# CP/Clinic

The Feline Magazine for Veterinary Professionals / Issue 2 / 2017

CATS PROTECTION

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*Senior Cat Clinics*

## Dentistry
*Feline dental and oral disease – part two*

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Considering running Senior Cat Clinics? – find out more on page 4

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# Meet the team

**Dr Sarah Elliott**
**BVetMed MRCVS**

**How long have you worked for CP?** I started at CP in 2015, initially as the Field Veterinary Officer (South) and now as the Central Veterinary Officer, based at the National Cat Centre.

**What did you do before working for CP?** I am a RVC graduate and worked in private practice in the Midlands and New Zealand. A subsequent job at the PDSA.

**What is your role within CP?** I provide veterinary advice for CP's 250+ branches, 34 centres and speak to vets overseeing the clinical care of CP's cats. I help develop veterinary policies and protocols for CP and deliver talks and workshops promoting cat welfare and shelter medicine. I manage the CP Veterinary Department support team and oversee the veterinary clinic on site.

**What do you like most about your job?** I love that my job is feline-focused and encompasses so many aspects of feline welfare, behaviour and medicine and am proud to work for a charity that puts cats first.

**What is your most memorable CP moment?** I meet many people who are enthusiastic and hugely knowledgeable about cats and have had some memorable moments hearing their stories and learning from them.

**What are your hobbies/other interests?** I recently started running and there are plans to partake in a running event in aid of CP next year, so I'm getting in shape for that!

**If I weren't doing this, I'd probably...** be working for another veterinary charity, hopefully with cats! I can't think of another job I'd prefer, other than the one I've got.

# Feline Senior Clinics

***Nathalie Dowgray** asks who should run them, when and how often should cats attend and what should they involve*

**Historically veterinarians have relied on annual vaccinations as the time to perform an annual** health check. However a cross-sectional study looking into vet registration found 13.6% of cat owners had not registered their cat with a vet since they moved to their current address and unregistered cats were significantly more likely to be unvaccinated [(1)]. Cats that are registered with a vet clinic may not be presented every year and as vaccine recommendations are changing, this leads to a reduction in the frequency of vaccination advised especially in adult indoor cats [(2)]. As vets we know it is not uncommon for our clients to lapse with vaccination recommendations. It is thus important for us to take this into consideration and consider rebranding these visits as 'wellness' exams where the need for vaccination can be discussed based on the individuals needs and risk of disease. This is in line with recommendation on reducing the risk of feline injection site sarcomas [(3)]. In this article we will discuss who in the practice should be running these clinics, when we should be inviting cats to these clinics, what age range to include and how often to see cats. Finally we will be considering what we should be doing during this clinic.

## Getting started

When you are establishing a senior cat clinic in your practice it seems obvious to invite clients who attend regularly with their cats and those that you already send vaccine reminders out to. But this is also a really good opportunity to contact clients who may not have attended for some time. Once you have established as a practice what age group of cats you will be inviting to attend it is worth searching back through your records and including all cats that fall within the chosen age group on your practice system.

How you run your senior clinics will depend on the size of your practice and what level of staffing you have. Running these clinics as a nurse lead clinic is likely to make them more cost effective. But veterinary input is going to be required if vaccinations are going to be included and if additional testing is going to be performed.

When we should be inviting cats to attend a senior cat clinic, how frequently we should be seeing them and what we should be doing in the clinic are all closely related.

Ageing in cats is poorly defined; two recent articles have reviewed the physical and functional changes associated with ageing in cats [(4)] and healthy ageing vs. disease [(5)] and are well worth a read. The general agreement is that ageing starts to occur in cats from seven years of age [(6–8)]. ISFM/AAFP life stage guidelines describe cats aged seven-10 years as mature, 11-14 years as senior and 15+ as geriatric [(9)]. Based on this, 'senior' cats, aged 11 and over, are the logical group to invite to attend a senior cat clinic. However consideration should be given to mature cats aged seven-10 as well. Summarised below are the diseases that are common in our ageing felines and an indication of the age when the prevalence of these diseases start to occur.

*Obesity prevalence is greatest in mature and senior cats*

| Disease | Age related prevalence |
|---|---|
| **Chronic Kidney Disease (CKD)** | Increases in prevalence in cats over 8-10 years [10]<br>37.4% in cats aged 0-4.9 years<br>40.9% in cats aged 5-9.9 years, 42.1% in cats aged 10-14.9 years and 80.9% in cats 15-20 years [11] |
| **Hyperthyroidism** | Overall prevalence at 2.4% rising to 8.7% in cats 10 years and over [12]<br>6% prevalence in cats over 9 years [13]<br>3.93% prevalence in cats over 10 in Hong Kong [14] and 8.9% in cats over 9 in Japan [15]. |
| **Hypertension** | Prevalence is higher in cats aged over 10 years [16,17] |
| **Diabetes** | Over 6 years of age is a risk factor [18] |
| **Arthritis/DJD** | 92% with a least one joint affected by OA, increasing age was a significant variable with each year of age being associated with a 13.6% increase in arthritis score [19].<br>Retrospective radiographic analyses have given the following prevalence; 33.9% in a group of cats with the average of 6.5 years [20], 22% in a group of cats aged 3-19 years [21], and 90% in a group of average age 15.2 years [22]. |
| **Heart disease** | Heart murmur prevalence increases with age; 24.1% in cats 6-12 months, 37.5% in cats 1-3 years, 44.1% in cats 3-9 years and 59.8% in cats over 9 years. This study also found that the presence of a heart murmur and an increasing age group were risk factors for the diagnosis of hypertrophic cardiomyopathy (HCM) [23]. |
| **Weight and body condition score** | Cachexia (loss of lean body mass) is associated with a number of the age related diseases in cats [13,24]. Sarcopenia, the loss of lean body mass in the absence of disease is also associated with ageing in cats [25]. Body weight in cats increases to 9 years of age and then tends to decrease. BCSs tend towards obesity between 7 and 13 years [26]. |

## The increasing risks

As you can see the risk of many of these age related diseases is starting to increase in the 7-10 year age range. The other advantage is that this group of cats are considered to be in their prime. It can be very helpful for us as clinicians to know what is 'normal' for the individual cat at this time as it can help us understand the significance of a change later in life. How often we should be inviting cats to attend will vary slightly on their age group and their state of health.

Cats in the seven-10 year age range should be seeing a vet for a wellness exam once a year; if clinic resources permit it offering a six-monthly mid-year check up with a nurse would also be advisable to detect any early signs of disease. Cats aged 11-14 should also see a vet once a year and should visit the clinic every six months [6], this visit can be with a vet or a nurse, which may depend on the cat's current state of health. Cats aged 15 years plus should be seen by a vet every six months and ideally a three-monthly interim check up with a nurse should be offered.

## What should we be doing during a senior exam?

Again this will vary with how you structure your practice. I like to think of the structure as being separated into the essentials and the additional (or optional) extras. What you choose to include will be partly decided by the individual cat in front of you but also what is affordable for the average owner in your practice. Some practices may choose to have a 'one size fits all' option for all senior cats or set options for each age range. Alternatively, you may decide to offer the essential health check at a set fee and then add the additional extras based on the individual cat's needs.

## Essential senior health check

- Thorough history from the owner; look for owner-observed changes in the cat's behaviour, eating, drinking and mobility
- Thorough physical examination including:
  - oral examination and dental assessment
  - palpation for a goitre
  - body weight
  - body condition score
  - coat condition
- Visual orthopaedic assessment if the cat is willing to walk around the room
- Discussion on vaccination and parasite control

As you can see the only cost to the practice for this part of the examination is your time. It's important to keep good records of weight and BCS for all ageing cats as often they will only have very slight weight loss but will have lost significant lean body mass. Ideally, either a muscle condition score (see **www.wsava.org/nutrition-toolkit**) or a description of the muscle condition on the day of examination should be included in the clinical records.

## Additional extras

- Urine
  - Specific gravity
  - Dipstick
  - Sediment exam
- Blood pressure
- 'Senior' blood tests
- Retinal examination

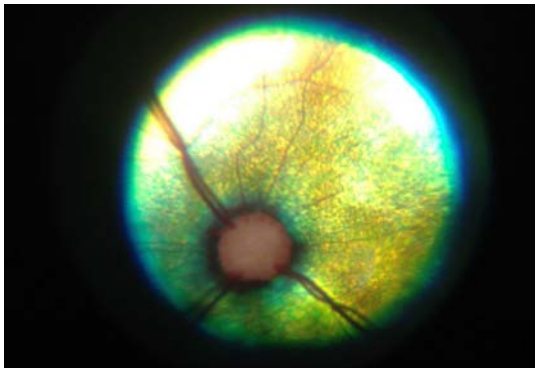
Urine examination is one of the most useful additional tests to perform on senior cats and if I can get a sample it is the first test I would spend money on performing. Urine concentration of over 1.035 makes renal disease and thyroid disease less likely and lack of glucose on a dipstick makes diabetes unlikely. Using a simple urine test combined with your clinical exam findings can give you a really good idea if a senior blood test is necessary and if measuring total T4 should also be included.

Blood pressure measurements should be performed at all exams with cats that are diagnosed with CKD or hyperthyroidism to monitor for secondary hypertension. However idiopathic hypertension also occurs in ageing cats, with a 7% prevalence found in one cohort of cats over nine years [27] so blood pressure monitoring is advisable in our senior and geriatric groups and if possible start in the mature group.

*Blood pressure measurement can be quickly performed in the consultation*

A minimum database has been advised annually in all cats over seven years [6] however, including this into every examination may not be appropriate for your client base. It is more important that cats attend an examination and have a thorough physical exam than have a blood test. The additional cost a blood test will incur may make this unaffordable for many clients and result in poor attendance. In saying that, if your client base and the structure of your senior clinics support it, then performing a minimum data base annually will aid in early detection of disease and can help in planning if anaesthetics are required to treat e.g. dental disease.

Retinal examination is indicated in older cats if blood pressure monitoring is not available as hypertensive retinopathy is well recognised in cats. A prevalence of 16% was found in a cross-sectional study of cats aged eight years and over (n=43) in New Zealand [28]. A UK study found an overall prevalence of 28.8% (n=177) reducing to 10.6% in cats aged 10 or less and increasing to 45.7% in cats aged over 10 years [17]. If a cat is boarder-line hypertensive on blood pressure assessment then a retinal examination is also useful to determine if treatment is required.



*Retinal examination is useful if blood pressure is not available or you need to establish the clinical significance of a higher blood pressure result*

Senior clinics are very important in maintaining the health of our ageing cats, with the average age of a cat now being around 14 years [29] many cats are living at least half their lives with an increased risk of developing one or more age related diseases. Regular veterinary exams will enable us to identify disease earlier and to manage multiple comorbidities as they develop.

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## Nathalie Dowgray

BVSc, MRCVS, MANZCVS (feline), PGDip IAWEL

Nathalie graduated from Massey University in 2002. In the last six years she has worked primarily with shelter cats; at Cats Protection and the RVC shelter medicine rotation. During this time Nathalie passed her Membership Exams in Feline Medicine for the Australian, New Zealand College of Veterinary Scientists and in 2016 she completed a Post Graduate Diploma with the University of Edinburgh in International Animal Welfare, Ethics and Law. She has just started a PhD with Liverpool University looking into the ageing of cats.

# Feline dental and oral disease – part two

*This is the second article exploring feline dental and oral disease and the diagnostic and therapeutic challenges these can post.*

**Tooth Resorption (TR) is a common condition affecting the teeth of domestic cats. It can be** difficult to detect with cats often masking signs of oral discomfort.

Tooth resorption begins as an external root resorption process on root surfaces, initiated by multi-nucleated cells called odontoclasts. It starts in the cementum and progresses into root dentine and eventually the crown. The peripulpal dentine is relatively resistant to resorption and the pulp becomes involved late in the disease. Once the crown dentine is affected overlying enamel is undermined and fractures off.

There are broadly thought to be two distinct types of TR which are distinguished radiographically. Type 1 which presents with focal and expanding loss of root tissue starting at the cemento-enamel junction (CEJ). Affected teeth have normal root radiodensity without the presence of replacement of dentine, with bone and maintenance of a distinct periodontal ligament around the remaining root structure. Type 2 lesions, which originate apical to the alveolar bone margin, are characterised by replacement resorption of root tissue, loss of a clear periodontal ligament structure and disruption of the normal architecture of root tissues including the loss of a clear root canal space.

Tooth resorption becomes clinically evident as a defect at the CEJ though this usually represents a late stage lesion. TR may be evident at a much earlier stage radiographically. Alveolar bone expansion and osteomyelitis in cats occurs in conjunction with periodontal inflammation and frequently with tooth resorption (Bell et al, 2015).

## Epidemiology

Prevalence rates of TR range from 28.5-70% depending on the population of cats studied and the method of diagnosis (Gorrel, 2014). Incidence of TR increases with age and in a study looking at the prevalence of TR in a population of cats presented to a hospital for non-dental related procedures the age group of 10 to 15-years old showed an increased risk of 6.56 times for TR occurrence compared with the group nought to four years of age (Mestrino et al, 2013). All teeth may be affected but the mandibular third premolar and molar teeth most commonly had TR lesions, especially Type 1 lesions. Canine teeth were statistically more likely to have Type 2 lesions (Mestrino et al, 2013).

A French study has shown that the prevalence of tooth resorption was significantly higher in pure-breed cats (70.0%) compared with mixed-breed cats (38.0%). For all lesions, 60.0% were Type 2 compared to 40.0% Type 1. There was an increased frequency of tooth resorption observed in older mixed breed-cats and female pure-breed cats (Girard et al, 2008).

## Aetiology and pathogenesis

The aetiology of tooth resorption in cats is not clear. Based on their position and presentation it is presumed that Type 1 lesions are inflammatory in origin and associated with periodontal disease (Delaurier et al 2009) whereas Type 2 are non-inflammatory and of uncertain aetiology.

It has been shown that resorptive lesions are prevalent among cats without evidence of clinical disease and that resorptive lesions may initiate anywhere on tooth root surfaces. Lesions are frequently detected on the subalveolar tooth surface but these lesions are most frequently

associated with repair. By contrast those lesions at the CEJ are not associated with a reparative process (Delaurier et al, 2005).

Tooth resorption is initiated by odontoblasts, cells which strongly resemble osteoclasts and it is therefore assumed that they may be under the influence of similar regulators. It is known that osteoclasts are affected by a number of factors including inflammatory cytokines and 1,25 dihydroxy Vitamin D (1,25(OH)2D) . Periodontal disease is very common in cats and therefore their teeth are exposed to inflammatory cytokines and local production of 1,25(OH)2D is increased by inflammatory cytokines. Therefore both may contribute to the onset of TR in cats (Vrieling, 2010).

A study has provided evidence that three cytokine-like proteins OPG (osteoprotogerin), RANK (receptor activator of nuclear factor kappa-B) and RANKL (receptor activator of nuclear factor kappa-B ligand) are found on the surface of tooth roots that are undergoing TR. These proteins play a significant part in normal bone remodelling (Senn et al, 2010) through the activation and de-activation of osteoclasts. This may provide some understanding of the nature of Type 2 TR lesions through the activation and de-activation of odontoclasts and explain the observation that there is histological evidence of repair. There is also evidence that osteoclast precursors in cats with and without tooth resorption are differentially susceptible to osteoclast stimulating factors (Booij-Vrieling et al, 2012).

Additional studies have shown conflicting evidence whether TR may be associated with increased serum (rather than local) concentrations of 25 hydroxy Vitamin D (Girard et al, 2010; Reiter et al, 2005). There appears that there is no association between Feline Calici Virus status and TR (Thomas et al, 2017) and a recent study has suggested that mast cells may play a role in the pathogenesis of the disease (Arzi et al, 2010).

One paper suggests that long term excessive ingestion of Vitamin D may be associated with the development of lesions that resemble TR and that cats with TR also had decreased urine concentration indicating that TR may be associated with some form of systemic insult. This could correlate with the fact that excess Vitamin D ingestion has been shown to cause renal mineralisation and varying degrees of renal disease (Reiter et al, 2005).

*Picture showing the right maxillary fourth premolar in a cat with evidence of an enamel defect above the gingival margin which is suggestive of an underlying Tooth Resorption lesion (x-rays are required to confirm this).*


*Radiograph of the left mandibular premolars of a cat which shows a Type 1 Tooth Resorption lesion affecting the mesial root of the fourth premolar and Type 2 Tooth Resorption lesions affecting the mesial and distal roots of the third premolar.*

*Clinical examination of this cat demonstrates significant gingivitis and loss of normal crown structure affecting the mandibular third premolar and gingivitis affecting the mesial root of the mandibular fourth premolar suggesting the presence of Tooth resorption and requiring X-rays for a specific diagnosis.*

## Diagnosis

Diagnosis of TR in cats is by a combination of both clinical and radiological examination. Neither modality is effective on its own as clinical examination will only discover lesions present at the CEJ and shallow lesions on the buccal or lingual surface of a tooth may not be evident radiographically.

Clinical examination involves detailed examination of the visible tooth surface with good illumination and magnification and exploration of the exposed and subgingival tooth surface with a periodontal probe and sharp explorer.

Radiological examination involves x-ray of all teeth using a dental x-ray generator and intra-oral film or sensor. Radiological assessment of tooth resorption has been shown to correlate strongly with histopathological findings (Senn et al, 2010) and therefore intra-oral dental radiographs are important in detecting and monitoring the progression of TR.

CT, which in theory should be a good imaging modality for detecting TR has been shown to have a high specificity but low sensitivity for the detection of TR in cats (Lang et al, 2016).


*This is the post extraction radiograph of the right mandible of a cat demonstrating the successful extraction of the right mandibular incisors, canine and third and fourth premolars.*

## Treatment

Conservative treatment of TR by restoration of coronal lesions has been shown to be ineffective in feline patients and treatment of teeth with TR lesions at any stage is by extraction.

Many teeth undergo replacement resorption of root structure and dentoalveolar ankylosis with the roots becoming fused to the adjacent alveolar bone. In the absence of endodontic disease and peri-apical or peri-radicular infection these teeth can be managed by crown amputation and intentional retention of resorbing root tissue. It is important that this procedure is reserved for tooth roots that can't be extracted using closed or open extraction techniques (Reiter et al, 2014). It is imperative that tooth extraction is performed under radiographic control involving both pre and post extraction x-rays. Any intentionally retained root structure should be marked on the patient's dental chart, recorded in its clinical notes and the owners should be informed that a tooth or teeth have not been completely extracted. In some cases it may be necessary to monitor patients by taking further radiographs to check the clinical significance of intentionally retained root material.

The use of Alendronate at 9mg/Kg twice weekly has been shown to slow or arrest the progression of TR (Mohn et al, 2009) however further work is necessary to assess the optimal dose and potential for toxicity in cats.

*This is the post extraction radiograph of the left mandible of a cat demonstrating the extraction of the fourth premolar and molar and crown amputation and intentional root retention of the third premolar.*

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# Peter Southerden

BVSc MBA DipEVDC MRCVS RCVS Recognised and European Specialist in Veterinary Dentistry


Peter graduated from Liverpool University in 1984. He bought Eastcott Veterinary Clinic as a single handed small animal practice in Swindon in 1987. The practice gained Hospital status in 1997. Eastcott Veterinary Hospital now employs over 100 staff and is a first opinion and specialist referral small animal hospital.

After completing an MBA in 1994 he became a Diplomate of the European Veterinary Dental College in 2010 and is a recognised RCVS and European Veterinary Specialist in Dentistry. He sees referred dentistry, oral and maxillofacial surgery cases at Eastcott Veterinary Hospital, teaches regular courses in dentistry and oral surgery and has lectured at both UK and International veterinary conferences.

# Feline neutering scenarios in a shelter setting

*This article discusses the role of and safe approach to pre-pubertal neutering*

**Working in a shelter-medicine setting increases the likelihood of being exposed to neutering** scenarios that are more unusual than in private practice, particularly in those which handle a lower volume of charity work. This report will discuss the role of pre-pubertal neutering and the use of the quad protocol to facilitate safe anaesthesia for paediatric patients, as well as the neutering of feral and pregnant cats, focusing primarily on females.

## The role of pre-pubertal neutering

Feline early or pre-pubertal neutering is defined as the neutering of kittens before the onset of puberty – usually carried out at four months old or younger. Historically, cats tended not to be neutered until they were at least six months old, as there was a perceived higher risk associated with the anaesthetic and adverse effects in adulthood if they were neutered before then. Some kittens reach sexual maturity before they are six months old and many owners allow kittens outside once they have completed their vaccination course, which can lead to unplanned pregnancies. This puts the owners in the difficult position of deciding whether to terminate the pregnancy by spaying the kitten or whether to allow the pregnancy to continue and have to care for a pregnant cat and the kittens. This can also lead to owners getting stuck in a loop of not knowing when is the best time to have their cat spayed after kittening, so the cat continues to have litters.

In a shelter-medicine setting, pre-pubertal neutering has become the norm. We now have a good understanding of how to safely perform the anaesthetic and surgery. Research into the potential adverse effects has proven that the concerns are either unfounded or the risks are equivalent to neutering when older – and early neutering can facilitate safe and rapid adoption for the kittens.

If all kittens were neutered before being adopted, the risk of unwanted pregnancy would be eliminated and kittens could safely be allowed to go outside as soon as they get to their new home. It also means that kittens can be adopted sooner without concern over owner non-compliance regarding neutering at four months old. Early neutering reduces undesirable behaviours such as urine spraying and makes the kitten more loyal to the home, which means they would be at lower risk of contracting FIV or FeLV, and getting cat bite abscesses or other injuries associated with fighting and roaming (Bessant, 2014).

Studies have found no adverse effects on long-term health when compared to neutering at six months or older. Historically concerns included reduced urethral diameter and therefore increased risk of lower urinary tract disease such as urethral obstruction, and delayed long bone growth plate closure. The concern over urethral diameter has been proven unfounded, and while growth plate closure is delayed in kittens neutered before puberty, it does not affect the size of the adult cat (ibid.).

Many veterinary surgeons find that once they have overcome the mental barrier of operating on such a small patient, the procedure itself is easier. Ligaments are not so tight, allowing for easy externalisation, blood vessels are less developed, reducing the risk of haemorrhage and allowing fewer ligatures to be used (shortening the surgical time) and there is minimal abdominal fat which permits better visualisation. Now that we understand that paediatric patients have increased risk of hypothermia and hypoglycaemia due to minimal

fat and glycogen storage, we can easily mitigate for these additional considerations. These factors all mean that there is no significantly increased risk associated with pre-pubertal neutering compared to neutering at six months or older.

## The use of the quad protocol to anaesthetise paediatric patients for neutering

The quad protocol, first devised by David Yates of the RSPCA, uses ketamine, medetomidine, buprenorphine and midazolam given in a single intramuscular injection without the requirement for a premedication (Welsh, no date). It has grown in popularity and is now commonly used in young kittens in a shelter setting as it gives rapid induction, good depth of anaesthesia, multi-modal analgesia for up to 12 hours and rapid recovery. The medetomidine can also be reversed with atipamezole, though it is recommended to allow at least 20 minutes after induction before reversing. The doses are calculated according to body surface area, so for this to be accurately estimated an accurate weight must be gained on the day of the procedure. As the quad protocol is a general anaesthetic, gaseous volatile agents are rarely required for maintenance. Castrates usually do not require intubation, but it may be desirable to intubate females in order to maintain them on oxygen. This also means that supplemental volatile agent can easily be given if required.

As discussed above, small kittens have a few additional risks when compared with older and larger animals, in particular hypothermia and hypoglycaemia. There are several things we can do before, during and after the operation to reduce the risk of these occurring. Before the surgery, food should only be withheld for three to four hours prior to induction and water should not be withheld at all (Root Kustritz, 2002). Kittens should be kept with any littermates as much as possible: kept together until the procedure and reunited as soon as they are waking up, which will help to minimise both hypothermia and stress associated with separation. During the surgery a warm ambient temperature should be maintained in the prep and theatre areas, and heat pads or Bair Huggers should be used. Excessive clipping, cleaning and use of surgical spirit to prepare the surgical site should also be avoided. Once the surgery is over, keep the kitten warm with blankets and offer food as soon as they are awake enough to eat to help avoid hypoglycaemia (Welsh, no date).

*Uterus and ovaries post removal*

*Drugs drawn up, labelled and ready with anaesthetic sheet for monitoring*

Provided that kittens are kept warm throughout the perioperative period and are not fasted for long periods of time, there is no reason that an anaesthetic at this young age need involve any more risk than an anaesthetic at a later age.

## The neutering of feral cats

Cats Protection estimates that there are currently approximately 1.5m feral cats living in colonies in the UK (Feral cats, no date). Feral cats have not been socialised with humans and therefore find handling of any kind extremely stressful. In order to facilitate their welfare and good population control, a trap, neuter and release system is commonly used. Any feral cat that is trapped and brought into a Cats Protection branch or centre is assessed by a veterinary surgeon as soon as possible, with obviously sick cats being blood tested for FIV and FeLV. Cats that test positive for either of these diseases or have another illness or injury that cannot be cured in a single vet visit are euthanased on humane grounds without confirmatory testing. Any healthy cat that has been trapped is vaccinated,

*Feral cat being trapped for TNR (Trap, Neuter, Release) Credit: Dawn Gibson*

*Ear-tipping of the left ear post neutering to prevent re-capture.*

*Pregnant spay*

given anti-parasitic treatments and neutered prior to release (Cats Protection, 2015). Neutering these cats not only helps to limit the expansion of feral cat colonies but also limits disease spread, particularly by entire males who roam more widely and are more likely to get into fights than females.

As feral cats are so unused to being handled, many premedication and induction protocols used on docile pet cats in private practice, or cats awaiting adoption in shelters, are often inappropriate, causing undue stress to the cat and putting the handlers at risk of scratches or bites. Intramuscular protocols are useful because the cat can be confined in a crush cage for injection, minimising the risk for all involved. The quad protocol is given intramuscularly, but is expensive to give in adults as it is dosed according to body surface area. The triple combination of ketamine, medetomidine and buprenorphine may therefore be used preferentially as it still gives good depth of anaesthesia and good multi-modal analgesia (Welsh, no date). The cat could also be premedicated with an intramuscular combination such as ketamine and midazolam, which gives profound sedation, before induction with intravenous propofol and maintenance on a gaseous volatile agent.

Feral cats should be neutered via the same procedure as any other cats, with pregnant queens being spayed in the midline if necessary (the neutering of pregnant queens is further discussed below). Confinement for long periods of time is highly stressful for feral cats, so females should be returned to the site where they were trapped after 24 to 48 hours and males after 12 to 24 hours (Cats Protection, 2015).

In addition to neutering, 10mm should be removed from the tip of the left ear in adult cats and slightly less in kittens if they are to be released. This is an internationally recognised symbol for a neutered cat and it is easily visible in low light and at a distance, and it prevents multiple anaesthetics being performed unnecessarily (ibid.).

## The neutering of pregnant queens

The neutering of pregnant queens does not necessarily pose more difficulty from a practical point of view compared to a non-pregnant queen. Thorough palpation of the abdomen before making an incision will allow the surgeon to determine both if the queen is pregnant and how advanced

the pregnancy is. Queens without palpable foetuses can be spayed via the flank approach and even if they are pregnant it will likely be early enough for a flank approach to provide adequate exteriorisation. Queens with palpable foetuses will usually need to be spayed via a midline approach.

Pregnant animals have more developed uterine and ovarian blood vessels and increased tissue friability, meaning that good haemostasis and gentle tissue handling are of paramount importance. Double ligation of pedicles is often necessary and a combination of encircling and transfixing ligatures may be required.

The difficulty most often encountered with the spaying of pregnant animals is an ethical one – many people feel strongly that a viable pregnancy should not be terminated, especially when the health risk to both the queen and kittens is minimal. While many veterinary surgeons, both in a shelter setting and private practice, will feel that terminating a pregnancy is acceptable both as a method of population control and to potentially preserve the long-term quality of life of the queen, others will feel that the neutering should wait until after the kittens are born. The neutering of pregnant animals can also cast a negative light on a charity in the eyes of the public.

The advantages of neutering pregnant animals are numerous. If the queen is feral and has been trapped, it is better to terminate her pregnancy and neuter her than to release her still entire, as there is then a high risk that she will become pregnant before being trapped again, if she were trapped again she would have to be put through a second confinement and anaesthetic, and also there would be numerous entire kittens in the colony. Keeping a feral cat confined until kittening is also contrary to her welfare. If the queen is unwell or in poor condition then maintaining the pregnancy and kittening may pose a higher risk and she may be unable to care for her kittens appropriately once they are born. Kittens born to queens testing positive for FIV or FeLV are at significantly increased risk of contracting these diseases from their mother. In the case of a queen, who can be rapidly rehomed if she were not pregnant, terminating her pregnancy will significantly minimise the length of her stay in the shelter and the stress this will bring.

The main disadvantages to the queen of spaying while pregnant are the increased risk of haemorrhage and tissue perforation, and waiting until after kittening would certainly decrease these risks. However, with good surgical technique, one could argue that maintaining a pregnancy, kittening and rearing the kittens presents more of a health challenge, along with the stress of a prolonged confinement which could bring increased chance of infection and stress-related conditions such as lower urinary tract disease.

In conclusion, the advantages of neutering a pregnant queen, from a medical, welfare and population control standpoint, outweigh the advantages of waiting until the kittens are born.

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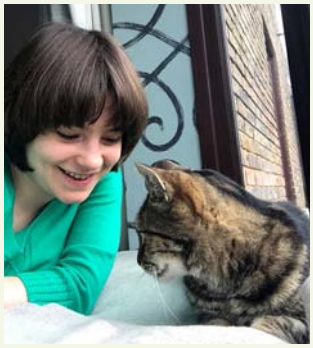
# Miranda Bowden-Doyle

Dr Miranda Robyn Bowden-Doyle, BVetMed MRCVS

When I was little, I wanted a kitten and to be a vet – one came along pretty quickly, the other took a few years! I feel like I've seen everything during my studies from new puppy checks to a snake being given an enema, but cats were my first love and are still my favourite animal, and my two rescue cats, Samson and Delilah, have now been ruling the roost for 12 years.

# What makes a cat-friendly home?

*A discussion worth having during cat consultations*

**Undesirable behaviours are a primary reason cats are relinquished to rescue facilities. Of** those, house soiling, aggression towards other cats or people and destructive actions tend to be the most commonly cited. Regrettably, these negative behaviours are often a product of misinformation or misunderstanding of a cat's basic needs and natural tendencies. Studies have suggested that owners exposed to material relating to feline behaviour, such as books or discussions with animal care professionals, are less likely to relinquish their cats. Consequently, veterinarians and veterinary staff are fundamental in reducing feline relinquishments and improving the welfare of currently owned cats.


*'DIY' feeding enrichment - start off easy and build up to more complex options*

Although veterinarians are being expected to do more and in less time, it is important to not disregard basic conversations about cat husbandry during consultations. Considering the amount of erroneous material that circulates, veterinarians should make it a priority to ensure that owners are advised correctly on making their home as cat-friendly as possible. A cat-friendly home considers the needs of the cat and provides an environment that is suitable and stimulating. Cats that are not allowed to express their natural behaviours can become frustrated or stressed and as a result can develop undesirable behaviours. Even if the cats have outdoor access, ensuring the inside of the home is cat-friendly will enhance their welfare overall. This report will highlight important caretaking requirements that should be discussed with all cat owners.

## Food

Cats are naturally solitary creatures that hunt and eat alone. Bearing this in mind, it becomes easy to make feeding time more enriching. Cats will eat several small meals throughout the day in the wild, stalking and catching often more than 10 mice and other prey. Therefore, the traditional method of offering food once in the morning and once in the evening is not ideal. Instead, owners should try to offer several small meals throughout the day (unless instructed otherwise by a veterinarian). While this can be difficult to achieve, increasing the feeding up to three or four times a day is still better than twice, or purchasing an automatic feeder that releases the food in small meals throughout the day, or even putting some of the food in a puzzle for the cat to work out on their own is beneficial. And because they naturally eat alone, food bowls should

*Many cats prefer ceramic water bowls, but allow for individual preferences*

not be placed in areas of high traffic and multi-cat households should separate feeding bowls. In regards to bowl material; ceramic, glass, or stainless steel bowls are preferable over plastic, which can be more difficult to keep clean.

It is also important to mention that cats are obligate carnivores that require diets high in protein and have almost no requirement for carbohydrates – and that the scent of their food is generally more important than the taste. Therefore, choosing the right diet for a particular cat is another opportunity to enhance their overall wellbeing. Cats can easily develop aversions to certain types of food if they associate the food with a bad experience, so changes in diets must be done with care and veterinarians should not attempt to start prescription diets while the cats are hospitalised.

## Water

In the wild, cats consume prey, such as mice, which inherently have high water content and thus cats do not require as much from fresh water sources. However, domesticated cat diets are often low in water content, especially if being fed dry food. Cats that do not meet their required water intake can be at risk for certain medical conditions such as cystitis, thus it is important to encourage cats to drink water. Cats are very fastidious and wild cats will instinctually drink from water sources that are away from where they have consumed their food, as the water nearby could be contaminated by their prey's carcass. This is important to remember, because it means that water bowls should be located separately from food bowls. Additionally, many cats prefer drinking water from a flowing source, such as the kitchen tap or a pet fountain, which again relates back to wild cats where stagnant water could be more contaminated. And as with food bowls, water bowls should be ceramic, glass, or stainless steel and should be in locations that allow the cat to drink alone.

## Litter trays

House soiling is one of the most common reasons for relinquishment to rescue facilities but can often be reduced with an understanding of a cat's basic needs and behaviour. As mentioned previously, cats are extremely fastidious and the slightest issue with their litter tray can result in inappropriate elimination in other locations that the cat deems more suitable than the tray. The number of litter trays is important and a general rule is to have one tray per cat, plus one extra. Litter trays should be kept in low traffic areas and away from other resources such as food or water bowls. Size also matters: trays should be large enough so the cat can turn around and deep enough for sufficient levels (3cm) of litter – older cats are an exception, as they may appreciate a shallower tray that is easier to climb in and out. Covered litter trays can offer privacy, however they trap odours meaning heavily-scented litter or soiled litter could discourage a cat from using it. Cats prefer litter substrate that is fine and sand-like which best mimics what they would naturally use and will not feel uncomfortable under their paws.

*A scratch pad rather than post being used in a pen*

*Fishing rod toys are a great way for humans to interact with their cats*

*Cats like to perch and hide – the Cat Hide provides for both of these needs.*

One of the most important requirements for cats is a clean litter tray. Owners should scoop out the soiled litter at least once a day and clean the entire tray once a week. Often cats can be picky about the location of the litter tray, the substrate used, the presence of a litter tray liner and design of the tray. It is therefore important that owners pay attention to their cat's soiling habits and modify their litter tray accordingly, often with just trial and error, assuring that any changes are done gradually and carefully so the cat does not develop an aversion or become stressed.

## Environmental enrichment

Cats that are unable to express their natural behaviours can become frustrated and in turn develop unwanted behaviours. Owners should offer their cats a stimulating environment, keeping in mind the species' fundamental needs and giving their cats plenty of choice and control of their surroundings. Scratching posts are essential in every home. Cats scratch not only to condition their nails, but also as visual and olfactory territory markers. There are two types of scratching: vertical and horizontal, with some cats preferring one type to the other and some cats preferring both. Vertical scratching usually happens on surfaces like the sides of couches or doorframes and horizontal scratching often happens on carpet and rug corners. Thus, owners should pay attention to which type of scratching their cat prefers and provide a variety of suitable surfaces – this can be in the form of scratching posts, cardboard floor scratchers, cat trees etc.

*Most cats prefer predatory play with toys that mimic the natural hunting experience as much as possible*

Play is another vital component of a cat-friendly home. Most cats prefer predatory play with toys that mimic the natural hunting experience as much as possible. This includes toys that move randomly, are made from fur or feathers and are the size of prey animals. Toys should be periodically rotated out with other toys so they maintain some novelty. Cats also characteristically favour toys filled with or rubbed in catnip.

Another very important component of a cat-friendly home is the provision of comfortable resting places and safe spaces to retreat and hide. Most cats feel vulnerable on the floor, and climbing is a natural behaviour, so features such as cat trees or shelves in the home can offer cats an escape place, as well as a place with a vantage point of the surroundings. Cat owners should try to offer several resting and climbing areas in the home, again to give cats more choice and control of their environment.

While this report is not exhaustive of all cat-friendly features of a home, it is a good starting point to begin a dialogue with cat owners. Veterinarians should strive to have every member of the clinic aware of these fundamental components of cat husbandry and be open to discussions with owners. Veterinary clinics must promote themselves as a hub for valuable resources not just for medical questions, but also for behavioural questions. Additionally, clinics should add relevant husbandry information to their website, or prepare pamphlets to give to new clients – regardless if they are new cat owners or seasoned cat owners, there is always the potential to learn more. Veterinarians should increase the consultation length for first-time clients so there is enough time to address both the presenting complaint as well as time to understand the cat's home life. By providing information and resources relevant to feline behaviour, veterinarians will have a better relationship with cat owners and cat owners will have a better understanding and a more fulfilling relationship with their cats.

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**Colette Angel**

BVM&S MRCVS


Growing up in Chicago I loved two things: animals and traveling – which is how I ended up living in Scotland, studying veterinary medicine! I've meandered quite a bit, with time spent living in Mexico, a brief detour to art school, and some experience in research. Throughout it all, I've always been a self-proclaimed crazy cat lady. It wasn't until vet school that I realised I could dedicate my career exclusively to cats, and I now plan to specialise in feline medicine.

# All the latest news from Cats Protection

## CP turns 90

During the 1920s, cats were not seen as the companion animals they are today. Rather than pets, most were thought of as nothing more than pests.

Concern was expressed at the general ignorance of many people regarding the needs of the domestic cat, so much so that on 16 May 1927, a group of like-minded people gathered together at Caxton Hall in London to form the Cats Protection League, an educational society to raise the status of cats.

"It is the League's chief aim to create and stimulate an ever-growing admiration for the cat as he is found to be by those who have taken the trouble to study his character and understand his ways."

At first, the charity was run from a small office at George Bell & Sons publishing house in London, but in 1935 a property was secured in Slough which remained as the charity's headquarters until 1978 when it moved to Sussex.

In its early years, the charity was formed of a few 'cat clubs' in Slough, Ilford and Liverpool. Today there are over 250 branches from Shetland to Southampton, Bridgend to Bournemouth, Coleraine to Cambridge... beyond and between!

The charity pioneered the campaign for neutering cats, which initially was not an easy task as many cat lovers were often shocked by the idea of neutering. Cats Protection persevered, believing this was the only effective way to reduce the number of unwanted cats in the UK – introducing voucher schemes to assist owners with the cost of neutering in the 1960s. We now run the largest single-species neutering programme in the world.

The dedication and commitment of our volunteers and staff has never waned; it has survived war and recession; defying the odds and helping as many cats as possible. Our aim remains the same as it did in 1927, no matter what the challenges, we will provide better and brighter futures for the thousands of cats that come through Cats Protection's care.

In 90 years, Cats Protection has:

- rehomed over 2m cats and kittens*
- neutered over 3.5m*
- helped over 4.5m*
- championed the rights of cats
- helped people of all ages to understand cats and their needs

**conservative estimates, taken from the figures listed in available Annual Reports since 1927*


## ADCH Cat Workshop

The Association of Dog and Cat Homes (ADCH) held its first ADCH Cat Workshop on 17 May and was hosted by Cats Protection at the National Cat Centre in Sussex. The Cat Workshop was a huge success and attended by 44 delegates representing 20 organisations. Topics covered included Quality of life, Welfare & ethics, Cats & the law, Cat friendly homing, Environmental enrichment, Infectious diseases as well as Human wellbeing (including compassion fatigue). This collaborative event included speakers from Cats Protection, Battersea Dogs & Cats Home, Blue Cross and Lincoln University to name but a few. It also offered attendees the opportunity to attend a tour of the National Cat Adoption Centre and a tour offered by the Donkey Sanctuary, meeting three of their donkeys on site and learning more about their care, health and behaviour while there.

Our thanks go out to everyone who attended and to all the speakers who gave up so much of their time and expertise. This may have been the 'first ever' cat workshop but it definitely won't be the last.

## Understanding Cats' Needs (UCN)

Cats Protection is developing a new online learning course which has been designed to provide you with the knowledge and skills to meet your cat's specific needs.

The course, called Understanding Cats' Needs, will be coming soon and can be accessed on the Cats Protection website once launched. It can be worked through in one go or in bite size chunks and is suitable for adults and older children – free to all. The course is designed for cat owners and those working with cats in a veterinary, animal care or animal welfare profession. It will provide an insight into why cats behave as they do and will help you to enhance your relationship with them.

## Helpful video content

Over recent months we've been building up the content on the CP national YouTube channel, so we're starting to get a lovely range of helpful cat care and behaviour advice that supporters can watch and learn from. Topics include: Introducing cats to cats, Introducing cats to dogs, Moving house with your cat and Caring for indoor cats – among many others!

These have been created in response to some of the most common searches online and queries received on social media – feel free to share them with your clients, or to use them as a tool for potential new cat owners or adopters looking for advice.

The YouTube channel home page can be found at: **www.youtube.com/catsprotection** – click 'Videos' underneath the header image to view a full list of all the videos. You can also find them on Facebook and Twitter if you'd like to share those versions.


*Find CP's cat care and behaviour videos on YouTube!*

## Genie crowned as UK's top cat

A cat from Lincoln has been crowned overall winner in Cats Protection's National Cat Awards 2017.

Eight–year-old Genie was chosen for helping her 12-year-old owner battle bone cancer.

The black-and-white puss was selected as a finalist in the Outstanding Rescue Cat category in recognition of the incredible support and inspiration she has provided for Evie Henderson, who was diagnosed with bone cancer in March 2016.

Evie, who lives with parents Tina and Chris in North Hykeham, has endured six gruelling rounds of chemotherapy; several painful operations and lengthy hospital stays far from home.

Throughout her treatment, Evie has drawn strength from the bond she has with her beloved pet, watching videos of her from her hospital bed and telling doctors that she needed to get better so she could go home to see Genie. When Evie's hair started to fall out, she noticed that Genie's fur was moulting and said that it helped her feel like she wasn't alone.

Genie beat four other amazing moggies to take the overall crown after winning the Outstanding Rescue Cat category. The other category winners were:

- Mittens – winner of Furr-ever Friends – who helps a young girl with autism cope with a serious medical condition
- Pixie – winner of Hero Cat – who alerted a sleeping couple to their toddler who was choking in her cot
- Spike – winner of PURINA® Better Together – who helps his owner cope with a debilitating disease
- Tilly – winner of Most Caring Cat – who helps her owner cope with an agonising medical condition

Genie was announced as the overall winner today by a team of celebrity judges at an awards ceremony at The Savoy Hotel in London. Receiving her second trophy from the judges, Evie said: "I'm utterly stunned. I really can't believe it. Genie deserves this so much. I was so happy to win our category but to win again is really amazing, incredible. It's fabulous; I'm shocked, surprised and delighted by my cat at the same time."


*Winners and judges at the National Cat Awards*

*Genie, a black-and-white cat, was announced as the overall winner by a team of celebrity judges at an awards ceremony at The Savoy Hotel in London.*

*Evie, the proud owner of winning cat Genie receiving the award*

## Our Paw-some Afternoon Tea really was PAW-SOME!

On 26 May, over 2,000 cat lovers across the country hosted a Paw-some Afternoon Tea in aid of Cats Protection, including 15 vet practices. Huge thanks goes out to everyone who baked, brewed and gathered to make this such a triumph; the feedback we've had has been fantastic. So far we've raised approx. £32,000 but money is still coming in so that's not a final amount.

We plan on holding this event each year so please do get in touch to let us know your thoughts and ideas: **events@cats.org.uk**

Thank you!