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# PAIN MANAGEMENT FOR VETERINARY SPECIES

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This text summarizes and often transcribes the AAHA/AAFP Pain Management Guideline for dogs and cats. *J Am Anim Hosp Assoc* 2007; 43:235-248.<sup>1</sup>

## Introduction

Historically, and persistently, it's thought animals don't feel pain and/or they perceive pain differently than humans. It's often stated that pain following surgery or injury is beneficial because it limits movement of veterinary species and prevents further injury. Clearly, this is not the case, since animals and humans have similar neural pathways for development, conduction, and modulation of pain. Veterinary species have neural pathways and neurotransmitters that are similar to those of people, so it follows that veterinary species experience pain similarly to humans.<sup>1</sup>

Unmanaged pain decreases quality of life in all patients, and prolongs recovery from surgery, injury, or illness. Modern analgesic strategies allow animals to live more comfortable lives and prevention and management of pain has become a fundamental part of quality and compassionate care of all veterinary species.<sup>1</sup>

The veterinary team (veterinarian, technician, staff, etc.) has the responsibility to recognize, assess, prevent, and treat pain. Pain is a critical pathophysiology and its presence or absence should be a critical sign. It should be integrated into all patient evaluations. The most common sign of pain is change in behavior and those behaviors can be very different from those demonstrated by or within other species.<sup>1</sup>

## Types of Pain

All tissue injury may cause pain. A negative consequence of pain are the stress responses, mediated by the endocrine system. Increased cortisol, catecholamines, inflammatory and other mediators cause tachycardia, vasoconstriction, decreased gastrointestinal motility, delayed healing, reduced immune responsiveness and sleep deprivation. Inadequate pain prevention or management can lead to pain perception magnification and an unnecessarily prolonged pain state.<sup>1</sup>

Adaptive pain - the normal response to acute or chronic tissue damage. Inflammatory mediators sensitize neural pathways and the CNS, increasing the perception of pain.<sup>1</sup>

Maladaptive pain - adaptive pain that goes unmanaged and leads to physiological and physical spinal cord and brain changes. The thalamus can become a spontaneous pain generator. Pain then becomes difficult to control in some patients. When that happens, some patients require specific drug therapy, such as N-methyl-D-aspartate (NMDA) receptor antagonists (amantadine) and gabapentin (aimed at restoring normal central transmission). Patients may also require multiple therapies (pharmacologic as well as nonpharmacologic) to manage pain.<sup>1</sup>

Neuropathic maladaptive pain: spontaneous pain and hypersensitivity with damage to or a lesion of the nervous system.<sup>1</sup>

Functional maladaptive pain: hypersensitivity to pain resulting from abnormal processing of normal input.<sup>1</sup>

Central maladaptive pain: pain initiated or caused by a primary lesion or dysfunction in the central nervous system.<sup>1</sup>

Wind-up pain – is an altered pain threshold that induces increased sensitivity both in the PNS and CNS. Pain may also be experienced in areas unrelated to the original cause. Wind-up causes a worsened acute pain and describes the processes that results in maladaptive pain.<sup>1</sup>

Allodynia - is pain caused by a stimulus that does not normally result in pain and can be a component of maladaptive pain. A dog with long-standing, untreated vertebral osteoarthritis may not tolerate light stroking along its back.<sup>1</sup>

Dysphoria - state of anxiety or restlessness, often accompanied by vocalization.<sup>1</sup>

### **Pain Anticipation and Early Intervention**

Unintentional pain or discomfort associated with veterinary procedures is easily overlooked. Procedures that often induce discomfort, but often lack pain management, include manual stool evacuation, IV catheterization, ear cleaning, anal sac expression (especially in cats), etc. A reassessment of these and the need for pharmacologic pretreatment should be considered. Opioids tend to reduce pain or discomfort of some procedures. Use sedation, and/or anesthesia to prevent struggling, subsequent pain or injury, and aversion when animals must be excessively restrained due to fear, aggression and/or preexisting pain.<sup>1</sup>

There are conditions where it is unclear the extent of pain that animals experiences. Systems involved include visceral, gastrointestinal, urogenital diseases, CNS and dermatologic. Table 1 identifies common signs of pain and Table 2 lists conditions and procedures that may be overlooked or underestimated as causes of pain. Management for these conditions and procedures may include pharmacologic and/or non-pharmacologic management or better restraint methods.<sup>1</sup>

Differences between dogs and cats may be poorly recognized. Examples include osteoarthritis, intervertebral disc disease and spondylosis which are common in old cats. Many of the behaviors associated with these diseases have been ascribed to “old age” rather than pain.

### Anticipating and Reducing Surgical Pain

Levels of pain associated with surgery should be anticipated. The more tissue trauma, the more pain. Pain is proportional to increasing levels of circulating cytokines.<sup>2</sup> Superficial procedures are less pain full than abdominal surgery. Orthopedic procedures can cause severe pain as compared to both. Routine procedures are painful. Repeat surgeries may be more painful than the original procedure in association to changes in CNS with repetitive and prolonged stimulation. Minimal tissue trauma may help alleviate pain.<sup>2</sup>

**Table 1<sup>1</sup>: Signs of Pain**

General Signs	Specific Signs
Loss of normal behavior	Decreased ambulation or activity, lethargic attitude, decreased appetite, decreased grooming (cats). Harder to assess in the hospital.
Abnormal behaviors	Inappropriate elimination, vocalization, aggression or decreased interaction with other pets or family members, altered facial expression, altered posture, restlessness, hiding (especially in cats).
Reaction to touch	Increased body tension or flinching in response to gentle palpation of injured area and palpation of regions likely to be painful, e.g., neck, back, hips, elbows (cats).
Physiologic parameters	Elevations in heart rate, respiratory rate, body temperature, and blood pressure; pupil dilation.

**Table 2<sup>1</sup> : Type of Pain Cause**

Type of Pain	Cause
Cardiopulmonary	Congestive heart failure (pulmonary edema and pleural effusion); pleuritis, cerebral vascular accident, thromboembolism (clot).
Oncologic	Any and all cancer.
Dermatologic	Otitis, severe pruritus, burns, chronic wounds; abscess, cellulitis, clipperburns, urine scalding, severe chin acne.
Dental	Oral tumors, feline oral resorptive lesions ("neck" lesions), fractures (no matter how small), tooth abscess, ulcers, stomatitis.
Gastrointestinal	Constipation, obstipation, obstruction, megacolon; anal sac impaction; hemorrhagic gastroenteritis, pancreatitis, gastric dilatation-volvulus (GDV), foreign body.
Musculoskeletal	Most often overlooked in cats. Muscular soreness, arthritis, degenerative joint disease, tendon or ligament injury, intervertebral disc disease, facet pain of spondylosis, osteodystrophy, dislocations.
Ocular	Corneal disease and ulcers, glaucoma, uveitis.
Urogenital	Uroliths, ureteroliths, queening/whelping, feline lower urinary tract disease/interstitial cystitis, acute renal failure, enlarged kidneys (capsular swelling), lower urinary tract infections, urinary obstruction, vaginitis (especially in obese cats).
Hospital procedures	Restraint (examination, obtaining blood and urine samples, radiographs, and ultrasound; even gentle handling and hard surfaces can increase pain in an already painful animal). Urinary/IV catheterization, bandaging, surgery, thoracocentesis, chest tube placement and drainage procedures, abdominocentesis. Manual extraction of stool and anal sac expression (especially in cats).
* Regardless of method used, onychectomy causes a higher level of pain than spays and neuters.	

## Pharmacological Intervention

### ***Multimodal analgesia - use of more than one drug with different actions to produce optimal analgesia.***

Classes of analgesics are listed in Table 3. The choice of pharmacologic agents is based on an assessment of the patient, patient's history, underlying or preexisting conditions, presenting complaint, and a laboratory evaluation if need be. Drugs, indications, contraindications, adverse events, and doses are found in many other sources.<sup>2-6</sup> Multimodal pain management takes advantage of the different modes of action. Reduced doses often can be used to decrease the potential for adverse events side and provide superior pain management.

**Perioperative Analgesia**

Many approaches are useful. Reduce anesthetic requirements with opioids. Reduce the transmission of noxious stimuli with local anesthetic. Decrease inflammation with an NSAID from surgical trauma during anesthetic recovery. A combination of these approaches agents may help prevent the evolution of maladaptive pain. Opioids are anesthetic-sparing and should be consistently used. A single dose of carprofen given to shelter dogs undergoing ovariohysterectomy demonstrated good analgesia for up to 24 hours in most dogs.<sup>6</sup>

**Analgesia for Other Procedures and Conditions**

Local or topical anesthetics are useful for managing pain or discomfort associated with a variety of conditions and procedures (e.g., clipper burns, urine scald, IV catheter placement, manual extraction of stool, anal sac expression).

**Table 3<sup>1</sup> : Drug Classes and Characteristics\*<sup>t</sup>**

Drug Class	Comments
Alpha-2 agonists	Analgesic, sedative, muscle relaxant; dose-related duration, reversible.
Anxiolytics	Anti-anxiety (anxiety enhances pain); preappointment or preanesthetic.
Corticosteroids	Analgesic; anti-inflammatory.
Local anesthetics	Analgesic; anesthetic-sparing; blocks pain recognition.
NMDA <sup>t</sup> receptor antagonists	
Amantadine	Reduces "wind-up"; good for chronic pain management in dogs; typically not used for adaptive pain.
Ketamine	Somatic analgesia; reduces "wind-up."
NSAIDs <sup>s</sup>	Analgesic; anti-inflammatory; long duration of action.
Opioids	Analgesic; anesthetic-sparing; reversible; short duration of action.
Topical anesthetics	Dermatologic conditions, anal/genital procedures, hospital procedures(e.g., catheter placement).
Tricyclic antidepressants	Antidepressant and anxiolytic, with analgesic properties. Used as adjunctive analgesic; enhances opioid analgesia. Used in humans to treat chronic and neuropathic pain at lower doses than those used to treat depression.
Gabapentin	Reduces "wind-up"; good for chronic pain management in dogs and cats; typically not used for adaptive pain
Tramadol	Analgesic; good for chronic pain management in dogs and some cats.
Gaynor J, Muir W. Handbook of Veterinary Pain Management. St. Louis, MO: Elsevier Publishing, 2002.	

## Nonpharmacological Intervention

It is imperative to consider nonpharmacologic therapy as an adjunct to pharmacologic agents to enhance pain prevention, management, and treatment.

Many basic lifestyle changes can reduce pain. Controlled exercise and weight management are used to decrease joint stress and improve muscular support of the joints.<sup>7,8</sup> Simple environmental accommodations can benefit animals and prevent or reduce discomfort. These include, but are not limited to: easy litter box access, access to litter boxes (no hood, ramp, stairs, low-entry side, etc.); soft bedding, easy access food and water dishes (raised, lowered, etc.), nonslip floors, gates to prevent stair access, appropriate warm-up prior to exercise.<sup>9</sup>

Hospital care in this area includes soft padded bedding during illness or surgery, warm water or air blankets to facilitate recovery from anesthesia, minimalization of the length of hospital stay, gentle and respectful patient handling. It is also beneficial to decrease visual and auditory stimulation and separate dogs and cats within the hospital setting. Shy or anxious cats should have a box or similar structure in their cage to provide a hiding place.<sup>1</sup> Acupuncture should also be considered. is most supported by evidence; its use in humans is endorsed by the National Institutes of Health.<sup>10</sup>

Nutraceuticals, such as glucosamine and chondroitin, have questionable benefit. There is evidence that omega-3 fatty acids decrease inflammation in osteoarthritis, and dietary intervention can improve clinical signs in osteoarthritic dogs.<sup>11-13</sup> Chondroprotective agents such as polysulfated glycosaminoglycans have been demonstrated to modify the progression of osteoarthritis by maintaining chondrocyte viability via the inhibition of cartilage degradation pathways.<sup>14, 15</sup> Physical therapy) must also be considered to aid in returning a patient to normal function following surgery or trauma or as a part of a long-term strategy to manage pain. Pharmaceutical and non-pharmaceutical intervention can be combined to manage pain.

## Summary

“It is important to create reasonable expectations for the client. Clients can be helped by the use of decision-making trees and explanations of probable outcomes and by being given choices. Euthanasia can be a gift to relieve pain and suffering and should be included as a reasonable and humane option at some point. A client may not apprehend the level of suffering the pet is experiencing or have any way to gauge quality of life. Quality-of-life indices are being developed to assist pet owners in making these kinds of difficult decisions.<sup>41</sup>

At the onset of an animal’s terminal condition, it is beneficial to ask the client to remember what activities the pet enjoyed and have the client compare these to the pet’s current status. This process helps to clarify the client’s understanding of quality of life. When possible, these issues should be discussed with the client while the pet is still healthy, before the animal is ill or in pain.”<sup>1</sup>

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## Resources for Assessing Pain Associated with Various Procedures and Conditions

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