

Determining if a cat is in pain, and treatment options

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Detecting pain in cats is difficult for clinicians as cat behaviour makes pain assessment more challenging. It is in their nature to mask signs as an adaptive survival strategy. In addition, owners are often not able to understand that their pet may be in pain as the disease may be undetected, for example dental disease. Owners may feel their pet is naturally ageing and not suffering from pain, for example in older cats with osteoarthritis. It is important to communicate clearly with an owner in order to successfully make them understand that their pet is painful. Directly comparing the patient's scenario to a human one can be useful to help owners understand their pet better.

Pain is a physiological response to noxious stimuli and consists of a sensory and motor component as well as cognitive and emotional components. A negative emotional state can influence perception of pain, therefore as clinicians we should be doing all that we can to avoid negative emotions in feline patients both in the hospital and the home, using appropriate handling techniques and managing the environment (see Tables 1 and 2).

It is generally easier for clinicians to diagnose acute pain compared to chronic pain. Acute pain is due to tissue damage, frequently from trauma or inflammatory conditions. It resolves once the tissue has repaired and healed. Chronic pain is a maladaptive response of the central nervous system and persists after tissue healing. It is characterised by a mixed nociceptive input (chronic inflammatory, neuropathic and/or functional pain) that can occur due to disease or injury or

- Trauma (e.g. road traffic accidents, balcony falls, cat fight injuries)
- Urinary tract disease (e.g., cystitis, urethral obstruction)
- Pancreatitis
- Acute rhinitis
- Ocular pain (e.g., corneal ulceration)
- Ear pain (e.g., acute otitis externa)

Table 3. Common causes of acute pain in cats.

occurs by itself. Chronic pain has no clear end point unlike acute pain.

In a clinic setting, it can be difficult to examine cats completely as their posture is likely to be different on a consulting room floor or table compared to their home environment. Protective (previously described as negative) emotions may be activated that are not present in the home or cats may appear frozen. Chronic pain may not become apparent in a physical examination therefore careful discussion with the owner is needed. Discussing specific behavioural changes and mobility changes can be a good indicator of the presence of chronic pain in cats. Specific behaviours can include changes to the use of litter trays (for example no longer using the tray at all, eliminating adjacent to the tray, taking extra time to get in or out of the tray or taking longer to eliminate while in the tray), changes to resting areas (for example, reluctance to go up or down stairs or on/off furniture), changes to grooming behaviour (unable to comfortably groom certain areas, therefore becoming unkempt), changes to feeding/drinking habits (the positioning of bowls can make it difficult for a cat with osteoarthritis to access resources) or changes to interaction with the owner (cats can become more withdrawn or clingy). Video footage of the animal moving or eating, for example, may be useful to help examine the patient for evidence of chronic pain.

ACUTE PAIN ASSESSMENT

As clinicians we can be confident that the patient will be suffering from pain in obvious scenarios, for example a traumatic incident (see Table 3). Using a scoring system can help the veterinary team monitor a patient for pain or monitor the response to the administration of analgesia. Scoring systems can also assist in the consideration of pain in disorders where the detection of pain is more difficult. The Feline Grimace Scale (FGS) is a facial expression-based scoring system for acute pain assessment in cats. It considers five facial factors, called action units (AU) and assigns them a score (see Table 4 and Figure 1). The final score is calculated by adding the scores for each unit and dividing this total by the maximum possible score (10 if

Nociceptive pain
Stimulus producing tissue damage activates nociceptors.
Inflammatory pain
Inflammatory mediators released after tissue injury.
Neuropathic pain
Lesions or disease affecting somatosensory system causes pain.
Functional pain
Pain caused by an unknown mechanism.

Table 1. Types of pain.

Pain
Sensory and emotional response associated with actual or potential tissue damage.
Allodynia
Pain associated with a stimulus that does not normally cause pain.
Hyperalgesia
Increased sensation of pain from a stimulus that does cause pain.
Peripheral sensitisation
Increased response of nociceptive neurones in the periphery to stimulation.
Central sensitisation
Increased response of nociceptive neurones in the central nervous system to their normal input.

Table 2. Definitions of terms associated with pain in animals.

Five action units of FGS:

1. Ear position
2. Orbital tightening
3. Muzzle tension
4. Whiskers position
5. Head position

Each unit is scored:

- 0 (absent)
- 1 (moderately present)
- 2 (present)

Table 4. The Feline Grimace Scale components

all five action units are scored). Analgesia is recommended when the final score is four out of 10 or more. This provides a user-friendly, quick method to assess the presence of pain in the feline patient.

The 'Glasgow Composite Measure Pain Scale - Feline' is

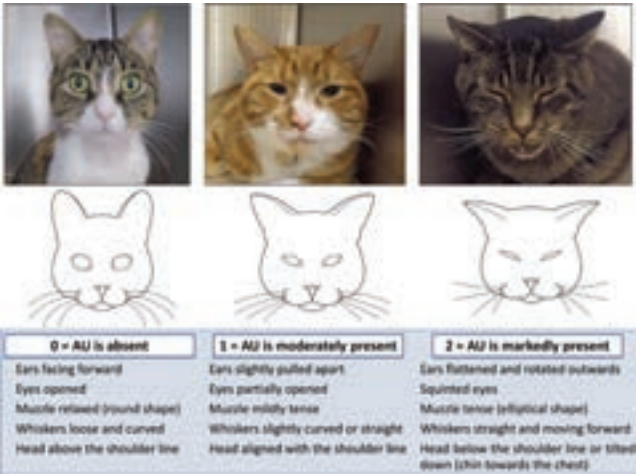


Figure 1.

another tool commonly used in first opinion practice. As well as calculating scores based on the patient's facial expression, the operator completes a simple questionnaire with scored answers and analgesia titrated based on the findings. It includes 28 descriptor options within seven behavioural categories. Users should follow the assessment procedure as described in the the Glasgow Feline Composite Measure Pain Scale questionnaire.

The maximum score is 20 and analgesic intervention is recommended when the individual's score is five or more.

- Conformational related disease (for example Scottish Fold cats, brachycephalic breeds)
- Osteoarthritis/Degenerative joint disease
- Chronic gingival disease
- Dental disease (for example, feline oral resorptive lesions, rotten teeth)
- Chronic rhinitis
- Cancer pain (can be localised or disseminated, inflammatory, neuropathic)
- Neuropathic pain (for example, due to amputation, Intervertebral disk disease or structural lesions)
- Visceral abdominal disorders (for example, chronic gastrointestinal, pancreatic, urinary diseases)
- Ocular disease (for example, ulceration, uveitis, glaucoma)
- Feline oral pain syndrome
- Ear disease
- Skin disease
- Diabetes-induced neuropathy
- Feline hyperaesthesia syndrome

Table 5. Common causes of chronic pain in cats.

- The patient's general gait
- The patient's posture
- The presence of lameness
- Whether the cat is able to jump up or down on surfaces
- Whether the cat is able to go up or down stairs
- How the patient lies down or gets up from rest
- The position in which the cat sleeps
- The location of sleeping areas
- How the patient interacts with owners
- How the patient interacts with toys
- Whether the patient has increased sleep or resting periods
- The patient's demeanour
- The patient's grooming habits (either neglect of grooming or overgrooming)
- The patient's eating and drinking behaviours
- Usage of the litter box and the presence of inappropriate elimination
- New vocalisation or growling/growling
- The presence of repetitive behaviours

Table 6. Behaviours that can be altered in chronic pain and can, therefore, be discussed with the owner and used to monitor management.

These guides can be downloaded and printed to have to hand in the ward environment. They provide a consistently reproducible method to record pain and can be used by different team members to manage the patient. They can also be used to monitor the response to any analgesics administered and allow these to be titrated if needed or additional agents may need to be introduced to the treatment plan.

CHRONIC PAIN ASSESSMENT

Many disorders can cause chronic pain, which can result in changes in the modulation of pain signals, hyperalgesia (an enhanced sensitivity to pain) and allodynia (pain elicited by a stimulus that does not normally cause pain) (see Table 5). While it may be possible to determine chronic pain from the physical examination in some cases, other causes will remain undetected. Discussing behavioural changes with the owner can be used to determine whether pain is present and also to determine the response to any treatment or environmental changes (see Table 6).

MEDICATIONS USED ROUTINELY IN PAIN MANAGEMENT IN FIRST OPINION PRACTICE

There are numerous drugs available in feline practice to provide analgesia (see Table 7 which runs from page 140 to 142). The concept of multimodal analgesia, using different drugs with different modes of action, provides optimal pain relief in most scenarios. Butorphanol provides excellent sedation but has poor analgesic properties, so should not be used for painful conditions.

Other medications such as tramadol, amantadine and amitriptyline have been used in the management of pain in cats. However, proof of efficacy of these medications is lacking and it is best to consider drugs listed in Table 7 first. Clinicians should keep up to date with developments in analgesia, as this is an area undergoing frequent research and product development.

Text continues (after Table 7, pages 133-135) on page 135.

Drug	Summary
Methadone	<p>Characteristics:</p> <ul style="list-style-type: none"> • Opioid (full agonist). • Used for moderate to severe pain. • Used in sedative and premedication protocols to improve sedation and analgesia. • Response variable between individuals. • Fast onset of action (approximately 5 minutes when given IV). • Duration of action 4-6 hours. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> • Dysphoria may be seen. • Can cause respiratory depression, more common when given under general anaesthesia. • Can cross placenta. • Metabolised by liver (impaired liver function could lead to prolonged effect). <p>Dosage:</p> <ul style="list-style-type: none"> • 0.1-0.6mg/kg slow IV or IM q4-6h (commonly given 0.2mg/kg).
Buprenorphine	<p>Characteristics:</p> <ul style="list-style-type: none"> • Opioid (partial agonist). • Used for mild to moderate pain. • Used in sedative and premedication protocols to improve sedation and analgesia. • Response variable between individuals. • Fairly quick onset of action (approximately 15 minutes when given IV). • Duration of action 6-8 hours, possibly longer. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> • Dysphoria may be seen. • Can cause respiratory depression but effects are lesser compared to methadone. • Can cross placenta. • Metabolised by liver (impaired liver function could lead to prolonged effect). <p>Dosage:</p> <ul style="list-style-type: none"> • 0.01-0.03mg/kg IV or IM q6-8h (commonly given 0.02mg/kg). • Can also be given transmucosally, which is useful for owners to give at home. • Subcutaneous administration can be unreliable at the above dosages, with reduced bioavailability in some animals. • Some studies have shown that a single injection of high dose buprenorphine (0.12-0.24mg/kg) delivered subcutaneously has a potential for clinical use in cats, offering 24 hours of analgesia.
Fentanyl	<p>Characteristics:</p> <ul style="list-style-type: none"> • Opioid (full agonist). • Used for moderate to severe pain, provides profound analgesia. • Most commonly used for orthopaedic procedures. • Used most often as a transdermal patch but can be used IV or as CRI. • After patch application, peak plasma levels take 7-12 hours to be achieved and patches last for 5 days. • Alternative analgesia must be provided before peak activity occurs. • Careful patient handling is required if a patch is placed. • Ensure fur clipped to allow correct patch application. • Secure edges of patch to skin with tissue glue and apply a light bandage. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> • Application of a heavy bandage or proximity to a heat source can cause vasodilation and increase absorption, so should be avoided. • If the patient is discharged with a patch in place, clear written guidance should be issued to the owner regarding correct handling of the patient and caution to the risk of ingestion by animals or small children. • Patches should be disposed of at a veterinary practice. <p>Dosage:</p> <ul style="list-style-type: none"> • 25 µg/h patch for cats 3-5kg. • 12.5 µg/h patch for smaller cats.
Meloxicam	<p>Characteristics:</p> <ul style="list-style-type: none"> • Non-steroidal anti-inflammatory drug (NSAID). • Preferentially inhibits COX-2 enzyme, limiting formation of prostaglandins involved in inflammation from arachadonic acid. • Used to alleviate inflammation and pain in both acute and chronic musculoskeletal disorders and the reduction of postoperative pain. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> • Can affect renal perfusion so should only be administered in hydrated patients and when given in hospitalised or anaesthetised patient's blood pressure should be monitored. • Can be used in cats with CKD but should use lowest effective dose and maximal dosing interval. Half doses are generally recommended. Owners must make sure the patient is hydrated and clinically well before administering, therefore it is often recommended to make sure patient eating well before adding drug. • Can cause gastrointestinal side effects, including vomiting, diarrhoea, anorexia and gastrointestinal bleeding. • NSAIDs should not be given to animals with clotting problems. • Metabolised by liver (impaired liver function prolongs effect). Can be used in patients with liver disease but at the lowest effective dose and maximal dosing interval. Giving every other day at a minimum can reduce the risk of drug accumulation. • Must not be given when the patient has already received glucocorticoid treatment or other NSAIDs. • Should not be given if the patient has been given another potentially nephrotoxic medication. • Not to be given in pregnant queens or cats <6 weeks of age <p>Dosage in acute settings:</p> <ul style="list-style-type: none"> • 0.2 mg/kg SC as a single injection. • Can be followed with oral suspension at 0.05mg/kg PO q24h for up to 4 days. <p>Dosage in chronic disease:</p> <ul style="list-style-type: none"> • Initial oral dose 0.1mg/kg. • Maintenance dose is 0.05mg/kg PO q24h.

Drug	Summary
Robenacoxib	<p>Characteristics:</p> <ul style="list-style-type: none"> Non-steroidal anti-inflammatory drug (NSAID). Preferentially inhibits COX-2 enzyme, limiting formation of prostaglandins involved in inflammation from arachadonic acid. Used to alleviate inflammation and pain in acute settings. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Can affect renal perfusion so should only be administered in hydrated patients and, when given in hospitalised or anaesthetised patient, blood pressure should be monitored. Can be used in cats with CKD but should use lowest effective dose and maximal dosing interval. Half doses are generally recommended. Owners must make sure the patient is hydrated and clinically well before administering, therefore it is often recommended to make sure patient is eating well before adding drug. Can cause gastrointestinal side effects, including gastrointestinal bleeding. NSAIDs should not be given to animals with clotting problems. Metabolised by liver (impaired liver function prolongs effect). Can be used in patients with liver disease but at the lowest effective dose and maximal dosing interval. Giving every other day at a minimum can reduce the risk of drug accumulation. Must not be given when the patient has already received glucocorticoid treatment or other NSAIDs. Should not be given if the patient has been given another potentially nephrotoxic medication. Not to be given in cats <16 weeks of age or < 2.5kg. <p>Dosage:</p> <ul style="list-style-type: none"> 2mg/kg SC q24h for maximum of 2 doses. 1-2mg/kg PO q24h for maximum 6 days.
Carprofen	<p>Characteristics:</p> <ul style="list-style-type: none"> Non-steroidal anti-inflammatory drug (NSAID). Preferentially inhibits COX-2 enzyme, limiting formation of prostaglandins involved in inflammation from arachadonic acid. Used to alleviate inflammation and pain in acute settings. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Can affect renal perfusion so should only be administered in hydrated patients and when given in hospitalised or anaesthetised patient, blood pressure should be monitored. Can be used in cats with CKD but should use lowest effective dose. Half doses are generally recommended. Clinicians must make sure the patient is hydrated and clinically well before administering, therefore it is often recommended to make sure patient eating well before giving the drug. Can cause gastrointestinal side effects, including gastrointestinal bleeding. NSAIDs should not be given to animals with clotting problems. Metabolised by liver (impaired liver function prolongs effect). Can be used in patients with liver disease but at the lowest effective dose and maximal dosing interval. Giving every other day at a minimum can reduce the risk of drug accumulation. Must not be given when the patient has already received glucocorticoid treatment or other NSAIDs. Should not be given if the patient has been given another potentially nephrotoxic medication. Only the injectable form is licensed to use in cats as a single injection. Do not give to pregnant animals or animals <6 weeks of age. <p>Dosage:</p> <ul style="list-style-type: none"> 4mg/kg IV or SC on a single occasion.
Ketamine	<p>Characteristics:</p> <ul style="list-style-type: none"> A non-competitive excitatory neurotransmitter N-methyl-D-aspartate (NMDA) antagonist. Can provide excellent visceral and somatic analgesia as well as dissociative anaesthesia. Inhibits central sensitisation. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Ketamine has sympathomimetic effects (increases heart rate, vascular tone and myocardial oxygen demand) and negative inotropic effects (direct myocardial depressant effects). Therefore, caution should be used in patients that are in shock or have cardiovascular disease. Can cause excitation or abnormal behaviour so needs to be administered with other agents. Respiratory depression can occur. <p>Dosage:</p> <ul style="list-style-type: none"> Loading dose 250-500µg/kg followed by an intraoperative dose of 10-20µg/kg/min and a postoperative dose 2-5µg/kg/min. It can also be administered as an injection of 0.1-0.5mg/kg IM. This can be given once or more at start of and/or before the end of surgery (or at 20 minute intervals during surgery).
Local anaesthesia: Lidocaine	<p>Characteristics:</p> <ul style="list-style-type: none"> Provides reversible blockade of the sodium channel, preventing propagation of action potentials along the nerve fibre. Can be used as local or regional anaesthesia. Commonly used as splash blocks, local tissue infiltration and dental nerve blocks. Has a rapid onset of action and intermediate duration of action (commonly combined with bupivacaine for optimal effects). <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Cats are very sensitive to the toxic effects so the maximum dosage must be accurately calculated. If topical preparations have already been used (for example EMLA or Intubeaze), this should be taken into account. Do not give intravenously. Can cause depression, vomiting, bradycardia, hypotension and seizures. <p>Dosage:</p> <ul style="list-style-type: none"> Safe dose is 2-4mg/kg.
Local anaesthesia: Bupivacaine	<p>Characteristics:</p> <ul style="list-style-type: none"> Provides reversible blockade of the sodium channel, preventing propagation of action potentials along the nerve fibre. Can be used as local or regional anaesthesia. Commonly used as splash blocks, local tissue infiltration and dental nerve blocks. Has a slower onset of action and long duration of action (commonly combined with lidocaine for optimal effects). <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Cats are very sensitive to the toxic effects so the maximum dosage must be accurately calculated. Do not give intravenously. <p>Dosage:</p> <ul style="list-style-type: none"> Safe dose is 1-2mg/kg.

Drug	Summary
Gabapentin	<p>Characteristics:</p> <ul style="list-style-type: none"> Analogue of neurotransmitter gamma-aminobutyric acid (GABA). Precise mechanism of action unknown. May provide benefit in neuropathic pain. Commonly used as adjunct with other medications but can occasionally be used as sole agent. <p>Adverse effects and cautions:</p> <ul style="list-style-type: none"> Long-term effects on patients with renal or hepatic disease not determined. Can cause adverse effects, including sedation and ataxia. <p>Dosage:</p> <ul style="list-style-type: none"> An effective dose is not fully understood, commonly quoted dosage ranges are 5-10mg/kg PO q8-12h. A reduced dose 1-5mg/kg is recommended for cats with CKD.

Table 7. Analgesics used in first opinion practice.

Text continues from page 132

ADJUNCTS TO ANALGESIA

There are additional measures we can consider for hospitalised patients with pain to make them feel more comfortable and to reduce the potential for negative emotions:

- Cardiovascular support (for example intravenous fluids and oxygen supplementation).
- Support for fractures or wounds (bandaging and dressings).
- Careful surgical techniques and tissue handling.
- Use of muscle relaxants to reduce muscle spasms, for example, in urethral spasm.
- Reduce anxiety through sympathetic handling and provision of a quiet environment.
- Ensure the environment is at an appropriate temperature, with ambient lighting and provision of dark periods. Try and keep food and water bowls apart from each other and from the litter tray.
- Ensuring patient bedding provides adequate support.
- Ensure the kennel and containers are cleaned regularly, and the patient groomed, if tolerated and sufficient nursing time provided.
- Nutritional support can make a patient feel more comfortable and assist wound healing.
- Monitor the patient's faecal and urine output. Clean the perineal area if needed and provide support where needed.
- Use gentle physiotherapy, for example, massage or passive range of motion exercises.
- Consider alternative forms of therapy, for example, acupuncture.

For animals with acute and chronic pain managed in the home setting, a number of factors listed above can be considered. Environmental modification to ensure patient comfort should always be discussed. Clinicians should not assume that owners will automatically know what simple measures they could take in order to improve their pet's quality of life. Environmental modification is usually required. For example, introducing a number of steps/blocks/boxes can help the cat get comfortably from the floor to a sofa or bed. Consideration of comfortable bedding material providing patient support is important. Raising the food and water bowls may reduce strain on the musculoskeletal system and increase food and water intake. Obesity can lead to an increase in chronic pain, therefore weight control is important. Environmental enrichment and physical therapy can help with this, as well as monitoring

the pet's diet. Owners may need to avoid providing excess enrichment however, for example, providing lots of toys the cat can not effectively use. This may lead to arousal in an individual who is unable to use the toys appropriately and subsequently leads to frustration in the patient.

There has been an increase in use of alternative therapies, such as acupuncture or electromagnetic field therapy. This may be useful in an individual, but there is no data available currently in cats.

SPECIFIC DISEASES THAT CAUSE CHRONIC PAIN

Osteoarthritis

Owners who may consider that their pet is merely getting older commonly disregard signs of osteoarthritis. It is primarily inflammatory pain but can also involve neuropathic pain. The hip, stifle, shoulder, elbow, tarsus and spine are most commonly affected.

Cats with osteoarthritis do not often limp and are more likely to have changes in their gait and reduction or alteration in behaviours or interactions with the owner. The patient may withdraw from the owner, the owner's touch or may become clingier. Aggression can occur to the owner or other animals. The patient may appear to be resting more or may be more restless. Postural changes are frequently noted with an altered standing or sitting posture common. Changes in mobility are frequently detected on discussion with the owner. Difficulty using the litter tray is common and inappropriate elimination may occur. Grooming habits are frequently altered and the patient may appear matted or may overgroom painful areas. There are a number of pain scales available to use in the assessment of osteoarthritis in cats, including the Client Specific Outcomes Measures and the Montreal Instrument for Cat Arthritis Testing.

Management of osteoarthritis

Environmental modification is an important component of the management of osteoarthritis. Simple considerations can make a marked improvement in the patient's quality of life. As previously noted in this article, introducing a number of steps/blocks/boxes can help the cat get comfortably from the floor to a sofa or bed. Also, as previously mentioned, consideration of comfortable bedding material is important. It's also worth repeating that raising the food and water bowls may reduce strain on the musculoskeletal system and increase food and water intake.

Osteoarthritis affects individuals in different ways. There will be varying degrees of peripheral and central sensitisation,

resulting in different clinical signs. Non-steroidal anti-inflammatory drugs (NSAID) are a mainstay of treatment of osteoarthritis.

Given that osteoarthritis tends to occur in older cats, concurrent diseases such as chronic kidney disease (CKD) are common. It is generally recommended to titrate the administration of NSAIDs to the minimal effective dosage based on response to therapy. This can be altered if needed, for example, in the case of an acute flare up of disease. Overweight animals should be administered a dose appropriate for their ideal weight. NSAIDs should be used with caution in patients with cardiovascular or liver disease. Multiple studies have shown that long-term NSAID therapy is safe in cats with stable CKD. Classification of a cat with stable CKD is not fully determined, but may include minimal changes in bodyweight and creatinine over a period of months and successful management of any concurrent conditions, for example hypertension. Patients should be hydrated with consideration of multiple water resources, including water fountains and wet food. Guidelines for the management of CKD should be followed. Client education is important as the client is the primary care-giver. They should be monitoring for clinical signs including anorexia, weight loss, vomiting, diarrhoea, polyuria or polydipsia. Regular clinic-based health assessments should be performed, including weight checks and blood or urine sampling where necessary. Meloxicam has been licensed for long-term use in cats. As a palatable liquid formulation, it is easy for most owners to administer and can be titrated to the lowest effective dose. Robenacoxib is another NSAID licensed for treatment of cats, but at a maximum of six days' duration.

NSAIDs are beneficial in the management of peripheral sensitisation but multimodal analgesia is needed to manage animals with central sensitisation (for example, gabapentin). Opioids may be useful for acute pain settings but are not often used in the long-term management of osteoarthritis. Tolerance and constipation are some of the most common adverse effects. Buprenorphine can be used at home via transmucosal administration and can be a useful adjunct to other pain management strategies. Gabapentin can provide additional analgesia in some cats and can be useful where neuropathic pain is present. It is mostly used as an adjunct treatment but can sometimes be used successfully as the sole agent in particular cases.

If in doubt, it is advisable to perform a therapeutic trial at home and ask the owner to score the patient's mobility and behaviour to assess patient response.

Recently a novel therapy for the treatment of pain associated with feline osteoarthritis has been licensed in Ireland by Zoetis. Solensia (frunevetmab) is an anti-nerve growth factor (NGF) monoclonal antibody. In osteoarthritis, NGF is elevated and exerts its effects by binding to neuron and immune cells resulting in increased pain, the release of pro-inflammatory mediators (and more NGF) and neurogenic inflammation. In the treatment of osteoarthritis, monoclonal antibodies target and neutralise NGF and are eliminated via normal protein degradation pathways with minimal hepatic or renal involvement. This can allow control of pain in animals with

CKD or those who do not tolerate meloxicam. Solensia is administered at a dose of 1ml for cats 2.5-7kg (2ml for cats over 7 kg) as a single subcutaneous injection once monthly.

Feline Oral Pain Syndrome

Feline Oral Pain Syndrome (FOPS) has been likened to trigeminal neuralgia in humans. Burmese and older cats are more likely to suffer from the disorder. Stress may also be involved in the disease. Oral pathology such as resorptive lesions or gingivostomatitis can be associated with the disorder.

Clinical signs include pawing or traumatising of the face, exaggerated mouth movements (such as licking) and vocalisation (such as growling when eating or grooming). Appetite changes are common and food aversion may occur. Self-mutilation of the tongue, lips or buccal mucosa can occur in more severe cases.

Multimodal analgesia is generally recommended, with gabapentin often used as the primary analgesic.

Feline hyperaesthesia syndrome

This idiopathic condition is characterised by skin twitching and muscle spasms in the lumbar area. Licking of the lumbar, flank and tail regions can occur. An exaggerated response to touch may be seen. Episodes are generally intermittent and variable. Gabapentin is frequently used, along with other medications (for example, phenobarbital, amitriptyline, NSAIDs).

Feline chronic gingivostomatitis

Feline chronic gingivostomatitis (FCGS) is a common and sometimes severe disease of undetermined aetiology. Immune-mediated response to dental plaque and various infectious organisms have been attributed to the development of FCGS. It can affect all oral and pharyngeal soft tissues. Most cats present with reduced appetite or issues with eating or swallowing food. Grooming may be reduced and cats may appear unkempt. Weight loss may be present. Owners may detect an odour from the mouth.

As well as a full clinical examination, blood sampling for routine haematology and biochemistry, along with testing for feline calicivirus, feline herpesvirus and retroviral infection is recommended.

Management of FCGS

Full dental radiographs are recommended with dental cleaning. Removal of plaque and subsequent home cleaning can reduce or eliminate inflammation of the oral tissue. Some cats will respond well to this alone and others will respond poorly. Teeth affected by periodontal disease should be extracted correctly.

Antibiotics can be useful to control inflammation, using agents with both aerobic and anaerobic penetration. Clindamycin (11mg/kg PO q24h) is commonly used. Oral cleansing with a suitable chlorhexidine solution once or twice daily is important to prevent plaque in the short and long term.

It is recommended to reassess patients two weeks after initial dental cleaning. If dental cleaning is not sufficient and clinical signs persist, all molars and premolars should be extracted

as soon as possible. Multiple studies have indicated that this either resolves the disorder or reduces inflammation markedly. Total mouth extraction is sometimes required.

Analgesics such as NSAIDs and transmucosal buprenorphine are commonly used in management of these patients at home. Methadone should be used during dental procedures, along with local anaesthesia techniques. Immunomodulatory therapy, for example, interferon, has also been described.

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Reader Questions and Answers

1. WHICH ROUTE OF ADMINISTRATION OF BUPRENORPHINE AT STANDARD DOSAGE RATES IS NOT RECOMMENDED DUE TO POTENTIAL ISSUES WITH ABSORPTION:

- A. Transmucosal
- B. Intramuscular
- C. Subcutaneous
- D. Intravenous

2. WHICH FEATURE IS NOT USED AS PART OF THE FELINE GRIMACE SCALE ASSESSMENT:

- A. Ear position
- B. Tail position
- C. Whisker position
- D. Head position

3. ALLODYNIA IS DEFINED AS:

- A. Pain associated with a stimulus that does not normally cause pain
- B. Increased sensation of pain from a stimulus that does cause pain
- C. Increased response of nociceptive neurones in the periphery to stimulation
- D. Increased response of nociceptive neurones in the central nervous system to their normal input

4. WHICH PART OF THE BODY IS NOT ONE OF THE MOST COMMONLY AFFECTED AREAS IN FELINE OSTEOARTHRITIS:

- A. Hip
- B. Stifle
- C. Elbow
- D. Carpus

5. THE NOVEL TREATMENT, FRUNEVETMAB, EXERTS ITS EFFECTS VIA:

- A. Monoclonal antibodies, which target and neutralise nerve growth factor
- B. Preferentially inhibits COX-2 enzyme, limiting formation of prostaglandins involved in inflammation from arachadonic acid
- C. Analogue of neurotransmitter gamma-aminobutyric acid
- D. A non-competitive excitatory neurotransmitter N-methyl-D-aspartate (NMDA) antagonist

ANSWERS: 1C; 2B; 3A; 4D; 5A