Veterinary Medicine Doesn't Have to Hurt: A Comprehensive Approach to Veterinary Pain Management

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Introduction

The management of pain in veterinary medicine has evolved from an elective consideration to a fundamental ethical and medical imperative. As defined by the International Association for the Study of Pain (IASP), pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage. For the veterinary professional, the commitment to alleviating suffering is a cornerstone of the professional oath. When pain is left unmanaged, the consequences are not merely behavioral; they are profoundly physiological. Untreated pain triggers a systemic stress response that leads to weakened immune systems, delayed wound healing, and increased metabolic demands. In hospitalized patients, this can manifest as tachycardia, hypertension, and a catabolic state that leads to significant weight loss. Furthermore, chronic pain contributes to cognitive decline and a severely diminished quality of life, often straining the human-animal bond to the point of elective euthanasia.

Understanding Nociception

To effectively treat pain, one must first master the complex anatomy of nociception, which consists of four distinct and sequential components. The process begins with transduction, where a noxious stimulus—be it mechanical, thermal, or chemical—is converted into an electrical nerve impulse at the sensory nerve endings, known as nociceptors. This stage is heavily influenced by chemical mediators such as prostaglandins, substance P, and histamines, which lower the threshold for nerve firing. The signal then undergoes transmission, traveling along afferent nerve fibers toward the dorsal horn of the spinal cord. It is important to distinguish between the two primary fiber types: A-delta fibers, which are myelinated and transmit fast, sharp, localized pain; and C fibers, which are unmyelinated and transmit slow, dull, aching, or chronic pain.

Once the signal reaches the spinal cord, it enters the stage of modulation. In the dorsal horn, the signal is either amplified or suppressed by endogenous systems before being sent to the brain. This is a critical point of intervention for many pharmacological agents. Finally, the signal reaches the cerebral cortex for perception, the conscious recognition of pain. Understanding this pathway is the foundation of pre-emptive analgesia—the practice of administering pain medication before a painful stimulus (such as a surgical incision) occurs. By blocking these pathways early, clinicians can prevent the debilitating phenomenon known as "wind-up" or central sensitization. Wind-up occurs when sustained

input from C-fibers leads to a state of hyperexcitability in the spinal neurons, causing the patient to experience pain from normally non-painful stimuli, a condition known as allodynia.

Function and Effect of Pain

Pain provides a protective reaction to potentially dangerous stimuli. Pain is what stops you from holding onto a hot pan out of the oven and reminds you to keep your weight off a sprained ankle while you're healing. Pain also triggers the sympathetic nervous system, the fight or flight response, through the release of cortisol, epinephrine, and norepinephrine.

Pain, when left untreated, has both psychological and physiological consequences. The physiological consequences may include changes in cardiac function (tachycardia, hypertension, increased cardiac workload), respiratory function (shallow breathing, hypoventilation), and immune function (increased cortisol levels, delayed wound healing, immunosuppression, catabolism). The psychological changes may include increased aggression, restlessness, panting, guarding, hiding, decreased appetite, and abnormal grooming.

Untreated acute pain will lead to maladaptive chronic pain, which severely reduces quality of life and requires ongoing multimodal therapy to manage.

Scoring pain is an important part of every veterinarian's assessment, and a pain score should be considered a vital sign. Many options for objective pain scores exist. Some are used for acute pain scoring, like the Colorado State University Acute Pain Score, while some are more adapted to chronic pain scoring like the Feline Musculoskeletal Pain Index. It is important for the team to agree on which pain scoring system to use, and then use it for both initial assessment and ongoing evaluation of pain management therapies.

Pain Management Options

The gold standard for modern veterinary pain management is the implementation of multimodal therapy. This strategy involves the simultaneous use of two or more classes of analgesic drugs that target different points in the nociception pathway. The primary advantage of this approach is synergistic efficacy; by attacking pain from multiple angles, clinicians can achieve superior analgesia while utilizing lower doses of individual drugs, thereby significantly reducing the risk of dose-dependent side effects. For example, while an opioid might target modulation and perception, a local anesthetic targets transmission, and an NSAID targets transduction.

In acute clinical settings, particularly perioperative care, the protocol typically begins with a combination of Mu-agonist opioids (such as fentanyl or hydromorphone) and Alpha-2

agonists (such as dexmedetomidine). Opioids remain the most potent tools for altering the perception and modulation of pain, while Alpha-2 agonists provide excellent sedation and supplemental analgesia. To complement these systemic treatments, local anesthetics like lidocaine and bupivacaine are utilized to provide a complete "transmission blockade." Local blocks are among the most underutilized yet effective tools in the veterinary technician's arsenal. Techniques such as dental blocks for extractions, testicular blocks for castrations, and ring blocks for digit amputations can render a surgical site completely numb, allowing for lighter planes of general anesthesia and smoother recoveries.

As patients transition from acute surgical pain to chronic management, the therapeutic focus shifts toward long-term comfort and mobility. Chronic pain, such as that associated with osteoarthritis (OA), is often a mixture of inflammatory and neuropathic pain. Managing these cases requires a "tiered" approach. Non-steroidal anti-inflammatory drugs (NSAIDs) like carprofen or meloxicam remain a mainstay for reducing inflammation at the site of transduction. However, for patients with advanced OA or nerve-related pain, gabapentin is an essential addition. Gabapentin targets the neuropathic component of pain by stabilizing calcium channels in the central nervous system. For refractory cases where "wind-up" has already occurred, amantadine serves as an oral NMDA receptor antagonist, effectively helping to "reset" the spinal cord's sensitivity.

In recent years, the landscape of chronic pain management has been revolutionized by the introduction of monoclonal antibody therapies, specifically Librela (bedinvetmab) for dogs and Solensia (frunevetmab) for cats. These biologics target Nerve Growth Factor (NGF), a key driver of pain signaling in osteoarthritic joints. Because these are proteins, they are metabolized like naturally occurring antibodies, offering a safer profile for patients with hepatic or renal concerns that might preclude the long-term use of traditional NSAIDs.

Beyond pharmacology, a comprehensive pain management plan must include non-pharmacological interventions. Weight management is perhaps the most critical component for orthopedic patients, as excess adipose tissue not only increases mechanical stress on joints but also acts as a pro-inflammatory organ, secreting cytokines that exacerbate systemic inflammation. Physical modalities such as Photobiomodulation (Cold Laser Therapy) utilize specific wavelengths of light to stimulate cellular repair and reduce edema. Acupuncture and therapeutic exercises further support muscle mass and joint health.

Nursing Considerations

The veterinary technician plays a pivotal role as the primary advocate for the patient. Because animals cannot verbalize their discomfort, the technician must be expert in

recognizing species-specific behavioral cues. In dogs, pain may be obvious—limping, vocalizing, or panting. In cats, however, the signs are often much more subtle, such as a "hunched" posture, decreased grooming, or hiding in the back of a kennel. By utilizing validated pain scoring systems such as the Glasgow Composite Measure Pain Scale or the Colorado State University Acute Pain Score, the veterinary team can move from subjective observation to objective assessment, ensuring that interventions are timely and effective.

Ultimately, the goal of "Vet Med Doesn't Have to Hurt" is to foster a culture of proactive rather than reactive care. By integrating a deep understanding of nociceptive physiology with a diverse toolkit of pharmacological and physical therapies, veterinary professionals can ensure that every patient—regardless of age or procedure—experiences the highest possible standard of comfort. When we successfully manage pain, we do more than just treat symptoms; we facilitate healing, preserve the human-animal bond, and uphold the highest standards of our profession. Through multimodal strategies and a commitment to constant reassessment, we can truly ensure that veterinary medicine is a field where healing happens without unnecessary suffering.

References

Colorado State University. (2021, February 4). *Animal pain scales*. Animal Pain Scales. https://vetmedbiosci.colostate.edu/vth/services/anesthesia/animal-pain-scales/

Colville, T. P., & Bassert, J. M. (2008). *Clinical anatomy and physiology for veterinary technicians* (2nd ed.). Mosby.

Grubb, T., Sager, J., Gaynor, J. S., Montgomery, E., Parker, J. A., Shafford, H., & Tearney, C. (2020). 2020 AAHA anesthesia and monitoring guidelines for dogs and cats. *Journal of the American Animal Hospital Association*, *56*(2), 59–82. https://doi.org/10.5326/JAAHA-MS-7055

Grubb T, Lobprise H. Local and regional anaesthesia in dogs and cats: Descriptions of specific local and regional techniques (Part 2). Vet Med Sci. 2020 May;6(2):218-234. doi: 10.1002/vms3.218. Epub 2020 Jan 21. PMID: 31965749; PMCID: PMC7196680.

Lascelles, D. (2018). *The Feline Musculoskeletal Pain Index (FMPI) WHAT IT IS, WHAT IT DOES*. Painfreecats.org. https://painfreecats.org/the-fmpi/

Lydia Love DVM. "Mixing Local Anesthetics - Yay or Nay?" *Navas*, 27 Sept. 2019, https://www.mynavas.org/post/mixing-local-anesthetics-yay-or-nay.

Margeti, C., Kostakis, C., Tsioli, V., Karagianni, K., & Flouraki, E. (2024). Local anaesthesia techniques in dogs and cats: A review study. *Pets*, *1*(2), 88–119. https://doi.org/10.3390/pets1020009

Reid J, Nolan A, Hughes J, Lascelles D, Pawson P, Scott E. Development of the short-form Glasgow Composite Measure Pain Scale (CMPS-SF) and derivation of an analgesic intervention score. *Animal Welfare*. 2007;16(S1):97-104. doi:10.1017/S096272860003178X

University of Montreal. (2019b). *Feline grimace scale: Easy acute pain assessment in cats*. Feline Grimace Scale website. https://www.felinegrimacescale.com/

Wanamaker, B. P., & Massey, K. L. (2015). *Applied pharmacology for veterinary technicians* (5th ed.). Saunders.