State of the art
Monitoring the cat with CKD

Clinical nursing
Analgesia for oral procedures

A closer look at...
Toxoplasmosis

How to...
Reduce stress in the clinic

The International Society of Feline Medicine
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Welcome to the September edition of Feline Focus, which contains some really practical, useful information and tips to take back to your practice today. We start with Natalie Finch’s article on monitoring cats with chronic kidney disease. Identifying and treating complications early can make a huge difference to affected cats, prolonging their life. Could your practice do more for these cats? We move on to part 2 of our series on anaesthesia and analgesia for dental procedures, where our author Marieke de Vries encourages you to consider local anaesthesia as well as multimodal, pre-emptive analgesia. Ian Wright discusses how to answer queries from clients about toxoplasmosis, a cause of concern to many pregnant cat owners, but with sensible precautions cats pose a minimal risk. We finish with a great article by Lauren Finka on reducing stress in the clinic. You may be a Cat Friendly Clinic already (see www.catfriendlyclinic.org), but the tips in this article are worthy of a read. Being cat friendly doesn’t mean a re-build or fancy equipment, as Lauren explains, it is about having a patient and flexible approach, and understanding and avoiding causes of stress.

Remember our webinars! This month we have a bumper CPD for nurses with two webinars instead of our usual one. See www.icatcare.org/nurses for information and registration.

Best wishes,

Sam Taylor, Veterinary Editor

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Monitoring the cat with chronic kidney disease in the clinic and at home

Chronic kidney disease (CKD) is common in the senior cat population. Early diagnosis and monitoring may be important in slowing disease progression and improving quality of life. Within the clinic blood and urine screening, blood pressure measurement, body weight and body condition scoring are important in the management of cats with CKD. At home, owners can monitor general demeanour, maintain a food diary and collect urine samples. Recommended treatment of feline CKD includes feeding a renal diet restricted in protein and phosphate content, which has been shown to improve survival. Additional management such as anti-hypertensive medication, treatment for proteinuria, phosphate binders and potassium supplementation should be tailored to a patient’s individual needs.

Chronic kidney disease (CKD) is a common illness, mainly affecting older cats. Following diagnosis it is important to understand why monitoring of cats with CKD is valuable. Monitoring forms an essential component of the management of these cases; it facilitates early diagnosis and detection of any secondary complications of CKD which may develop, thereby allowing early treatment. This will not only improve quality of life for cats but may also slow the progression of disease and increase survival time. Monitoring also provides information about disease stability which can give some indication regarding progression and prognosis. It is also important that owners understand the importance of monitoring to ensure they remain committed. Nurses and technicians should be involved in the monitoring of cats with CKD, and specific geriatric or CKD clinics can be very useful for staying in touch with owners to allow appropriate monitoring.

Key point
Chronic kidney disease commonly affects older cats. Monitoring is important to identify complications, assess progression and help to prolong life in affected cats.

Monitoring in the clinic
Blood testing
Creatinine
Blood creatinine concentration is the most widely used marker of kidney function in veterinary medicine. Its clinical utility is based on its
relationship with glomerular filtration rate (GFR; the most accurate measurement of renal function). The relationship is exponential and therefore, in early kidney disease there can be a significant decrease in GFR before any corresponding increase in creatinine concentration is seen (Figure 1). Creatinine is mainly produced from muscle and therefore concentrations can reflect not only GFR but also muscle mass. In patients with poor body condition and reduced muscle mass, creatinine concentrations will be lower. There can also be variability in creatinine measurements between in-house blood analysers in veterinary practice, and in reference intervals between different laboratories, and this is an important consideration if comparing results.

**Urea**

Urea is also a commonly used marker of renal function. Urea is more affected by non-renal factors such as dehydration, a high protein diet, recent feeding and gastrointestinal haemorrhage than creatinine. For this reason, it is considered a less reliable marker.

**Cats with increasing creatinine concentration**

If a cat that has been diagnosed with CKD has increasing creatinine concentration, termed worsening azotaemia, it is important to rule out that it is not dehydrated. Hydration status can be assessed by checking for tacky mucous membranes and prolonged skin tenting. If a patient is suspected to be dehydrated, then appropriate fluid therapy should be instigated. A concurrent urinary tract infection (UTI) or pyelonephritis should also be excluded by performing urine culture and sensitivity. Cats with worsening azotaemia may be experiencing an ‘acute on chronic’ episode in which there is acute deterioration in a patient with CKD. It is important to exclude initiating factors for this such as recent general anaesthesia or non-steroidal anti-inflammatory drug (NSAID) administration. If all of the above are excluded, then it is likely that the cat has progressive CKD.

**Cats with decreasing creatinine concentration**

If a cat that has been diagnosed with CKD has decreasing creatinine concentration, this may represent a
loss of muscle mass. Therefore, review any changes in body weight or body condition score. It is also possible that there may have been a previous acute kidney injury (AKI) for which the initiating factor has resolved allowing the kidney function to improve. Cats with CKD can also develop hyperthyroidism which can complicate assessment of kidney function. This is because hyperthyroidism will increase GFR and consequently decrease creatinine concentration. Therefore, measuring total thyroxine in a cat with decreasing creatinine concentration, particularly an older cat, is important.

**Phosphate**

Phosphate is a further important blood parameter to monitor in cats with CKD. Phosphate plays a role in the development of renal secondary hyperparathyroidism in which there is increased production of parathyroid hormone (PTH) from the parathyroid gland. Renal secondary hyperparathyroidism can lead to mineralisation of tissue, particularly the kidneys, which can contribute to worsening kidney disease. In one study of cats with CKD, it was found that phosphate was an independent predictor of survival with each 1 unit increase in phosphate concentration associated with an 11.8% increase in risk of death.4

**Calcium**

Calcium should also be monitored in cats with CKD. Total calcium (calcium which is measured routinely in biochemistry panels) is generally normal or increased and ionised calcium (the biologically active form of calcium requiring specific ion-selective electrode analysers for measurement) is generally decreased in cats with CKD.

**Key point**

Other parameters to monitor in cats with CKD in addition to creatinine include phosphate, calcium and potassium. Increased phosphate is associated with a decreased survival and a low potassium may affect a cat’s appetite.

**Electrolytes**

Electrolytes (sodium, potassium and chloride) are important to monitor and in particular potassium. Hypokalaemia (low potassium concentration) is reported in approximately 20% of cats with CKD and is thought to develop due to increased urinary losses, reduced appetite and vomiting. Management of hypokalaemia involves oral potassium supplementation.

**Haematology**

Haematology should be performed alongside biochemistry or, as a minimum, packed cell volume (PCV) measured. This is because cats in the later stages of CKD can develop anaemia. This can be due to reduced production of erythropoietin (the hormone which stimulates red blood cell production) in diseased kidneys, reduced life span of red blood cells due to accumulation of uraemic toxins and gastrointestinal effects.
haemorrhage. Management of anaemia involves the administration of drugs that stimulate production of red blood cells such as recombinant erythropoietin or darbepoietin. Recombinant erythropoietin has been associated with production of antibodies against red blood cells in up to 25% of cats it is used in and, therefore, darbepoietin is the drug of choice. Nandrolone (Laurabolin) is licensed for the management of cats with CKD and has been suggested to improve anaemia; however, there are no clinical studies that have been performed to support its use.

**International Renal Interest Society (IRIS) staging system**

The IRIS staging system for CKD was established to provide a tool for veterinarians to communicate about patients without depending on reference intervals for healthy animals set by any particular laboratory. It is widely used in clinical and research work to promote uniform standardisation, aid in diagnosis and management and predict prognosis. The IRIS staging system for CKD is applied to cats with confirmed CKD and is based upon fasting plasma creatinine, with substaging based on urine protein:creatinine ratio and systolic blood pressure. IRIS has also recommended target phosphate concentrations for each stage of CKD in cats to be achieved through feeding specially formulated renal diets and administering phosphate binders (Table 1).

**Table 1: IRIS staging system and target phosphate concentration for cats with CKD**

<table>
<thead>
<tr>
<th>IRIS stage</th>
<th>Creatinine concentration</th>
<th>Target phosphate concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>&lt;140 µmol/l</td>
<td></td>
</tr>
<tr>
<td>Stage 2</td>
<td>140–250 µmol/l</td>
<td>&lt;1.45 mmol/l</td>
</tr>
<tr>
<td>Stage 3</td>
<td>251–440 µmol/l</td>
<td>&lt;1.61 mmol/l</td>
</tr>
<tr>
<td>Stage 4</td>
<td>&gt;440 µmol/l</td>
<td>&lt;1.94 mmol/l</td>
</tr>
</tbody>
</table>

**Urinalysis**

Ideally, urine should be obtained for urinalysis via cystocentesis (Figure 2), particularly if performing culture and sensitivity. Urine specific gravity (USG) should be measured using a refractometer and not using a urine dipstick. This is because dipsticks are designed for human use and their USG measurement is not reliable in cats. USG can be variable in cats with CKD. It is generally lower (<1.035) but it has been shown in artificial models of kidney disease that cats can still retain concentrating ability despite significant loss of functioning kidney tissue. Protein can be assessed on dipsticks but these do not provide a quantitative measurement. Urine
Table 2: IRIS guidelines for substaging of proteinuria in CKD

<table>
<thead>
<tr>
<th>Urine protein: creatinine ratio (UP:C)</th>
<th>Substage of proteinuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.2</td>
<td>Non-proteinuric</td>
</tr>
<tr>
<td>0.2–0.4</td>
<td>Borderline proteinuric</td>
</tr>
<tr>
<td>&gt;0.4</td>
<td>Proteinuric</td>
</tr>
</tbody>
</table>

protein:creatinine ratio (UP:C) is used to provide a quantitative measurement. The IRIS guidelines for the substaging of proteinuria in CKD are presented in Table 2.

Treatment of proteinuria is only instigated if a cat is demonstrated to be persistently proteinuric (ie, UP:C >0.4) without evidence of urinary tract inflammation. Reducing proteinuria is important as proteinuria may be intrinsically damaging to the kidneys by causing inflammation, which may worsen kidney disease. Proteinuria is associated with survival in cats with CKD. Drugs for managing proteinuria in cats include angiotensin converting enzyme (ACE) inhibitors such as benazepril and angiotensin receptor blockers such as telmisartan. Other management options include feeding a renal diet, which is reduced in protein, and supplementing with essential fatty acids, which may reduce inflammation in the kidney.

A urine sediment examination should be performed on urine samples obtained from cats with CKD to look for evidence of an inflammatory sediment, such as the presence of white blood cells and bacteria indicating a UTI. Urine should also be submitted for culture and sensitivity. Some cats can have a subclinical UTI where there are no clinical signs associated with it or no evidence of an inflammatory sediment on sediment examination. Cats with CKD are predisposed to developing UTIs as they will generally have more dilute urine. Up to 35% of cats with CKD are reported to develop a UTI at some point during the course of their disease. If a UTI is confirmed, antibiotic choice should be based on culture and sensitivity results.

Key point

Urinalysis is important to perform in cats with CKD:

- Urine specific gravity should be measured on a refractometer and not using a dipstick as these are designed for humans and are not accurate for cats.
- Cats with CKD should have the protein in their urine measured using a urine protein:creatinine ratio. Cats with a ratio above 0.4 should be treated with an ACE inhibitor or angiotensin receptor blocker.
- Up to 35% of cats with CKD are reported to develop a urinary tract infection and may show no clinical signs. Sediment should be regularly examined in cats with CKD and, ideally, urine culture performed.

Body weight and body condition score (BCS)

Body weight and BCS can provide useful information regarding a cat’s overall condition and should be recorded at each visit. The 9-point scoring system is generally recommended for monitoring BCS. Any significant change in weight or BCS is cause to investigate that there are no concurrent problems or secondary complications of CKD developing.
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Blood pressure monitoring

Systolic blood pressure should be monitored in cats with CKD (Figure 3). Between 19% and 61% of cats with CKD are reported to develop hypertension and if uncontrolled, may damage the kidneys and contribute to progression of disease. The IRIS guidelines for substaging of blood pressure in CKD are presented in Table 3. Anti-hypertensive medication is generally recommended if systolic blood pressure is persistently >160mmHg in a calm, non-fractious cat. The drug of choice is amlodipine which is a calcium channel blocker resulting in vasodilation of blood vessels.

<table>
<thead>
<tr>
<th>Systolic blood pressure (mmHg)</th>
<th>Diastolic blood pressure (mmHg)</th>
<th>IRIS substage</th>
<th>Risk of hypertensive end organ damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;150</td>
<td>&lt;95</td>
<td>0</td>
<td>Minimal</td>
</tr>
<tr>
<td>150–159</td>
<td>95–99</td>
<td>1</td>
<td>Low</td>
</tr>
<tr>
<td>160–179</td>
<td>100–119</td>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;180</td>
<td>&gt;120</td>
<td>3</td>
<td>High</td>
</tr>
</tbody>
</table>

Figure 3: Systolic blood pressure should be measured in cats using the Doppler technique

Tip

Blood pressure should be measured in all cats with CKD, perhaps in a nursing clinic.

Dietary management of feline CKD

Ideally, all cats with CKD should be transitioned onto a renal diet. These diets are, amongst other factors, low in protein and phosphate which helps to reduce blood phosphate concentrations. The feeding of a renal diet has been shown to improve the survival of cats with CKD.6 In this study, cats that were fed a renal diet survived for a median of 633 days compared with cats fed a normal diet which survived only 264 days.

Cats are notoriously fussy eaters and Box 1 includes some top tips for introducing a renal diet. Phosphate binders can also be administered to decrease phosphate concentrations. These can be administered alone or in combination with a renal diet. To be effective they must be administered with food as they act to bind phosphate within the gastrointestinal tract and prevent its absorption.

There are various renal diets and phosphate binders available for cats...
and there are no studies that have evaluated if there is a benefit of one particular product over others.

**Frequency of visits to the practice for cats with CKD**
The frequency of monitoring cats with CKD at the clinic depends on firstly, the stability of the disease and secondly, whether there are any secondary complications of kidney disease. In addition, owner commitment may play a role. Ideally, cats should be rechecked every 2–4 months monitoring weight and BCS, biochemistry, haematology, urinalysis (including UP:C and urine culture) and systolic blood pressure at each visit. Renal clinics can be established within the practice to encourage owners to return regularly. As cats with CKD are generally older cats, they can be affected by multiple diseases and so regular monitoring at nursing clinics should be encouraged (see **Geriatric clinics: can you afford not to offer them?** *Feline Focus* 2015; 1[10]; 371–374).

**Box 1: Top tips for introducing renal diet**

- Do not introduce the renal diet when the cat is hospitalised in the clinic as this can lead to food aversion.
- Do not introduce the renal diet when the cat is inappetent as this can also lead to food aversion.
- Transition onto the diet over a few weeks by mixing with normal food, or offering alongside the normal diet, slowly increasing the proportion of the renal diet.
- If the cat doesn’t eat one particular diet then try a different formulation, flavour or brand.
- Try to encourage feeding 100% of the renal diet but if this is not possible then feeding as much as possible.

**Monitoring the cat which is difficult to handle**
The ISFM/AAFP feline friendly handling guidelines should be followed with every cat and will help to minimise stress in a fearful patient and facilitate sampling (Figure 4). Furthermore, becoming a cat friendly clinic (see www.catfriendlyclinic.org) will help enormously in handling fearful cats. However, there may be patients which, despite following the guidelines, are very difficult to handle and sample in the clinic.

**Key point**

Sedation should be avoided if possible in cats with CKD to avoid reducing blood pressure and blood flow to the kidneys. Sedative drugs that do not affect blood pressure should be used if necessary and attention paid to hydration.

**Figure 4:** Following the ISFM/AAFP feline friendly handling guidelines will help to minimise stress in a fearful patient and facilitate sampling.
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The obvious solution is to sedate such patients; however, this will reduce blood perfusion to the kidneys and may worsen kidney disease. Therefore, this should be avoided unless it is essential to perform testing because of concerns that the cat is deteriorating, developing a concurrent problem or secondary complication of CKD. It is unlikely that a reliable measurement of systolic blood pressure will be obtained from the cat and it should be discussed with the owners that they must be extra vigilant regarding monitoring for acute onset blindness which would suggest hypertensive retinal damage. Free-catch urine samples can be obtained by the owners at home as discussed below and can be of some use.

**Monitoring the cat with owners with limited finances**

There may be financial limitations for some owners. This can be overcome by offering free nursing clinic appointments to monitor body weight and blood pressure between full check-ups; for example, a nurse appointment every 3 months and a full check-up including bloods every 6–12 months. This means the cat is still monitored and complications identified. A minimum renal panel can be performed rather than full biochemistry. The minimum panel should include creatinine, urea, phosphate, calcium and electrolytes. Use an in-house PCV rather than full haematology and perform in-house urinalysis.

**Monitoring at home**

Many owners are very committed to their cats and are eager to perform useful monitoring at home. As with all pets, general demeanour should be monitored along with monitoring for any signs that might suggest systemic illness such as lethargy, weight loss, vomiting and diarrhoea. It is helpful for owners to maintain a food diary which has value in providing information regarding appetite and quantity of renal diet a cat is actually eating. Monitoring of urination for any changes such as polyuria, stranguria or haematuria that may suggest development of a UTI should be performed. Free catch urine samples can be obtained at home and bought into the clinic where USG, UP:C, dipstick and sediment examination can be performed. However, as discussed above, if there is suspicion of a UTI a cystocentesis sample should ideally be collected and submitted for culture and sensitivity.

It can be very upsetting for owners to discover that their pet has CKD. It is important to counsel them that, although this is a progressive
disease, it generally progresses slowly and cats will often die from other causes. There is a very helpful, informative book entitled ‘Caring for a cat with chronic kidney disease’ which is written by Dr Sarah Caney. Owners can purchase this book online at www.catprofessional.com.

Subcutaneous fluid administration at home

It has been suggested that administration of subcutaneous fluids by owners to their cats with CKD at home may be beneficial as it may manage any dehydration which might develop. However, it has been shown that cats with early stage CKD do not have reduced body fluid volumes compared with normal cats. There are no clinical studies evaluating beneficial effects of subcutaneous fluid administration in cats with CKD. It is theoretical that they may be detrimental by placing increased functional demand on the kidneys and also, as cats are small and susceptible to fluid volume overload, may contribute to development of hypertension. Therefore, the author does not recommend their use in early stage CKD. There may be a place for subcutaneous fluids in the management of cats with later stage disease, and this should be decided on a case by case basis.

References


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- Effectively educate your clients on how best to meet their cats’ behavioural needs
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Effective pain control is important in cats undergoing dental and oral procedures. Once pain is established it can be a challenge to treat effectively. Use of pre-emptive and multimodal analgesic protocols is therefore recommended. Various analgesic techniques are available for this purpose, and should be selected on an individual basis. Local anaesthetic techniques can provide very effective analgesia, and allow reduced doses of other anaesthetic and analgesic drugs to be used.

To effectively prevent and treat pain, a good understanding of the involved mechanisms is essential. The use of pre-emptive and multimodal analgesia is vital for effective pain management of cats undergoing potentially very painful oral and dental procedures.

Pain generation pathways
Activation of nerve endings by noxious stimuli results in the generation of electrical impulses. These electrical impulses are generally transmitted via afferent nerve fibres to the dorsal horn of the spinal cord, through which they reach the cerebral cortex where pain perception takes place. The trigeminal nerve is responsible for transmission of (painful) stimuli derived within the oral cavity. Noxious stimuli initiating this pathway originate either directly from oral manipulation or from inflammation triggered by tissue damage. Inflammatory mediators such as prostaglandins, potassium and hydrogen ions, adenosine triphosphate, bradykinin and nerve growth factor all reduce the threshold for stimulation of sensory nerve endings. As a result, more impulses arrive at the central nervous system (CNS): a process called peripheral sensitisation. This results in increased stimulation of N-methyl-D-aspartate (NMDA) receptors within the CNS with a consequently exaggerated response to the stimulus (central sensitisation or ‘wind-up’). This hyperexcitable state within the CNS can remain present even after the original painful stimulus has disappeared. Characteristic for central sensitisation is the ability for nociceptive thresholds to increase, resulting in amplified or prolonged pain. This can be a significant challenge in patients with chronic pain.

After graduating from Utrecht University in the Netherlands in 2001, Marieke de Vries completed an equine internship at a large equine referral centre in the Netherlands, where she gained interest in anaesthesia. An internship and residency in veterinary anaesthesia and analgesia at Cambridge University, UK, followed, after which she successfully passed the European board examinations and became an ECVAA specialist. Marieke joined Davies Veterinary Specialists in May 2014 after having worked for more than 6 years at two other referral centres within the UK.

This article covers analgesia in oral procedures in detail. Anaesthesia was covered in last month’s issue (Care of the cat undergoing dental and oral procedures 1: general anaesthesia. Feline Focus 2016; 2[6]: 229–240).
Clinical nursing

sensitisation is the presence of allodynia (in which a normally non-painful stimulus is experienced as painful) and hyperalgesia (a painful stimulus elicits an abnormally strong pain reaction). Central sensitisation can last for days to weeks, or even a lifetime.¹

Key point

Once pain is established, it becomes more difficult to control. Pre-emptive administration of analgesic agents before a painful stimulus is recommended.

Once pain is established, it becomes more difficult to control; pre-emptive administration of analgesic agents before a painful stimulus is therefore desired. The aim of pre-emptive analgesia is to prevent the development of central sensitisation. Inadequate levels of analgesia may result in extended hospitalisation and fluid support, additional analgesic requirements and feeding assistance.²

Multimodal analgesia

There are several classes of analgesic agents that can be used as part of a multimodal analgesic protocol:

- **local anaesthetic agents**: these effectively prevent peripheral noxious impulses reaching the CNS by blocking sodium channels. Injection of these drugs along sensory nerves can therefore provide optimal pre-emptive analgesia.
- **opioids**: acute pain impulses are well controlled with opioids as these agents modulate wind-up pain and the conscious perception of pain.
- **alpha-2 adrenoceptor agonists**: these provide not only sedation and muscle relaxation but also analgesia and have synergistic actions with opioids.
- **NSAIDs**: by inhibiting cyclooxygenase (COX) enzymes, non-steroidal anti-inflammatory drugs (NSAIDs) reduce peripheral inflammation.
- **NMDA-receptor antagonists**: (eg, ketamine) can be of added value in chronic pain states characterised by central sensitisation.

For recommended doses and routes of administration of the various analgesic agents see Table 1.

Local anaesthetic techniques

Local anaesthetic techniques should be part of the balanced anaesthetic protocol as they ensure optimal analgesia by blocking sensory nerves. Application of these techniques results in a reduction of the amount of anaesthetic agents needed to maintain an adequate level of anaesthesia; they therefore improve patient safety by reducing side effects. Administration of long-acting local anaesthetic agents also ensures analgesia well into the postoperative period.

Contraindications for local anaesthetic techniques are infection, tumours and inflammation at the injection site. For extra-oral approaches, the fur can be clipped and the skin surgically prepared before inserting the needle.

There is no need for special instruments to apply regional nerve blocks; a 1 ml syringe with a 25–27 G needle is all that is needed. It is advisable not to draw up more than the maximum recommended dose of local anaesthetic agent to avoid overdosing. In general, a volume of 0.2–0.3 ml is recommended per injection site in cats.¹ To limit the chance of irritating the periosteum,
the needle should be positioned in
such a way that the bevel remains
parallel to the bony surface, with the
bevel directed towards the nerve to
maximally expose the nerve to the
anaesthetic agent. See Box 1 for more
on the sensory innervation of the oral
cavity.

Local anaesthetic agents
Lidocaine, mepivacaine, bupivacaine
and ropivacaine are local anaesthetic
agents commonly used for nerve
blocks; the main difference between
these agents being time of onset
and duration of action. When
administered at relatively high
doses, these agents can have
profound cardiovascular and CNS
side effects, even with cardiac arrest
as result. The total dose which can
be safely used has to be calculated
beforehand, taking into account
lidocaine used for desensitisation
of the larynx and agents used for
desensitisation of the skin, if
applicable. When several blocks are
planned, the calculated maximum
safe amount should be divided over
the various blocks and diluted with
sterile saline if necessary. Different
local anaesthetic agents can be used
in the same patient but their
systemic toxicity is additive: the
maximum dose per agent should be
reduced concordantly. See Table 3
for onset time, duration of action

Table 1: Analgesic agents for use in cats

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buprenorphine</td>
<td>0.02 mg/kg q6-8h</td>
<td>IV, IM, SL</td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>0.2-0.5 mg/kg q3-6h</td>
<td>IV, IM</td>
<td>Use lower dose for IV</td>
</tr>
<tr>
<td>Morphine</td>
<td>0.2-0.5 mg/kg q3-6h</td>
<td>IV, IM</td>
<td>Slow IV</td>
</tr>
<tr>
<td>Pethidine</td>
<td>2-5 mg/kg q2h</td>
<td>IM</td>
<td>Do not give IV</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>2-5 μg/kg 5-10 μg/kg/h</td>
<td>IV</td>
<td>During surgery</td>
</tr>
<tr>
<td>Tramadol</td>
<td>3-5 mg/kg q 12h</td>
<td>PO</td>
<td></td>
</tr>
<tr>
<td>Dexametomidine</td>
<td>0.5-1 μg/kg/h</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>Medetomidine</td>
<td>1-2 μg/kg/h</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>Carprofen</td>
<td>4 mg/kg</td>
<td>IV, SC</td>
<td>One-off dose</td>
</tr>
<tr>
<td>Meloxicam</td>
<td>0.2 mg/kg 1st dose</td>
<td>SC, PO</td>
<td>Try to taper down oral dose to effect in case of chronic use</td>
</tr>
<tr>
<td></td>
<td>Per body weight following dose q24h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketamine</td>
<td>0.2-0.5 mg/kg 5-10 μg/kg/min</td>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>Amantidine</td>
<td>3-5 mg/kg q24h</td>
<td>PO</td>
<td></td>
</tr>
</tbody>
</table>

IV = intravenous, IM = intramuscular; SL = sublingual; PO = per os; SC = subcutaneous

Key point
Local anaesthetic techniques should be part of the balanced anaesthetic protocol as they ensure optimal analgesia by blocking sensory nerves.
Clinical nursing

Box 1: Sensory innervation of the oral cavity

The sensory innervation of the oral cavity is provided by the trigeminal nerve and its two branches which are the maxillary and mandibular nerves. See Table 2 for structures innervated by the relevant nerves and Figure 1 for the various locations on the skull. For more detailed information on the landmarks for these local anaesthetic techniques, the readers are referred to dedicated textbooks.3,4

Table 2: Sensory nerves of the oral cavity with their related desensitised structures after successful nerve blockade

<table>
<thead>
<tr>
<th>Nerve blocked</th>
<th>Desensitised structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infraorbital (within the infraorbital canal)</td>
<td>Ipsilateral third to first premolar teeth, canine and incisor teeth and associated soft tissues, skin of the muzzle and the upper lip</td>
</tr>
<tr>
<td>Maxillary</td>
<td>Ipsilateral maxilla (teeth, bone and soft tissues), skin of the nose, cheek, upper lip</td>
</tr>
<tr>
<td>Mental (within the mental canal)</td>
<td>Ipsilateral canine and incisor teeth, rostral lower lip, rostral intermandibular tissues</td>
</tr>
<tr>
<td>Mandibular</td>
<td>Ipsilateral mandibular (teeth, bone and soft tissue), labial tissues, rostral lower lip, rostral intermandibular tissues</td>
</tr>
</tbody>
</table>

and recommended doses for the various agents.

Possible complications of local anaesthetic techniques
To avoid nerve damage, the needle has to be carefully manipulated, both during insertion as during withdrawal. It is recommended to replace the needle each time a new injection is made. Injection under high pressure may result in nerve damage, especially when injecting into a canal. Intravascular injection of especially bupivacaine can result in (potentially severe) cardiovascular and neurological side effects. It is good practice to always aspirate before injecting to confirm that the tip of the needle has not hit a blood vessel. Haematoma formation at the injection site sometimes occurs but rarely results in serious implications.

Opioids
Mu opioid receptor agonists provide excellent analgesia for moderate to severe pain. Methadone, morphine and buprenorphine are all suitable for use in cats. Morphine may result in...
vomiting, especially in non-painful cats; its intravenous (IV) administration can potentially result in histamine release. Slow IV administration or intramuscular (IM) injection is therefore advisable. Methadone is similar in action and duration to morphine but less likely to induce vomiting; it also has some antagonistic effects on NMDA receptors. Buprenorphine is a partial mu-agonist and suitable for treatment of mild to moderate pain. Its absorption after oromucosal/sublingual administration is good in cats; however, the subcutaneous route is not recommended because of unreliable uptake and, therefore, effect. The multidose preparation of buprenorphine has been shown to be less favourable for the oromucosal route than the 1 ml vials; its administration resulted in hypersalivation and less cooperative behaviour.5

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset time (min)</th>
<th>Duration of action (h)</th>
<th>Maximum recommended dose (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lidocaine</td>
<td>5–15</td>
<td>1–2</td>
<td>6</td>
</tr>
<tr>
<td>Mepivacaine</td>
<td>5–15</td>
<td>1.5–2.5</td>
<td>10</td>
</tr>
<tr>
<td>Bupivacaine</td>
<td>10–20</td>
<td>4–6</td>
<td>2</td>
</tr>
<tr>
<td>Ropivacaine</td>
<td>10–20</td>
<td>3–5</td>
<td>3</td>
</tr>
</tbody>
</table>

**Table 3: Onset time, duration of action and maximum dose of local anaesthetic agents used for local nerve blocks in cats**

**Tramadol**
Tramadol is a synthetic derivative of codeine but is strictly speaking not an opioid. Its main action is via inhibition of serotonin and noradrenaline re-uptake; some of its metabolites have (weak) mu-opioid receptor agonist activity. Compared with dogs, cats produce high concentrations of its metabolite O-desmethyltramadol, which has a high affinity for the mu opioid receptor. As tramadol is metabolised in the liver via pathways that are sometimes not well developed in cats, a lower dose with a longer dosing interval is recommended compared with dogs.

**NSAIDs**
These drugs inhibit COX-I and COX-II enzymes involved in prostaglandin synthesis. Various NSAIDs are licensed for the use in cats, although none specifically for dental procedures.

NSAIDs vary in selectivity for inhibition of both COX-I and COX-II enzymes. The most common adverse effects related to their use are gastrointestinal disturbances, ranging from vomiting and diarrhoea to erosions, perforations and even death. Renal toxicity is another side effect because NSAIDs can alter renal haemodynamics resulting in regional hypoperfusion and subsequent renal failure. Their use is contraindicated in hypovolaemic and hypotensive patients. Special care has to be taken in patients with decreased liver and renal function.

The use of NSAIDs in cats with renal disease remains controversial as there is still a relative paucity of information on their chronic use in this species. Fear of toxicity exists which may be due to the cat’s unique metabolism; its relative deficiency of certain enzymes may

**Splash block**
If a local anaesthetic technique is not feasible or unsuccessful (the patient reacts to a painful stimulus in the innervated area), a splash block can be performed with 2% lidocaine or 0.5% bupivacaine by bathing the wound or incision before closing. The agent should be left in place for 2 minutes for adequate penetration into the nerve endings.
result in a prolonged half-life for certain drugs. Meloxicam, piroxicam and robenacoxib are less likely to accumulate in cats as their metabolism does not involve these enzymes. Long-term treatment with meloxicam for degenerative joint disease has been described in cats with both normal renal function and chronic renal disease.6,7 Lifespan was not reduced in the latter group compared with cats without renal impairment, while quality of life clearly had improved. Patients should be carefully selected when NSAIDs are prescribed for long-term use and regularly assessed for adverse effects. If in doubt, withhold the administration of the NSAID until the patient is fully recovered from anaesthesia and normal hydration state and normotension are ensured.

**Alpha-2 adrenoceptor agonists**
These drugs provide analgesia, sedation and muscle relaxation and act synergistically with opioids. Besides these desirable effects these drugs also have profound cardiovascular side effects: an increase in systemic vascular resistance, bradycardia and a significant reduction in cardiac output (CO) are common. Alpha-2 agonists should not be used in cardiovascular compromised patients. Often, much lower than the recommended manufacturer doses are sufficient when used as part of pre-anesthetic medication. However, even doses as low as 5 μg/kg IV result in profound reduction in CO.

**NMDA-receptor antagonists**
Ketamine and amantadine are examples of NMDA-receptor antagonists and can be used for treatment of chronic pain states. Ketamine can either be administered as a bolus or as an IV infusion. Amantadine is given orally.

**Conclusions**
Pre-emptive and multimodal analgesia is the most effective way to control pain in the patient treated for dental and oral procedures. There are various drug choices and treatment should be selected according to the individual cat’s requirements. Local anaesthesia is very effective in such patients.

**References**

Toxoplasmosis: putting disease risks into perspective

Cats carry a number of different endoparasites of clinical and zoonotic significance. A few of these are immediately recognised by the public due to their zoonotic potential. *Toxoplasma gondii* is one of these organisms and does carry significant zoonotic risk as well as potentially causing disease in cats. However, cats pose a minimal risk to humans, who are most commonly infected via undercooked meat. Control of human toxoplasmosis is based predominantly on sound hygiene and food preparation practice, and much of the zoonotic risk can be mitigated through sound advice to clients. Veterinary nurses and technicians are at the forefront of dispensing this advice and putting owner concerns about the risks their cats pose into perspective.

The names of few feline parasites are immediately recognised by the public, but a few are known and feared due to their zoonotic significance. *Toxoplasma gondii* is one of these parasites and does carry significant zoonotic risk, as well as potentially causing disease in infected cats. Treatment is difficult and there is no effective chemoprophylaxis so hygiene forms the basis of disease control. Veterinary nurses and technicians play a vital role in dispensing accurate control advice as well as keeping disease concerns in perspective and allaying public fears. This is of particular concern to pregnant cat owners or immunosuppressed individuals, who may be worried about the risk that their pet cat represents. This article provides practical advice that nurses and technicians can give to help keep the public safe.

**Life cycle and transmission**

*T. gondii* infects all mammals but only felids act as a definitive host; ie, the parasite can only produce...

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**Key point**

Cats are infected by *T. gondii* most commonly by eating rodents and birds.

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**Figure 1**: The life cycle of *T. gondii*. Cats, as definitive hosts, are required for the parasite to produce oocysts. Intermediate hosts, including humans, may be infected.
A closer look at...

- oocysts (eggs) when infecting a cat. These oocysts are passed in the faeces (Figure 1). Although cats can be infected through faecal-oral ingestion of oocysts, they most commonly acquire the infection by ingestion of tissue cysts. This occurs through predation of intermediate hosts such as rodents (Figure 2) and birds, by feeding on raw or undercooked meat or, less commonly, eating aborted ovine material.

**Clinical signs in cats**

Clinical toxoplasmosis is rare in cats. Most immunocompetent adult cats remain subclinical carriers. Kittens infected in utero can show signs of infection after birth, and prenatal infections of kittens are frequently fatal. The reasons for clinical manifestations in adult cats are not fully understood but thought to be linked with immunosuppression. This may be secondary to the use of immunosuppressive drugs or viral pathogens such as feline leukaemia virus or feline immunodeficiency virus. Affected animals show a variety of systemic signs including fever, anorexia, abdominal pain and dyspnoea. Uveitis and central nervous disorders may also develop.

**Diagnosis and treatment**

When oocysts are shed by infected cats, it is in large numbers (Figure 3). This only occurs for a short period of time and repeat shedding is infrequent. This in combination with the small size of the oocysts (typically 12.5 x 10.5 μm, thin shelled) makes detection by faecal examination difficult. Importantly, oocysts are not infective immediately, but only after 1–5 days depending on environmental conditions. Diagnosis is therefore based on a combination of clinical signs and serum antibody detection. Serology should be interpreted with care as clinical signs may develop before antibodies are present. The presence of antibodies may simply indicate prior infection.
Treatment with clindamycin can be useful (12.5 mg/kg q12h for up to 4 weeks) to resolve clinical signs of toxoplasmosis. This treatment does not eliminate infection. Clinical outcomes are improved if treatment is started early, so speculative treatment is justified if clinical infection is strongly suspected. There is no evidence that treatment has any effect on oocyst shedding so use of antibiotics is contraindicated in cats not exhibiting clinical signs, irrelevant of their serological status.

**Key point**

The diagnosis of toxoplasmosis in cats is challenging and serology must be interpreted carefully as positive titres may indicate prior exposure rather than current infection.

**Zoonotic disease**

While healthy people have a low risk of developing acute toxoplasmosis if infected, immunocompromised individuals or children infected in utero can suffer from severe ocular and cerebral signs that can lead to blindness or death. Zoonotic disease can be broadly grouped into three different categories:

- **acquired toxoplasmosis:** occurs worldwide with exposure to oocysts through environmental contamination or more commonly through the consumption of tissue cysts in undercooked or raw meat. The seroprevalence of human *T. gondii* infection has decreased significantly in Europe due to changes in eating habits, such as reduced foraging of wild fruit and vegetables and decreased consumption of raw or undercooked meat. Water borne infection and contamination of fruit and vegetables from kitchen gardens and allotments continues to be a significant source of infection. Strains of *T. gondii* in Europe and North America seem to be less virulent than those found in South America, and many cases are subclinical. Concerns about adult infection should therefore be kept in perspective. Reports have identified infection as a risk factor for schizophrenia, bipolar disorders, epilepsy and migraine, although a cause and effect is far from established.

- **congenital toxoplasmosis:** if women are infected while pregnant, transplacental infection can occur. Children infected in utero can suffer from severe, sometimes fatal, toxoplasmosis. This may be local, most commonly ocular or cerebral, or a generalised form affecting multiple organs. Infections acquired during the first trimester usually result in miscarriage. Women infected during the second trimester may have children that survive birth but with severe, sometimes life-threatening defects. Children
infected in the third trimester tend to be less severely affected.

- **opportunistic infection:** infection in immunocompromised patients, such as those suffering from HIV, undergoing chemotherapy or transplant patients, can be devastating, leading to central nervous system, ocular or multiple organ signs.

**Control of human toxoplasmosis**

Nurses and technicians are likely to be asked by concerned owners, especially pregnant women, about the risks of infection and how to minimise them. Owners should be reassured that infection poses minimal risk to immune competent adults (see Box 1) or to pregnant women that were seropositive prior to pregnancy. Infection, however, can carry significant disease risks and can be minimised by simple control measures. There is no specific need for cats to be removed from households with a pregnant family member.

**Reducing transmission risk**

The risk of transmission of toxoplasma can be reduced by:

- **thorough cleaning of litter trays:** daily cleaning ensures that any oocysts shed do not have time to sporulate and become infective. This cleaning should not be carried out by pregnant women and gloves should be worn. Litter trays should be cleaned with boiling water and detergent periodically to kill oocysts. Hands should be thoroughly washed after handling cat litter and bags of litter well sealed, for example in a plastic bag, before putting in general waste.

- **good hand hygiene:** reduces the risk of oocyst ingestion. Pregnant women should wear gloves when working with soil and handling sand from sandpits/boxes where cats may defaecate. Pregnant women should not handle lambs or kids but if they must, then strict hygiene must be maintained. People working in the meat industry are also over represented for infection, demonstrating the need for strict hygiene in these environments.

- **thorough washing of fruit and vegetables:** reduces the risk of oocyst contamination. Cats are frequent visitors to allotments and kitchen gardens so particular attention should be paid to fruit

**Box 1: What is the risk of acquiring toxoplasmosis from cats?**

- Research has shown that contact with cats does not increase the risk of *T. gondii* in people. In fact, veterinary surgeons are no more likely to be infected than the general population, including people with no cat contact.

- Eating raw or undercooked meat significantly increases the risk of acquiring the infection.

- Oocysts are not found on the coat of cats so stroking a cat poses no risk.

- It is rare to find oocysts in the faeces of cats, even those that are seropositive for infection.
and vegetables from these sites intended for raw consumption.

- **thorough cooking of meat:** destroys tissue cysts before consumption. Meat should only be eaten after thorough cooking or, if intended for raw or rare consumption, after freezing at −20°C for at least 2 days. Microwaving heats food unevenly so may not be effective.

- **cleaning food preparation surfaces:** using hot water and detergent inactivates any tissue cysts.

- **covering children's sandpits:** prevents cats using them as litter trays.

- **monitoring in pregnancy:** as seronegative women are at increased risk of infection, the serological status of pregnant women may be monitored (routine in some countries, not in others). Clients should be encouraged to discuss this with medical professionals.

**Key point**

There is no point testing concerned owner's cats for toxoplasmosis as interpretation of results is complex and there is no correlation with seropositivity and oocyst shedding.

By discussing and impressing upon owners the importance of hygiene control measures, nurses and technicians can help to minimise the risk of infection, while keeping client concern in perspective. Pregnant or immune suppressed owners may ask if testing their cats is worthwhile in terms of assessing their relative disease risk. Serology is not useful in this respect as not all infected cats are seropositive and there is no correlation between seropositivity and shedding of oocysts.

**Conclusions**

Toxoplasmosis is a disease very much at the forefront of public awareness as its links to complications during pregnancy are well known and often highlighted in the media. This will lead concerned clients to consult veterinary professionals including nurses and technicians for advice. *T gondii* poses a significant zoonotic disease risk and clients should be advised best practice to minimise these risks but they should also be kept in perspective as the risk from cats is minimal.

**References**


**Useful web resources**

FELINE STRESS AND HEALTH

MANAGING NEGATIVE EMOTIONS
TO IMPROVE FELINE HEALTH
AND WELLBEING

Brand new from ISFM, this guide is designed to help veterinary professionals better understand, prevent and manage stress and distress in cats.

The 160-page guide has been broken down into twelve easily digestible chapters, covering what stress and distress are, why cats can become stressed and/or distressed, and how this impacts on the behaviour and health of the cat. The guide looks at the causes of stress and distress in different environments, including the veterinary clinic, homing centres, at home and in multi-cat households, and how it can be prevented and managed.

This practical guide provides some basic ideas, principles and tips which can be implemented by all veterinary professionals, and will make a huge difference to the cats in your care.

Available now from:

www.icatcare.org/shop

An essential guide to understanding, preventing and managing feline stress to improve the health and wellbeing of the cats in your care
A practical guide to help reduce stress in cats in the veterinary clinic

While visits to the vets are rarely enjoyed by cats, many of the stressors they experience can either be greatly reduced, or in some cases eradicated, by implementing various different practical strategies in the clinic. Providing more ‘cat friendly’ areas for owners to wait with their cats, allowing more time per consultation, and adopting a more flexible, gentle and individual-based approach to handling cats during the examination are all highly effective at reducing stress. When housing cats, care should be given to the resources provided in the cat’s cage. Owners can be encouraged to help prepare the cat for their visit by bringing in items from home (such as towels, bedding and cat igloos) and also carrying out some basic training.

Visits to the vets can be very stressful for both the cat and owner, and in some cases an initial aversive experience can result in the cat making long-lasting negative associations with the clinic. Adequately managing the stress levels of cats in the veterinary clinic is therefore important as:

- Cats that become highly stressed during a consultation or procedure may be more difficult or dangerous to handle, making vital procedures difficult.
- Stress may affect the results of certain tests and alter physiological parameters (e.g., elevating blood glucose and heart rate).
- Postoperative recovery/treatment periods may be longer due to stress-induced immune-suppression.
- If the owner feels that their cat has had a particularly aversive experience while at the vets, this may give them a bad impression of the practice.
- Owners may be reluctant to take their cats to see the vet in the future if they are worried about the stress each visit will likely cause. This means that the cat can miss out on important or vital preventive treatments, or an early diagnosis.

There are however, a variety of different practical strategies that can be implemented to help reduce the stress the cat experiences. This article highlights some of the basic, but highly effective methods that can be used by those working with cats in the veterinary clinic in order to manage the stress levels of feline patients before, and during consultations, as well as when handling and housing the cat in the clinic.

Managing appointments
A busy, noisy veterinary clinic with a waiting area full of customers, their dogs, cats and possibly also children, can be particularly
daunting for some cats. It may therefore be beneficial to have blocks of ‘cat only’ slots at quieter times of the day, so that the cats are likely to encounter a more relaxed and peaceful waiting area upon arrival.

Providing longer appointment times, particularly for anxious cats, will enable veterinary staff to have sufficient time to adopt a more flexible approach during the appointment, allowing the cat to come out of the carrier in their own time and/or explore the room prior to examination.

### Key point

Providing clients with elevated areas to place cat baskets, out of view of other cats or dogs can reduce the stress of the waiting room.

### The waiting area

A cat that has had a stressful or aversive experience within the waiting area is likely to be more stressed and less easy to handle during the appointment. Cats will generally feel safer the more concealed they are in the presence of potential threats and stressors (such as other cats, dogs, unfamiliar humans, sudden loud and unfamiliar sounds and bright lighting). In addition, being higher up also provides cats with a better vantage point for observing possible threats, while at the same time being out of harm’s way.

A simple and effective solution to help reduce stress while in the waiting area is to provide a ‘cat only’ section, which is as physically separate from the ‘dog area’ as possible. Ensuring there is a visual barrier between these two areas (for example, using strategically placed display boards, merchandise, or a row of chairs in the cat section with their backs facing the dog area) is particularly beneficial.

**Tip**

Receptionists should be asked to give cat owners towels or sheets to cover wire cat carriers with in the waiting room.

The ‘cat only’ section can be further enhanced by:

- Providing a seating area large enough to accommodate both cats and customers, so that each cat can be placed on a raised surface rather than on the floor.
- Placing divisions or partitions between every few seats will also help to create visual barriers between cats placed on chairs.
- Secure ledges or deep shelving attached to the wall may also offer a suitable raised alternative to a chair.
- Some cats may feel anxious when in cat carriers that are quite visually ‘exposed’ (such as the carriers made of wire mesh rather than solid plastic). Providing clients with cotton sheets or towels large enough to cover their cat carrier may help to keep such cats calmer when in the waiting area. However it’s important to ensure the sheets are freshly washed in between each use to remove the scent of other cats.
- Using a plug-in Feliway (CEVA) diffuser will provide cats with ‘reassuring’ pheromones during their time in the waiting area.

If providing a ‘cat only’ waiting area is not practical, a suitable alternative is to allow, and indeed encourage, owners to leave their cat in the car.
until the vet is ready to start the consultation. Cats that do not cope well at the vets may particularly benefit from staying in the car and avoiding the waiting area altogether.

**During the consultation**
Cats are generally incredibly sensitive to their surroundings, particularly when in a novel environment. In such situations, perceived safety and security are going to be paramount to the cat. For certain cats this may mean avoiding exposure by remaining partially ‘hidden’; for others, being able to explore the new environment and identify areas of safety and potential threats is as important. Some cats may be relatively calm in this situation, but will need a few minutes to adjust before they feel confident enough to emerge from their carrier. This time can be used to discuss the cat’s health with the owner prior to examining the cat.

**Key point**
Some cats will feel more secure when examined in the base of the cat carrier, others will prefer to explore the consulting room. Try to follow the cat’s preference, if possible, to reduce stress.

**Remaining hidden**
Some cats will not want to emerge from their carrier and will find any attempts to remove them particularly stressful. Gently removing the lid or roof of a carrier (where possible) and performing the examination with the cat remaining in the bottom half of the carrier is recommended (Figure 1). Some cats will also benefit from being covered with a towel or blanket when the lid is removed, again to reduce how ‘exposed’ they may feel. A carefully placed towel may also encourage certain cats to remain still and better tolerate handling.

A cat that is terrified, and may panic as soon as the lid of the carrier is removed, can be tricky to manage. Try removing the back end of the carrier lid initially by lifting it up slightly to create a small gap. Enlist another person to start feeding a towel through the gap as it is made bigger, so that they can start to cover and then wrap the whole of the cat with a towel and gently but firmly hold the cat in place before the lid is fully lifted and removed (Figure 2). Always consider the person’s safety during this
procedure, particularly if the cat is likely to behave aggressively as the towel is fed through the back of the carrier.

Exploring the environment
Some cats will benefit from being given the chance to spend several minutes sniffing and exploring objects within the consultation room undisturbed, before being examined. High value treats can also be dropped or placed near to the cat to encourage positive emotions.

Cats that do not cope well being confined within a carrier may particularly appreciate a few initial minutes to stretch their legs. Within this period of time, the arousal levels of many cats may start to decrease so that when it comes to handling during the examination they may be slightly more relaxed. The examination can then be performed wherever the cat seems comfortable, for example on a window ledge or on the floor.

Handling and restraint
Placing a large towel on the consultation table for the cat to stand on offers a more stable non-slip surface, as well as something for the cat to grip on to. Bedding from the carrier itself may provide a familiar scent profile. If the cat becomes anxious or begins to panic during the examination, the towel can also be quickly wrapped around the cat to help to restrain it. When the cat is placed back into the carrier, the towel can be used to ‘scoop’ up an anxious cat, reducing its ability to struggle free and escape.

Initially, offering your fingers (palm facing down) to the cat to sniff before touching any other area is a nice gentle way to ‘introduce’ yourself to the cat prior to examination.

Managing the very frightened, panicked cat
Allowing more time during the consultation will provide the added bonus of being able to adapt handling methods to better suit the cat and the situation.

Key point
Less is more: using towels and minimal restraint techniques can minimise the cat’s negative experiences in the veterinary clinic.

Very frightened cats that are likely to panic and attempt to escape, or behave aggressively, may benefit from gentle but firm restraint using carefully placed towels. However, the general use of physical restraint techniques such as ‘scruffing’, ‘clipnosis’, muzzles and anti-anxiety ‘shirts’ is not recommended. While these methods may all be effective in reducing or restricting the physical mobility of the cat, observations of the cat’s posture and body language during the use of such techniques would suggest that in many cases negative arousal, and therefore stress levels, are substantially increased.

The practical use of muzzles and anti-anxiety ‘shirts’ on cats that are highly stressed, likely to panic or behave aggressively, is limited and the process of applying these products is not only likely to increase their stress, but may also place the handler at risk of being bitten or scratched.

In most instances, less ‘invasive’ types of restraint using towels is thought to be as effective a method of restraint as any of the above. If cats are considered unsafe to handle using towelling methods then sedation may be the better option.
Managing the relatively calm cat
Less anxious cats or those that are not as likely to panic, flee or behave aggressively will benefit from a much more hands off approach to restraint (see Box 1). Even if the cat appears to cope well with being examined, it is still likely to be more aroused in the consultation room than when at home. This means that even if the cat normally enjoys or tolerates a lot of physical handling and stroking it may be much more ‘touch sensitive’ when at the vets, enjoying or tolerating this handling much less than usual. In many cases arousal levels in such cats are best managed by avoiding prolonged touching or handling as much as possible, both during restraint of the cat but also inbetween individual procedures.

Where the cat is likely to benefit from gentle stroking during the consultation, focusing on the facial regions of cat where the scent glands are located (eg, perioral, submandular, cheek and temporal) are likely to induce a more pleasant sensation in the cat than, for example, touching their scruff, back and caudal regions.

When it is necessary to reposition the cat on the examination table, or place the cat on to the weighing scales, for example, allowing a little more time and encouraging the cat to move into position of their own accord, using high value treats where suitable rather than physical handling, is recommended.

Housing
If cats are to be housed at the clinic for a period of time, it is a good idea to encourage owners to bring in some extra towels or blankets from home that can be left in the cage. These provide the cat with a sense of familiarity during its stay. An element of privacy within the cage is also a must for cats. Owners can also be asked to bring in a medium sized cardboard box (big enough for the cat to rest in but small enough to fit in the cage) (Figure 5) or an igloo bed, to provide the cat with a familiar environment.
smelling hiding/resting place. Alternatively, one of the extra
towels/blankets can be hung over
part of the cage door, acting as a
curtain.

Housing cats away from the visual,
auditory and olfactory presence of
dogs is also recommended, as is

housing cats in cages that are not
directly facing other cats, or near to
busy areas of the clinic where there is
likely to be frequent activity and
disturbance. Using a plug-in Feliway
(CEVA) diffuser within the area
where the cat is housed is also
recommended.

Conclusions
Applying the above simple
strategies will enable more effective
stress management of feline
patients. Allowing more time per
consultation, particularly for anxious
cats is beneficial, as is adopting a
more flexible approach to allow the
cat to feel more comfortable before,
and also during, a consultation.
Gentle handling should always be
the preferred method and, where
necessary, towels are recommended
over other forms of physical
restraint. Towels can be applied to
the cat in a variety of different ways
to offer a range of restraint types.
For further information on feline
friendly handling and different low-
stress techniques please see the
resources listed below.

Useful resources

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behavior modification of dogs and cats.

• International Cat Care, Cat Friendly Clinic

What can owners do?

Owners can use a range of simple,
effective, reward-based training methods
to help their cats to adjust to the type of
experiences they may have at the vets
(such as handling during examinations,
receiving treatment and being contained in
and travelling in a carrier), helping to
reduce their stress. Practical training
strategies can be found in:
Bradshaw J and Ellis S. The trainable cat:
a practical guide to making life happier
for you and your cat. Particular Books, UK,
2016.
Catfest weekend

Birmingham, UK
15–16 October

icatCare Conference + The Cat Group Conference

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