Pain assessment in animals

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Attitudes to pain in animals have changed dramatically over the past two decades, with marked advances in its treatment. However, while the importance of measuring animal pain in a valid and reliable manner has been acknowledged for some time, veterinary scientists have been slow to recognise the important contribution of the psychometric approach to the construction of measurement instruments. Well-established in human medicine, psychometric methods, which ensure that the end product is valid, reliable and, where required, responsive to clinical change, are the ‘gold standard’ in instrument design.

In addition to discussing the particular challenges veterinary scientists face when designing instruments to measure pain in animals, this article describes the psychometric approach and, using the dog as an example, demonstrates how this approach can be used to produce scientifically robust pain scales for non-human species.

Pain is a complex multi-dimensional experience involving sensory and affective (emotional) components. In other words, ‘pain is not just about how it feels, but how it makes you feel’ and it is those unpleasant feelings that cause the suffering we associate with pain. It is a uniquely personal experience, which means that it is impossible for us to appreciate how it is perceived by another person or animal, but most scientists now believe that we should assume animals suffer pain in a similar way to ourselves. Some would go even further. In 1985 Rollin suggested that pain produces more suffering in animals than it does in people because animals do not understand why it occurs and Robertson (2002) added that an animal’s inability to anticipate relief from pain also contributes to that additional suffering.

At its simplest, pain is classified as either acute or chronic. Acute pain is generally associated with tissue damage or the threat of this and serves as a result of ill health and/or medical interventions such as osteoarthritis and the authors have shown that chronic pain may have a similar negative effect in animals as it does in people, thus affecting the patient’s HRQoL. Quality of life is a general term, but when QoL is altered significant negative impact on the HRQoL of dogs suffering from this condition (unpublished results).

Challenges of measuring pain

Psychometric methodology

The psychometric approach requires that measurement instruments demonstrate the psychometric properties of validity, reliability, and responsiveness to change, before being adopted for clinical use, and offers a range of methods for such evaluation. The processes necessary for the creation and testing of psychometric instruments are well established and may be described in three phases.

■ Phase 1 involves the specifying of measurement goals, the identification of the patient population, and the development of a pool of potential items (questions) for inclusion in the instrument.

■ Phase 2 involves the selection of suitable items from the item pool, and the development of a pool of potential items (questions) for inclusion in the instrument.
Companion animal

Fig 2: The Simple Descriptive Scale (SDS), Numerical Rating Scale (NRS) and Visual Analogue Scale (VAS) used to measure pain in companion animals.

Unidimensional Pain Scales

**Fig 2: The Simple Descriptive Scale (SDS), Numerical Rating Scale (NRS) and Visual Analogue Scale (VAS) used to measure pain in companion animals.**

**Box 1: Descriptive statement that accompanies the CMPS-SF scores**

**Inter-rater reliability** — when two or more observers concurrently applying the instrument to the same subject should provide similar scores — is an important kind of reliability.

**Responsiveness**

Responsiveness is the property that ensures that the instrument is sensitive enough to detect differences in health status that are not only statistically important, but are also important to the clinician or to the owner. In the case of pain, if a pain scale can detect relatively small changes in pain state before and after analgesic administration, that is an indication that it is responsive.

In addition to possessing the fundamental properties of validity, reliability and responsiveness, a good clinical instrument must also be practical and easy to use and interpret. Even if a measure is valid and reliable, it may not be acceptable to the individual whose pain is being measured or whose life style is being changed, in part or in whole, as a result of using the instrument. Consequently, if the user’s judgment can be affected by factors such as age, gender, personal health and clinical experience. For example, when scoring a dog that has undergone surgery for cruciate ligament repair, a veterinarian who has undergone similar surgery him or herself may be inclined to score the pain more severely than one who has not. Similarly, women tend to score the pain more severely than one who has not.

**Psychometric properties**

**Validity**

This is fundamental to the use and interpretation of any instrument and, where possible, age and breed population norms should be available for comparison. How an animal feels about its situation will vary with its breed, age and individual circumstances. For example, the opportunity of a long romp on a windswept beach is likely to be perceived in one way by an energetic young Labrador retriever and may be perceived entirely differently by an elderly Cavalier King Charles spaniel that has been raised in a quiet home.

**Reliability**

Reliability is a measure of whether an instrument can measure accurately and reproducibly what it is intended to measure, so that measurements of individuals on different occasions when their condition is unlikely to change, or made by different observers at the same time, produce the same or similar results. If an instrument is to be used by an independent observer, then

Species, breed and individual differences

Behavioural disturbances have long been recognised as potential indicators of the presence of pain in animals, and in recent years these have been used to develop a range of ‘composites’ of instruments such as the tools developed in Glasgow for measurement of canine acute and chronic pain (Holton and others 2001, Reid and others 2007 and Wiseman-Orr and others 2004, 2006). Constructed using the psychometric methods described above (or similar), such instruments are designed to take account of the multidimensional nature of pain and to be more objective and so more reliable than the SDS, NRS and VAS.

However, it is important to bear in mind that each species manifests its own unique pain-related behaviours or behavioural disturbances, often rooted in the evolutionary process (eg, selection pressures may have ensured that prey species do not ‘advert’ in an obvious way to a predator) and so cannot simply be translated to another species. Consequently, a behaviour-based pain scale for the dog is not directly transferable to the cat, although the methodology used to construct each instrument is generic and can be applied to any species.

Over the past two decades the focus of human pain measurement has been on ‘how it makes you feel’ and, in a veterinary context, the importance to its welfare of how the animal feels is now widely recognised. However, how an animal feels about its situation will vary with its breed, age and individual circumstances. For example, the opportunity of a long romp on a windswept beach is likely to be perceived in one way by an energetic young Labrador retriever and may be perceived entirely differently by an elderly Cavalier King Charles spaniel that has been raised in a quiet home.

Many instruments to measure pain in animals have been developed on an ad hoc basis, but now there is growing support for rigorous methods to be applied to the development and testing of pain measures for use in veterinary medicine. These measures must be valid and reliable pain measurement tools. In this regard adoption of the psychometric approach is increasing. An example of an instrument development that has made use of psychometric methodology is the Glasgow Composite Measure Pain Scale (CMPS–SF), a clinical decision making instrument that measures acute pain in dogs. It has been developed for dogs in acute pain. It includes 30 descriptor options within six behavioural categories, including mobility. Within each category, the descriptors are ranked numerically according to their associated pain severity and the person carrying out the assessment chooses the descriptor within each category that best fits the dog’s behaviour at that time. It is important to carry out the assessment procedure as described on the questionnaire, following the protocol closely. The pain score is the sum of the rank scores. The maximum score for the six categories is 24, or 20 if mobility is impossible to assess. The total CMPS-SF score has been shown to be a useful indicator of analgesic requirement and the recommended analgesic intervention level is 6/24 or 5/20.

A number of questionnaire instruments designed to measure chronic pain and HRQL in companion animals are available. It is important providing evidence with a range of instruments to choose from, veterinary
practitioners should satisfy themselves that, for the one they choose, there is sufficient published evidence to support its appropriate construction, validity, reliability and responsiveness — the key properties of a scientifically robust measurement instrument.

Conclusion

The development of instruments to measure pain and HRQL is a time-consuming and complex undertaking, but it is essential. Paraphrasing Albert Einstein, ‘some things can be made simple, but only so much so before they lose meaning’. By adopting a rigorous methodological approach to constructing pain measurement instruments that assure their validity, veterinary practitioners can be more confident of managing and treating pain of all origins in animals under their care.

References


Further reading


Quiz: Pain assessment in animals

(1) For the following statement, select the answer that best completes the sentence. When used to measure acute pain in the dog, the visual analogue scale (VAS) is:

a. a multidimensional scale
b. effective at measuring the affective dimension of the pain
c. designed to measure pain intensity
d. used effectively to measure chronic pain
e. consistently reliable

(2) For the following statement, select the answer that best completes the sentence. The signs of chronic pain in animals:

a. are best assessed by the veterinary surgeon or nurse
b. stop when healing is complete
c. reflect the impact of the pain on the animal’s quality of life
d. are more obvious than those of acute pain
e. are the same in all species

(3) If two similarly qualified male vets and two female vets are asked to assess post-surgical pain in the same dog simultaneously, which of the following outcomes might you expect?

a. The scores are likely to be the same.
b. The men will tend to give higher pain scores than the women
c. The mens’ scores will vary more than those of the women
d. Inter-observer variability may be reduced by the use of a composite measure pain scale
e. A unidimensional scale would give the most reliable pain scores

(4) For the following statement, select the answer that best completes the sentence. An instrument to measure pain in animals that is reliable is one that:

a. measures what it was intended to measure
b. will give the same result when applied on different occasions to the same animal when that animal’s pain status is unchanged
c. will distinguish between different groups of animals, for example, a group of well dogs from a group of ill dogs
d. is easy to use
e. can detect differences in pain status

Answers:

b, c, d, e.