are most credible. There is no evidence in the recent literature that osteopathic manipulation alone influences the progression of disease in canine osteoarthritis, however there is evidence that pain, movement and quality of life are influenced by more than cartilage loss. That's the power of the osteopathic eye: some dogs are still painful when they are treated conventionally and whole-body planning may be needed if the dog has already developed chronic compensatory patterns.

Chapter 6: Integrating OMT with Conventional Veterinary Care: Rehabilitation, Exercise and Analgesia

6.0 Introduction

Chronic pain management in dogs should be multimodal, individualised and continually reassessed, and should not be a single prescription event, as suggested by Gruen et al. (2022). Cachon et al. (2023) reiterated that concept with the suggestion of stage-based treatment for osteoarthritis, which involves owner education, analgesia, rehabilitation and functional monitoring. This chapter therefore explores how OMT can be integrated into traditional veterinary medicine without taking its place. The main concept is that manual therapy has more value when it enhances the dog's ability to move, exercise tolerances and response to analgesia, and the veterinarian retains the responsibility for diagnosis, drug selection, and risk management.

6.1 Why multimodal integration is necessary

The treatment of osteoarthritis should be tailored to the clinical stage, owner commitment and practical feasibility as poor adherence can lead to poor outcomes even with good plans, according to Mosley et al. (2022). Pye et al. (2022) suggested that pharmaceutical interventions are still needed but not as the sole intervention, but as part of a functional approach. Corral et al. (2021) showed that bedinvetmab could decrease pain in a large number of dogs, but does not necessarily result in increased strength, coordination or endurance. This is important since dogs with OA may not be deconditioned despite having a good pain score. Symptom relief is thus not a luxury, but rather the means of achieving usable function through integration. The clinical philosophy of Professor Stuart McGregor's AOB Functional Technique is very similar to this multimodal approach as it considers manual therapy as part of a larger rehabilitation program and not an isolated therapy technique. Cachon et al. (2023) concluded that the management of canine

osteoarthritis should include function, rehabilitation, and regular reassessment, and Gruen et al. (2022) emphasized that chronic pain management involves coordinated interventions for function and pain. The AOB Functional Technique thus enhances clinical reasoning focused on restoring efficient movement in addition to traditional veterinary care.

6.2 Rehabilitation and controlled exercise

Mille et al. (2022) believe that the purpose of canine physiotherapy is to reduce pain, preserve muscles and restore joint function, not just for appearance's sake. Wright et al. (2022) demonstrated that functional mobility tests can be used to track treatment response, allowing for exercise to be tailored to the actual capacity and not owner's best guess. Turner et al. (2024) observed that localized vibration was an effective method for assessment in dogs with hip dysplasia, and Pedersen et al. (2024) noted that TENS changed gait parameters in dogs with OA. Similarly, Leung et al. (2024) and Sprunks et al. (2024) propose that physical modalities can contribute to the conditions for movement by decreasing discomfort and increasing loading tolerance. The key is to dose exercise, rather than simply encourage it, as overdoing it can easily reinforce pain behaviour as well as inactivity.

6.3 Analgesia and adjunctive therapies

The AAHA Pain Management Guidelines for Dogs and Cats list NSAIDs as the primary drug for chronic pain, with other drugs and procedures used as adjuncts when they are not effective or when there are adverse effects (Alves et al., 2024). Corral et al. (2021) and Michels et al. (2023) demonstrated that bedinvetmab can help alleviate the pain caused by osteoarthritis, however Kronenberger (2023) warned that the evidence base for these drugs is still relatively weak and should be used wisely, not as a blanket solution. Mejia et al. (2021) and Talsma et al. (2024) indicated that CBD could provide additional relief in some dogs. Enomoto et al. (2024) and Alves

et al. (2024) reinforce the multimodal argument by demonstrating that meaningful improvements can be achieved with an analgesic and interventional approach, when applied as part of a structured plan. Analgesia, that is, should not be a substitute for movement rehabilitation, but should make it easier to move.

6.4 Monitoring outcomes and coordination

Gildea et al. (2024) showed that owner completed measures of quality of life were able to identify both changes in the dog and changes in the owner; this is important because successful OA management is apparent in dogs' daily function, not just in clinic-based pain scores. When no objective measure of the effects of manual therapy is used, then it should be warned, since many supplements are not more effective than placebo, argued Barbeau-Grégoire et al. (2022). Dobenecker et al. (2024) and Kampa et al. (2024) have shown that a modest benefit is not a real benefit, and that the standard osteopathic care should meet if it is to be integrated credibly does not. Continuous reassessment during treatment to gauge the meaningful functional change that is achieved with manual intervention is also recommended by Professor Stuart McGregor's AOB Functional Technique. This focus on objective review aligns with Wright et al. (2022) who showed the benefit of functional mobility testing, and with Gildea et al. (2024), who emphasized the need to monitor quality of life over time. Incorporation of these objective outcome measures into the practice of osteopathic intervention adds to the credibility of osteopathy in the field of multidisciplinary veterinary rehabilitation. The real-life application is that the veterinarian, rehabilitation therapist and osteopathic practitioner should have a common review process in place to allow for escalation, maintenance or termination of treatment based on response, rather than habit.

6.5 Weight management, adherence, and long-term follow-up

Restricted feeding is crucial for dogs that are obese, it can help to optimize their body composition and activity, and excess weight makes it harder to maintain any mechanical intervention and increases OA pain (Oba et al. 2023). This study further reinforces the rehabilitation model as the dog is still overloaded even if the best osteopathic release or exercise program is performed. Gildea et al. (2024) also showed that quality of life assessments can be useful in capturing the owner and dog's long-term changes, potentially aiding in maintaining adherence following the first visit to the clinic. Hence, long-term follow-up is not only an administrative issue, but the most important one to turn short-term treatment success to long-term management.

6.6 Why analgesia and movement must be synchronised

The concept behind using osteopathy along with veterinary medicine is to support function rather than suppress sensation, as is the focus of pain control, Gruen et al. (2022) explained. Cachon et al (2023) further pointed out that treatment should be individualized based on the stage of the disease and a dog that is very stiff may need more pain relief before being able to go on the floor for exercise. Pye et al. (2024) recently reaffirmed the crucial role of non-pharmaceutical care but stated that it cannot be used in lieu of or instead of proven medical care. This is clinically significant as osteopathic treatment can help decrease tension and increase comfort but cannot overcome the inflammatory and nociceptive load of active OA. Analgesia that is synchronised with movement will thus have the best chance of a functional and lasting effect. Osteopathic release and exercise work together – when the dog can move more easily, osteopathic release and exercise work together; when the dog can't move easily, it can't move well, and osteopathic release and exercise work against each other.

6.7 Conclusion

Throughout this chapter, the author has suggested that osteopathic manipulation is best used as a part of the veterinary rehabilitation process and not in lieu of it. Exercise rehabilitates capacity, analgesia reduces the threshold to movement and monitoring of outcomes avoids overclaiming. At this time, there is some evidence that integrated care can enhance comfort and function as long as treatment is matched to stage (objectively measured) and adjusted based on data. This is why it is best to use a multimodal treatment to treat a dog's OA. It also protects clinical integrity, for the dog's reaction is what matters, not the therapist's opinion, as to whether treatment should be continued or not. This is especially true in chronic OA, where the gain in stair climbing, sit-to-stand transitions and rest comfort is more important than a dramatic change in one visit. It also aids in differentiating real improvement from transient relief following treatment and transport at home and in clinic.

Chapter 7: Discussion: Limitations, Clinical Realities, and the Evidence Gap in Animal Osteopathy

7.1 Synthesis of Key Findings

The previous chapters have discussed how OA is a complex, multifactorial disease that should be treated multimodally, positioning osteopathy as a complementary component within a broader veterinary care team rather than a standalone treatment. The literature describes the incidence of OA in the adult dog population as around 20%, with pathology including degeneration of the cartilage, inflammation of the synovial membrane, and adaptation of the biomechanics (Anderson et al., 2020). Symptomatic treatment (NSAIDs, surgery) has many limitations such as side effects and lack of full functional recovery (Mosley et al., 2022). These limitations arise because conventional approaches target only the primary joint lesion, failing to address compensatory dysfunctions elsewhere in the body. The whole-body nature of canine OA is consistent with osteopathic principles: body as a whole, structure-function, self-healing and rational treatment. Chronic pain persistence has potential mechanisms for addressing through modulation of sensitised nociceptive pathways as well as autonomic regulation, both of which have been explored in visceral and neural approaches (Corral et al., 2021). Osteopathy can be used in combination with conventional veterinary treatment (rehabilitation and controlled exercise) to improve the functional outcome and movement economy and loading tolerance (Mille et al., 2022). But evidence to support these benefits, as discussed above, has repeatedly been found to be quite weak.

7.2 Critical Evaluation of the Current Evidence Base

The published literature on canine osteoarthritis and osteopathy has methodological shortcomings. Pye et al. (2022) point out that pharmaceutical treatment. Existing studies are predominantly individual case reports, small cohort studies, or pilot studies without control group and blinding. Maler (2023) states that there is a theoretical foundation for veterinary manipulative therapy (VMT), such as osteopathy, in neurology and biomechanics, but the evidence available at present is not enough to make definitive recommendations. This is very different from the situation in human osteopathy, where there has been a gradual increase in the number of randomised controlled trials demonstrating effectiveness for specific musculoskeletal conditions. Connor et al (2023) show across a range of healthcare settings that is consistently associated with better outcomes for patients, but in veterinary osteopathy, methodological challenges, for example small sample sizes and lack of validated outcome measures specific to manual therapy in dogs have limited its adoption to date.

7.3 The Evidence Gap

There are a number of important questions that remain unanswered. First, there is no large study randomised controlled treatment (RCT) comparing OMT with sham manual therapy or standard care alone in dogs with OA. Han et al. (2024) in their scoping review of RCTs illustrate that high-quality trial design is possible in a variety of clinical settings, and that veterinary manual therapy should adhere to the same criteria. Second, there are no standardised outcome measures specific to osteopathy. Although patient reported outcomes are well described and validated by Mokkink et al (2024), an owner-reported outcomes validated instrument following osteopathic treatment in

dogs does not exist and does not meet COSMIN criteria. Third, it is unclear how these mechanisms work, that is, whether improvements are due to biomechanical correction, neurophysiological modulation, placebo effects, or concurrent interventions. However, Taylor et al. (2026) point out that placebo effects are difficult to measure and appraise in clinical trials, particularly in veterinary settings, where owner expectations could impact outcome reporting without those expectations meaningfully affecting patient outcomes.

7.4 Clinical Realities of Canine Osteopathic Practice

When treating non-verbal canine patients, practitioners have to encounter unique difficulties. Welfare in Animal Care is discussed by Willette et al (2023) which states that the subjective measurement of improvement is open to observer bias. In the osteopathic context this is the case, as placatory findings and behavioural observations are not as objective as quantitative gait analysis or force plate measurement. As with the caregiver placebo effect in veterinary literature, owners may report improvement due to wishful thinking or a need to justify the investment in treatment. Goudman et al. (2022) highlight patient-reported outcomes as a subjectively reported measure in chronic pain, which must be interpreted carefully. In canine osteopathy, this clinical fact requires careful, honest communication regarding the anticipated benefits and a search for objective evidence of functional change, if available.

7.5 Limitations of Extrapolating from Human Osteopathy

There are unique, non-trivial challenges to translating human osteopathy evidence to canine practice (Zhang et al., 2025). First, there is a fundamental difference between a dog's quadrupedal

weight distribution and human bipedal weight distribution that affects the loading patterns on the joints and the compensatory responses to OA. Second, the anatomy of the canine lumbosacral junction (7L vertebra vs 5L in humans) alters the mechanics of the spine and patterns of technique use. Third, dogs cannot verbally report their pain, so there is a need for behavioural proxies (e.g., activity monitoring, owner questionnaires) which can be subject to observer bias. Fourthly, the optimal treatment dose (session duration, frequency, application of force) is not established in canines at all. These species differences require species-specific veterinary investigation rather than assumption of equivalence.

7.6 Clinical Reasoning in Evidence-Limited Contexts

Despite the lack of supporting evidence, practitioners must make practice decisions in the clinical setting. Structured clinical reasoning frameworks are shown to enhance decision-making quality even when evidence is incomplete by Sim et al. (2022). In evidence limited situations, clinical decisions are made using a structured approach, guided by existing research, systematic monitoring and pre-determined thresholds for continuation and cessation. The practitioner starts with validated owner reported questionnaires, e.g. Liverpool Osteoarthritis in Dogs (LOAD) questionnaire, or functional mobility tests, like the number of stairs climbed or the number of times the dog can sit to stand, which are repeated every two to three weeks and again after four to five weeks to look for measurable improvement. Success criteria should be established beforehand; a clinically meaningful change of 15% or more on a mobility score or a significant change on an owner-reported visual analogue scale. The practitioner revisits the same measures after 4-6 sessions (usually 4 weeks). No measurable improvement within a reasonable timeframe should be continued with osteo treatment being discontinued if required; if measurable improvements are

demonstrated, treatment can be continued and monitored. One published canine osteopathy case study showed physiological changes (HRV). However, more trials with objective outcomes are required. This protocol will keep osteopathy accountable and will not become "a convincing story rather than a proved treatment" as warned in the previous chapters.

7.7 Chapter Summary

The amount of evidence in animal osteopathy is large but not impossible. There are currently no RCTs, poor understanding of mechanisms, lack of standardised outcome measures and challenges in translating human evidence. Caution is called for in interpreting improvement in clinical reality—such as non-verbal patients, observer bias, and caregiver placebo effects. Structured clinical reasoning, systematic documentation of outcomes, and transparent communication of evidence limitations, while delivering compassionate patient-centered care, should be encouraged in practitioners.

Chapter 8: Conclusion and Recommendations for Canine Osteopathic Practice

8.1 Restatement of Thesis Aim and Key Findings

This thesis has explored the potential of canine osteopathy in the treatment of osteoarthritis and how different osteopathic manual therapy techniques can help in the treatment and long-term care of dogs with osteoarthritis. The investigation confirms that OA is a common, complex disease that needs multimodal treatment in dogs. Osteopathic philosophy is coherent with the whole-body symptoms of chronic joint disease, and specific techniques such as soft tissue, articulatory and neural modulation have theoretical advantages. The evidence is still very incomplete, however,

with small studies, methodological flaws, and a lack of high-quality randomised controlled trials, leaving a substantial evidence gap that currently prevents reliable assessment of treatment outcomes.

8.2 Principal Conclusions

Three key findings result. Firstly, osteopathy is a theoretically valid and patient-centered method to correct compensatory dysfunctions and chronic pain mechanisms which contribute to canine OA. Second, there is currently suggestive evidence that osteopathy may be helpful, but not enough to make claims of efficacy; it should therefore be used in the context of multi-disciplinary veterinary treatment and not alone. Third, the evidence gap throughout the thesis requires systematic research attention, such as RCTs, standardised outcome measures and mechanistic studies.

8.3 Recommendations for Clinical Practice

Practitioners should take a cautious approach to treatment, based on evidence, which involves: a thorough assessment of whole body with observation of gait and functional tests; treatment of the lowest force possible and using a patient-centered approach; realistic goal setting, aiming to improve function rather than cure the structure; good communication with referring veterinarians about the limitations of the evidence; systematic documentation of the animal's mobility using validated mobility tests; and a willingness to end any treatment that does not make an observable difference. Connor et al., (2023) and Sim et al., (2022) highlight that when evidence is incomplete, practitioners' critical thinking and outcome monitoring can improve outcomes.

8.4 Recommendations for Research

Future research should focus on the following:

- RCTs using sham manual therapy controls for osteopathic intervention and standard care (SC) versus SC alone
- Owner-reported outcome measures (OPOM) designed and validated according to COSMIN methodology (Mokkink et al., 2024).
- Objective assessment measures such as instrumented gait analysis, force plate measurement and accelerometry.
- Mechanistic research of the neurophysiological, biomechanical and fascial effects of specific OMT techniques.
- Comparative effectiveness research to define patient subgroups (age, breed, OA stage) that are most likely to benefit from each technique.
- Dose response studies for optimal frequency, duration and length of session.
- Studies that follow children longitudinally over time (6+ months).

The evidence of human osteopathy needs to be validated in other species (Zhang et al., 2025).

8.5 Final Concluding Statement

Canine osteopathy for the treatment of osteoarthritis falls somewhere between the extremes, a theory that makes sense and has lots of potential applications for use in practice, but not much empirical research to back it up. The way forward should involve systematic research, responsible practice, and a spirit of honesty. Osteopathy can be documented, timed with exercise, evaluated with functional changes and included in multimodal veterinary care and may be of meaningful benefit. The AOB Functional Technique of Professor Stuart McGregor provides a practical and principled framework for this responsible practice, ensuring that osteopathic intervention remains accountable, evidence-informed, and focused on measurable functional outcomes for the benefit

of canine patients. Practitioners, educators and researchers have the responsibility to produce the evidence that will make the promise into proof.

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