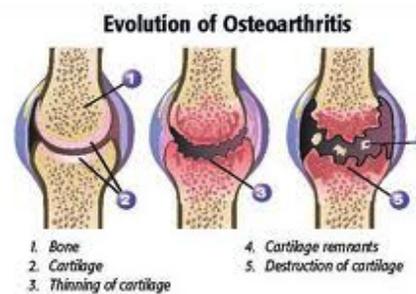
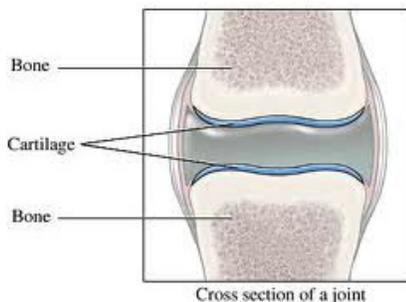




## OSTEOARTHRITIS

### WHAT IS ARTHRITIS?

**Arthritis is the inflammation of one or more joints.** A joint is area where two (or sometimes three) bones meet. The end of the bone at the joint is lined by **cartilage** and the joint space is filled with joint fluid. In a normal joint, cartilage is smooth and slippery and allows the two bones to move back and forth without friction. Normal joint fluid is sticky and provides lubrication to the joint. **The hallmark of arthritis is the thinning and breakdown of cartilage, which leads to inflammation, joint swelling, watery joint fluid, and pain.** Additional changes that occur include the development of bone spurs and thickening of the surrounding tissue.



There are several different types of arthritis, but the most common kind in dogs and cats is osteoarthritis (OA) or degenerative joint disease (DJD) that develops secondary to:

- Joint instability (examples: hip dysplasia, cranial cruciate ligament rupture)
- Joint incongruity (example: elbow dysplasia)
- Osteochondrosis (cartilage flap; most common in shoulder and elbow)
- Trauma (example: fracture that involves the joint)

### HOW IS OA DIAGNOSED?

The most common way that OA is diagnosed is on x-rays. X-rays do not show cartilage or soft tissue structures but they do show joint swelling and secondary changes to the bone such as thickening and bone spurs. Sometimes mild sedation is required to obtain x-rays. The only way to assess the cartilage is through surgery using arthroscopy or arthrotomy. These procedures require full anesthesia and are typically considered both diagnostic and therapeutic. Sometimes we will recommend a joint tap in order to assess the joint fluid. Joint taps are typically performed if there is significant joint swelling and we are suspicious of an infection or autoimmune condition. A CT scan or MRI is occasionally recommended in order to best assess the bone or surrounding soft tissues to determine the cause and extent of arthritis. CT scans are usually recommended for conditions of the elbow, tarsus (hock) and carpus (wrist), whereas MRI is usually recommended for the shoulder, hip or stifle (knee). Full anesthesia is required for both CT and MRI.

## CAN OA BE TREATED?

Osteoarthritis is unfortunately an incurable disease in both animals and people; however there are many effective treatment options to successfully treat and manage the condition long term. Treatment options can be divided into surgical and non-surgical. Surgery may be recommended at the time of initial diagnosis if early intervention can decrease the progression of OA (such as cruciate ligament tears, OCD). In some cases we will recommend a multi-modal non-surgical approach prior to surgery (hip dysplasia).

## MULTI-MODAL MANAGEMENT OF ARTHRITIS

### 1. PAIN MANAGEMENT

Non-steroidal anti-inflammatories (NSAIDs) are the first line of pain relieving medication used in small animals. These medications decrease inflammation and relieve pain associated with acute trauma and/or chronic arthritis. Examples of veterinary NSAIDs include: Deramaxx, Rimadyl, Metacam, and Previcox.

- It is essential that you follow the recommended dosing for the individual medication prescribed. Side effects can occur with these drugs that can potentially be severe. If your pet starts vomiting, stops eating or develops other signs of GI upset, please discontinue the medication and call us or your regular veterinarian right away.
- It is **essential** that these medications **not** be combined with steroids, aspirin, or other NSAIDs. Do not give a new or different NSAID within 7 days of stopping the previous medication. Similarly, do not give an NSAID within 7 days of aspirin, prednisone or any other steroid.

If your pet is intolerant or does not respond to NSAIDs, other pain relievers can be prescribed, including gabapentin and amantidine.

### 2. WEIGHT LOSS/MANAGEMENT

It has been shown that the most effective way of decreasing the pain and progression of arthritis in both people and pets is by maintaining a lean body weight. In dogs and cats, this often means that they are "on the skinny side of normal." In other words, you should be able to see a waistline from the top and from the side, and should be able to feel but not see the ribs.

Weight loss is best achieved through a combination of diet and exercise. Just like in people, it is all about calories in vs. calories out. If your pet needs to lose weight, it is essential that the proper amount of calories be given throughout the day: this often means decreasing the quantity of food being fed and most importantly, decreasing the amount of high calorie treats.

### 3. CARTILAGE PROTECTION

Arthritis is a vicious cycle of cartilage breakdown, leading to increased production of inflammatory products, which then lead to further degeneration of cartilage. There are several ways that we can decrease the breakdown of cartilage and slow the progression of arthritis.

**Adequan:** This is a polysulfated glycosaminoglycan, which is a large molecule that is very similar to a normal part of cartilage. The medication has been shown to decrease joint inflammation and protect cartilage, delaying the progression of arthritis and decreasing pain. This medication is given under the skin or into the muscle twice a week for 4 weeks and then once a month.

**Glucosamine and chondroitin sulfate:** These are also components of normal articular cartilage. Supplementing these molecules has been shown to decrease the degeneration of cartilage and decrease pain. These are available as supplements that are given orally or are available already combined in certain diets. There are no federal regulations with regard to the products available commercially. Therefore, some products may not contain the amount of glucosamine or chondroitin that the label claims. **We recommend the veterinary specific brand Dasuquin**, which has been shown to contain the appropriate amount of glucosamine and chondroitin, and additionally contains ASU and MSM, which have additional beneficial effects.

#### 4. THERAPEUTIC DIET/OMEGA-3 FATTY ACIDS

High levels of Omega-3 fatty acids are capable of decreasing inflammation associated with arthritis. Diets that are high in Omega-3 fatty acids have been found to improve lameness, decrease pain, increase activity, and reduce the need for NSAIDs in dogs with arthritis. The therapeutic foods Hills j/d and Purina JM have been proven to decrease symptoms of pain in dogs with arthritis.

#### 5. PHYSICAL REHABILITATION/THERAPEUTIC EXERCISE

Regular controlled physical activity is an important aspect of managing arthritis. Low-impact exercises such as walking and swimming are the cornerstone of physical rehabilitation. Other exercises should be incorporated that strengthen the muscles supporting effected joints, increase core strength, improve joint range of motion, increase endurance, and improve body coordination. Home exercises are very effective if 30 minutes can be dedicated to exercising your dog every day. Additionally or alternatively, therapy appointments can be scheduled with a veterinary rehabilitation therapist. These sessions typically last 30 minutes and will incorporate hydrotherapy, land-based exercise therapy along with manual therapy such as massage and therapeutic modalities (see below). **The most important thing to remember is that regular, controlled exercise is needed rather than “weekend warrior” or infrequent/ high intensity activities.**

#### 6. THERAPEUTIC MODALITIES

A therapeutic modality is a device or tool that transfers energy to the patient for a therapeutic purpose. Common therapeutic modalities include: ice packs, heat packs, laser, and extracorporeal shockwave therapy.

- **Ice packs:** Ice is recommended to decrease inflammation following an acute injury or “flair up”. The application of ice decreases the blood flow to the area and decreases the transmission of pain from the site of injury to the brain (numbs the joint). Animals with arthritis can benefit from the application of an ice pack to the affected joint for 15-20 minutes after exercise.
- **Heat packs:** Heat is recommended to reduce muscle spasms and provide a soothing sensation. The application of heat increases the blood flow to an area. Animals with arthritis can benefit from the application of a warm pack to the low back or muscles surrounding the affected joint. **Heat should be applied at least 2 hours after exercise.**
- **Laser:** Laser therapy, otherwise known as photobiostimulation, is the administration of light energy to the tissue in order to stimulate a biologic response. It has been scientifically proven that cells respond to laser light by increasing the production of ATP (increasing their metabolism). This enables cells to function more efficiently and effectively. The end results of photobiostimulation include: improved wound healing, decreased swelling, decreased pain, and decreased muscle spasms. Laser treatments are painless. A sensation of heat may be felt in animals with dark hair or if a Class IV laser is used, but sedation is not required. Treatments take between 5-20 minutes, depending on the size of the area being treatment and the type of laser used. Laser energy has a cumulative effect, so several treatments are recommended over the first few weeks, and later “top off” treatments can be administered.
- **Extra-corporeal sound wave therapy (ESWT):** This modality is a high-powered ultrasound. Sound waves are transmitted to the tissue, which stimulate cells to express growth factors and other molecules that improve healing and decrease pain. ESWT has been used in horses and people for the past 2 decades to treat a variety of musculoskeletal conditions, particularly ligament and tendon injuries. Other conditions that have been shown to respond to ESWT include arthritis, delayed bone healing and chronic, non-healing wounds. This treatment requires heavy sedation. Typically, treatments are administered every 3 weeks for a total of 3.

#### 7. STEM CELL THERAPY

Stem cell therapy has sparked much controversy over the last several years. It is essential to note that these debates concern embryonic stem cells that are derived from an embryo or fetus and are pluripotent, or capable of differentiating into any cell line. Stem cell therapy that is currently used in veterinary medicine utilizes adult, or mesenchymal stem cells. These cells are derived from an animal’s own bone marrow or fat, and are capable of limited differentiation.

Mesenchymal stem cells have the capacity to differentiate into cartilage, ligament, tendon, bone, muscle, nerve, liver, and cardiac tissue. When stem cells are implanted into a region, they secrete growth factors and other molecules that can stimulate repair and regeneration of tissue, similar to using a bone graft to stimulate fracture healing. It is also believed that inflammation is decreased and pain relieved through this process.

**Current clinical indications for stem cell therapy in small animals include:**

- Osteoarthritis
- Immune-mediated poly-arthritis
- Osteochondrosis/OCD
- Ligament and tendon injuries
- Fractures

**THE TREATMENT PROCESS**

Patients are evaluated through the surgery department. If current radiographs are not available, they will be obtained. Stem cells are collected from fat. Outpatient surgery is required to collect fat (or it is collected in conjunction with another surgical procedure). Animals return either 2 days later for injection of the stem cells into the joint. Heavy sedation, or sometimes brief anesthesia is required for stem cell injection into the joints and/or tendons being treated. Fluoroscopy and/or ultrasound is commonly used to aid injection into severely arthritic joints or directly into tendons. The animals are discharged again the afternoon of injection.

All patients should return for follow-up examinations every thirty days, for the first three months. Note: When the initial fat is processed, additional cells will be saved (or banked) for future use if needed, so additional collection procedures are not required.

We believe that stem cell therapy is most effective when combined with rehabilitation. Therefore, we recommend that patients enroll in a physical rehabilitation program.

**Contraindications for stem cell therapy include:** cancer (any), and any condition that precludes sedation.