TODAY'S
VETERINARY
P R A C T I C E

PHYSICAL
REHABILITATION
FOR VETERINARY PRACTICES

March/April 2012   Volume 2, Issue 2

PRACTICE BUILDING
Building Strong Relationships

ON YOUR BEST BEHAVIOR
Feline Urine Marking

IMAGING ESSENTIALS
Radiography: Stifle Joint

Visit **TVPjournal.com** to officially confirm your **FREE 3-year subscription**

Feline Friendly Article

Pain Assessment in Dogs & Cats

Anusha Balakrishnan, BVSc, and Elana Benasutti, CVT

The greatest evil is physical pain.
– Saint Augustine

Pain has long been recognized in human medicine as having a deleterious effect on several organ systems in the body. It has been shown to:

- Amplify the body's stress response to traumatic injury
- Cause several metabolic and endocrine derangements
- Impede healing and patient recovery.

DEFINITIONS

Pain in veterinary patients has been defined as an aversive sensory and emotional experience associated with actual or potential tissue damage.[1] Potential causes of pain include:

- Trauma
- Major or minor surgery
- Acute or chronic inflammatory conditions.

Pain may also be felt in the absence of any identifiable noxious stimulus. In such cases, the pathology may exist in the central nervous system (neuropathic pain) causing the animal to perceive pain that is inappropriately excessive for the degree of inflammation or tissue trauma.

Pain is typically classified as acute or chronic:

- **Acute pain** is broadly defined as pain that lasts for a short period of time and usually subsides after the inflammatory and healing processes are completed.
- **Chronic pain** is a more complex phenomenon, and can last much longer than acute pain (up to lifelong).

Recognition and control of acute pain in the early stages is important, as undermanaged acute pain has a higher likelihood of incomplete resolution, therefore, resulting in chronic pain.[2]

THE COMMUNICATION GAP

The patient's inability to speak makes the task of proper pain assessment challenging: the patient cannot communicate about:

- Character of pain
- Location or length of pain
- Whether pain exists.

The veterinary professionals responsible for patient care must, therefore, rely upon the word of the animal owner, their own clinical observations, and the various parameters that have been documented to assess pain in patients.

PAIN SCALES & MANAGEMENT GUIDELINES

Several pain scoring scales and sets of pain management guidelines have been developed for use in veterinary patients. They can be used for serial monitoring of pain levels in hospitalized patients, which facilitates optimal pain management for an in-clinic patient, despite different personnel caring for that patient throughout its stay.

Obvious limitations to this approach include the fact that these parameters are affected and altered significantly by trauma, surgery, anesthesia, pharmacologic interventions, and the stress of being handled by veterinary personnel.

Acute & Chronic Pain

Some scoring systems and guidelines have been shown to be useful in assessing and quantifying chronic pain, such as pain associated with osteoarthritis in dogs and cats. These systems/guidelines often rely upon questionnaires provided to animal owners and use easily assessable behavioral characteristics, such as activity levels and ability to exercise, to evaluate pain:

- **AAHA/AAFP Pain Management Guidelines for Dogs and Cats[1]:** aahanet.org/publicdocuments/painmanagementguidelines.pdf
- **Questionnaire to Measure the Effects of Chronic Pain on Health-Related Quality of Life in Dogs[3]**

A few systems have been developed to assess acute postsurgical pain, which may be more relevant in a hospital setting:

- **Subjective and Objective Measures of Postoperative Pain in Cats[4]**
- **Canine Acute Pain Scale[5]:** ivapm.evetsites.net/refId,20468/refDownload.pml (case-sensitive)
- **Feline Acute Pain Scale[5]:** ivapm.evetsites.net/refId,20467/refDownload.pml (case-sensitive)
- **Acute Postsurgical Pain in Dogs and Cats[6]**
- **Scale to Evaluate Postoperative Pain in Dogs.[7]**

Pain Grading

Other systems that have been described include:

- **Simple Descriptive Scales:** Canine Simple Descriptive Pain Scale, ivapm.evetsites.net/refId,20473/refDownload.pml (case-sensitive)
- **Visual Rating Scales.**

These types of scales allow the user to grade pain as none, mild, moderate, or severe. While relatively easy and straightforward to use, these systems may not be very sensitive in distinguishing subtle changes in pain levels.

The **Visual Analog Scale** (VAS; partnersagainstpain.com/printouts/A7012AS1.pdf) has been widely used in human medicine and has also been evaluated in several veterinary studies.[8-11] The scale consists of a line, most often 100 mm long, with 2 descriptors representing extremes of pain intensity (no pain and extreme pain) at each end. Users make a mark somewhere along the line that represents the pain intensity, and the VAS is scored by measuring the distance from the "no pain" end of the line. While it has been shown to be sensitive and reproducible, a major shortcoming of this scoring system is that it relies heavily on the experience and familiarity of the user with VAS.[9]

Behavior-Based Pain Assessment

A behavior-based acute pain scoring system—the **Glasgow Composite Measure Pain Scale** (CMPS)—was developed at the University of Glasgow, which takes

Figure 1. Glasgow Composite Measure Pain Scale–Short Form

PAIN ASSESSMENT IN DOGS

Some signs of pain in dogs are apparent and easily detectable, while others are more subtle. **Table 1** lists the most common signs of pain in dogs:[14-18]

Table 1. Signs of Pain in Dogs

Category	Clinical Signs
Attitude/ Mentation	• Scared, submissive appearance • Unwilling to eat or interact with people • Inability to lay down
Body Movement	• Constant trembling with/ without stimulation and/or handling • Flinching from fingertips lightly brushed over the body
Facial Expression	• Tense facial muscles with furrowed brows • Lips drawn back • Grimace with unfocused or fearful look in eyes • Dilated pupils • Ears flattened against head
Guarding	• Guarding or biting at a painful area • Tensing abdomen when palpation is attempted • Growling when approached
Posture	• Back or abdominal pain: Hunched up or tense appearance • Severe abdominal pain: Prayer position (standing on the hindlimbs, with sternum and forelimbs flat on the floor) • May move to back of cage or into corner
Respiratory Pattern	• Short, shallow breathing pattern
Vocalization	• Crying, whining, whimpering

into consideration several parameters, such as:[12,13]

- Demeanor
- Response to people
- Posture, mobility, and activity
- Response to touch
- Attention to painful area
- Vocalization.

This pain scoring system has been well validated for use in veterinary medicine, and has been shown to be reliable and sensitive. Application of scaling models to this score has also enabled the use of this system in clinical research and clinical trials.[13]

A shorter version of the CMPS, the **Short Form** (CMPS-SF, **Figure 1**, page 69),[14] was developed in 2007 for the purpose of routine clinical use, with emphasis on speed, ease of use, and guidance for analgesia provision. The CMPS-SF is comprised of 6 behavioral categories with associated descriptive expressions:

1. Vocalization (4 descriptions)
2. Attention to wound (5 descriptions)
3. Mobility (5 descriptions)
4. Response to touch (6 descriptions)
5. Demeanor (5 descriptions)
6. Posture/activity (5 descriptions).

Items are placed in increasing order of pain intensity and numbered accordingly. The observer chooses that item within each category that best describes the patient's behavior and ranked scores are summed; the maximum pain score is 24; 20, if mobility is impossible to assess.

Figure 2. Anxious, postoperative patient.
Courtesy Holly Killian, CVT

SUBJECTIVE PAIN ASSESSMENT

Practical clinical experience is one of the most effective ways to become adept at pain assessment. Signs of pain vary greatly among individual patients, and differences in pain expression may be subtle and difficult to evaluate without sufficient experience or knowledge.[1]

Clinical experience is also valuable because some signs of pain must be assessed by touch (tactile versus visual assessment). For example, tenseness of the abdomen is best assessed with gentle palpation.

In the hospital setting, particularly 24-hour facilities where patients may be monitored by several different veterinarians and veterinary technicians, it becomes vital to:

- Discuss pain assessment for each patient among the practice team
- Have the same individual, as often as possible,

Figure 3. *Painful, postoperative thoracotomy patient; note the facial expression with grimace and furrowed brows.* Courtesy Holly Killian, CVT

Figure 4. *Patient from Figure 3 resting more comfortably after a dose of analgesics.* Courtesy Holly Killian, CVT

make serial assessments of a patient's pain to reduce the possibility of interobserver variability.
- Develop a specific pain assessment protocol that allows all personnel to use the same parameters to assess patient pain.

Visual Pain Assessment
Prior to Examination
- The patient should be evaluated from a distance prior to handling to avoid changes in behavior resulting from human proximity.[15,16]
- While observing, the respiratory rate and pattern of breathing should be noted.
- Posture, facial expression, position of ears, and tenseness of body should all be observed as they may change significantly once the caregiver interacts with the patient.

Examination Room
- In an examination room setting, it may be beneficial to observe and examine the patient both with and without the owner present. For example, animals that are frightened or suffer from separation anxiety may be easiest to examine with the owner in the room.
- Pet owners should be asked about their animal's normal behavior at home and how they have reacted to pain previously. This allows better pain assessment during physical examination and hospital stay.

In the Hospital
- Some hospitalized patients will let down their guard and allow signs of pain to be observed.
- However, there are many that never relax while hospitalized, and subsequently are much more difficult to accurately assess.
- There are also animals that maintain their inherent

survival mechanism, which causes them to hide any sign of weakness, including pain. These stoic dogs can appear deceptively relaxed and comfortable, despite being in significant pain.

Physical Examination
A thorough physical examination should be performed after the initial visual examination. However, the importance of physical examinations to assess patient pain must be balanced against the possibility of causing a patient further stress with repeated handling.
- Gentle and compassionate handling of the patient during the examination is vital, particularly if patient pain is anticipated.
- Potentially stressful procedures, such as checking rectal temperature, should be performed at the end of the examination, if possible.
- If the source of pain is already known, the rest of

Figure 5. *A patient resting comfortably in the hospital*

the examination should be completed before assessing it; however, if the source of pain is unknown, potential causes should be determined prior to further examination.

Physiologic Changes

Pain, which causes increased stimulation of the sympathetic nervous system, results in many physiologic changes reflected in physical examination findings. These changes include:[20]

- Elevated heart rate
- Elevated body temperature
- Elevated respiratory rate +/- increased respiratory effort.

However, these parameters may be altered due to factors, such as anxiety, surgery complications, or clinical conditions (eg, hypotension). If physiologic changes continue once pain is adequately controlled, other causes should be considered.

Tactile Pain Assessment

Several signs of pain can be detected by tactile manipulation. Eliciting pain through palpation of affected body parts may be the only way to recognize that pain exists.

- Most animals will vocalize or show obvious signs of discomfort when the affected area is manipulated.
- Gentle yet thorough abdominal palpation can be extremely useful in detecting focal pain, particularly in conditions, such as pancreatitis, renal pain caused by pyelonephritis or nephroliths, gastrointestinal obstructions, or urethral obstructions.
- Musculoskeletal pain can be detected by a thorough orthopedic examination, including superficial and deep palpation of the muscle and bone, flexion, extension, and range of motion assessment, particularly in the limbs, to identify signs of swelling or joint effusion.

SPECIFIC CHALLENGES OF PAIN ASSESSMENT

Due to variability in each animal's expression of pain, pain assessment in veterinary patients can be very challenging. Signs of pain need to be evaluated in the context of patient history, physical examination, and laboratory findings.

A stoic animal in which pain is suspected but difficult to identify should still be treated appropriately, especially if the disease process or procedure warrants it. Response to therapy can serve as a diagnostic tool for pain assessment, especially if improvement in the

patient's demeanor or posture is noted.

Some signs of pain discussed earlier are subjective and not specific. Several other conditions can cause these signs in patients. Some of the more commonly encountered examples include:

- **Elevated heart rate, temperature, blood pressure, or respiratory rate/effort:** Caused by a plethora of systemic conditions and the least specific indicators of pain in veterinary patients.[20-24]
- **Vocalization:**
  - » Many dogs will whine or whimper quietly in a rhythmic pattern when painful. Loud barking or howling is usually related to anxiety, dysphoria, need to urinate/defecate, or need for attention.
  - » However, rhythmic whining may also be noted in, for example, patients that need to have their urinary bladder expressed or those suffering from opioid-induced dysphoria.
  - » It can be very difficult to differentiate dysphoria or anxiety from true pain. Often, administering a mild sedative will help resolve dysphoria. Switching analgesics or altering doses may also help distinguish true pain from dysphoria.
  - » Dysphoric animals usually do not respond to interaction with caregivers; however, painful animals usually do.
- **Trembling:** May be caused by pain or anxiety; in the authors' clinical experience, certain dog breeds, such as Yorkshire terriers or Chihuahuas, have an increased tendency to tremble even when healthy and pain free.
- **Pupillary Dilation:** Can have multiple etiologies in addition to pain, including various neurologic conditions that involve cranial nerve abnormalities or administration of pharmacologic agents, such as opioids (in cats) or atropine and other mydriatics.

SUMMARY

Accurate pain assessment is becoming a vital prelude to appropriate and adequate pain management. Pain recognition and management, therefore, become essential steps toward our goal of delivering compassionate, humane, and scientifically sound medicine for the animals in our care. ■

CMPS = Glasgow Composite Measure Pain Scale; CMPS–SF = Glasgow Composite Measure Pain Scale–Short Form; VAS = visual analog scale

References
1. Hellyer P, Rodan I, Brunt J, et al. AAHA/AAFP pain management guidelines for dogs and cats. *J Fel Med Surg* 2007; 9(6):466-480.
2. Matthews KA. Pain assessment and general approach to management. *Vet Clin N Am Small Anim Prac* 2000; 30:729-755.

PAIN ASSESSMENT IN CATS

Accurate pain assessment in cats can be challenging. Physical examination findings indicative of pain may include:

- Negative reaction when a painful area is palpated
- Vocalizing
- Trying to escape
- Growling
- Scratching or biting.

Cats that are seriously ill or more subdued may only flinch when a tender area is touched, while others may be so fractious and difficult to handle that ascertaining their pain is almost impossible.

Behavior

If possible, owners should be asked about the cat's usual behavior and attitude in the clinic/hospital setting. When a cat that historically has a mild temperament, even in the clinic, is fractious, growls, or attempts to bite when approached, it may be an indicator of discomfort or pain (eg, urethral obstruction).

When left alone, a painful cat usually curls up and remains withdrawn and quiet. Respiratory rate may increase with pain, but this may be the only obvious visual sign, apart from lack of interest in surroundings and decreased interactivity.

Posture

Painful cats tend to remain confined to a small area, usually in one position. Nonpainful cats have a pose that is relaxed in a subtle way in comparison to the somewhat stiff, tense posture of a painful cat.

Painful cats may also have a tendency to hide, but this is nonspecific as healthy cats also tend to hide, particularly in unfamiliar hospital surroundings. Some painful cats may bite at themselves and attempt to mutilate the affected area, or may run around frantically, often backing up in an apparent attempt to escape the pain, while others may lay still in response to severe pain and even purr.

Table 2 lists the most common signs of pain in cats.[15,16,18,22]

Table 2. Signs of Pain in Cats

Category	Clinical Signs
Attitude/Mentation	• Usually withdrawn; may become aggressive • Absence of normal behaviors, such as grooming
Body Movement	• May tremble if in extreme pain • Usually flinch when painful area is touched even lightly
Guarding	• Often guard painful area by hissing, swatting, or biting
Posture	• Remains in the same position for long periods of time • Stiffly sits sternal, with head tucked under or laying flat • If curled up, may have stiff, "hunkered down" appearance
Respiratory Pattern	• Sometimes tachypneic
Vocalization	• Meowing mournfully • Purring

3. Wiseman-Orr ML, Nolan AM, Reid J, et al. Development of a questionnaire to measure the effects of chronic pain on health-related quality of life in dogs. *Am J Vet Res* 2004; 65(8):1077-1084.
4. Cambridge AJ, Tobias KM, NewberryRC, Sarkar DK. Subjective and objective measures of postoperative pain in cats. *JAVMA* 2000; 217(5):685-690.
5. Hellyer PW, Uhrig SR, Robinson NG. Canine acute pain scale and feline acute pain scale. Colorado State University Veterinary Medical Center, 2006.
6. Hellyer PW, Gaynor JS. Acute postsurgical pain in dogs and cats. *Compend Contin Educ Pract Vet* 1998; 20:140-153.
7. Firth AM, Haldane SL. Development of a scale to evaluate postoperative pain in dogs. *JAVMA* 1999; 214:651-659.
8. Jensen MP, Chen C, Brugger AM. Interpretation of visual analog scale ratings and change scores: A reanalysis of two clinical trials of postoperative pain. *J Pain* 2003; 4(7):407-414.
9. Holton LL, Scott EM, Nolam AM, et al. Comparison of three methods used for assessment of pain in dogs. *JAVMA* 1998; 212:61-66.
10. Hudson JT, Slater MR, Taylor L, et al. Assessing repeatability and validity of a visual analogue scale questionnaire for use in assessing pain and lameness in dogs. *Am J Vet Res* 2004; 65(12):1634-1643.
11. Welsh EM, Gettinby G, Nolan AM. Comparison of a visual analog scale and a numerical rating scale for assessment of lameness, using sheep as the model. *Am J Vet Res* 1993; 54:976-983.
12. Holton L, Reid J, Scott EM, et al. Development of a behavior-based scale to measure acute pain in dogs. *Vet Rec* 2001; 148:525-531.
13. Morton MC, Reid J, Scott EM, et al. Application of a scaling model to establish and validate an interval level pain scale for assessment of acute pain in dogs. *Am J Vet Res* 2005; 66:2154-2166.
14. Reid J, Nolan AM, Hughes JML, et al. Development of the short-form Glasgow Composite Measure Pain Scale (CMPS-SF) and derivation of an analgesic intervention score. *Anim Welf* 2007; 16(S):97-104.
15. Sackman J. Pain management. In McCurnin DM, Bassert JM (eds): *Clinical Textbook for Veterinary Technicians*, 5th ed. Philadelphia: WB
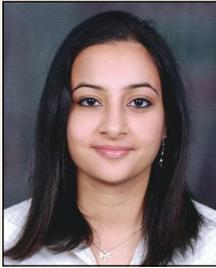
Anusha Balakrishnan, BVSc, is a first-year resident in small animal emergency and critical care medicine at University of Pennsylvania School of Veterinary Medicine. Her special interests include sepsis, shock, and coagulopathies. Dr. Balakrishnan received her veterinary degree from Madras Veterinary College (India), followed by a small animal rotating internship at University of Wisconsin–Madison School of Veterinary Medicine.

Elana M. Benasutti, CVT, has been a critical care nurse in the Intensive Care Unit of the University of Pennsylvania Matthew J. Ryan Veterinary Hospital for 10 years. Prior to her current position, Ms. Benasutti was an ultrasound technician in the radiology department. She recently wrote a chapter for Advanced Monitoring and Procedures for Small Animal Emergency and Critical Care, edited by Jamie M. Burkitt and Harold Davis. Ms. Benasutti is a graduate of Harcum Junior College in Bryn Mawr, Pennsylvania. In addition to small animal veterinary medicine, she also pursues an interest in dairy farming.

Saunders, 2002, p 512.

16. Orskov T. Pain assessment in cats and dogs. *Irish Vet J* 2010; 63(6):362-364.

17. Brodbelt DC. Anesthesia and analgesia. In Lane DR, Cooper B (eds): *Veterinary Nursing*, 2nd ed. Philadelphia: Elsevier Butterworth-Heinemann, 1999, p 637.

18. Hansen B. Pain and pain management. In Fenner WR: *Quick Reference to Veterinary Medicine*, 3rd ed. Baltimore: Lippincott Williams and Wilkins, 2000, pp 45-47.

19. Mathews KA. Non-steroidal anti-inflammatory analgesics for acute pain management in dogs and cats. *Vet Comp Orthop Traumatol* 1997; 10:122-129.

20. Holton LL, Scott EM, Nolan AM, et al. Relationship between physiologic factors and clinical pain in dogs scored using a numerical rating scale. *J Small Anim Prac* 2008; 39(10):469-474.

21. Conzemius MG, Brockman DJ, King LG, et al. Analgesia in dogs after intercostal thoracotomy: A clinical trial comparing intravenousbuprenorphine and intrapleuralbupivicaine. *Vet Surg* 1994; 23:291-298.

22. Smith JD, Allen SW, Quandt JE, et al. Indicators of postoperative pain in cats and correlation with clinical criteria. *Am J Vet Res* 1996; 57:1674-1678.

23. Sammarco JL, Conzemius MG, Perkowski SZ, et al. Postoperativeanalgesia for stifle surgery: A comparison of intra-articularbupivicaine, morphine or saline. *Vet Surg* 1996; 25:59-69.

24. Conzemius MG, Hill CM, Sammarco JL, et al. Correlation between subjective and objective measures used to determine severity of postoperative pain in dogs. *JAVMA* 1997; 210:1619-1622.