

**Evaluating the Efficacy of Combined Osteopathic Manipulative Treatment and Exercise
Therapy in Accelerating Recovery from Canine Lower Back Pain.**

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Introduction

Canine lower back pain (CLBP) is a prevalent issue that significantly impacts a dog's mobility, quality of life and overall well-being. Common causes of back pain in dogs include intervertebral disc disease (IVDD), musculoskeletal strain, and degenerative lumbosacral stenosis (DLSS). (1,5) Dogs suffering from back pain will often demonstrate physical impairment and psychological distress such as poor balance and coordination to behavioral changes, altered gait, stiffness, inability to jump, unilateral or bilateral pelvic limb lameness, and expression of pain in the spine region. (5,10) Traditional treatments primarily focus on pain management or rest, but there is increasing interest in holistic approaches that enhance healing and improve functional outcomes due to the ongoing symptoms. (8) Osteopathy has become a common approach and has gained recognition as an effective complementary therapy for addressing and managing musculoskeletal disorder, mobility impairments and dysfunction in both equine and small animal patients. (26) Additionally, exercise therapy plays a crucial role in enhancing a dog's quality of life by improving mobility, strength and overall physical function. (17)

Osteopathy is an approach that involves hands-on techniques for diagnosing and treating somatic dysfunction (SD). Somatic dysfunction is the term used to describe the altered regulatory function in various body regions that resulted in restricted movement, tissue abnormalities and inflammatory signs. These dysfunctions can appear in different body regions, sometimes even in areas distant from the site of original symptom site, highlighting the interconnected nature of the musculoskeletal and nervous system (27) A key component of osteopathy is osteopathic manipulative treatment (OMT) which includes techniques such as myofascial release and spinal

manipulation, functional techniques. These techniques aim to restore physiological function and support the body's homeostasis, which may be disrupted by SD. (11) OMT is widely used to treat low back pain (LBP) and there is increasing interest in assessing its effectiveness as an intervention for this condition. (20)

Similarly, exercise is a well-established method for managing back pain and is recognized as one of the most effective methods to enhance healthy lifestyles, boost quality of life, mental health and the management of many chronic diseases including back pain. (7) Incorporating exercise into rehabilitation programs can aid in alleviating pain, promoting spinal stability, enhancing proprioception and reversing abnormal paraspinal muscle activation patterns that lead to persistent pain and decreased function. (17) Individuals with back pain are advised to engage in different types of exercises, such as aerobic conditioning, core stabilization and strength training. To maximise the benefits, improve long-term musculoskeletal health, and enhance the treatment efficacy, a customised approach to exercise therapy is necessary. (16)

Despite the known benefits of osteopathy and exercise therapy individually, the efficacy of combining osteopathic interventions with exercise therapy in canine back pain recovery remains underexplored. Currently, there are limited published research studies that examine the effectiveness of combined OMT with structured exercise in both the canine and human population. This study will focus on determining whether combining osteopathic manipulative treatment with exercise therapy leads to faster or more complete recovery compared to using either approach alone. By leveraging existing literature, this study aims to provide valuable

insights into multimodal conservative management, ultimately improving the standard of care for dogs suffering from back pain.

Canine Lower Back Pain

Lower back pain (LBP) ranks among the most prevalent musculoskeletal disorders, affecting an estimation of 70-85% of the human population. (8,11) LBP is associated with both functional and anatomical changes within the central nervous system and musculoskeletal structure. (5,14) According to one study, people with LBP have altered intervertebral disc height, paravertebral ligament length and load, and proprioceptive receptor adaptability, thus reducing the proprioceptive muscle and causing lumbar instability and poor postural control. (21) In response, surrounding soft tissue undergo proliferation to stabilize the affected region, which can worsen the neuropathic pain, and further disrupt biomechanics. (14,16) Research suggests that persistent peripheral injuries or inflammation such chronic back pain, can initiate a cycle of pain and neurologic dysfunction in human. The ongoing process can trigger local reorganization of both nociceptive and non nociceptive afferents, which can alter the reaction to painful stimuli. (5) This restructuring may result in increased pain perception, muscle tension, change in posture and movement, as well as influence behavior, learning, and memory. (5,11) Additionally, kinesiophobia, or the fear of movements due to pain is frequently observed in individuals with LBP. This fear is an important factor to the physical and psychological impact of LBP, potentially leading to depression and functional incapacity. (6)

LBP is also a common issue observed in dogs. Various health issues that can trigger back pain in dogs include intervertebral disc disease (IVDD), osteoarthritis (OA), trauma, degenerative lumbosacral stenosis (DLSS), muscle strain, and infections (1, 8,18). Additionally, obesity in dogs and excessive physical activity can exacerbate spinal stress and increase the risk of injury, as the structure of the vertebral column does not accurately reflect the dorsal standing posture of the animal, resulting in continuous compression of the spine during everyday activities. (5) Depending on the underlying reason, dogs' back pain symptoms might vary, but they frequently include difficulties getting up, sitting or lying down, unwillingness to jump, hyperesthesia of the spine or pelvic limbs, muscle atrophy and pelvic limbs lameness. (5,12) Certain muscle groups, such as the paraspinal muscles, play a crucial role in spinal stability by counteracting the stress placed on the spine and preventing excessive curvature, such as kyphosis or lordosis. (5) However, some research has discovered a significant atrophy of the paraspinal muscle in humans and dogs with LBP, which could impact spinal stability. (5,17) In more serious instances, neurological deficits such as hind limb weakness, ataxia or even paralysis may develop if there is significant involvement of the spinal cord. (1,12)

Both osteopathic interventions and exercise therapy focus on restoring normal musculoskeletal function, reducing SD and enhancing and encouraging natural movement patterns to support long-term recovery. (7,15) However, certain instances of back pain are identified as a red flag and should not be treated with exercise or osteopathic methods. Red flag pain may present as persistent pain or constant discomfort that intensifies when the patient lies down, disrupts sleep, acute paralysis or severe weakness in one or more limbs, loss of deep pain sensation, urinary or fecal incontinence and/or accompanies an unanticipated weight loss. (7,12) Potential causes of

this pain might include a tumor, cauda equina syndrome, infection, or spinal fracture. (2,7,11) Identifying these red flags is crucial as they may require urgent veterinary attention.

Osteopathic Manipulative Treatment

Osteopathy is a healthcare approach that focuses on restoring the structural balance, improving mobility, and boosting the body's natural healing mechanisms. (10) Rooted in a philosophy that views the body as an interconnected system, osteopathy seeks to find and treat the underlying causes of dysfunction rather than just its symptoms. In both human and veterinary medicine, osteopathic treatment is founded on four core principles: the body is a unit, structure and function are reciprocally interrelated, the body possesses self-regulatory mechanisms, and rational therapy is based upon an understanding of body unity, self-regulatory mechanisms and the interrelationship of structure and function. (4) A key component of osteopathy is osteopathic manipulative treatment (OMT), a hand-on therapeutic and holistic approach, addressing the body as a whole and may be applied to various regions of the body, including areas distant from the symptomatic area. (11,25) OMT targets the somatic dysfunction (SD) associated with LBP which might include restricted joint mobility, muscle imbalances, and change in neural function. (26) SD, which frequently contributes to pain, stiffness, and decreased functional capacity, can arise from accidents, repetitive strain, posture abnormalities, or underlying musculoskeletal problems. (11) OMT includes various manual techniques such as soft tissue stretching, spinal manipulation, myofascial release (MFR), osteopathic articular balancing method (OAB), among others. (11) All these techniques aim to restore the body mechanism and improve the quality of life.

Numerous studies have often investigated the effectiveness of OMT for LBP in human trials. Research examining the clinical response and recurrence patterns of LBP with varying severity has provided distinct insights into short-term and long-term treatment outcomes. The notable short-term benefits of OMT were largely attributed to consistent responders who maintained a pain reduction of at least 50% indicating substantial improvement in LBP throughout the study, demonstrating substantial improvement in LBP symptoms throughout the study. (19) These findings imply that OMT significantly improves functional recovery and pain management in people with different levels of LBP severity. Additionally, a large-scale osteopathic trial assessed the efficacy of OMT in 455 patients with LBP. The findings found that OMT led to significant improvements in pain reduction and functional status, reinforcing its role as a viable treatment option for LBP. (20) Furthermore, evidence suggest that OMT can effectively reduce pain and improve functional capacity in individuals suffering from acute or chronic low back pain including those who are pregnant and in the postpartum period. (10,11) Beyond its role in pain relief and functional improvement, OMT has also been linked to significant psychological benefits. Mental health problems including kinesiophobia, anxiety, and depression are frequently linked to chronic pain, and these conditions can worsen disability and lower quality of life. (3) According to studies, OMT has also been associated with notable reduction in depression and kinesiophobia, both of which are commonly associated with LBP. (6)

Osteopathic principles are not limited to human medicine but have also been adapted for use in veterinary practice, particularly in the treatment of musculoskeletal disorders in animals. The fundamental goal of OMT is to remove the barriers and blockages to allow the body to regain its

natural function and self-healing capabilities. (22) OMT is not just about addressing symptoms but rather seeks to optimize the overall health and function of the body as a whole by ensuring that all systems are working in harmony. (25) Various mobilization or manipulation techniques can help to reduce pain, stiffness or muscle hypertonicity in animals. (15) Research has suggested that, similar to human physiology, since the body functions as a connected whole, dysfunction in one area can affect the entire system, meaning even subtle lameness in a forelimb or hindlimb can lead to compensatory back dysfunction in animals. (26) For example, an animal that is limping due to an issue in the front legs may adjust its posture or gait in a way that places additional strain on the back or it might be the other way around. This cycle of compensatory changes and resulting strain is known as neuromuscular feedback loop and OMT can help disrupt the cycle of neuromuscular feedback loop between muscle tissue and the spinal center and back, allowing animals to recover their functions and improve their mental well-being. (22) However, research specifically focused on OMT for LBP in canine remains limited, and most evidence supporting its efficacy is derived from human studies. Evidence supports integrating OMT into multimodal LBP treatment, showing its effectiveness in reducing pain, improving mobility, and enhancing quality of life. (6,10)

Exercise Therapy

Exercise is recognised for its role in promoting healthy lifestyles, extending lifespan, enhancing quality of life, supporting mental well-being and managing various chronic conditions, including low back pain. (7) Allied health practitioners, such as physiotherapists, chiropractors, occupational therapists, and osteopathic physicians, commonly prescribe exercise. (9) Studies

have demonstrated that exercise therapy can alleviate pain levels, reduce the likelihood of recurrence and boost overall functional ability in individuals suffering from both acute and chronic back pain. (6) A study by Hayden indicated that exercise therapy could be more beneficial than providing education and non-exercise physiotherapy alone in enhancing both pain relief and functional ability. (16) Additionally, exercise appears to be more effective in the short and medium term for reducing disability and may also provide greater pain relief. (16)

Different forms of exercise have been explored in the management of LBP, including general physical activity and structured exercise programs. Physical activity such as walking or jogging help enhance aerobic capacity and muscular strength particularly the lumbar extensor muscles while structured exercise such as core stabilisation programs routines involve concentric, eccentric and isometric muscular contractions that challenge the body's homeostasis through repetitive movements. (13) Both physical activity or exercise aim to increase the blood circulation to the back which is essential for the healing process of the soft tissues in the back. Additionally, they help to enhance muscle strength or to prevent muscle atrophy, improve spinal stability, flexibility and to counteract abnormal activation patterns of paraspinal muscle such as multifidus that lead to chronic pain and reduced function. (7,13)

The primary components of prescribed exercise include the activity's frequency, intensity and duration, which are essential in optimizing therapeutic outcome. (7) These factors determine the effectiveness of exercise interventions and help tailor rehabilitation programs to maximize pain relief, functional improvement, and overall well-being. In a human trial, the effects of aerobic exercise interventions, such as walking on treadmills at low, moderate, and high intensities, on

LBP symptoms and functional recovery were assessed. The result indicated that moderate-intensity aerobic exercise, performed at 40%-60% at heart rate reserve (HRR), was the most effective in reducing pain and disability. Compared to low or high intensity exercise programs, this intensity level was associated with fewer risks, greater adherence, and maximized therapeutic effects. (13) While low intensity exercises did not offer enough stimulation for improvement, high intensity workouts were often linked to increased strain and reduced adherence. As a result, it is advised that people with LBP engage in moderate intensity aerobic exercise as a safe and efficient intervention. (13) In addition to aerobic training, core stabilizing and strengthening exercise programs have demonstrated significant efficacy in reducing LBP and enhancing spinal support. A human study investigating the impact of these exercises found that there is a 39%-76.8% reduction in LBP symptoms, highlighting their effectiveness in improving postural control, spinal alignment and neuromuscular coordination. (13) Moreover, lumbar extensor strengthening and a progressive resistance spinal strengthening exercise program have demonstrated significant improvement in muscular strength, range of motion, and patient reported function, as well as decreases in disability scores for individuals with LBP. (7)

Similarly, exercise therapy plays an important role in the management of canine low back pain by promoting spinal stability, improving muscle coordination and reducing pain-related dysfunction. (17) Core strengthening exercises, underwater treadmill training, proprioceptive training, and dynamic weight bearing activities are frequently recommended workouts for canine lower back pain. (5,17). A study was conducted to find out if an exercise-based intervention could improve lumbar paraspinal muscle cross-sectional area (CSA), enhance symmetry and density and alleviate pain and function in canine with LBP. (17) According to these findings, it

suggest that both humans and canine benefited significantly from an 8- week core strengthening program, which included improvements in lumbar paraspinal muscle mass or symmetry, cross-sectional area, density and enhanced functional outcomes. (13, 17) To further enhance spinal mobility and proprioception, exercise programs for canine often incorporate balance exercises on unstable surfaces, such as physioballs and balance boards, as well as controlled stair climbing, ramp walking, circling, weaving and performing spinal movements on different surfaces. (17) In order to improve flexibility and overall spinal health, all these exercise programs are made to promote a variety of spinal movements in canine, including extension, lateral flexion and ventroflexion. (5, 17) Ultimately, these functional activities help dogs with LBP avoid injuries and maintain long-term musculoskeletal health in addition to reducing pain and increasing mobility. (17)

Combination of Osteopathic Manipulative Treatment and Exercise Therapy

The effectiveness of OMT and exercise therapy in managing people with LBP have been the subject of a few research. One such study involved a group of participants diagnosed with LBP where one group participated in a regular exercise program, whereas the other group underwent OMT. The findings showed that both therapies significantly improved functional status and pain reduction. However, the OMT group showed a more noticeable reduction in pain intensity and a higher improvement in functional abilities (8). These results are in line with another study that highlights OMT' s effectiveness in providing better pain relief than exercise therapy alone, although both treatments are still regarded as valuable interventions for managing LBP. (6)

Despite the promising results, it seems that much of the existing research on OMT for chronic pain primarily focuses on short-term results, which limits the ability to fully understand its long-term effectiveness and whether the benefits sustained over time are comparable to other treatments such as exercise therapy or combination of both treatments. (10) Accordingly, research suggested that combining both interventions may enhance therapeutic results, potentially leading to faster recovery, greater pain relief and a higher standard of living for patients suffering from LBP. (6,8)

One particular study exemplified the effectiveness of combining OMT and exercise therapy in treating LBP. In this study, thirty patients with LBP were divided into three groups. One group received exercise therapy, another underwent osteopathic intervention, and the third group received a combination of both treatments. All interventions were administered six days a week for six weeks and the result indicated that the third group achieved the most significant improvements in pain relief, mobility, and overall functional status. (24) This highlights the potential benefits of integrating OMT with exercise therapy for LBP treatment.

Further supporting this approach, another study investigated the combination of OMT and targeted exercise therapy for managing achilles tendinopathy, a prevalent musculoskeletal issue. The study discovered that combining these two treatments led to significant pain reduction and notable improvements in functional performance which confirmed the benefits of combining OMT with exercise therapy in treating musculoskeletal conditions. (23)

Furthermore, a survey of 992 osteopaths in Australia found that 74% of them regularly prescribe exercise, often in combination with manual therapies like OMT. This shows the potential advantages of integrating OMT with exercise to provide better healing results and implies that Australian osteopaths frequently prescribe exercise. (9)

Although there isn't much research specifically focused on canine low back pain, applying a similar combination approach of OMT and exercise therapy may hold potential for improving the health and recovery of dogs with LBP. OMT helps alleviate pain and restores mobility, creating an optimal foundation for exercise therapy. By reducing muscular hypertonicity and improving joint mechanics, OMT may enhance the effectiveness of exercise interventions, allowing for earlier and safer participation. (8,9) While OMT provides immediate pain relief and improved mobility, exercise therapy reinforces long-term stability by strengthening spinal stabilizers and improving neuromuscular control. When used together, OMT may prime the nervous system for improved proprioception and movement control, facilitating more effective motor learning during exercise therapy. (24) This is particularly beneficial in CLBP cases where neuromuscular inhibition contributes to chronic dysfunction. Given the positive results in human studies, combining OMT and exercise therapy may prove beneficial in treating musculoskeletal issues in animals as well, though further research is required to confirm this.

Conclusion

Canine lower back pain (CLBP) is a common and debilitating condition that significantly impacts a dog's mobility, quality of life and overall well-being. In order to improve recovery, there is increasing interest in combining osteopathic manipulative treatment and exercise therapy. This paper aims to review existing research to assess the effectiveness of combined osteopathic manipulative treatment (OMT) and exercise therapy in treating CLBP. Research in human studies suggests that combining OMT and exercise therapy offer a complementary method of treating musculoskeletal issues such as LBP by targeting both functional rehabilitation and structural dysfunction. While OMT seeks to maximise neuromuscular function, reduce somatic dysfunction and restore biomechanics of the body, exercise therapy aids in improving stability, strengthening the limbs and core and preventing recurrence of pain.

It may be possible to improve recovery results and the quality of life for dogs with LBP by using a multimodal approach that includes exercise treatment and OMT. However, more research is needed to specifically evaluate the efficacy of this combined approach in canines, and to establish the most effective treatment protocol. The results could potentially change the standard of care in veterinary practice by being incorporated into clinical practice, increasing the therapeutic alternatives available, and helping to establish more comprehensive and successful treatment options for dogs with low back pain.

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