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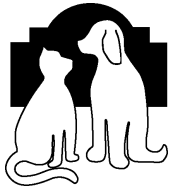
## **Medicine: Non-Steroidal Anti-inflammatories and the campaign against pain**

Many of us have experienced pain: the pain of a broken bone, head or muscle aches, the pain of surgery, a sprained ankle, or the pain of arthritis. When we feel painful, we take medication to feel better. For us, we take aspirin, or Tylenol, or ibuprofen. For serious cases of pain, we see our physicians and get stronger medication, such as Vioxx or Celebrex. What do all of these pain-relieving drugs have in common? They are all in a class of drugs called Non-Steroidal anti-inflammatories (NSAIDS). What many pet owners do not realize is that animals also experience pain. Although it is tougher to determine, research has found not only do animals experience pain, but they can actually learn to avoid it. What that means as pet owners is that we must be diligent in observing our pets, and if they show signs of pain, we must take steps to correct it. One of those steps involves using drugs to combat the pain. One such category of drugs that we use is NSAIDS. Because many human drugs are toxic to dogs and even more so to cats, we must be very careful in what medication can be given. Luckily for us, there has been a lot of research and development into NSAIDS for dogs (and cats). There are now 5 types of prescription strength NSAIDS to choose from. This article will tell you about pain, NSAIDS and corticosteroids, and what are the benefits and the risks of using NSAIDS with your pets.

### **How do I know my pet is painful?**

Because our pets cannot talk, it is much more difficult to determine when they are experiencing pain. Some signs are obvious, some less so. Cats hide pain better than dogs do and cats experiencing pain are likely much more underdiagnosed than dogs that have pain. Some breeds, such as Labrador Retrievers are better at hiding pain than a beagle.

- Limping: Basically if a dog or cat is limping they are painful. Some nerve damage can cause limping without pain, but this is the exception not the rule. Generally the worse the limp, the worse the pain
- Lethargy: This is a non-specific symptom which has many causes other than pain. If this lethargy comes after heavy exercise, it is more likely due to pain.
- Exercise Intolerance: This also can be due to many factors, but if your dog used to be able to go for miles and is now dragging after a couple of blocks, this can be due to pain.
- Reluctance to run or jump
- Reluctance to go up/down stairs
- Yelping/crying/whining when touched
- Hiding/less social/personality change
- Increased panting can be due to pain
- Breathing faster
- Trembling



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- Repeatedly licking a joint or area
- Loss of appetite

### **What are some causes of pain? What is acute vs. chronic pain?**

Pain comes from activation of special nerves called pain receptors. These pain receptors become activated from a variety of causes: touch, pressure, heat, and chemical causes. Acute pain is temporary. It lasts from seconds to a few days. Examples are post-surgical pain, a cut, a strain/sprain, or a burn. Chronic pain lasts for many days to years. Chronic pain is much more common than acute pain and much harder to spot as the symptoms generally come on slowly.

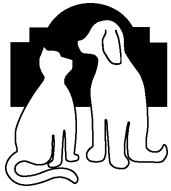
### **What can be done for pain?**

Acute pain is treated by repairing the cause. Once that is done, usually the pain is gone. If it is not, then pain medication is given. Sometimes this is in the form of a narcotic (a drug that blocks areas in the brain which can register pain). Sometimes NSAIDS are used. For severe acute pain, sometimes both are used.

Chronic pain is much more difficult. One of the most common causes of chronic pain is osteoarthritis (also called degenerative arthritis). This form of arthritis can affect any joint in the body. Common places in dogs can cats are the spine, hips, elbows, and knees. Sometimes such as in the case of hip dysplasia, the problem can be fixed with surgery. Unfortunately, most cases are not fixable. In these cases medication is sometimes used.

The first step is to bring your pet in for an examination if you think they might be experiencing pain. Generally the sooner you bring them in, the better, as certain injuries get harder to fix the more time that goes by. After your pet is examined, diagnostic tests maybe recommended if pain is suspected as being a problem:

- **Radiographs:** Commonly called X-Rays, radiographs can tell us a lot about the body, especially when dealing with bones. These can find many problems including osteoarthritis, fractures, certain infections, and tumors.
- **Joint aspirations:** These are aspirations (sucking the fluid using a syringe) of joint fluid that allow for a sample of the joint fluid to be sent in for examination and culture. These check for osteoarthritis, immune-mediated arthritis (like rheumatoid arthritis), and infections in the joint.
- **Ultrasound:** This non-invasive procedure can detect changes to tendons, ligaments, and muscle.
- **Nuclear scans:** These scans, such as scintigraphy, CT, and MRI are only performed by a nuclear medicine specialist. Luckily, there is one nearby in Tustin. They are not commonly used-mostly due to cost.
- **Arthroscopy:** A special scope that uses a small hole to examine inside the joint. Not only can it detect certain diseases, but in many cases fix them at the same time.
- **Laboratory diagnostics:** These blood and urine tests check overall health. They are especially important because some symptoms of pain can be from organ pain or dysfunction detectable only on lab tests. Also, if it is from a correctable cause, surgery may be an option and lab work needs to be performed before anesthesia. Also, it is also imperative to check for any problems before starting medications such as



NSAIDS. All medications may cause side effects and NSAID are no exception.

Once testing is performed, a plan for treating the pain will be formulated. The specifics of the plan will be determined during the discussion between doctor and pet owner. This may include more tests, surgery, or medication. One of the medications may be an NSAID.

### **What is an NSAID?**

NSAIDs reduce fever, swelling, inflammation, and pain. This class of drugs is the second-best anti-inflammatories. Remember than NSAID stands for non-steroidal anti-inflammatory. Corticosteroids (not the same thing as anabolic steroids abused by weightlifters) are the most potent anti-inflammatories. But because corticosteroids have huge numbers of unpleasant and dangerous side effects, research into drugs that had a similar positive effect and less negative side effects was started. The results were the NSAIDS. Good anti-inflammatory effect without the side effects. NSAIDS have been around for many decades, starting with Aspirin. As time and technology have progressed, many NSAIDS have been developed. The goal is even more anti-inflammatory effect and even less side effects.

### **How do NSAIDS work?**

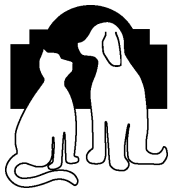
NSAIDS work by blocking certain pathways which lead to production of a biochemical called prostaglandins. These biochemicals are found all over the body. Sometimes they perform a needed function and are good. But they are also responsible for triggering a chain of events which can lead to pain. The goal of a good NSAID is to block the bad prostaglandins while sparing the good ones. An example of good prostaglandins are COX-1. These are necessary to maintain good stomach and intestinal health. An example of bad prostaglandins are COX-2. These increase inflammation and pain in the joints. Although a point of debate among researchers, a good NSAID blocks COX-2 more than COX-1. Too much blocking of COX-1 can lead to blood clotting problems, vomiting, diarrhea, and even ulcers in the stomach and intestinal tract. For example, Aspirin is about 50/50 blocking for both COX-1 and COX-2. Because of differences between species the same drug can have different COX activities between humans and other animals.

### **What are the benefits of NSAIDS? What are the negatives?**

The best benefit of using NSAIDS is that they quickly decrease pain and inflammation. That makes them great for acute and chronic pain. The main downside is that, by themselves, they do nothing to correct the underlying problem. It is important to note that they do not work like a narcotic like morphine. Morphine blocks certain receptors in the brain. It is also addictive and causes sedation. NSAIDS block chemicals where the pain and inflammation are occurring to prevent the inflammation from starting in the first place. They are not addictive and do not cause sedation. Like any medication side effects can occur. Due to these side effects, especially to the internal organs, not all pets can take the medications and sometimes special monitoring must be performed regularly.

### **Why can't I use my own prescription or over the counter NSAIDS for my pet?**

Every species metabolizes medications differently. What may be good for a human may not work or be very toxic to a dog or cat. The toxicity can be acute or build up over time. For example one dosage of Tylenol (acetaminophen) can be lethal to a cat. Ibuprofen and naproxen can cause severe gastrointestinal side effects and organ damage. Newer human prescription NSAIDS is also quite toxic. Aspirin can be used for



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dogs and cats, but at a much lower dosage. Aspirin is a fairly weak anti-inflammatory as compared to the newer generations. Also, because it has both COX-1 and COX-2 effects, it can have profound gastrointestinal side effects and certainly affects blood clotting. In fact, just like humans, we use aspirin to prevent complications from certain heart diseases. NEVER use aspirin without veterinary consultation, and never use it with corticosteroids or other NSAIDs.

### **What are the NSAIDS available for dogs and cats?**

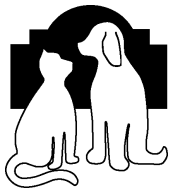
At this point there are five prescription NSAIDS approved by the FDA for use in dogs. There is one used as an extra-label use in cats.

**Rimadyl (carprofen):** This is the oldest of the prescription NSAIDS. It comes as a pill (caplet) or a liver-flavored chewable and is given once or twice daily. It is generally well tolerated. It is a COX-1 sparing NSAID. This drug is used for both post-surgical pain and chronic pain. Because it has been around for so long, it has the most documentation and long-term safety studies due to the high number of dogs who have been on it. Side effects reported include stomach upset, ulcers, and diarrhea although uncommon. A suppression of the bone marrow may also occur although really rare. There are also reports of seizing in rare instances. Of more concern is that there can be a type of reversible liver damage which can be fatal if not caught early. In the study, older black Labrador retrievers seemed at highest risk, although they are also one of the highest percentages of dogs on the medication at the time of the study. For most dogs the drug works great with little to no side effects. But because of the side effect potential, lab work needs to be checked before long term usage and on a regular basis afterward. Of particular attention are the liver values and blood counts. Because it is a tasty chewable, extra precautions need to be taken to prevent overdose. With the advent of other NSAIDS Rimadyl is generally not prescribed for Labradors or dogs with a history of liver changes.

**Etogesic (etodolac):** This is the second oldest of the NSAIDS made for dogs. It is also used for people (Lodine) It comes as a tablet and is given once daily. It seems to be more effective for acute pain rather than chronic. It is more selective for COX-2 than COX-1 but has some COX-1 effects. This means that it has more reports of gastrointestinal side effects including vomiting, diarrhea, and lethargy. A few dogs were reported to have hives. Kidney changes have also been reported. This drug has not been extensively studied in dogs under 1 year of age or under 10 lbs. As more potent NSAIDS have been developed we have been using this drug less and less. On a positive note though, it is now available as a generic and this is unique among the NSAIDS for pets.

**Deramaxx (deracoxib):** This is a COX-1 sparing NSAID. It comes as a liver flavored chewable. Because it binds COX-2 so well, it can be given as a once daily dosing. It is also used for both acute and chronic pain. It is not recommended for dogs under 4 months of age or under four pounds. While a relatively new drug (we've been using it for a little over a year), so far the side effects have been minimal. It can cause stomach side effects and in rare cases kidney parameter changes. Like the chewable Rimadyl, overdose is possible because dogs like the taste.

**Zubrin (tepoxalin):** This drug is very new. It came out last spring. It comes as a dissolvable tablet that is placed on the tongue. It has both COX-1 and COX-2 effects, and also inhibits another inflammatory compound called lipoxigenase. The most common side effects include gastrointestinal (vomiting, diarrhea,



and anorexia). Like all NSAIDS there is a potential for liver or kidney changes. The drug seems to work better for chronic pain than for acute. Due to the dosing, sometimes requiring multiple tablets given once daily, the cost can become quite high. Generally we use this drug for dogs that don't respond as well to other NSAIDS.

**Metacam (meloxicam):** While a new drug for us in the United States it has been used in Canada and Europe for many years. Metacam is a COX-1 sparing drug. It is a once daily drug and is a liquid. The dosage is interesting. For dogs, the syringe is dosed in pounds of body weight. It can be given orally or in the food. For smaller dogs, the dosage can be placed in the food directly from the bottle at 1 drop per pound. This drug while FDA approved only for dogs, can be used as an extra-label use for cats. It is used for both acute and chronic pain. Gastrointestinal upset can occur but is reported rarely. Toxicity to the kidneys is quite low and liver problems seem low as well. Human versions of this drug exist as well (Metacam and Mobic). Although new for us, it seems quite promising.

### **What NSAID is best for my pet?**

This question is difficult to answer. All pets, just like people respond differently to medications. One dog may do better with Rimadyl than Metacam. Another may have an allergic reaction to Etogesic but be fine on Zubrin. Generally if there are too many side effects or the medication is not as effective at controlling pain, then a switch is recommended. At the time of writing, we seem to be using Rimadyl, Deramaxx, and Metacam the most often, although we do stock all five NSAIDS. At some future point a study might be performed for determining the most effective one.

### **My pet has been prescribed a NSAID. What precautions need to be taken?**

NSAIDS can react to other medications, especially other NSAIDS. Never give one NSAID with another. Do not forget that aspirin is an NSAID. Also corticosteroids can cause severe reactions with NSAIDS. Basically before starting an NSAID make sure to tell the doctor ALL medications AND supplements your pet is currently taking.

Lab work may be recommended. Usually this is before starting the medication. Because changes to the blood count, liver, and kidneys can occur with any NSAID, a comprehensive panel is taken. After 1 month and every 6 months, a smaller blood test is taken to make sure to catch any changes before irreversible damage occurs.

Give the NSAID with a full meal. This tends to minimize any gastrointestinal side effect.

If any side effects occur (vomiting, diarrhea, anorexia, bleeding, lethargy, jaundice, changes to thirst and urination, or hives) stop the medication and call immediately.

### **Summary**

While NSAIDS can cause some potentially dangerous side effects, most dogs (and cats) can do very well on them. We have dogs who have been on NSAIDS for many years to deal with their pain. NSAIDS are a blessing, as they help to prolong the quality of our pets' lives. With careful consideration and monitoring your painful pet could return to the joyful days of puppyhood and kittenhood. If your pet is experiencing pain, please schedule an appointment. The pain of getting old is not something your pet has to deal with any longer.