



# Osteoarthritis in Dogs

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Osteoarthritis (OA) can be either primary (caused by wear and tear or age-related disease) or secondary (caused by injury to the joint). Secondary OA is very common in dogs and is generally the result of elbow or hip dysplasia, osteochondrosis, or cranial cruciate ligament injury, all of which lead to instability or abnormal loading of the affected joint and ultimately loss of cartilage and bone spur formation in the affected joint. John Payne, DVM, MS, Pittsburgh Veterinary Specialty and Emergency Center, Pittsburgh, Pennsylvania, USA, discussed the diagnosis and management of OA in dogs.

OA-related changes to the joint affect all joint tissue. In the articular cartilage, changes begin with fibrillation of the cartilage surface, damage to the chondrocytes, and release of cartilage degradation products (CDPs), matrix metalloproteinases (MMPs), nitric oxide (NO), and inflammatory cytokines. The MMPs and the CDPs are engulfed by synoviocytes that release inflammatory mediators. All of these processes contribute to the cycle of inflammation, degradation, and pain of OA. A classic feature of OA is a loss and change in the character of proteoglycans (ie, destruction exceeds production, and newly synthesized proteoglycans are abnormal).

Diagnosis consists of physical examination and radiographic testing. Treatment approaches may include surgery, weight loss, nonsteroidal anti-inflammatory drugs (NSAIDs) or other pain medications, nutritional supplements, physical therapy, or other alternative treatments. The initial approach should always be to treat the underlying disease. To manage situations in which surgery has proven benefits, Dr. Payne recommends using surgery initially, followed by medical management to achieve symptomatic relief.

In most instances, surgical management does not provide complete pain relief. The most effective step for long-term management of OA is weight loss. Added weight increases stress to the joints and makes the dog less likely and able to exercise appropriately. Fat also releases lipokines that potentiate the systemic and local effects of inflammation. Management techniques, as with humans, consist primarily of decreased caloric intake and also include increased physical activity. Weight loss medications like Stentrol may be beneficial in some dogs, but Stentrol is no longer commercialized in the United States. Physical therapy to increase muscle tone can also be useful because it helps maintain joint stability and improve range of motion.

NSAIDs are extremely effective for symptomatic relief and are safe even for long-term use. NSAIDs can be used daily or on an as-needed basis to reduce both inflammation and pain. Serious side effects are uncommon, and most are related to gastrointestinal issues. If symptoms appear, advise the owner to stop medication use. Long-term administration of carprofen provides steadily increasing improvement in the clinical signs and symptoms of OA [Innes JF et al. *Vet Rec* 2010; Autefage A, Gosselin J. *Revue Méd Vét* 2007; Mansa S et al. *Vet Rec* 2007] with a low overall incidence of adverse events that does not increase throughout time.

Tramadol, a narcotic analog that binds to opioid receptors, has been used widely in dogs for pain relief, but questions remain regarding its efficacy. Gabapentin is a drug intended to alleviate neurogenic pain that appears to alter calcium channels, reduce calcium currents, and block the formation of new synapses [Eroglu C et al. *Cell* 2009]. The benefits of gabapentin when treating OA pain are not known. There is solid evidence that nutritional supplements containing glucosamine, chondroitin, and omega III fatty acids are effective as part of a balanced approach to treating OA, although they are not very potent and do not stimulate cartilage repair. Alternative therapies such as cold laser therapy, stem cell therapy, chiropractic care, and homeopathy are popular, but there is little scientific evidence to support their use. Although some alternative therapies seem to work, they can be costly. Noting that older dogs and dogs with chronic disease are less likely to respond to treatment [Autefage A, Gosselin J. *Revue Méd Vét* 2007; Mansa S et al. *Vet Rec* 2007], Dr. Payne suggested that early diagnosis and treatment may result in the best outcome.

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