



Osteoarthritis In Dogs: Comprehensive approach

Puli Vishnu Vardhan Reddy*, Rajat Sagare¹, Pradeep²

* Ph.D. Scholar, Department of Veterinary Surgery and Radiology, Madras Veterinary College
TANUVAS

¹ Ph.D. Scholar, Department of Veterinary Clinical Medicine, Madras Veterinary College
TANUVAS

² PG. Scholar, Department of Veterinary Clinical Medicine, Madras Veterinary College
TANUVAS

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Abstract

Osteoarthritis (OA) in dogs is a prevalent, progressive, and debilitating joint disease that significantly impacts their quality of life. This condition, characterized by degeneration of articular cartilage, subchondral bone changes, and synovial inflammation, shares striking similarities with human OA. Various factors including genetics, trauma, obesity, and aging contribute to the development and progression of OA in dogs. Clinical signs such as lameness, stiffness, and reluctance to exercise are commonly observed, although they may vary depending on the affected joints and the severity of the disease. Diagnosis typically involves a combination of physical examination, radiography, and occasionally advanced imaging modalities such as computed tomography or magnetic resonance imaging. Management strategies aim to alleviate pain, improve joint function, and slow disease progression, often involving a multimodal approach including weight management, exercise modification, physical therapy, pharmacological interventions, and, in severe cases, surgical options like joint replacement or arthrodesis. Despite the advancements in understanding and managing OA in dogs, there remains a need for further research to explore novel therapeutic targets and refine treatment strategies for optimizing the welfare of affected animals.

Keywords: Lameness, Osteoarthritis, Radiography,

INTRODUCTION

Osteoarthritis in dogs, also known as canine arthritis or degenerative joint disease (DJD), is a common condition characterized by the progressive degeneration of joint cartilage and underlying bone. It primarily affects older dogs, but can also occur in younger ones due to genetic predisposition, joint abnormalities, previous injuries, or developmental issues. Osteoarthritis can cause pain, stiffness, decreased mobility, and reduced quality of life for affected dogs.

ETIOLOGY:

Aging: As dogs age, the wear and tear on their joints increase, leading to degeneration of cartilage and bones.

Genetics: Certain breeds are more prone to developing osteoarthritis due to genetic predispositions. Breeds such as Labrador Retrievers, German Shepherds, and Golden Retrievers are commonly affected.

Joint injuries: Previous injuries or trauma, such as fractures or ligament tears, can predispose dogs to develop osteoarthritis later in life.

Obesity: Excess weight places additional strain on the joints, accelerating the degenerative process.

Developmental issues: Conditions like hip dysplasia, elbow dysplasia, and OCD (osteochondritis dissecans) can lead to abnormal joint development and contribute to osteoarthritis.

PATHOPHYSIOLOGY OF OSTEOARTHRITIS IN DOGS:

Following the onset of the disease, there's a continuous sequence of mechanical and biochemical events that lead to the deterioration of cartilage, increased density in the subchondral bone, inflammation of the synovial membrane, formation of enthesiophytes, and the emergence of periarticular osteophytes.

In the progression of OA, inflammation within the joint leads to the invasion of leukocytes. These cells, along with synovial cells, release enzymes, free radicals, cytokines, and prostaglandins, intensifying inflammation, altering cartilage metabolism, and causing cartilage damage. This synovial inflammation is a major source of pain in OA. Additionally, as levels of hyaluronic acid (HA) decrease in synovial fluid, its lubricating properties diminish, contributing to joint discomfort. Cartilage deterioration progresses with fibrillation of superficial layers, exposing deeper layers to stress and causing fissures. Chondrocytes cluster and enlarge, while proteoglycans are depleted despite increased synthesis, reducing matrix support. Continued degeneration leads to the release of cartilage fragments and proteases, worsening inflammation and collagen breakdown. This collapse of the collagen network releases more proteoglycans into synovial fluid. Ultimately, the cartilage loses its ability to withstand compressive forces, potentially exposing subchondral bone.

Articular Cartilage Degradation: Articular cartilage covers the ends of bones in joints, providing a smooth surface for movement and cushioning against impact. In OA, there is progressive degradation of this cartilage. The cartilage becomes thinner, loses its elasticity, and develops fissures and fibrillation. Eventually, it may wear away completely, exposing the underlying bone.

Subchondral Bone Changes: Underneath the cartilage lies the subchondral bone. In OA, there can be changes in the subchondral bone, including sclerosis (hardening), cyst formation, and bone remodeling. These changes contribute to joint stiffness and pain.

Synovial Inflammation: The synovial membrane lines the inner surface of the joint capsule and produces synovial fluid, which lubricates the joint. In OA, the synovium can become inflamed, leading to synovitis. Inflammatory mediators released in the synovial fluid contribute to pain and further cartilage damage.

Osteophyte Formation: Osteophytes, also known as bone spurs, are bony outgrowths that develop at the margins of the joint in response to the chronic inflammation and stress associated with OA. While osteophytes can help stabilize the joint, they can also contribute to pain and joint dysfunction if they impinge on surrounding structures.

Changes in Joint Dynamics: As OA progresses, there can be alterations in joint biomechanics and dynamics. This may include joint instability, abnormal joint loading, and changes in gait patterns. These changes can exacerbate cartilage wear and contribute to further joint degeneration.

Neuropathic Pain: Chronic pain associated with OA can lead to neuropathic pain, which involves changes in the nervous system's processing of pain signals. Central sensitization and peripheral nerve sensitization can occur, amplifying pain perception even in the absence of ongoing tissue damage.

Muscle Weakness and Atrophy: Dogs with OA may develop muscle weakness and atrophy around affected joints due to pain and reduced physical activity. This can further compromise joint stability and function.

SYMPTOMS:

- Limping or favouring one limb
- Stiffness, particularly after resting
- Reluctance to exercise or play
- Difficulty rising or climbing stairs
- Swelling or thickening around the joints
- Behavioural changes, such as irritability or aggression when touched in certain areas.

TREATMENT

The treatment of osteoarthritis (OA) in dogs involves a multifaceted approach aimed at reducing pain, improving joint function, and slowing the progression of the disease. Here's a detailed overview of the treatment options for OA in dogs:

Medications: Nonsteroidal anti-inflammatory drugs (NSAIDs): These drugs come in first line of treatment of Osteoarthritis because of their ability to reduce joint pain and decrease synovitis. Carprofen, meloxicam, firocoxib and deracoxib, are the common NSAIDs prescribed for dogs.

Analgesics: Grapiprant, Tramadol or gabapentin may be prescribed as additional pain relief for dogs with OA, especially when NSAIDs alone are insufficient or contraindicated.

Nutraceuticals: Glucosamine and chondroitin sulfate: These compounds are components of joint cartilage and are thought to support cartilage health and slow its degradation. They are commonly found in joint supplements for dogs.

Omega-3 fatty acids: Omega-3 fatty acids have anti-inflammatory properties and may help reduce joint inflammation and pain. Fish oil supplements are a common source of omega-3 fatty acids for dogs with OA.

Other supplements: Additional supplements such as MSM (methylsulfonylmethane) and green-lipped mussel extract may also be beneficial in managing OA symptoms. pentosan polysulfate

Weight Management: Maintaining a healthy body weight is crucial for dogs with OA, as excess weight puts additional strain on the joints and exacerbates pain and inflammation. A balanced diet and controlled calorie intake, along with regular exercise, can help dogs achieve and maintain a healthy weight.

Physical Therapy: Physical therapy modalities such as massage, hydrotherapy, therapeutic exercises, and passive range-of-motion exercises can help improve joint mobility, strengthen muscles, and reduce pain in dogs with OA.

Joint Support Products: Orthopedic bedding: Providing supportive bedding, such as orthopedic foam beds or memory foam mattresses, can help cushion joints and provide relief for dogs with OA.

Joint braces or wraps: In some cases, joint braces or wraps may be recommended to provide additional support and stability to affected joints, particularly during exercise or physical activity.

Surgical Interventions: In severe cases of OA or when conservative treatments are ineffective, surgical options may be considered. These may include procedures such as joint replacement (e.g., total hip replacement), arthroscopy, or joint fusion. Surgical interventions are typically reserved for cases where there is significant joint damage or dysfunction.

Lifestyle Modifications: Adaptations to the dog's environment, such as providing ramps or steps for easier access to elevated surfaces, can help reduce stress on affected joints and improve mobility. Low-impact exercise, such as swimming or walking on soft surfaces, can help maintain joint mobility and muscle strength without exacerbating pain or causing further joint damage.

Regular Veterinary Monitoring: Dogs with OA require regular veterinary check-ups to monitor disease progression, adjust treatment plans as needed, and assess response to therapy. Your veterinarian may recommend periodic X-rays or other diagnostic tests to evaluate joint health and monitor changes over time

Dog owners need to work closely with their veterinarians to develop a comprehensive treatment plan tailored to their pet's individual needs and to monitor for any potential side effects or complications associated with treatment. Early intervention and proactive management strategies can significantly improve the quality of life for dogs with OA.