**Osteoarthritis, Pain, Supplements, Multimodal Management**

**OA or DJD is an inflammatory disease affecting the joint and its surrounding tissues. This is caused by normal forces imposed on an abnormal joint or abnormal forces on a normal joint. It is** most often associated with breakdown and loss of articular cartilage and subchondral bone thatresults in pain, inflammation, thickening of the joint capsule and reduced range of motion. Cartilage, which lines the ends of bones, has no blood vessels or nerve endings. Early damage to cartilage won’t cause pain and therefore, early diagnosis and treatment may not occur.Cartilage is comprised of theextracellular matrix (ECM) to keep cartilage resilient and chondrocytes to generate and renew the ECM. Cartilage reduces friction between the bones within the joint and distributes pressure over the bones. The subchondral bone provides a supportive foundation for cartilage, supports the bone plate, and provides elasticity needed for shock absorption

OA is painful because the subchondral bone under the cartilage is exposed and there is bone on bone rubbing. Subchondral bone HAS blood vessels and nerve endings. The synovial membrane stretches, the joint capsule thickens and there is pain when these things happen. The joint capsule encloses the entire joint and consists of an inner layer called the synovial membrane, the middle or subsynovial membrane, and the tough fibrous outer layer. The muscles, tendons and ligaments can also be painful. Muscles atrophy, the joint capsule tightens resulting in loss of flexibility, and ligaments weaken around the joints. These pets lay around because they are painful, they gain more weight from fat, the muscles atrophy as muscle cells are replaced by fat cells, and the range of motion decreases in the joints.

While it is most often seen in older dogs and cats, a 2022 study found that 38% of dogs over 1 are affected and 4/5 dogs over 8 yrs of age are affected. In cats, 90% over 12 yrs of age have OA and most NEVER show any clinical signs!! 61% of cats over 6 yrs of age have OA and 48% have it in multiple joints. The most commonly affected cat joints are the hips, stifles, tarsus or hock and elbow. There is Primary OA which is often idiopathic but can be associated with aging and obesity. There is Secondary OA which if often associated with trauma or incorrect conformation and the most common form. So, what are a dog’s primary risks for developing OA?Genetics**,** Breed**,** Conformation **(**body or leg size, joint angles and low pelvic muscle mass) Age**,** Obesity (overweight dogs are 4 times more likely to have OA and dogs that were free fed (rather than receiving scheduled, portioned meals) were more likely to become overweight and to develop osteoarthritis) andSex and/or neuter status. Male dogs are more predisposed to developing OA possibly due to hormones, activity types/levels and weight. Research also suggests that spayed/neutered dogs are more likely to develop joint diseases because of reduced protective hormones and weight gain associated with spay/neuter.

**Multimodal management of OA:** this includes anti-inflammatory drugs like NSAIDS; pain management with products like gabapentin (which was recently shown to benefit those with chronic OA pain although it is still likely best for neuropathic pain, amantadine and monoclonal Ab like Solensia for cats in addition to NSAIDS; chondroprotectants like Adequan (this is most effective when started early), nutraceuticals and fatty acids listed below, weight management, controlled exercise (coupled with diet it is the only way to lose weight, so walking and swimming are great examples of this); adjunctive therapies which are listed below and environmental modifications. Most orthopedists and OA specialists believe that ALL the aforementioned things are needed simultaneously to have the greatest effect on our pets. **Controlling pain and/or inflammation as early as possible can interrupt the cycle of pain that leads to reduced activity and muscle atrophy. Early detection of OA can potentially i**mprove treatment results and long-term outcomesplus have a positive impact on the human-animal bond.

**SUPPLEMENTS** There are tons of supplements on the market. How do you know which ones are efficacious? One of the first things to do is check for an NASC Quality Seal. Nutramax products are not on the list, but vets still use these products because they have their own rigorous internal quality control system. So, what ingredients do we want to look for in our joint supplements? According to many board-certified specialists along with evidence-based medicine, Omega 3s, UCII, Eggshell Membrane and Green Lipped Mussel are recommended. No supplements on the market will rebuild cartilage, but they can help maintain it. If your breed is likely to develop arthritis in the future or has an orthopedic issue early in life, placement on a supplement is recommended. Supplements are also recommended for active dogs and cats. These supplements are not going to prevent arthritis, but they will help reduce it and make pets feel more comfortable. Make sure you read the label for age specifications. Yu Move is safe for pets over 8 wks of age, so are omega 3s. Movoflex is approved for pups of any age.

Omega 3s have the most evidence of efficacy. Fish based EPA and DHA are more effective than Flaxseed oil for pets so make sure you use a fish derived product. Omega 3s modulate inflammatory signals, helping to decrease joint pain, improve joint function and weight bearing. The arthritis dose of Omega 3s is much higher than what is on the label directions and you want to make sure to combine EPA and DHA mgs, DO NOT use the total omega 3s listed on the label. Omega 3s can affect the immune system, cause GI issues like diarrhea and possible vomiting, and they can also affect platelet function especially when used with NSAIDS and Clopidrogel. It needs to be stopped at least seven days before surgery. Nordic Naturals, Vetoquinol omega 3s, Dechra Snip Caps and Welactin are some products I use with my own pets. We always start with a low dose and gradually work our way up to a dose that the pet can tolerate. I normally recommend starting with 1/8 of the dose for about a week, seeing how the patient does, and then gradually increasing over the next month or so. If at any point GI side effects occur as you are increasing return to a lower dose that was OK and let me know. Cats should receive about 112-120 mg/kg of combined EPA/DHA for arthritis and kidney disease which means a 5# feline would get 272 mg, 8 #: 436 mg, 10 #: 545 mg etc

Dog weight (lbs) Recommended dose (mg) of combined EPA/DHA for osteoarthritis

5 574

10 965

15 1308

20 1623

25 1919

30 2200

35 2469

40 2730

45 2982

50 3227

55 3466

60 3700

65 3929

70 4153

75 4374

80 4591

85 4804

90 5014

95 5222

100 5427

UCII: This is undenatured collagen from chicken sternum cartilage and the most recognized product on the market is Vetoquinol's Flexadin. This will help with mild to moderate arthritis but likely will not help those with severe arthritis. It should help slow progression but likely cannot help an end stage joint. It helps to reduce pain, lameness and stiffness; increases range of motion and improves overall activity. It is absorbed by the gut, where it helps to activate anti-inflammatory mediators that help reduce joint inflammation and promote cartilage repair and prevents the immune system from attacking its own joint cartilage. That being said I still use this product with my severely arthritic Aires. If you are giving a product that contains glucosamine and chondroitin, make sure that you are not giving UCII at the same time. I normally separate them by about 12 hours. It will take about 30 to 60 days to see any improvement with this product. Flexadin can be given to small and medium breed dogs over 12 mos of age, large breed dogs over 15 mos of age and giant breeds around 18 mos of age.

Green Lipped Mussel: This must be derived specifically from New Zealand mussels. It provides antioxidants and anti-inflammatory benefits for dogs with osteoarthritis and helps alleviate arthritis signs in dogs. It has anti-inflammatory effects, improves pain scores and peak vertical force, and may help reduce progression of arthritis. There are TONS of GLM products available. I use Vet Strength Yu Move and Antinol.

Eggshell Membrane: **It is** a naturally occurring layer in chicken eggs, located between the calcified shell and albumin that includes collagen and elastin, Hyaluronic acid and Glycosaminoglycans. This product improves joint function in dogs, reduces key proinflammatory proteins and reduces pain. I use Movoflex advanced. Movoflex can be used in puppies.

Astaxanthin isa powerful antioxidantthat protects the joint from free radicals, mayhelp enhance the immune response in dogs and inhibits production of multiple inflammatory mediators.

Krill oil can reduce arthritic signs and paw edema, improve synovial proliferation, and in combination with astaxanthin and hyaluronic acid, markedly reduce chronic mild or moderate knee joint pain. This combo is found in Movoflex Advanced.

Duralactin has hyperimmune milk factor (HIMF), shown to reduce inflammation and therefore, pain.

Glucosamine/Chondroitin: This is NOT recommended because studies have shown that it had NO effect on OA patients compared to placebo.

“A 2022 Systematic Review and Meta-Analysis of Enriched Therapeutic Diets and Nutraceuticals in Canine and Feline Osteoarthritis” found that there was a “very marked non-effect of chondroitin-glucosamine nutraceuticals, which leads us to recommend that the latter products should no longer be recommended for pain management in canine and feline osteoarthritis.”

Therefore, while products like Yu Move and some others contain glucosamine and chondroitin and I recommend those, I am not specifically recommending purchasing glucosamine and chondroitin products because it is not the glucosamine or chondroitin that is benefiting the patient.

Plant-Derived Nutraceuticals like Avocado and soybean unsaponifiableshave beenshown to have anabolic, anticatabolic and anti-inflammatory properties that can improve mobility, reduce pain and enhance function in (OA). Boswellic acids**,** from *Boswellia serrata,* possess anti-inflammatory properties and can decrease pain and swelling and improve mobility for stifle OA. Curcumin,from turmeric, contains anti-inflammatory compounds.

CBD: The only product I can recommend is ElleVet because it has been studied. For more info consult the ElleVet website. Please note, CBD products can cause GI upset in pets. I had Aires on this product for years before I realized that his regurgitation was linked to this product because when I stopped it his signs also stopped!! I get nauseous from CBD so I thought maybe his clinical signs could be linked to it as well, and they were!

Ursolyx for dogs only: This is ursolic acid and it has been shown to reduce muscle loss. It does not help to regrow muscle, but it will help prevent further destruction of it. Muscle loss is a common problem with our older pets, those with certain disease processes and our arthritic pets. There is a link on my website under OA and Pain to this product. Study findings showed ursolic acid “inhibits molecular mechanisms of muscle atrophy and improves functional performance in dogs.”

Exercise has been shown to reduce pain, improve mobility, keep the joints lubricated and stimulate the brain. For those with hip dysplasia, 60 minutes of exercise daily is recommended as daily walks have been associated with reduced lameness in dogs with hip dysplasia. Mini walks/play sessions for dogs and cats with OA may be most beneficial. A combination of diet restriction and exercise can have a positive impact on mobility. Short, frequent walks are less likely to produce fatigue and soreness than longer walks, particularly during an OA flare. Go at a slow pace using a SHORT LEASH so you have control. Return home when the dog is still fresh and gradually increase the walk if possible. Make sure to end the walk if they are not using a leg, become lamer and are painful. You can also use Help ‘Em Harnesses and slings for walks too.

Protein requirements for older dogs, if not contraindicated, have also been shown to be twice that for young dogs.

Adjunctive therapies include rehabilitation therapies, regenerative therapies like Stem Cell therapy and PRP and herbal therapies like plant-based products and CBD. Rehabilitation therapies include: Strengthening exercises, passive range of motion and joint mobilizations, Massage therapy, Aquatic therapy like underwater treadmill, Low-level laser therapy, Therapeutic ultrasound, Extracorporeal shockwave therapy, Electrotherapy, PEMF loops or mats

What can you do? You can observe your pets for signs of pain, including:

Behavioral changes esp in cats , Changes in appetite; weight gain or loss for no known reason, Slowing down during daily activities, or not wanting to participate in activities, Difficulty in rising or lying down, Difficulty going up or down the stairs (or onto/down from a favorite piece of furniture), Difficulty getting into or out of a vehicle, Restlessness or pacing while standing, Whimpering or growling for no clear reason, Not grooming, Resting or sleeping more often, Excessive scratching, licking, overgrooming or biting an area near a joint, Not using the litter box, Night restlessness, Not being able to jump up on the counters, cat trees etc

You can make sure to keep your pets thin and if overweight, increase exercise and place on a diet which is likely going to be a vet formulated fresh diet or a prescription weight loss food. WEIGHT MANAGEMENT IS A MAIN CORNERSTONE OF OA MANAGEMENT. WEIGHT LOSS IS NEEDED TO MAKE PETS COMFIER. (see my website under NUTRITION AND OBESITY for more info) You can place your pets on joint supplements. You can take the Pain Scoring Tests listed on my website. For cats, the Zoetis website has a great OA quiz and there is also the Feline MS Pain Index. We can use the COAST or Canine OA Staging Tool, which is a test that will give us an OA baseline and can help us monitor dogs over time. Stage 0: dog is clinically normal (no visible signs of OA) and has no known risk factors. Stage 1: dog is clinically normal but has at least 1 known risk factor, e.g., breed disposition, age, underlying joint condition, high body weight and/or radiographic signs of dysplasia or joint trauma. Stage 2: dog shows mild clinical signs such as subtle stiffness in gait, asymmetry, lameness and changes in static body weight distribution. No difficulty rising. Stage 3: dog shows obvious abnormality in limb loading and motion, obvious stiffness in gait and shift in body weight distribution, and reduced use of affected limb. Stage 4: Dog has decrease in stance phase, marked difficulty rising, severe lameness, severe body weight shifting and abnormal limb loading. Struggles or is reluctant to move. LOAD is another questionnaire that **has 13 mobility based questions and this** can be used at an initial assessment along with follow-up visits. It helps establish a baseline number at the start of treatment and helps us track treatment efficacy.

**You can modify your home to help compensate for mobility issues or pain. These modifications can include** raising food and water bowls to a neutral position, using ramps or pet stairs, providing high-traction surfaces, such as yoga mats or carpet runners or paw friction pads directly on the paws, using mobility assistance, e.g., slings, harnesses, booties or carts, using soft beds or orthopedic beds, putting the litter box in the room your kitty is in most often, getting a box or boxes for each level of the house AND getting a low rise box that is easy to use.

More information can be found on my website under OA and Pain, Laser, and Shockwave.