Reviewing pain assessment and scoring models in cats and dogs – part one

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Categories : RVNs

Date : April 1, 2014

Stacey Crompton RVN, He, DipCVN, AVN, in the first of a two-part article, looks at literature and research into the various tools used for pain identification and severity in these companion animals

Summary

THERE is increased awareness within the veterinary profession of the importance of good management of postoperative pain (Slingsby and Waterman-Pearson, 1998; Morton et al, 2005). Potential complications with the patient may arise if pain is uncontrolled. This uncontrolled pain may result in the animal becoming anorexic, and in negative changes to biological and physiological aspects, including negative behavioural changes (Logan, 2007).

Methods for evaluating pain postoperatively in animals may prove to be difficult. The inability of patients to accurately express their feelings of pain or suffering increases the duty of care of those who undertake this responsibility. Morton et al (2005) and Robertson (2007) have stated veterinary clinicians should produce valid, reliable pain assessment tools for patients that are incapable of self-reporting. This would include animal patients in veterinary practices.

PAIN has been referred to as the fifth vital sign in humans, and measuring it has been an evolving process (Mathews, 2000). Hellyer and Gaynor (1998) and Robertson (2007) have similarly stated pain should be thought of as the fourth vital sign to all patient evaluations.

People are thought of as advocates for animals and, therefore, have a duty to ensure the patients have the right to inform veterinary staff they are suffering with pain. However, this can only be recognised or measured with appropriate clinical examinations and the assessor must be knowledgeable in pain recognition.

According to Morton et al (2005), methods for scoring pain in animals have been restricted to the use of three subjective rating scales originally developed for human use:

• the simple descriptive scale (SDS);

• the numeric rating scale (NRS); and

• the visual analogue scale (VAS).

However, there have been numerous pain scoring systems that have been used successfully in recognising pain. Lascelles (2004) has suggested these scales may simply be measures of how well the postoperative behaviour of dogs or cats fits the author's preconceived expectations for what constitutes paininduced behaviour. Holton et al (1998) has stated in agreement that the scales mentioned have been unreliable in the measurement of acute pain in dogs.

Pain scoring systems should, however, still be an integral part of an animal's postoperative evaluation, despite the problems that can occur with them (Robertson, 2007). With all this variation in the different opinions of assessing pain postoperatively in patients, the author will review the literature within this area of pain assessment and pain scoring postoperatively in patients.

Importance

There is growing interest by veterinary clinical specialists to explore the nature of how an animal reacts to pain and how best to treat it (Hansen, 2003). Hansen (2003) continued to discuss that recognition of pain and pain assessments have always been an integral part of animal care and veterinary clinical practice. Morton et al (2005) are, however, in disagreement by stating that although pain assessment was a previously neglected area it is now well recognised in veterinary medicine that optimal patient care includes the management of pain.

Pain assessment in animals has been conducted mainly to increase the understanding of the mechanical act of pain in reference to humans. The growth of veterinary clinical studies, however, has increased the interest in pain assessment studies in animals, for their benefit.

Most pain assessment scales have been initially developed for humans and then adapted for animal use. This may be thought of as a barrier in creating the perfect pain scoring scale for animals (Carsten et al, 2008).

With this factor considered when assessing pain in animals, its measurement has been the subject of much debate. However, the need to measure this important vital sign has been acknowledged and a number of different methods have been used to assess pain in animals. Holton et al (1998) observed the most commonly used methods rely on subjective observations of the animal's behaviour in the form of pain scoring scales.

Silka et al (2004) performed a human research study on verbal pain scores after research demonstrated an inadequacy and infrequency of analgesic administered to patients with painful conditions. The study concluded using a pain scoring system improved analgesia administration patterns for trauma patients in the emergency department.

Physiological factors

Physiological factors may be considered a very important aspect in aiding pain assessment, including changes in heart rate, respiratory rate, pupil dilation, increases in body temperature and changes to the patient's blood pressure. The physiological factors mentioned are most commonly cited as indicators of pain in literature; however, very little research has been undertaken to investigate the validity of these factors in pain assessment.

A clinical research study came to the conclusion findings of heart rate and respiratory rate were not useful indications of pain in hospitalised dogs. They also confirmed pupil dilation would not be a useful tool in the assessment of pain (Holton et al, 1998).

The objective parameters such as heart rate, respiratory rate and body temperature have not consistently been correlated with postoperative analgesia administration and pain assessment is often based on behavioural indicators (Smith et al, 1996 and 1999; Cambridge et al, 2000). Physiological values when assessing pain have been found to be unreliable. However, it is thought these would enhance pain assessment in some cases of pain recognition.

As physiological factors during pain assessment were found to be unreliable, Lascelles et al (1998) stated that with respect to pain assessment in animals, simple observation is an inadequate method of appraisal. Most research regarding pain assessment in humans who are incapable of self-reporting has been undertaken in neonates. The methods used rely on changes in behaviour, including a method of behavioural measurement.

Morton et al (2005) discussed the methods of scoring pain in the veterinary field and concluded measurement of pain has mainly been restricted to the use of three one-dimensional subjective rating scales. They were developed for human use and adapted for their use in animals, and include the SDS, NRS and VAS; however, they have been shown to be unreliable in veterinary settings.

Behaviour

Behaviour scoring is widely used in analgesic research, with studies using the VAS system to assess analgesia requirements and sedation. Therefore, this method of pain assessment is the most commonly used scoring system for postoperative pain management in animals. The VAS is a 100mm line with one end representing “no pain” and the other end representing “the worst possible pain”.

Holton et al (1998) criticised the VAS scoring method as being influenced by the visual and motor coordination of the observer, reducing the ability of users to accurately place a mark on the line. This may result in errors of up to 7mm being reported. Grant (2006) and Tranquilli et al (2004) have stated in agreement that the VAS may allow for over-interpretation and users would require training and experience in its successful use.

Stanway et al (2002) are in disagreement by explaining all pain scoring is performed by an observer and difficulties with placing the mark on the VAS line were unlikely to be a problem. They overcame this problem by allowing the operator to become familiar with the scoring system prior to the start of the assessment. VAS models have been used widely in veterinary studies and is said to allow a greater degree of sensitivity along with similar repeatability (Holton et al, 1998).

However, Tranquilli et al (2004) disagreed with this statement stating the NRS is usually more repeatable when used by multiple observers. Previous work on pain scales in human and veterinary studies have shown the NRS of assessment to be useful, and the ability to differentiate easily between relatively small variations in pain have been demonstrated.

Grant (2006) has described the NRS as being very similar to the VAS; however, the observer assesses the patient and then chooses a rating of pain on a scale of 0 to 10 or 0 to 100, rather than using a mark on a line. The NRS is commonly chosen for its use on pain scoring in animals and it has also been used extensively in the measurement of pain in human medicine.

Holton et al (1998) agreed and stated it was said to take the adequate middle ground between the lack of sensitivity of the SDS and the difficulty of using the VAS. Holton et al (1998) continued to describe an NRS as one of the most commonly used methods of scoring pain that is based on subjective observation of an animal’s behaviour.

Morton et al (2005) agreed with this statement, however continued to explain that these scaling models have been shown to be unreliable. Morton et al (2005) applied a scaling model to establish and validate an interval level pain scale in the assessment of acute pain in dogs. An NRS was used as one of the methods and it was found it was advantageous in that it takes an animal’s behaviour into consideration when assessing pain.

In contrast, it is thought the behaviour aspect of an animal’s pain may well be affected by sedation or recovery from general anaesthesia. This should be taken into consideration when assessing for pain in patients recovering from general anaesthesia, that are critically compromised or where

administered medication has sedative affects. Hansen (2003) has stated certain abnormal behaviour of animals may occur too rarely to be of much use when assessing pain, whereas other behaviour of animals could occur at high frequencies, indicating the need for intervention.

Other scales

A variable rating scale (VRS) may also be used in assessing pain postoperatively. However, literature including research articles about use of this method is uncommon. The VRS incorporates physiological data collection, including heart rate, respiratory rate, pupil size and rectal temperature when assessing for pain as well as the patient's behaviour.

Grant (2006) described the system as a sensitive and reliable method despite different assessors using the system. A number is chosen from the scale dependent on the definition or description of pain being experienced by the patient. These numbers will provide an overall total score once the pain assessment is complete.

A dynamic and interactive visual analogue scale (DIVAS) may be described as a modified VAS that incorporates an interactive dynamic assessment. The patient is first observed undisturbed, proceeding to the animal's response to approaching, handling and palpation, and a walking assessment is also performed. Similar to the VAS, a mark is then made on a 100mm line.

Grant (2006) has explained pain may proceed undetected if purely observation with no interaction is used to assess a painful patient. Because of this factor the DIVAS is generally considered inherently more sensitive than the SDS. With respect to pain assessment in animals, simple observation is an inadequate method of appraisal (Lascelles et al, 1998).

Shih et al (2008) concluded animals would often have a low pain score when visual observation only was used. The animal's discomfort was not detected until an assessor performed the second phase of the pain score, which included interaction and phase III palpation of the wound. The DIVAS III measurement was always higher than DIVAS I. This research emphasises the importance of interacting with the patient for a complete assessment, otherwise painful animals may go unnoticed.

A study by Mathews (2000) concentrated on looking at chronic pain in humans. This indicated that a 10 point to 20 point scale provided sufficient levels of information to describe pain intensity. However, the most basic pain scoring system in veterinary medicine is the SDS. These scales usually have three to five grades of choice that are defined by a short description.

Grant (2006) explained the easy use of the scale, but the negatives included the huge variation that different assessors may experience when scoring animals and the lack of sensitivity to "jump" from one number to another without detecting small changes in the patient's pain intensity.

SDS can be described as having a benefit of using a multifactorial pain scoring system. This would ensure several different particular pain behaviours of patients are included in the pain assessment, then the pain score numbers are added together to provide an overall pain score. Waterman-Pearson (1999) agreed that a useful way to assess pain is to use an SDS, as this would combine visual appraisal, interaction with the patient and palpation of the painful area, incorporating multifactoral pain scoring systems.

The Glasgow composite pain scale (GCPS) is another method for the assessment of acute pain in animals (Grant, 2006). It is based on the McGill pain questionnaire used in humans and consists of six sections that include assessment of different behavioural aspects of animals. This includes assessing any vocalisation of the patient, if there is any attention to the painful area, patient mobility, response to palpation and touch, demeanour and the patient's posture within the kennel area.

Grant (2006) explained the GCPS is very similar to the VRS in that the score from each section is added to provide an overall pain score for the animal concerned. The GCPS is the only scale validated for use in the assessment of acute pain in dogs.

Murrell et al (2008) has stated the GCPS is a reliable clinical tool to define different pain intensities and a change in pain score over time in dogs undergoing a variety of surgical procedures. However, Valtolina et al (2009) have suggested it can be particularly difficult to assess pain in dogs that are critically ill because systemic disease may obtund normal behavioural signs of pains. Despite this, Valtolina et al (2009) performed a study using this pain scale and included critically ill patients within the study.

The Melbourne pain scale (MPS) is similar to the GCPS in that it involves observations in several categories with a score for each category. However, behavioural and physiological assessments are considered. Hansen (2003) referred to the MPS as an effort to improve on the simplicity of the VAS system.

It has been negatively reported that user problems may occur in that the observer using the VAS pain scale is highly likely to disagree with other users regarding accurately placing a mark on the line to show the pain score.

Grant (2006) clarified that when the MPS was applied to dogs following ovariohysterectomy, it showed good agreement between different users, concluding it looked very promising for use in future clinical practice.

Hansen (2003), however, suggested if the MPS was applied to dogs post-surgery they would have been assigned a low pain score because the scale would not have captured the correct information. Hansen (2003) continued to provide an example – in postlimb amputation the dog may lie quietly, be unwilling to move, fail to eat and appear very depressed. A total score of four out of

27 may have been recorded for this particular patient.

The literature review will continue in the next article and discuss pain assessment with the views of other authors, including a conclusion, recommendations for implementing a pain scoring system in veterinary practices and recommendations for further study on the use of pain scoring models.

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Physical interaction with the patient on a regular basis must be performed to gain an accurate overall pain score.

The inability of patients to accurately express their feelings of pain or suffering increases the duty of care of those who undertake this responsibility.

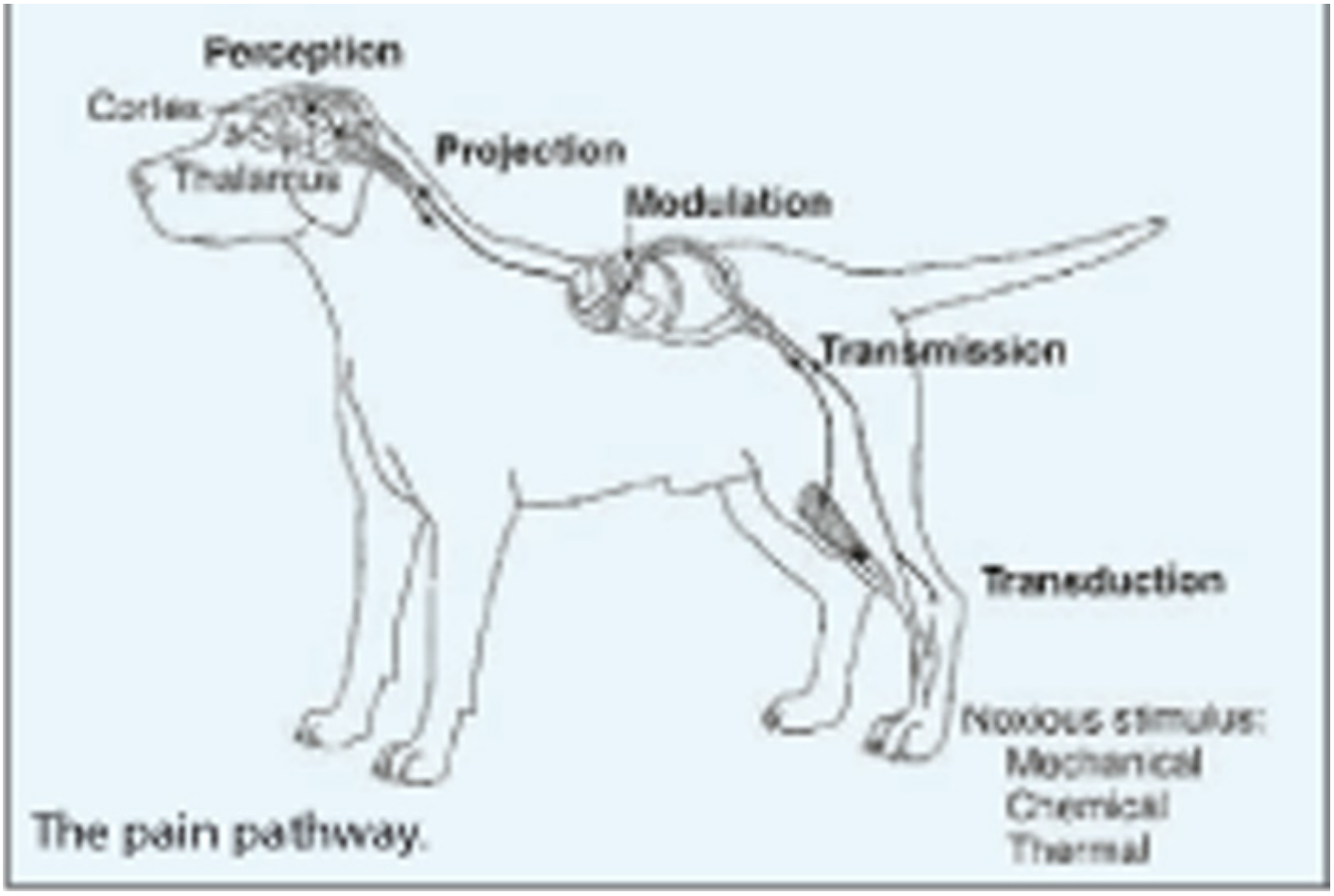
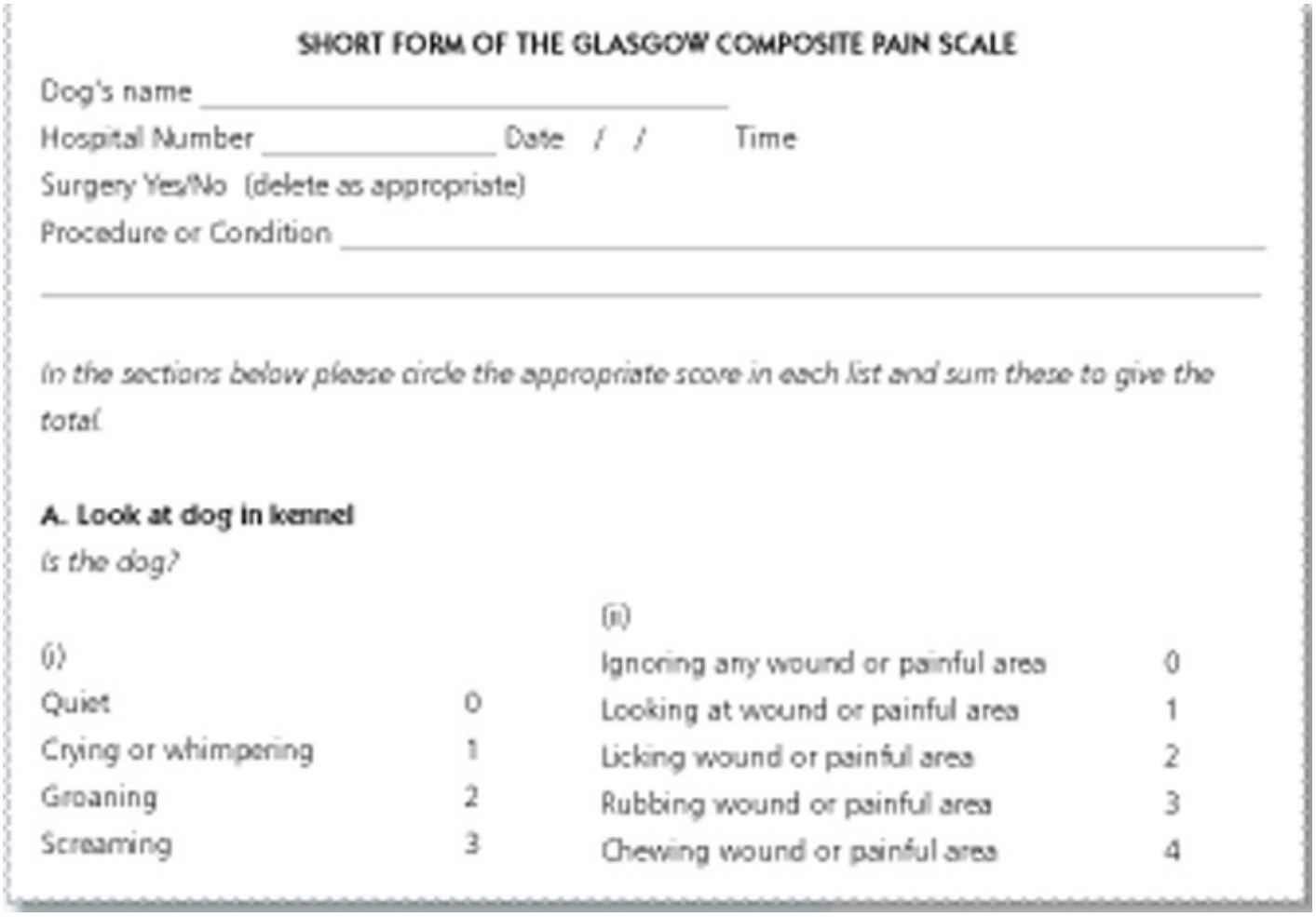


IMAGE: Reproduced with permission from *The Handbook of Veterinary Pain Management.*

If pain scoring a patient, observation of the patient out of the kennel area must be performed, observing its mobility.



SHORT FORM OF THE GLASGOW COMPOSITE PAIN SCALE

Dog's name _____

Hospital Number _____ Date / / Time

Surgery Yes/No (delete as appropriate)

Procedure or Condition _____

_____

In the sections below please circle the appropriate score in each list and sum these to give the total.

A. Look at dog in kennel

Is the dog?

(i)		(ii)	
Quiet	0	Ignoring any wound or painful area	0
Crying or whimpering	1	Looking at wound or painful area	1
Groaning	2	Licking wound or painful area	2
Screaming	3	Rubbing wound or painful area	3
		Chewing wound or painful area	4

SHORT FORM OF THE GLASGOW COMPOSITE PAIN SCALE (GCPS)