Osteoarthritis (OA)

Osteoarthritis (OA), also know as degenerative joint disease (DJD), is the most common form of arthritis in dogs and cats. It is estimated that at least 20% of adult dogs and 60% of adult cats suffer from OA. It usually occurs secondary to some sort of joint instability or trauma. There are a number of players inside the joint, including the cartilage covering the bones inside the joint (articular cartilage), the joint capsule (synovium), normal joint fluid, ligaments, fat, and bone. All these structures interact to keep the joint functioning properly.

Causes of OA. There are a large number of factors that have been implicated in development of OA. Genetic factors have been identified in humans, and a wide variety of genes have been studied in humans and animals. As animals age, their cells inside the joints don't work as well, and this decreases their production of protective and reparative agents. Body weight may increase the likelihood of joint disease. Obesity has been shown to affect development and progression of arthritis, causing inflammation, abnormal joint forces, and increased joint pressure. This is a very important area of study, so this body of information is constantly changing and expanding.

Disease Process. The pathogenesis of OA is highly complex. This is not to serve as a thesis on the intricacies of osteoarthritis formation, but this will provide a basic overview of the process.

First, the articular cartilage starts to degenerate from inflammation and/or instability. This leads to cells trying to produce more articular cartilage to replace what is lost or damaged as the cartilage ulcerates and erodes from the joint surface. This changes the composition of the joint fluid, making it less effective in keeping the collagen in the joint healthy. The cells overwork to form more cartilage, and at some point they are no longer able to keep up with the demand, and cartilage is lost inside the joint. During this time, the joint has proteins that are produced that cause inflammation. The cells that line the joint capsule are affected; they are infiltrated by inflammatory cells, and they start to increase their numbers to fight the inflammation and instability, so that the joint capsule thickens. Bone can start to abnormally form where tissues are damaged, causing bone spurs and new bone formation in places bone isn't supposed to be.

All structures except the articular cartilage have nerves associated with them. Moving a normal joint does not cause pain. During inflammation of a joint, nerve fibers that are normally silent start functioning and start to send pain signals. This causes the joint to be painful. Over time, these pain signals can lead to centralized sensitization, where the central nervous system amplifies the input from these neurons and leads to chronic pain.

Patient History. A variety of signs are seen with OA, including inactivity, stiffness, lameness, decreased jumping, and behavioral changes. There are a number of validated questionnaires that are used to track OA and its progression, including the Canine Orthopedic Index (COI). This allows veterinarians get a window into the patient at home instead of just evaluating them in the hospital. In cats, additional signs include not jumping to their normal maximum height, refusing to jump off of furniture or from heights, decreased grooming resulting in an unkempt appearance, and aggression.

Clinical Signs. Dogs can show lameness, stiffness, bunny hopping, muscle atrophy, joint swelling, decreased range of motion of joints, pain when the joint is manipulated, or grinding when the joint is moved. Cats are much more difficult to evaluate, but watching them move in the exam room can be helpful in knowing what they are comfortable doing; most cats would willingly jump off of an exam table, but they may land abnormally, causing suspicion.

Diagnosis. Radiographs are usually used to evaluate joints. Because positioning is important, and because these patients are often painful, sedation or anesthesia is used to take the radiographs. Joint capsule fluid may be removed from the affected joint for analysis at the lab, looking for different types of inflammatory cells. In certain cases, especially when elbow dysplasia is suspected, a CT scan can be used to further evaluate the joint structures. If there is a problem contributing to the arthritis that can be repaired, like a cranial cruciate ligament rupture or a medially luxating patella, surgery is recommended.

OA Management. Note that this section does not say “Treatment” but instead says “Management.” This is because once OA has affected a joint, it cannot be removed. Therefore, we are attempting to mitigate further progression and pain associated with OA.

Weight management is ***very*** important, and weight loss can even eliminate clinical signs of OA. Weight management is the number one thing that needs to be addressed in order to help our patients with OA. Every single plan we discuss to help decrease the adverse effects of OA will start with getting our patients to a healthy weight. Please see the Obesity section of the website for more information regarding weight loss.

A variety of **medications** can be used to help treat symptoms of OA. Nonsteroidal Anti-inflammatory Drugs (**NSAID**s) are a mainstay of treatment. These medications inhibit enzyme pathways that produce inflammatory mediators to decrease joint inflammation. Commonly used NSAIDs include carprofen (Rimadyl), meloxicam (Metacam), and grapiprant (Galliprant) in dogs, and meloxicam and robenacoxib (Onsior) in cats. Because NSAIDs can have adverse side effects, if they are to be used long term, blood work to check the pet's liver and kidney function is recommended prior to starting treatment and then every few months during treatment. Because of side effects, we strive to find the lowest effective dose for long term usage. **Amantadine** may be used to help with chronic pain. It is an N-methyl-D-aspartate (NMDA) receptor antagonist that works in the nervous system to stop pain transmission signals. **Gabapentin** and **pregabalin** are gamma-aminobutyric acid (GABA) analogues that are used in humans to treat neuropathic pain and are thought to decrease release of excitatory neurotransmitters to decrease pain. Joint injections of **hyaluronic acid (HA)** may be helpful in decreasing inflammation and increasing the lubrication within the joint. **Essential Fatty Acids (EFAs)** derived from fish oils have been shown to decrease inflammation in joints and increase force put on an affected leg.

A variety of other methods can be used to help support joint structures. **Polysulfated glycosaminoglycan** (Adequan) injections may help maintain chondrocytes and stimulate them to produce more chondrocytes to help repair articular cartilage. It also may contribute to the health of the joint fluid. It is given by injection twice weekly for 4 weeks, and then may be maintained with a once monthly injection. **Platelet rich plasma** (PRP) is produced by drawing blood from the patient, centrifuging it so that the platelets concentrate in the plasma liquid of the blood, and then delivering the PRP into a joint (or other area that is attempting to heal and needs aid). **Mesenchymal stem cell treatment** (MSC) may help regenerate tissues.

MSC are derived from bone marrow or surgically removed abdominal fat tissue, are cultivated at a laboratory, and are then sent back to the veterinarian for injection. MSC and PRP can be used separately or they can be combined to become even more effective. General **physical therapy** exercises can be used to strengthen muscles to help decrease joint stress. **Laser therapy** can be used on its own or in connection with the aforementioned treatments. **Moderate, consistent physical activity** is recommended, with leash walks happening 2-3 times per day. A new type of radionuclide injection called **Synovetin**, 117MSn, can be used in elbow joints to target inflammatory cells and kill them. We are currently working on obtaining a license to administer these injections.

Arthritis intervention is a fast growing field of study in pets. New management medications and techniques are being tested constantly. Most of these treatments may be pursued here at STVS, and we are happy to discuss them with you!

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