• **FACT SHEET No. 9**

Joint Pain in Pet Dogs and Cats

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Joint pain, particularly associated with osteoarthritis (OA), is common in companion animals such as dogs, cats, and horses. It results in impairment in mobility and performance of activities and is associated with spontaneous and induced pain. In pet dogs, osteoarthritis is a common condition possibly affecting a quarter of the population. OA in dogs is considered to be very similar to human OA [1] and therefore a potential spontaneous disease model. [15] [7] Additionally, such a "spontaneous model" has the added benefit that these companion dogs share the same environment as humans, potentially making the model more relevant than some rodent models. [15]

In pet cats, radiographic evidence of OA/degenerative joint disease (DJD) is apparent in up to 90 percent of all cats, [14] with an estimated 50 percent of these having clinical signs of impairment due to joint pain. Less is known about the etiology of OA in cats than in dogs, but the degenerative disease process appears very similar to that of other species. [1, 9] Other painful degenerative joint diseases such as the immune-mediated arthropathies occur in dogs and cats and may be underdiagnosed.

Etiology and Pathophysiology

In contrast to humans, OA in dogs is mainly due to developmental orthopedic diseases—hip dysplasia, elbow dysplasia, osteochondrosis dissecans, non-traumatic cranial cruciate ligament degeneration—and so is considered an early onset disease and a lifelong disease. The joints most commonly affected are the hip, stifle, and elbow.

In cats, the etiology of OA or DJD is less well understood, but the degenerative process appears to be very similar to other species. The joints most commonly affected are the hip, stifle, tarsus, and elbow.

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In both cats and dogs, all tissues of the joint are involved in the degenerative process, and pain is commonly associated with the disease. Although pain cannot be predicted by radiographic appearance, this procedure does predict alterations in range of motion. Peripheral and central nervous system plasticity associated with joint pain has been demonstrated in both cats [10] and dogs [18] and is thought to contribute to the overall pain state.

Pain associated with joint disease results in impaired or altered mobility, impaired ability to perform activities, and altered behavior. In dogs, it has been shown to disrupt sleep [11] and is thought to impair cognitive function. In both species, the multidimensional effects of pain appear similar to the effects in humans.

Clinical Signs and Diagnosis

In clinical veterinary practice, diagnosis is centered on four elements:

1. Owner-reported activity impairment. This is more readily detected in dogs, and several clinical metrology instruments have been developed to measure this (CBPI [4]; LOAD [17]) One owner-completed clinical metrology instrument has been developed to detect DJD-associated pain and activity impairment in cats (FMPI [2]).
2. Pain on manipulation of affected joints during an orthopedic evaluation, with pain being measured as a behavioral response.
3. Radiographic evidence of osteoarthritis (effusion; osteophytes; subchondral sclerosis; joint-associated mineralization).
4. Synovial fluid analysis.

Overall, outcome measures are relatively well developed in the dog but less so in the cat, which has influenced the development of therapies. In referral centers or in the comparative research setting, the effects of pain can be measured in both species by measuring limb use (kinetic variables measured using force plates or pressure sensitive walkways) [12], spontaneous activity through accelerometry [5], and central plasticity through quantitative sensory threshold testing. [6, 18]

Treatment

Because of a relative paucity of evidence-based information regarding dogs and cats, much of the current clinical approach to treatment is based on information borrowed from human medicine.

Dogs:

- A multimodal drug and non-drug approach is recommended to manage OA-associated pain. [8]

- The only class of drug approved by the U.S. Food and Drug Administration Center for Veterinary Medicine is the NSAID class (several approved), though other classes (caninized anti-nerve growth factor and prostaglandin E4 receptor antagonists (piprants), among others, are in development).
- Local (intra-articular) therapies are occasionally used, and several drugs (such as capsaicin analogues) are in development.
- Most evidence exists for efficacy of NSAIDs, dietary modulation through omega-3 fatty- acid supplementation, [16] weight management, and exercise.
- Adjunctive drug therapy (amantadine, tramadol, gabapentin) is commonly employed (evidence for efficacy of amantadine; [13] limited evidence for oral tramadol, which is metabolized very differently in the dog; no evidence for gabapentin). Overall, there is a lack of studies evaluating these therapies.
- Physical rehabilitation (exercise and other physical modalities) is commonly employed.
- Surgical joint replacement is available and used in the dog (hip, stifle, and elbow).
- Combination steroid and immunosuppressive therapies are used in the management of immune-mediated joint pain.

Cats:

- A multimodal drug and non-drug approach is recommended to manage OA and DJD-associated pain. [3]
- There are no FDA-approved drug treatments and only one approved drug in the European Union (NSAID), though other classes (felinized anti-nerve growth factor and prostaglandin E4 receptor antagonists (piprant), among others, are in development).
- Most evidence exists for efficacy of NSAIDs and dietary modulation through omega-3 fatty-acid supplementation. [16]
- Adjunctive drug therapy (mainly gabapentin) is employed, but studies evaluating these therapies are uncommon.
- Surgical joint replacement is available for the hip.

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