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# A look at chronic pain in cats

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**ABSTRACT:** Chronic pain is subtle and more difficult to recognise in both dog and cat patients. As veterinary nurses, we need to recognise both signs of chronic and neuropathic pain. Low-stress handling techniques should be employed with cats to reduce pain and distress that could exacerbate a pain state. While not many validated chronic pain scales are available for cats, assessment and recognition of feline chronic pain has been well described. Feline chronic pain conditions can be degenerative joint disease (DJD), non-DJD, nonmalignant pain and cancer pain. By learning about various feline chronic pain conditions and evidence-based treatments, we can alert our veterinarians quickly about changes that occur in the patient. One of our primary jobs is to educate owners about chronic pain to improve quality of life for our feline friends.

## Introduction

A previous article, "A look at chronic pain in dogs", dealt with chronic and neuropathic pain in our canine companions. That article explained definitions of chronic pain and ways to recognise it in canine patients. This article will deal with similar topics for our feline friends. Acute pain in cats may be easier to assess than chronic pain because changes in normal behaviours, including new behaviours such as escapism or the lack of common actions such as grooming, may be more obvious (Musk, 2014). Chronic pain may be more difficult to assess as the cat adapts to the condition and behavioural changes may be more subtle. As veterinary nurses, we are guided heavily by two documents published nearly simultaneously: World Small Animal Veterinary Association's Global Pain Council (Mathews et al., 2014) and the 2015 AAHA/AAFP Pain Management Guidelines for Dogs and Cats (Epstein et al., 2015). These two separate Task Forces drew remarkably similar conclusions on their recommendations, which were evidence-based insofar as possible, and where evidence was thin or mixed, represents a consensus of expert opinion. Once again, this article will not talk about neurophysiology of pain in cats. There is no direct link between the duration or intensity of injury which transforms acute transient pain into chronic pain (Mathews et al., 2014). However,

as with neuropathic pain, appropriate management of acute pain is essential to prevent establishment of chronic pain.

## Defining chronic pain in cats

Chronic pain is often defined as pain lasting greater than 3–6 months (Merskey & Bogduk, 1994; Grubb, 2010a). Chronic pain results from central and peripheral sensitisation in which pain is sustained after nociceptive inputs have diminished. The American Pain Society has tried to meld both views into a definition of chronic pain that states, "chronic pain has been defined as pain without apparent biological value that has simply persisted, or persisted beyond expected tissue healing time" (American Pain Society, 2001). Chronic pain is often pathological and untreated has a negative medical impact. Because of the physiological and psychological changes brought about by chronic pain states, chronic pain has been defined as a disease rather than just a symptom of a disease (Grubb, 2010b).

## A word about neuropathic pain in cats

Neuropathic pain is a subunit of chronic pain. A proposed definition is "pain arising as a direct consequence of diseases affecting the somatosensory system", with further clarification on the definition of "disease" that may be required

(Niv & Devor, 2006). The International Association for the Study of Pain (IASP) has revised the definition by the Neuropathic Pain Special Interest Group (NeuPSIG) of the IASP as “pain arising as a direct consequence of a lesion or disease affecting the somatosensory system” (Treede, Jensen, Campbell, et al., 2008). Neuropathic pain arises from pathology of the nervous system. It involves a true insult on the nervous system (Grubb, 2010b). There are three pivotal phenomena intrinsic to the development of neuropathic pain (Mathews, 2008):

1. Central sensitisation (i.e. the process of “wind-up” and the resulting transcriptional changes in dorsal horn neurons leading to altered synaptic neurotransmitter levels and numbers of receptors). This is happening in the spinal cord.
2. Central disinhibition (i.e. an imbalance between the excitatory and inhibitory sides of the nervous system. This imbalance can occur quickly or over time.
3. Phenotypic change of mechanoreceptive Ab-fibres (light touching) to produce substance-P, such that input from them is perceived as pain. The normal pain perception is changed into an abnormal process.

Multimodal analgesia will almost always be necessary and is recommended at least in the initial treatment of patients with mild to moderate pain and throughout therapy for patients with more severe pain (Grubb, 2010b). See **Textbox 1**.

▣ **Textbox 1.** Neuropathic pain in cats can stem from (Mathews, 2008)

- Neuropathic pain associated with trauma: accidental and surgical
- Pelvic fractures
- Limb nerve entrapment
- Amputation
- Spinal cord injury
- Intervertebral disc herniation
- Diabetic neuropathy
- Congenital/developmental lesions
- Inflammatory bowel disease (IBD)
- Pancreatitis/pancreatic pain
- Feline orofacial pain syndrome
- Feline hyperesthesia/self-mutilation syndrome
- Gingivostomatitis
- Feline idiopathic cystitis (FIC)

- Feline infectious peritonitis (FIP)
- Feline herpes
- Post amputation including onychectomy
- Degloving injury

## Low-stress handling techniques for cats

An excellent article can be found in Williams (2016). Because cats are not small dogs, they need to think that what is happening to them is something that they are allowing and not something that the veterinary personnel are forcing upon them. Take note of the patient’s posture and behaviour while providing low-stress examination techniques which include (Yin, 2009):

- Have toys and treats available for the patient
- Use distractions, food, praise, play and petting when appropriate
- Watch the patient’s body language
- Allow a cat to willingly come out of a carrier
- Avoid direct eye contact
- Examine the pet where they are comfortable. For cats, this could be in a carrier with the top off, using towel wrapping techniques, on your lap, or on the floor
- Make use of pheromone diffusers in exam rooms

## Fear, anxiety and stress (disruption of routine)

Stress is a state of threatened homeostasis where an individual is responding to something that is external (Clark, Rager, & Calpin, 1997). There is now sufficient evidence to show that it is not the physical nature of an aversive stimulus that has negative consequences on the animal but rather the degree to which the stimulus can be predicted and controlled (Amat, Camps, & Manteca, 2015). Thus, it has been suggested that the term “stress” should be restricted to conditions where an environmental demand exceeds the regulatory capacity of the organism, when such conditions include unpredictability and uncontrollability. In domestic animals, stressors can be conveniently divided into physical stressors, social stressors resulting from the interactions with individuals of the same species and stressors related to handling by humans. Per its duration, stress is classified as acute or chronic (Amat et al., 2015). If stress becomes chronic, a correlation has been

shown between stress and disease development (Meaney, Szyf, & Seckl, 2007; Weiss, 1972). It has even been shown that early-life stress produces muscle hyperalgesia and nociceptor sensitisation in the adult rat (Green, Chen, Alvarez, Ferrari, & Levine, 2011). The study showed that neonatal stress induces a persistent decrease in skeletal, but not cutaneous, mechanical nociceptive threshold and that this behavioural musculoskeletal hyperalgesia associated with changes in nociceptor function in muscle is associated with enhanced activity in muscle nociceptors, namely, a lowered mechanical threshold, and increased conduction velocity. Furthermore, this early-life stress produces hyperalgesic priming in skin as well as muscle. These changes provide the first demonstration of neonatal stress-induced changes in primary afferent nociceptor function, changes that could contribute to the enhanced nociception observed in this model of an adult pain syndrome induced by early-life stress.

## How stress and pain intersect

Pain and distress can be thought of in terms of a continuum of emotional and experiential states that may occur in an animal. Comfort represents a state of well-being, where the animal is contented and comfortable. Stressors acting upon the animal in increasing severity cause the animal to progressively become uncomfortable (discomfort), then stressed (stress) and finally distressed (Distress). Distress represents the extreme point in this continuum, on the far right. Stressors acting upon the animal may move the animal’s experience along this continuum between the extremes of well-being and distress. Depending on the nature and severity of a stressor and on the animal’s current state of being, the animal may adapt successfully to a stress (adaptive behaviours) or it may become distressed in a way that threatens its well-being or health (maladaptive behaviours). Maladaptive behaviours include abnormal feeding, absence or decreased grooming, and changes in social interaction (aggression, withdrawal).

A departure from an animal’s normal behaviour is an important indicator that it is undergoing pain and distress. Therefore, it is so important to be aware of an animal’s normal behaviour, both as a species and individually. Responses to stress differ widely within and among species, and oftentimes signs of pain and distress are subtle and can be difficult to detect. Some of the more easily recognisable signs are listed in **Textbox 2**.

### Textbox 2. Signs of pain and distress

- Changes in temperament or attitude; a friendly, docile animal becomes aggressive or unresponsive
- Restlessness; pacing, changing position frequently
- Decreased activity; reluctance to move, does not respond normally when approached
- Isolation; stays in the corner of the cage, does not interact with family members
- Change in posture; hunching, huddling, crouching, stiff movement, head down
- Protecting a part of the body; growls or attempts to bite when that body part is approached or touched
- Abnormal vocalisation, especially when a painful area is touched; whimpering, hissing, squealing, squeaking
- Change in appetite and water consumption leading to weight loss and dehydration
- Self-mutilation, excessive licking of the area, biting, scratching, rolling, kicking
- Changes in hair coat appearance; decreased grooming leading to rough-looking coat, greasy appearance, piloerection (hair erect), loss of hair (baldness, hair shafts broken)
- Changes in facial expression; sleepy appearance, avoidance of light
- Discharge from eyes (tears, pus, blood) or nose (runny)
- Changes in bowel movement or urination; diarrhoea with soiling around the anus, or lack of bowel movements (constipation)
- Sores, reddened areas on the skin, open wounds
- Increased body temperature
- Changes in respiration rate or character; rapid, shallow breathing

The use of feline-friendly handling techniques should help reduce these problems. Handling is most successful when the veterinary team adapts the approach to each individual cat and situation (Rodan et al., 2011). See **Textbox 3**.

### Textbox 3. Goals for use of feline-friendly guidelines

- Reduced fear and pain for the cat
- Reinforced veterinarian–client–cat bond, trust and confidence, and thus better lifelong medical care for the cat
- Improved efficiency, productivity and job satisfaction for the veterinary team
- Increased client compliance
- Timely reporting and early detection of medical and behavioural concerns
- Fewer injuries to clients and the veterinary team
- Reduced anxiety for the client

### Stressors to consider in a veterinary hospital (Robertson, 2016)

Many cats do not like being put in a carrier, nor do they enjoy the car journey required for transport. Cats may become extremely stressed when confined to a small cage, especially if there is no place to hide. Veterinary clinics tend to be chaotic and the stimuli and smells present may be overwhelming to a cat. If a cat has never encountered a dog before, the noise and smell can be extremely distressing. Inappropriate restraint and the stress of an unfamiliar environment can have a detrimental effect on cats; for example, distressed cats will have increased heart and respiratory rates, elevated blood pressure and elevated cortisol levels, and they may become anorexic and resent handling that is required for treatment purposes, resulting in suboptimal care. In addition, under these circumstances cats are more likely to retaliate. Cat bites and scratches are potentially serious injuries in humans. Try to avoid having cats wait in a busy waiting room with other animals. As soon as the cat arrives at the clinic, it is best to take it directly to a quiet and secluded area to wait. If sedation must be used, benzodiazepines such as alprazolam are preferred (0.25–0.5 of 0.25 mg tablet BID, start one day before travel) (Little, 2016). Another solution for sedation is Gabapentin the night before and morning of travel 50–100 mg/cat with 1 tablespoon wet food. Educate the owners that the cat may be sleepy, slow and ataxic (Petty, Robertson, & Goldberg, 2016).

### Feline facial pheromones

The use of a synthetic fraction of feline facial pheromones in a spray formulation has been assessed for its calming effect on cats in a veterinary clinic before intravenous catheterisation (Kronen et al., 2006). The cage was sprayed with Feliway® (Ceva Animal Health, LLC) or placebo and the cat was placed in the cage for 30 min. Cats were videotaped and their behaviour assessed by a blinded observer. The facial pheromone had additional calming effects in cats given acepromazine and, to a lesser degree, helped to calm cats that were not given acepromazine, and the authors concluded that Feliway® helps to calm cats in unfamiliar surroundings. In another study, significant increases in grooming and interest in food were found in cats exposed to facial pheromones compared with a placebo (Griffith, Steigerwald, & Buffington, 2000). The spray can be used in cages, on tables and blankets, and a diffuser can be used in the cat area of a clinic. All cats should be provided with a hiding place and if possible an elevated perch while hospitalised.

### Chronic pain assessment in cats

Chronic pain is of long duration, and is commonly associated with chronic diseases, e.g. degenerative joint disease (DJD), stomatitis and intervertebral disk disease (Mathews et al., 2014). It may also be present in the absence of ongoing clinical disease, persisting beyond the expected course of an acute disease process such as neuropathic pain following onychectomy, limb or tail amputation (Mathews et al., 2014). As cats live longer there has been an increased recognition of chronic pain associated with certain conditions, which has a negative impact on quality of life (QOL). Pain recognition is the basis of effective pain measurement and management. The behavioural changes associated with chronic pain may develop gradually and may be subtle, making them most easily detected by someone very familiar with the animal (usually the owner) (Mathews et al., 2014).

Chronic feline pain should be assessed and “scored” in some manner (e.g. using either a descriptive, numerical rating or visual analogue scale). Re-evaluation over time will help determine the impact of pain, and the extent of pain relief. See **Textbox 4**.



**Figure 1.** Typical stance of a cat with degenerative joint disease (DJD)  
Courtesy Dr Sheilah Robertson

**Textbox 4.** Categories for assessment of chronic pain in cats (Mathews et al., 2014)

- General mobility (e.g. ease of movement, fluidity of movement)
- Performing activities (e.g. playing, hunting, jumping, using a litter tray)
- Eating, drinking
- Grooming (e.g. scratching)
- Resting, observing, relaxing (how well these activities can be enjoyed by the cat)
- Social activities involving people and other pets
- Temperament

**Feline chronic pain scales**

Several standardised, multifactorial clinical measurement instruments (CMI) for chronic pain in cats exist, but there are many more for our canine companions. Such CMI are chronic pain indices that primarily utilise pet owner observations and input. A list of chronic pain scales for use in cats is available:

Feline Musculoskeletal Pain Index (FMPI): <https://cvm.ncsu.edu/research/labs/clinical-sciences/comparative-pain-research/clinical-metrology-instruments/>

Feline Quality of Life Scale: <http://pawspice.com/clients/17611/documents/FelineQualityofLifeScale.pdf>

Health Related Quality of Life Scale – Cats: Freeman et al. (2012); Lynch et al. (2011)

**Feline chronic pain conditions**

**Degenerative joint disease/ osteoarthritis**

Degenerative joint disease (DJD) is very common in cats, much more common than has typically been considered. Up to 90% of cats can have radiographic changes of DJD, growing more common in older populations (Clarke et al., 2005; Hardie, Roe, & Martin, 2002; Slingerland, Hazewinkel, Meij, Picavet, & Voorhout, 2011). It does not appear to be conformational, or completely wear-and-tear either. Because feline DJD is now recognised as a serious welfare problem, particularly in older cats, it should be assumed that a senior cat has some DJD, and every effort should be made to incorporate gentle handling techniques. The most frequently affected joints in cats appear to be the hip, stifle, tarsus, elbow, thoracolumbar and lumbosacral area. See **Figure 1**.

Common feline DJD signs are less about limping or difficulty getting up from a nap, but include a stiffness, a loss of fluidity to gait; grooming difficulties, inappropriate eliminations, less jumping, lower jumping (going from chair to table instead of directly up to table; and on getting down, sliding down with front paws

before making the leap). See **Textbox 5**. Have you noticed that older cats just don't like to be held or petted or stroked as much? They just seem to be achy all over, sometimes to the point of aggression, this probably represents a cutaneous discomfort as a manifestation of central hypersensitisation (Bennett, Zainal Ariffin, Johnston, & Johnston, 2012).

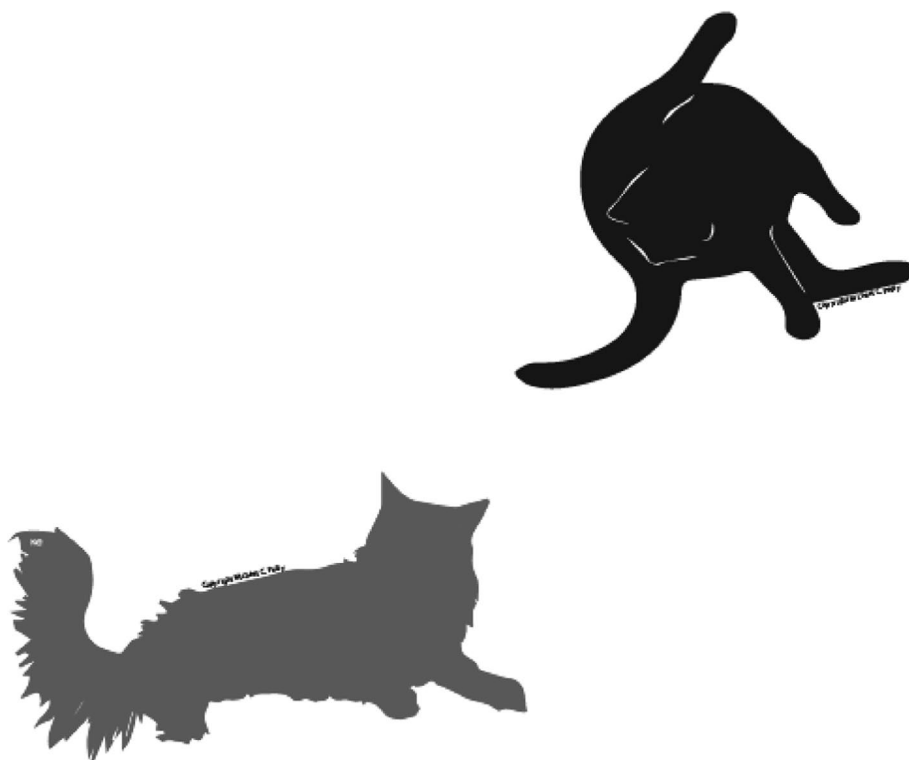
**Textbox 5.** Signs of chronic pain in cats

- Decreased grooming (see **Figure 1**)
- Reluctance to jump
- Inability or reluctance to climb or descend stairs (see **Figure 2**)
- Inability to jump as high as before (see **Figure 3**)
- Urinating and soiling outside the litter tray (see **Figure 4**)
- Increased or decreased sleep
- Avoiding human interaction (see **Figure 5**)
- Hiding
- Dislike of being stroked or brushed

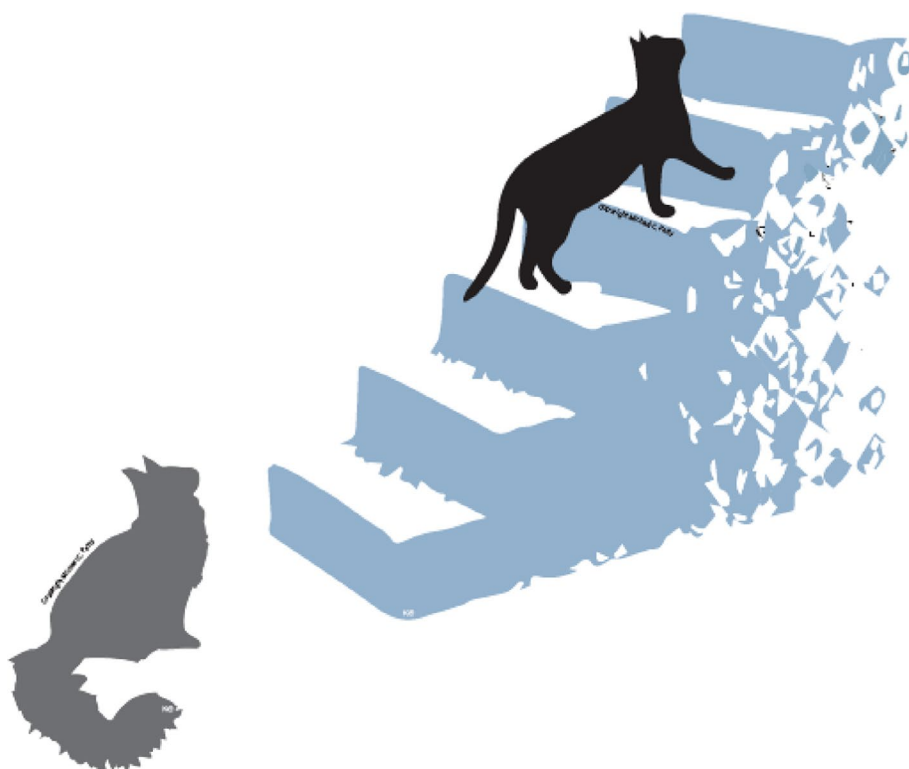
There are some excellent review papers about DJD or osteoarthritis (OA) in cats: Rychel (2010); Bennett, Zainal Ariffin and Johnston (2012a, 2012b); Harris (2013); Kerwin (2010); Lascelles and Robertson (2010).

**Risk factors that may increase DJD in cats (licatcare.org, 2016)**

- Genetics – certain breeds have an increased risk due to various underlying joint problems. This would include:
  - Hip dysplasia (abnormal development of the hip joints) seen especially in Maine Coon cats (but also Persians, Siamese and other breeds)
  - Patella luxation (dislocation of the knee cap) which has been reported more commonly in Abyssinian and Devon Rex cats
  - Scottish Folds are particularly prone to severe arthritis affecting multiple joints due to an abnormality of cartilage that occurs in the breed
- Injury or trauma – for example, fractures, dislocations and other joint injuries. These may cause abnormal joint conformation which can result in secondary osteoarthritis
- Obesity – there is no evidence that this causes arthritis, but it is likely to exacerbate an existing condition



▣ **Figure 2.** Reluctance or inability to groom  
Courtesy Dr Michael Petty



▣ **Figure 3.** Hesitancy or inability to climb or descend stairs  
Courtesy Dr Michael Petty

- **Acromegaly** – this is an unusual condition of older cats where a tumour in the pituitary gland secretes too much growth hormone. Affected cats usually develop diabetes mellitus, but some also develop secondary arthritis in their joints.

#### **Management of DJD in cats**

**Weight optimisation** – this is a chief strategy for management of DJD. Adipose tissue is a major endocrine organ, and most of the substances that it secretes into the circulation are pro-inflammatory cytokines, which infiltrate the synovium

of the joint and dorsal root ganglia and contribute to DJD pathology and neurologic sensitisation (Epstein, 2013). In cats, obesity led to a four-times higher risk of presentation to a veterinarian for clinically relevant lameness (Scarlett & Donoghue, 1998). Other feline studies have found only a weak correlation between body condition score (BCS) and radiographic DJD changes (Clarke & Bennett, 2006). The benefit of weight optimisation, from both a preventive and treatment perspective is quite clear. A high BCS most likely dramatically, and negatively, affects a cat's propensity for DJD and severity of disease. In an overweight patient, weight loss should be a primary treatment rather than a secondary afterthought. Regular exercise in cats provides for better joint health. The veterinary nurse can help educate owners about feline exercise such as walking on a harness and leash or creating play time with various toys (i.e. feathers attached to a stick or a laser pointer).

**Nonsteroidal anti-inflammatory drugs (NSAIDs) therapy** – DJD is an inflammatory disease that leads to central and peripheral sensitisation. Therefore, NSAIDs are a key pharmacologic intervention for DJD in cats (Epstein, 2013). Analgesic trials may sometimes be the only way to confirm that chronic pain was present. For example, after intervention with an NSAID in cats with a presumptive diagnosis of DJD, most owners believed that their cats made an improvement, and the most common clinical signs of improvement were a reduced unwillingness to jump, a higher jump and a noticeably less-stiff gait (Robertson, 2015). Cats have a low capacity for hepatic glucuronidation of exogenously administered drugs (Court & Greenblatt, 2000). The deficiency of the glucuronidation pathway in cats explains their susceptibility to the toxic side effects of phenolic drugs such as acetaminophen and long half-lives of other drugs such as carprofen and aspirin (Robertson, 2015). Choosing a drug that relies more on oxidative pathways, such as meloxicam or robenacoxib, and using pharmacokinetic data such as half-life from research studies to devise administration intervals allows clinicians to make an appropriate choice.

There are several review papers about the use of long-term NSAIDs in cats: Kerwin (2010); Lascelles and Robertson (2010); Sparkes et al. (2010); Bennett et al. (2012b).

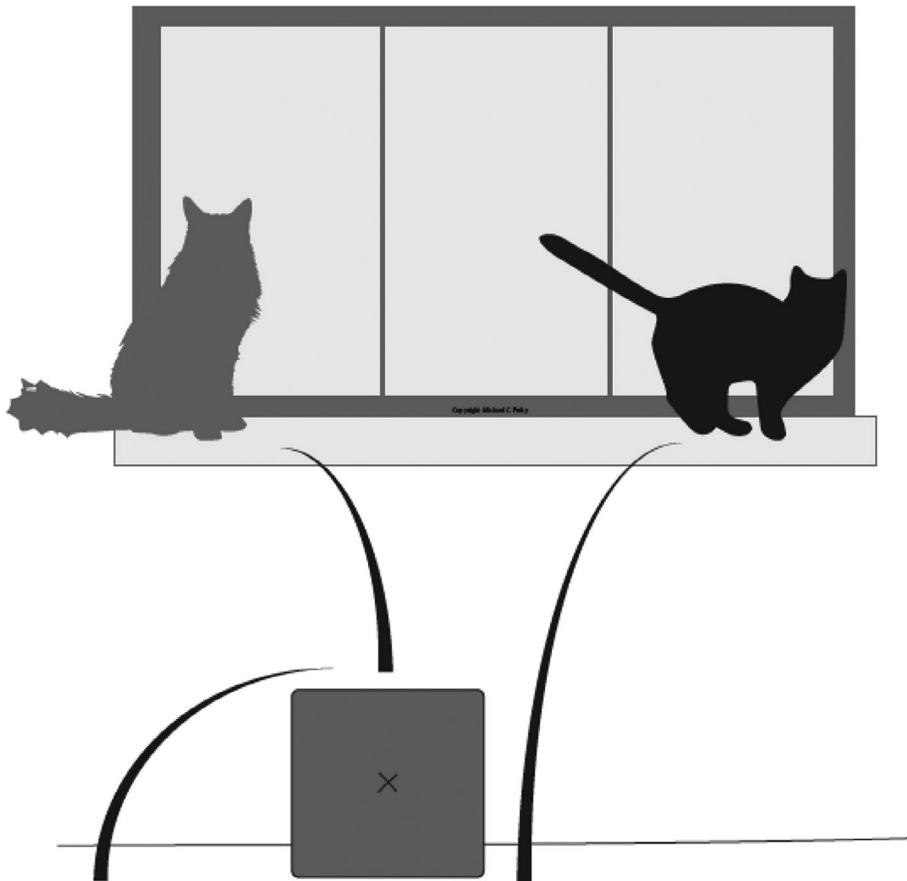


Figure 4. Hesitancy to jump down, or using chairs or other objects to jump down in stages  
 Courtesy Dr Michael Petty

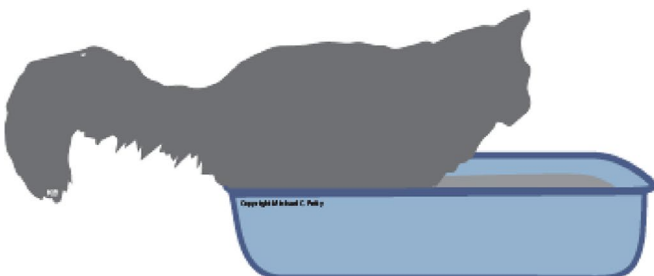
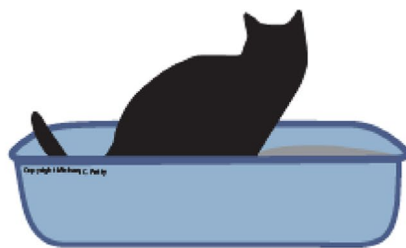


Figure 5. No longer climbs into litter tray, or only climbs part way in  
 Courtesy Dr Michael Petty

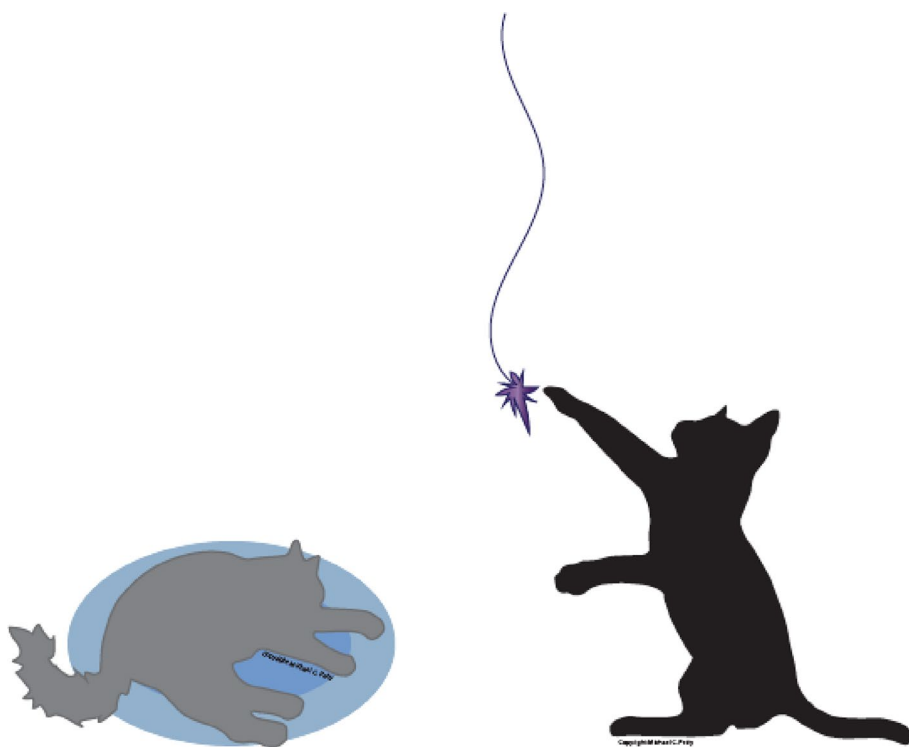
These are excellent articles that can help clear up doubt about extended use of NSAIDs in cats. It is beyond the scope of this article to discuss details about such use. The current evidence suggests that

there is a role for longer-term NSAID use in cats with chronic osteoarthritis and that when used appropriately can be utilised even in cats with chronic renal disease (CRD). Appropriate use means regular

monitoring, to include client education and follow-up (especially with regard to appetite, the diminishing of which may be an earliest sign of NSAID adverse drug events (ADE), followed by diarrhoea, weight and surveillance lab data. For long-term NSAIDs in cats: caution in poor BCS, ensure hydration (wet food, subcutaneous fluids (SC)), monitor renal values. The true incidence of ADEs related to long-term dosing of NSAIDs in cats is unknown, but the most commonly reported side effect of oral meloxicam is gastrointestinal upset. In a month-long study, 18% of cats showed intermittent signs of gastrointestinal upset (vomiting and/or diarrhoea), but signs were not severe enough to terminate treatment in any cat (Clarke & Bennett, 2006). In the largest clinical study to date (Gunew, Menrath, & Marshall, 2008), 4 of 46 cats vomited during meloxicam treatment, and 2 of these cats were withdrawn from the study. The most common adverse effect associated with piroxicam in cats with neoplasia was vomiting (Bulman-Fleming, Turner, & Rosenberg, 2010), but many of these cats were getting chemotherapy agents as well. The bottom line is that in the right population and with careful dosing and monitoring, long-term NSAIDs in cats are surprisingly well tolerated.

So far we have discussed the two most important management strategies for feline DJD/OA: weight optimisation, and NSAIDs. It is natural to move to other oral, systemic, adjunctive medications, but there is not just one or two but three other modalities that from an evidence-based perspective are more compelling for their predictable efficacy.

*Polysulfated glycosaminoglycans* – Veterinary polysulfated glycosaminoglycans (PSGAGs) administered by the parenteral route (i.e. IM injection) have met both regulatory scrutiny and quality control measures. Independent studies appear to support their clinical utility. One unpublished abstract administered radiolabeled Adequan subcutaneously to cats and found that it distributed completely to all joints. This supports the bioavailability of SC administration and this is how many veterinarians are prescribing it (extra-label) for owners to administer at home in cats. Off-label use is 4.4 mg/kg IM twice weekly for 4 weeks. Administer SC and continue long-term basis (every 1 month and adjust frequency per patient needs). Caution with patients at risk for bleeding (Epstein, 2014). The use of Adequan (PSGAG) at 4.4 mg/kg IM or subcutaneously every 3–5 days for a



▲ **Figure 6.** Reluctance to play or socialise  
Courtesy Dr Michael Petty

total of eight injections has been reported in cats (Robertson, 2015).

**Omega-3 fatty acids** – the primary joint essential fatty acid (EFA) is DHA or docosahexaenoic acid. There is a feline DHA-fortified diet (Hills JD<sup>®</sup>), but unfortunately it does not yet have the kind of robust data that we have in dogs with EPA-rich diets. Oils derived from fish oils rather than seed oils are a better source if long-chain omega-3 fatty acids are desired (Wortinger & Burns, 2015). In cats with DJD, two therapeutic foods are available for management of DJD in the USA. Hill's<sup>®</sup> Prescription Diet<sup>®</sup> Feline j/d<sup>™</sup> is available in the USA as well as in Europe. The active ingredients include high levels of *n*-3 polyunsaturated fatty acids (DHA), natural sources of glucosamine and chondroitin, methionine and manganese (Wortinger & Burns, 2015). Royal Canin Veterinary Diet<sup>®</sup> Mobility Support JS<sup>®</sup> Feline is available in the USA and Canada. The efficacy of therapeutic nutrition (Prescription Diet<sup>®</sup> Feline j/d<sup>®</sup>) is supported by three studies (Wortinger & Burns, 2015). The efficacy of therapeutic nutrition (Royal Canin Veterinary Diet<sup>®</sup> Mobility Support JS<sup>®</sup> Feline) is supported by one published study (Wortinger & Burns, 2015).

**Therapeutic exercise** – an aspect but cornerstone of physical rehabilitation, it is widely accepted in humans for its therapeutic and even analgesic benefit. From an evidence-based perspective, an exercise

programme remains among the most important management strategies that can and should be undertaken for DJD in cats. Physical rehabilitation or physiotherapy is concerned with physical function, and considers the value of movement and the optimisation of physical potential as being core to the health and wellbeing of individuals (Sharp, 2012). Manual therapy (e.g. massage, passive range of motion, stretching), thermotherapy (e.g. hot and cold), electrotherapy (e.g. laser therapy, ultrasound therapy, neuromuscular electrical nerve stimulation (NMES)) and exercise therapy (e.g. basic exercises for the post-operative orthopaedic and neurological patient, hydrotherapy, strengthening exercises, flexibility exercises, endurance exercises, balance and proprioception exercises, gait re-education, postural management for neurological patients, positioning and chest care for intensive care patients and maintenance exercises for recumbent patients) can all be utilised in feline patients.

#### **Additional medications for use in Cats for DJD (Epstein, 2014). Tramadol**

Dose: 1–4 mg/kg PO q 12 h

Very unpleasant taste; neurological side effects may occur; may produce opioid-like side effects

#### **Amantadine**

Dose: 3–5 mg/kg PO q 24 h

No convenient size of capsule for cats; syrup available

#### **Gabapentin**

Dose: initially 3–5 mg/kg PO q 12 h, taper upwards to effect; doses as high as 20 mg/kg or more may be needed PO q 8–12 h

Gradually reduce dose when withdrawing drug; appears effective, especially where sensitisation might be present; unpleasant taste

#### **Amitriptyline**

Dose: 0.5–1.0 mg/kg PO q 24 h

Lethargy, weight gain, decreased grooming and transient cystic calculi reported

Arthritic cats find it difficult to jump and reach their favourite high points where they feel safe and content, be it a bed, sofa or window ledge. Moving furniture to provide “stepped” accesses will help. A variety of purpose-built steps and ramps are also commercially available. The litter tray should be adapted so that it is easy for the cat to access and exit from and to comfortably position itself when urinating and defecating.

## **Non-DJD, nonmalignant pain**

### **Feline orofacial pain syndrome (FOPS) (Heath et al., 2010)**

A feline facial pain/mutilation syndrome has been recognised which is especially prevalent in Burmese cats, although occasional cases have been seen in the domestic shorthair, Burmilla and Siamese. Orofacial pain disorders are well-described in humans and FOPS shows some similarities to trigeminal neuralgia. Trigeminal neuralgia is characterised by paroxysmal bouts of pain in the distribution of the trigeminal nerve, usually the jaw. The pain is precipitated by trigger factors of which the most common is facial movement (e.g. chewing). For trigeminal neuralgia to occur there must be a combination of peripheral disturbance or damage (e.g. dental disease), together with a cerebral brainstem disinhibition of the trigeminal apparatus. This results in a paroxysmal discharge and reverberation of pain impulses when a trigger point is elicited. In many of the affected cats, tongue discomfort seems to be the primary problem and it is not unusual for the primary presentation to be to an emergency clinic with acute onset severe tongue mutilation. More information can be found at Rusbridge, Heath, and Gunn-Moore (2010) “Feline orofacial pain

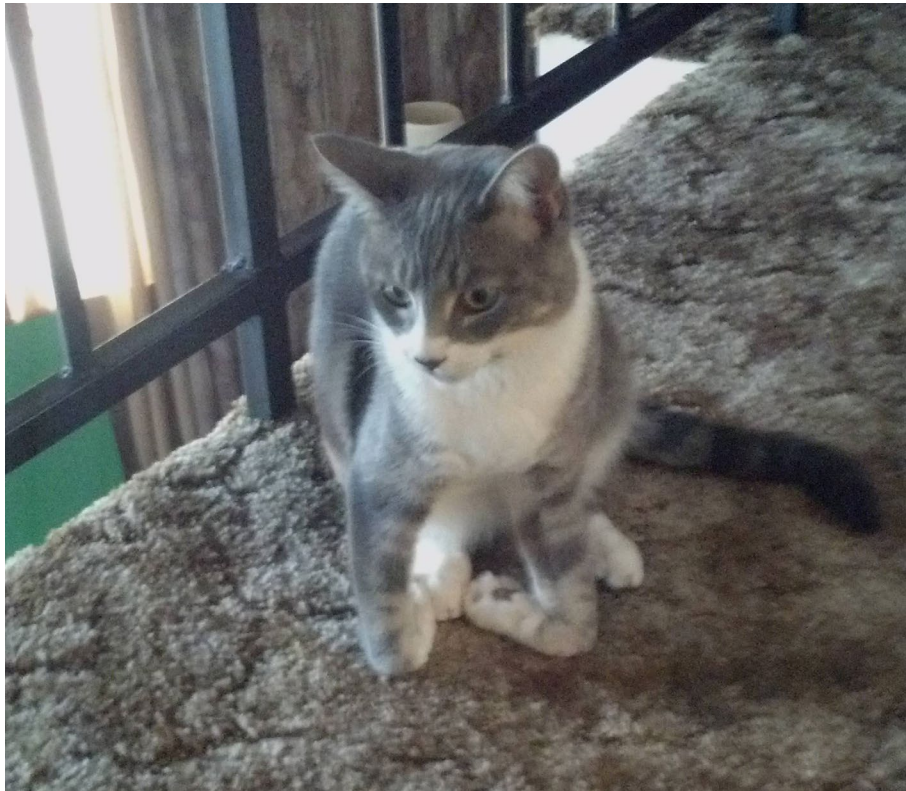


Figure 7. Declaw onychectomy patient  
Courtesy Dr Sheilah Robertson

syndrome face and tongue mutilation in Burmese” Feline Information Bureau. Available at: [www.fabcats.org/breeders/infosheets/orofacial/orofacial.html](http://www.fabcats.org/breeders/infosheets/orofacial/orofacial.html), Accessed 12 November 2016.

**Post-amputation (Mathews, 2008)**

Chronic stump pain is a known syndrome in human patients, but it also may occur

in veterinary patients (phantom pain may also occur, but only many months after the amputation; it might take for the nerve to have grown out to its normal peripheral ending, about 1 cm/month). A probable example of this is cat having undergone onychectomy and still lame or holding up a paw many months post-op. See Figure 7 Another example you may have

witnessed is a chronic licking at the site of a digit amputation; likely the patient is experiencing the classic neuropathic sign of “dysthesia”, or abnormal sensation (tingling, itching). The cause may be attributable to peripheral sensitisation because of spontaneous activity from sprouting regenerating nerve endings or neuroma formation that gives rise to secondary changes in otherwise silenced small dorsal root ganglia cells, central sensitisation, or cortical reorganisation. In humans, there has been an association of severity of pre-amputation pain with post-amputation stump and/or phantom pain. See Figure 8.

**Diabetic neuropathy (Mathews, 2008)**

Cats also can develop a neuropathy associated with this endocrinopathy. An extensive electrophysiological, biochemical and histological study performed on feline diabetic neuropathy definitively demonstrated equal involvement of sensory and motor nerves in these cats, with the sensory dysfunction involving the most proximal dorsal (sensory) nerve roots and the entire length of the peripheral sensory nerves in the thoracic and pelvic limbs (Mizisin, Shelton, Burgers, Powell, & Cuddon, 2002). See Figure 9. It is the presence of this sensory neuropathy and radiculopathy that may explain the observation that many cats with diabetes exhibit an aversion to being petted and cuddled and are commonly “cranky and aloof”. Many of these cats also resent having their paws touched, reminiscent of people who have a “diabetic hand and foot” (Dr Paul Cuddon, Colorado State University).

**Feline hyperesthesia syndrome (Ciribassi, 2009)**

Feline hyperesthesia syndrome (FHS) is known by several names, including rolling skin disease, neurodermatitis, neuritis, psychomotor epilepsy and pruritic dermatitis of Siamese. FHS can occur in cats of any age, but it is commonly seen in cats aged 1–5 years. Males and females are equally affected. While all breeds can be affected, Siamese, Burmese, Persian and Abyssinian cats are more commonly afflicted (Horowitz & Neilson, 2007). Affected cats often show rippling or rolling skin along the lumbar spine. Palpation of the lumbar musculature may elicit signs of pain. Affected cats commonly stare at their tail, then attack the tail and/or flanks. Biting of the tail base, forelegs and paws is common. These cats often run wildly around the home, vocalising at the



Figure 8. Amputation patient that has received good analgesia  
Courtesy Dr Sheilah Robertson



▲ **Figure 9.** Josh paw-licking from diabetic neuropathy  
Courtesy Dr Sheilah Robertson



▲ **Figure 10.** Feline stomatitis – I  
Courtesy Dr Sheilah Robertson

same time. The behaviour may be induced by petting or stroking the cat's fur and most commonly occurs in the morning or later in the evening.

### **Feline interstitial cystitis (Mathews, 2008)**

Feline interstitial cystitis (FIC) is a well-recognised problem in cats and is an example of visceral inflammation resulting in neurogenic pain, which also occurs in human beings. The term

FIC is reserved for those cats that have frequent recurrences of clinical signs or persistence of clinical signs chronically. Idiopathic cystitis can be acute or chronic, but interstitial cystitis is a chronic process. Both the analogous condition in humans and the one we recognised in cats are now recognised not as a urologic disease per se, but rather a somatic, neuropathic pain condition in which the bladder is a target organ.

### **Gingivostomatitis (Cannon, 2015)**

Feline chronic gingivostomatitis is a common, painful problem in cats, which can be frustrating to manage. It is an idiopathic condition, thought to occur when affected cats raise an inappropriate immune response against one of a range of oral antigens. See **Figures 10** and **11**. Plaque is an important inciting factor; therefore, dental scaling and polishing under anaesthetic is required in all cases. Extraction of teeth in the areas of inflammation is the most effective means of eliminating plaque. It can be technically challenging and must be carried out by an experienced operator. Referral to a veterinary dentist is recommended where possible. Additional medical treatment with antibiotics, anti-inflammatory drugs and omega interferon is also often required.

### **Cancer pain**

The word cancer means “crab” and was given to the disease because of its tenacity, a singular ability to cling to its victim like a crab's claws clinging to its prey (Fox, 2014). Cancer has become a frightening diagnosis in our culture, and when pets are diagnosed with cancer, the owner's first concern is usually pain. There are four main causes of cancer pain. See **Textbox 6**.

#### ▲ **Textbox 6.** Causes of cancer pain (Fox, 2014)

1. Is directly produced by the tumour
2. Is due to the various treatment modalities
3. Is related to chronic debility
4. Is due to unrelated, concurrent disease processes

Nerve compression has been identified as the most common cause of neuropathic pain in human cancer patients (79%), followed by nerve injury (16%) and sympathetically mediated pain (5%) (Chong & Bajwa, 2003; Fox, 2014). Tumours of the peripheral nervous system can lead to a state of wind-up and a spread of painful response to neighbouring tissues (Fox, 2014). The most common cancers in cats are lymphoma (lymphosarcoma); alimentary (gastrointestinal); cranial mediastinal (chest); extranodal, which can occur at any site, including the nose, kidneys and central nervous system; squamous cell carcinoma, mouth, nose, ear, eyelid or other skin sites; soft-tissue sarcoma, injection sites, feline injection site



**Figure 11.** Feline stomatitis – 2  
Courtesy Dr Sheilah Robertson

sarcoma (FISS) (Adams, 2016). Cats with cancer may present similarly with a mass lesion or nonspecific signs which may include hypo/anorexia, reduced activity and weight loss. Oral squamous cell carcinoma (SCC) is the most common oral tumour in both domestic cats and humans. Tumours generally occur on the tongue, gingiva, lips and oropharynx, and symptoms at presentation include oral pain, halitosis, excessive salivation, loosening and loss of teeth and anorexia (Stebbins, Morse, & Goldschmidt, 1989; Vos & Gaag, 1987). Malignant lymphoma (ML) also occurs commonly in cats and is histologically like human non-Hodgkin's lymphoma (Vail, Moore, Ogilvie, & Volk, 1998; Valli et al., 2000). While feline ML has historically been associated with infection by feline leukaemia virus (FeLV), in recent years the presentation of the disease has changed. Tumours now occur commonly in FeLV-negative animals, and frequently involve the gastrointestinal tract and nasal cavity (Moore, 1996; Vail et al., 1998).

Strategies for the treatment of chronic pain (e.g. unresectable tumours, metastatic disease) typically incorporate the principle of multimodal analgesia using a variety of different drug classes, escalating as required (Elliott, 2014). Cancer is not a static condition, but rather a neurobiological changing state; therefore, effective management of associated pain

must be continually assessed and possibly changed (Fox, 2014). In 1986, the World Health Organisation (WHO) developed a simple three-stage analgesic ladder for the treatment of cancer pain that relies on widely available and inexpensive analgesic agents (Fox, 2014). Contemporary thinking, however, is to use stronger analgesics earlier. See **Textbox 7**.

**Textbox 7.** Tumours frequently associated with pain in cats (Fox, 2014)

- Bone
- Central nervous system
- Cutaneous (invasive)
- Gastrointestinal
- Intrathoracic and abdominal
- Oral and pharyngeal
- Post-operative pain associated with tumour removal can be greater than anticipated, perhaps due to the presence of neuropathic pain

The management strategy of cancer-related pain should be multifaceted in nature, including: modification or removal of the source of pain via surgical resection and/or curative intent radiation therapy (CRT); pharmacological manipulation of the pain pathway; adjunctive therapies such as acupuncture and physical rehabilitation modalities; interventional analgesic techniques; and palliative care, including

reduced fraction radiation therapy (Love & DiBernardi, 2014).

While surgery, radiation therapy, or chemotherapy may be used alone for certain tumours, they are frequently combined to achieve better and longer tumour control, translating into prolonged and more complete pain alleviation (de Lorimier & Fan, 2005). Examples of cancer best treated with multimodality therapy include feline vaccine-associated soft-tissue sarcomas, soft-tissue sarcomas and certain oral tumours.

Management of cancer pain in the veterinary patient must include a dialogue between the owner and the veterinarian about QOL as well as death. Euthanasia is a valid therapeutic tool in the management of progressive and intractable pain in veterinary patients, but it is not one that is applied easily in most situations (Love & DiBernardi, 2014). Unrelieved pain is a major cause of suffering in patients with cancer. Veterinary Nurses must be vigilant about monitoring for and providing relief from pain, whether caused by the neoplastic process itself or coincidental in nature. Providing adequate management of pain is central to oncological care and will improve the QOL of the animal patient.

## Conclusion

As Veterinary Nurses, we must be experts on assessing acute, chronic and neuropathic pain in cats. We are the primary advocate for our feline patients. It is our duty to help educate owners and their families about chronic pain, which may be subtle. By recognising various chronic cat pain diseases and employing stress-free handling techniques, our feline friends will ultimately have better care and a much better quality of life.

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