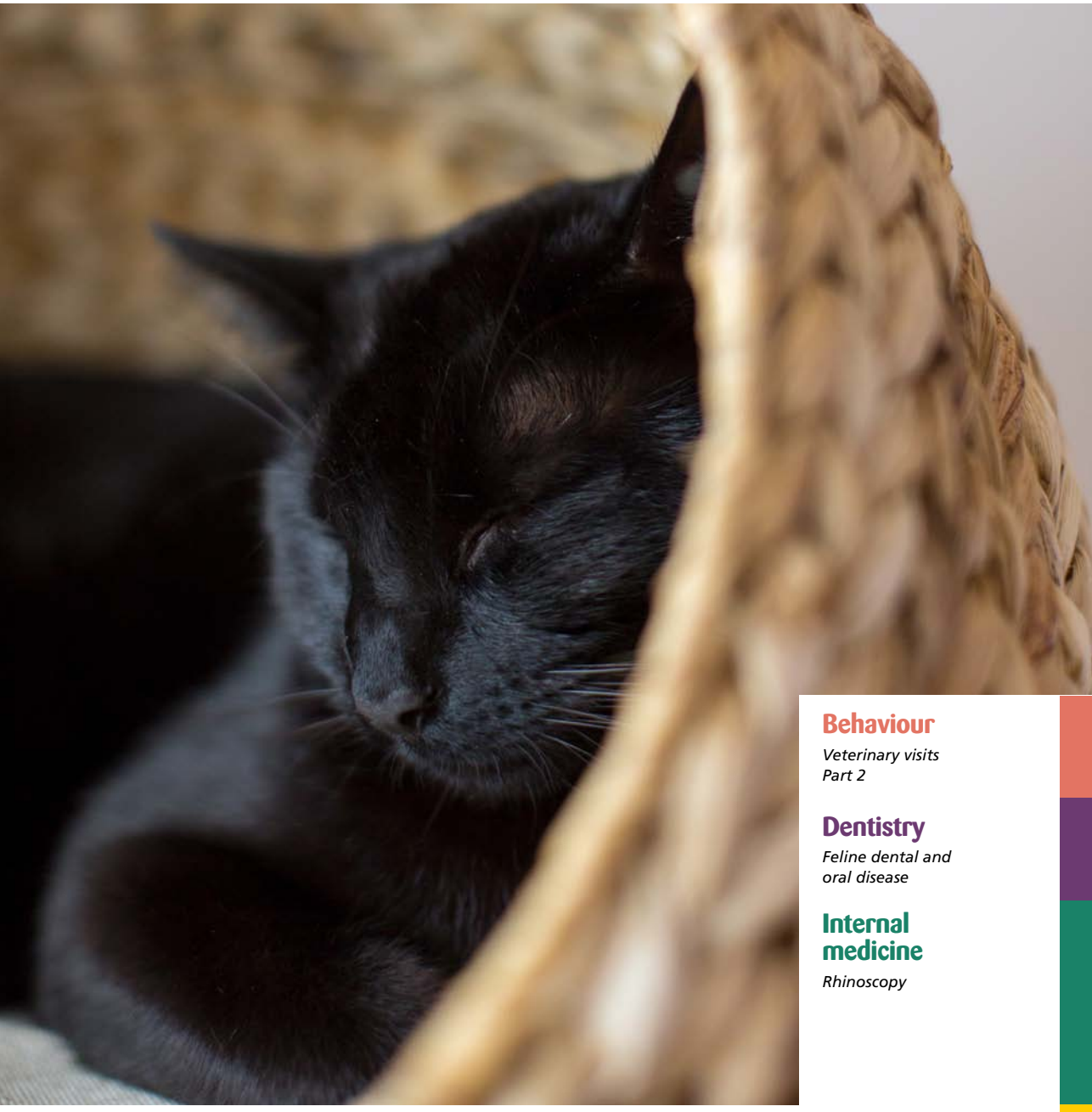
CP/Clinic

The Feline Magazine for Veterinary Professionals / Issue 1 / 2017

CATS PROTECTION



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Meet the team

Sandra Milburn
Education Veterinary Officer

How long have you worked for CP? I joined CP in April 2016

What did you do before working for CP? After 10 years working as a small animal vet in the UK, I worked for Canine Partners (Assistance Dog charity), before joining CP last year.

What is your role within CP: I work closely with various teams within CP, giving veterinary input on anything relating to cat care and welfare. Additionally, I am the editor of this magazine for vets.

What do you like most about your job? I enjoy the variety of people I meet with CP and learning more about all the aspects that make up this charity, while still keeping cats at the heart of everything I do in my role.

What is your most memorable CP moment? I volunteer at CP as a 'desensitiser' and hearing that the first cat I worked with, Timmy, has settled into his new life in a home and is going from strength to strength is just fantastic!

Do you/did you have a pet/-pets? We have two Jack Russel terriers. Currently, I have no cats… yet.

What are your hobbies/other interests? I really only have one hobby – triathlons. That keeps me busy, but also allows me to explore the lovely outdoors, eg the South Downs (near home) and Ashdown Forest (near work).

Where is your favourite place to visit? My home country Namibia. It's sunny, warm and 'full of' wide open spaces!

If I wasn't doing this, I'd probably be trying to become a full-time 'volunteer-vet'.

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Veterinary visits – how understanding feline behaviour can reduce stress before, during and after consultation

We continue our article from CP Clinic winter 2016

Low stress handling is essential to enhance the emotional well-being of our patients, in addition to our efforts to protect their physical well-being. The AAFP and ISFM have developed a series of feline-friendly handling guidelines and adapting this to each individual cat can lead to:

- reduced pain and fear for the patient
- reinforced vet-client-patient bond, trust and confidence and therefore improved lifelong medical care for the cat
- improved efficiency, productivity and satisfaction for the veterinary team
- increased client compliance
- early detection of medical and behavioural problems
- fewer injuries to clients and veterinary team
- reduced anxiety for the client.
  (Roden et al 2011)

Allowing the patient to explore surroundings at their own pace and providing a safe resource in the form of a familiar, covered carrier can facilitate examination

Feline behaviours relevant to the clinic or hospital environment

Cats are solitary animals, generally avoiding confrontation. Avoidance or hiding is often the initial response with fighting occurring as a last resort. Allowing cats to remain protected and hidden while at a veterinary practice can therefore improve handling.

If we can recognise signs of anxiety, we can take steps to prevent escalation to fear aggression. Ear position, body posture, facial and eye changes and tail movements are helpful indicators. Increased sweat may be produced from the paws. Vocalisation may occur in the form of distress miaowing to growling, hissing or spitting.

Cats lack techniques to resolve conflict through appeasement so resort to freeze, flee, fight or displacement behaviours. Both fear-induced withdrawal and aggression make diagnosis and treatment difficult. In addition, stress can impair recovery from illness or injury (Carney et al 2012).

Unfamiliar circumstances that cats encounter in veterinary clinics may give rise to anxiety and fear. These suppress normal behaviors (such as rest and feeding) and increase vigilance, hiding and dysfunctional signs such as anorexia, vomiting and diarrhea or lack of elimination. Physiologic responses to stress include hyperglycemia, decreased serum potassium concentrations, elevated serum creatinine phosphokinase concentrations, lymphopenia, neutrophilia, unpredictable response to sedation and anesthesia, immunosuppression, hypertension and cardiac murmurs (Carney et al 2012). These changes can complicate treatment of feline patients and create confusion with diagnosis.

Preparing the practice environment

Key considerations for creating a cat-friendly environment are listed below.

- Manage odours. Cats' sensitive sense of smell drives many of their behavioural responses. Some odours (eg disinfectant, blood, deodorant) may cause anxiety and fear. Ensure all surfaces are clean and areas ventilated
- Consider using a synthetic feline facial pheromone analogue. Cats may benefit from diffusers placed throughout the hospital and a spray used 30 minutes in advance on material used for bedding and handling
- Manage visual and auditory input. Keep other patients away from the cat's line of vision. Bright or constant light can be stressful. As cats perceive light in greater abundance than humans, using soft lighting (eg 60 W bulbs) may be helpful. Speaking quietly and avoiding excess chatter can help patients stay calm

Preparation of the practice environment should include all areas that the patient may visit (including the car parking area and distance of this from the practice). Waiting times should be minimised. Where possible, cat appointments should be made for quieter periods of the day and cat and other species appointments should be at different times. There should be provision of a separate feline waiting area. Provide level tables to place the carrier on so the cat is not on the floor. Cover the carrier with a familiar towel if possible or have towels available in the reception area to use. Ensure that towels are not swapped between cats as this will allow scent signals to transfer between patients (in addition to the risk of transferred diseases).

A minimum of one exam room should be dedicated to cats only and should provide a number of surfaces where the cat can make themselves comfortable, eg chair, windowsill. Conducting the exam wherever the cat appears most comfortable can improve handling. Provision of a variety of food treats, disposable toys or catnip can be beneficial.

Preparation of the practice environment should include all areas that the patient may visit (including the car parking area and distance of this from the practice)

Separate, clean feline waiting areas should be provided
Photo courtesy of RVC

Cat-only wards should be provided, separate from other patients. The cage should be large enough to accommodate the carrier and for the litter box to be away from food, bedding and water. Alternatively provision of a cardboard box or other safe haven with hiding and perching areas can be supplied. Side by side cages are preferable to cages facing each other as this reduces visual stimulus. Mid level or higher cages are preferable to those close to the floor. The temperature and noise level should be controlled; fibreglass cages are warmer, less reflective and quieter than stainless steel. Studies have shown that classical music increases behaviours associated with relaxation in animals (Herron and Shreyer 2014). Toys or bedding from home can reduce stress and consideration to the cat's litter and typical diet should be given. The type of litter tray should also be considered; elderly patients may benefit from a flat litter tray to aid entry and exit.

A cat-only consulting room should be made available. Photo courtesy of RCV

Interaction with the feline patient in the veterinary practice

Our body language and attitude can affect a patient's stress levels. Greet cats and owners with moderated body language and voice. Management of owners is needed, as they are frequently keen to get the cat out of the box quickly and may speak loudly. Be aware of any special requirements eg soft surfaces for patients with arthritis. Be prepared with equipment readily to hand to minimise length of exam and noise associated with looking for items. Use a slow approach with a calm positive demeanour. A direct, frontal approach may appear threatening.

Open the carrier door while taking the history so the patient can choose whether to venture out. If the patient is still in the carrier once the history has been taken, quietly remove the top and door if possible and perform as much of the examination as possible within the carrier. A towel could be placed around or over the patient to provide additional cover during the exam.

If the carrier cannot be disassembled, avoid grabbing the cat or tipping the carrier. Reach in and support the back end to encourage the cat to move forward.

There are a variety of handling techniques that can be utilised for each patient. These include:

- usage of towels or anti-slip mats under the cat or ideally bedding from the carrier
- examine the cat in a lap with the cat facing towards the client and away from the examiner, using your body and arm to support the cat
- allow the cat to maintain its chosen position
- vary your touch with the cat's response. Massaging the cranial aspect of the ears or between the eyes can help calm the cat. Most cats prefer the head and neck for physical touch and may become upset or aggressive if petted in other areas
- swaddle the cat in a towel or cover the head with a towel
- wherever possible, perform procedures in the exam room
- avoid direct eye contact
- move slowly and deliberately, minimising hand gestures. Use quiet voices and encourage the owner to do the same. Avoid loud noises or ambient sounds that may mimic hissing (eg whispering)

- put yourself on the same level as the cat; do not loom above or over the animal. Approach from the side
- if the cat is anxious, return it to the carrier as soon as possible and continue to talk to the owner while the cat is in its safe place
- if medical procedures are needed, begin with those less stressful or invasive

(Vogt et al 2010, Roden et al 2011)

If the cat exhibits signs of fear, slow down or take a break from handling. Regardless of our efforts, some patients may require sedation for examination.

In summary, optimal cat handling techniques and adjustment of the practice wherever practically possible have significant benefits in terms of patient stress and improved client bonding. Serious injury can occur to staff members and owners through inappropriate handling. Trust and bonding can be irreparably broken during a single examination by unsympathetic handling. Therefore it makes both good ethical and financial sense to improve feline handling in the veterinary practice.

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Optimal handling techniques allows the patient to return to the home environment with minimal disturbance

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Vanessa Biggle MVB, CertAVP, MRCVS works at the Beaumont Sainsbury Animal Hospital, the first opinion practice of the Royal Veterinary College and a gold standard ISFM Cat Friendly Clinic. Previously, she worked at various animal charity organisations in London, including the Celia Hammond Animal Trust, PDSA, Blue Cross and RSPCA as well as volunteering in Bosnia, Belize and Greece. She has a keen interest in feline behaviour and animal welfare, including population control, pain management and palliative care.

Feline dental and oral disease

This is the first of a series of articles that looks at feline dental and oral disease

There is a wide range of dental and oral conditions in cats which can present both diagnostic and therapeutic challenges.

This series of articles aims to give the reader an overview of common feline oral and dental disease, summarise recent progress in understanding the different disease processes and discuss diagnostic and therapeutic options. The ability to diagnose and successfully treat the conditions covered by this article assumes a detailed knowledge of the development and anatomy of the feline oral cavity and competence in diagnostic procedures such as history taking, examination, charting and dental and oral imaging.

Periodontal disease

Periodontal disease is a descriptive diagnosis for a range of plaque induced inflammatory conditions of the periodontium. The periodontium is the area of attachment of the gingiva to a tooth and comprises the gingiva, the cementum covering the root surface, the periodontal ligament which supports the tooth on the alveolus and the alveolar bone. It is probably the most common chronic disease in cats (O'Neill et al 2014) and is reported to occur in 60% of client owned domestic cats over three years of age and up to 85% of cats greater than six years of age. Individual and breed susceptibility to periodontal disease is recognised particularly in pure bred cats with for example Maine Coon and Siamese being more prone to early or severe periodontal disease.

Periodontal disease can be classified as gingivitis or periodontitis. Gingivitis is simply reversible inflammation of the gingiva. Periodontitis involves inflammation and irreversible destruction of the periodontium.

Gingivitis

Gingivitis is reversible inflammation of the gingiva without destruction of the periodontium. It is caused primarily by plaque bacteria which colonise the gingival sulcus (the space between the tooth and gingival margin). Bacteria and bacterial byproducts penetrate through the epithelium of the sulcus into the underlying connective tissue where they stimulate an inflammatory reaction (Fig 1 a, b and c). This inflammation can be acute and oedematous or chronic in nature. Chronic inflammation can result in both gingival recession or enlargement and hyperplasia.

The host inflammatory response dictates whether this condition resolves, reaches a state of equilibrium or evolves to a state of chronic inflammation. So, although specific periodontopathogens are necessary to initiate the disease process, it is ultimately the host's response to these bacteria that determines the course of the disease. (Perry and Tutt, 2015)

Gingivitis will resolve if the primary cause of the inflammation (plaque) is removed but can progress to periodontitis if it is untreated.

Control of gingivitis depends upon the regular, daily removal of plaque. This is challenging in cats and should be tailored to individual requirements, the severity of the disease and the compliance of the patient. Plaque removal can be achieved through regular daily tooth brushing, the use of oral antiseptics such as chlorhexidine and feeding diets or chews which have been proven to reduce the rate of plaque accumulation. In some cases professional periodontal therapy including tooth scaling and polishing may be required.

Tooth brushing is often difficult in cats though with perseverance many cats will accept it. The best

chance is to introduce it with kittens. For both adults and kittens it is necessary to train cats by rewarding compliant behaviour and avoiding excessive restraint. Though challenging, daily tooth brushing is undoubtedly the most effective technique for plaque control as plaque biofilm is not effectively controlled by antibiotics or other antibacterial products but needs mechanical removal.

Studies have shown that the daily addition of a chew to a cat's diet significantly reduced the accumulation of plaque and calculus following periodontal therapy and that gingivitis returned to normal four weeks after the chew was discontinued (Ingham et al, 2002). This indicates that promoting chewing activity is an important means of improving oral hygiene in cats.

Chlorhexidine gluconate (CHX) has a broad range of antibacterial activity and instances of resistance are uncommon. When used as a gel or oral flushing solution it is adsorbed on to both hard and soft tissues in the oral cavity which prolongs its activity. CHX gel can be used with a toothbrush. CHX used without brushing will help to reduce the total oral bacterial load but will not eliminate plaque biofilm. Prolonged use may result in staining of the teeth and increased calculus deposition.

Other oral antiseptics include Zinc Ascorbate gel which has shown to be effective in decreasing bacterial growth, plaque formation and gingivitis when applied following a professional teeth cleaning procedure and Xylitol which was effective in reducing plaque and calculus accumulation in cats when added to drinking water (Clarke D, 2006).

Where homecare does not remove plaque sufficiently to restore inflamed gingiva to health professional scaling and polishing may be necessary. Plaque on the tooth surface (both above and below the gum margin) should be removed with careful use of a sonic, ultrasonic or piezoelectric scaler and then the tooth surface polished using a slow speed hand piece, polishing cup and polishing paste. The frequency of professional therapy will depend on the severity of the gingival disease and the rate of recurrence but where possible should be followed up with effective daily homecare.

Periodontitis

Untreated gingivitis may progress to periodontitis though this is not inevitable. Periodontitis is defined as the apical (towards the root apex) migration

Fig 1.a Picture of the mandibular canine, premolars and molar in a cat with mild gingivitis characterised by inflammation of the gingival margin

Fig 1b: Picture of the right maxillary and mandibular teeth in a cat with mild gingivitis affecting most of the visible teeth but more significant gingivitis affecting the maxillary fourth premolar

Fig 1.c Picture of the canine, premolars and molar in a cat with generalised moderate to severe gingivitis.jpg

Fig 2 Picture showing periodontitis affecting the first molar in a cat characterised by apical migration of the level of gingival attachment associated in this case with gingival recession

of the level of attachment of the periodontium and involves irreversible destruction of the tissues supporting the teeth including the gingiva, cementum, alveolar bone and periodontal ligament (Fig 2). Early periodontitis is often asymptomatic but it can progress and cause symptoms such as halitosis, oral pain, dysphagia, inappetence and morbidity. In people there is a clear link between untreated periodontitis and other systemic disease and though this link hasn't yet been demonstrated in cats there is no reason to believe that it should be different.

Periodontitis is a bacterial disease and as attachment loss progresses the gingival sulcus becomes progressively deeper and the bacterial population changes form broadly aerobic gram positive cocci to anaerobic gram negative filamentous bacteria.

Though bacteria are a pre-requisite of both gingivitis and periodontitis, the host immune response involving the release of cytokines and other inflammatory mediators responsible for collagen destruction and the activation of osteoclasts which cause the direct loss of gingival connective tissue, periodontal ligament, cementum and bone and the apical migration of the epithelial attachment to the tooth. This migration explains the formation of the periodontal pocket. Ultimately the teeth may become mobile and are lost from the mouth.

A recent study showed that Porphyromonas was the most abundant genus in all gingival health categories and Peptostreptococcaceae were the most abundant family in gingivitis and mild periodontitis (Harris et al, 2015). A recent study (Alder et al, 2016) showed that domestic diets influence oral micro biome composition though it didn't confirm whether a dry kibble or wet diet were better for gingival health.

Predisposing factors for periodontitis include genetic factors (breed predisposition), immunosuppressive disease such as FIV, FeLV and diabetes, tooth overcrowding (seen in brachycephalic breeds such as Persian and British Blue), other dental pathology such as tooth resorption and tooth morphology including changes caused by tooth fracture.

Periodontitis is diagnosed by clinical and radiological examination. In conscious patients it may be possible to see evidence of gingival recession which is associated with apical migration of the level of epithelial attachment and destruction of periodontal tissues without periodontal pocket formation. This is commonly seen affecting the mandibular canine teeth in cats though it can affect any teeth. Examination under anaesthetic will involve probing and measuring the depth of the gingival sulcus. Probing depths or gingival recession of greater than 0.5mm are considered abnormal and an indication of attachment loss in the cat. As periodontitis progresses attachment loss, pocket depth and gingival recession increase which may culminate in tooth loss.

In the early stages of periodontitis the radiographic changes are represented by subtle loss of bone height at the alveolar crest. As the disease progresses various patterns of bone loss may be evident characterised as horizontal or vertical bone loss or a combination of both (Fig 3 a,b,c and d). Horizontal bone loss is the most common radiographic pattern of bone loss in cats (Lommer and Verstraete, 2001). Verstraete (1998) showed that radiographic examination yielded significant clinically important information in cats where periodontitis had been demonstrated following a detailed dental examination and also in cats where periodontitis had not been demonstrated (Verstraete FL et al. 1998) and it is therefore an essential part of the diagnostic work up.

Treatment of periodontitis will vary from case to case depending on the skill set of the veterinary surgeon, the nature of the disease and the expectations and compliance of the owner. This may include supra and subgingival sealing and polishing, root surface debridement, advanced periodontal surgery including guided tissue regeneration and extraction of teeth with advanced disease. Client education and regular follow up appointments are important as is instructing an effective homecare regime.

Extraction

Extraction of feline teeth is challenging. Their tooth roots are fragile, oval in cross section, are often curved with hooked or bulbous apices all of which predispose to root tip fracture and necessitates good extraction technique. Pre and post-operative radiographs are an important and integral part of the surgical procedure. Fractured root tips should be extracted in most cases, especially where there is evidence of endodontic

or periodontal disease and if a decision is made to leave a root tip in situ the owner should be informed and the patient should be monitored radiographically. Roots with replacement resorption may be intentionally retained if there is convincing radiographic evidence of loss of the normal periodontal ligament space, disappearance of a normal root canal and replacement resorption of the tooth root (Fig 4). This should be noted on patient records and owners should be warned of possible future complications.

Antibiotics are not a central part of the treatment of periodontitis because of the complex nature of periodontal infections and because plaque bacteria exist in a biofilm which protects them from the effect of antibiotics at normal dose ages. They may be indicated in acute disease or in treating chronic disease at the time of treatment in immune compromised patients. Amoxicillin-clavulanic acid has the highest in-vitro activity against the range of isolates when compared with other commonly used antibiotics such as clindamycin, cefadroxil and enrofloxacin.

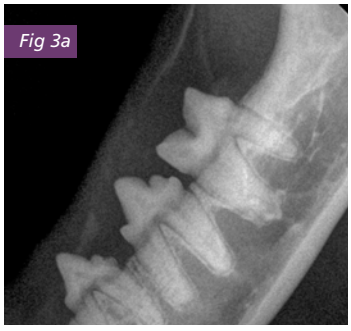
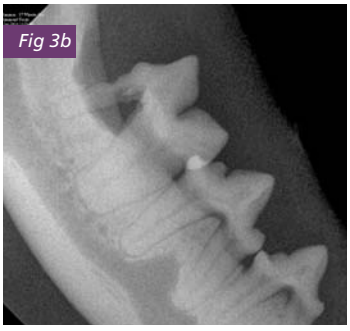


Fig 3a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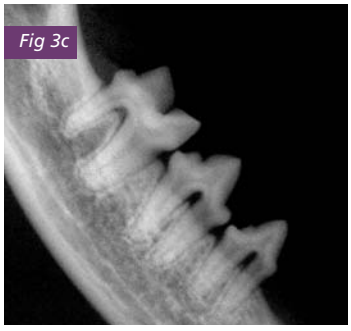
Fig 3c

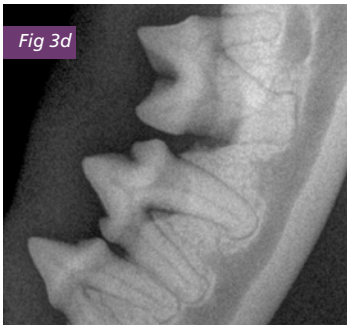
Fig 3d

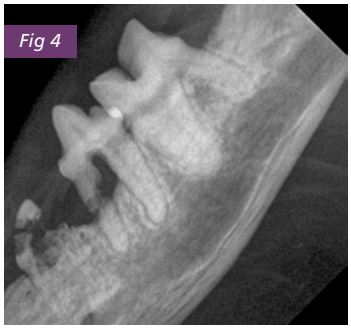
Fig 4

3a: normal alveolar bone

3b&c: horizontal bone loss associated with periodontitis

3d: vertical bone loss particularly affecting the mesial root of the molar associated with periodontitis

4: Root resorption of PM3

References

Available on request

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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.

A beginners' guide: practical approach to investigating feline upper respiratory disease using rhinoscopy

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American Board Certified Diplomate Feline Practice

Endoscopy is a minimally invasive alternative to more traumatic surgical exploration of the nasal cavity. It also allows for direct visualisation and access to lesions/foreign material and also allows for sample procurement and/or foreign body removal. The major disadvantage of rhinoscopy is the inability to examine the entire rhinarium including the dorsal and middle meati. This is particularly true in the cat due to significantly reduced working space.

Visualisation of the nasopharynx, laryngopharynx, and nasal cavities are all considered part of a full upper respiratory examination in the cat.

Indications and physical examination

The indications for rhinoscopy include: sneezing/'reverse' sneezing, nasal discharge, epistaxis and abnormal stertorous sounds.

Before conducting any endoscopic examination, it is essential to perform a thorough history and clinical examination. In addition, depending on the age of patient, chronicity, anticipated diagnostic procedures required to achieve a diagnosis, screening tests may be required (eg haematology, biochemistry, electrolytes, urinalysis, TT4 and blood pressure) to establish the general health and potential anaesthetic risk of the patient. The depth of evaluation will vary depending on the case; however, every case should at least receive a comprehensive history and full clinical examination for lesion localisation (ie upper respiratory vs lower respiratory). It is vital for the practitioner to understand that, without identifying the nature and location of the problem, endoscopy will be of little diagnostic value.

Physical examination should include an assessment of nasal airflow (decreased or normal, unilateral or bilateral change) and palpation of the palate and facial bones for pain, swelling, ipsilateral epiphora and exophthalmos. A conscious oral examination should ideally include a dental assessment and oropharyngeal examination. Some cats will allow for conscious digital palpation along the hard palate, soft palate and gingival margins which may identify incongruities consistent with nasopharyngeal space occupying lesions and periodontal disease as a cause for epistaxis, nasal discharge, or upper respiratory stertor. It must be remembered that despite this brief assessment, occult dental disease or oronasal fistulae can be missed on conscious physical exam. If dental disease is suspected, dental radiography is indicated, paying special attention to teeth 104, 204, 108 and 208. Additionally, any signs of exopthalmos, frontal bone asymmetry, or fleshy mass near 109 or 209 should prompt the clinician to pursue imaging for signs of erosive diseases, namely neoplasia or fungal infection (ie sinonasal/sinoorbital aspergillosis). A neurological examination should focus on cranial nerve evaluation and also detecting for any subtle signs of cerebral dysfunction such as weakness, decreased conscious proprioception and visual deficits. If clinically suspicious of cryptococcosis, cytology slides of nasal secretions and Latex Cryptococcal Antigen Testing (LCAT) should be submitted, especially in those patients travelling from endemic areas (eg Canada, Australia, USA) or residing in areas in the UK known to have access to pigeon guano. Equally, a neurological examination should be performed in any cat with upper respiratory tract disease and suspected middle-ear involvement. Signs of peripheral vestibular disease in cats with otitis media/interna may involve head tilt, Horner's syndrome, circling, ataxia, and nystagmus in the absence of postural deficits.

1) Bilateral epistaxis caused by systemic hypertension

A thorough otoscopic examination should be performed assessing the external ear canals. In cats with nasopharyngeal polyps, there may be an extension of tissue through the tympanic membrane into the horizontal ear canal. It is worth mentioning that while polyps originate in the tympanic bulla, they usually take one of two paths: 1) either progress down the Eustachian tube and become nasopharyngal, or 2) break through the tympanic membrane and become aural polyps.

Cats presenting with epistaxis should have a blood pressure and coagulation profile assessing both primary (platelet count and buccal mucosal bleeding time) and secondary haemostasis (PT and aPTT) as these patients may be at an increased risk of prolonged and potentially life threatening haemorrhage (Photo 1). Although the risk of serious haemorrhage is very minor and relatively easily controlled in most 'routine' rhinoscopy cases, the nose can normally bleed heavily and can be a particular complication especially if an underlying and unidentified coagulopathy is present.

Bacterial culture and antimicrobial susceptibility testing of superficial nasal swabs are often unrewarding and not generally recommended. Results typically yield normal intranasal bacterial flora and are difficult to interpret. Cultures of nasal biopsy samples may be more representative for deep mucosal infections and turbinate bone osteomyelitis (Johnson 2005), but this has not been definitively proven.

FHV-1 or FCV virus isolation and nucleic acid amplification techniques in cats are often used to implicate infection by these organisms. FHV-1 PCR assays are widely available and feline calicivirus reverse transcriptase PCR assays are also available; however, none of the PCR assays for FHV-1 have been shown to distinguish between wild-type virus and vaccine virus (Maggs 2005). Additionally, test sensitivity (detection limits and rates) varies greatly between the tests and laboratories. These infectious agents can be detected in healthy cats as well as in clinically ill cats. Thus, the positive predictive value for these assays is low. Equally, although considered an uncommon cause of chronic upper respiratory tract disease in cats, virus isolation would be most useful for FCV and can be isolated from nasal, conjunctival or oro-pharyngeal swabs. It must be

appreciated that virus isolation may give a 'false negative' due to small numbers of virions in the sample, virus inactivation during transit, or to the presence of antibodies in extracellular fluids that prevent virus replication in vitro. The chance of successful virus isolation can be maximised if swabs from both conjunctiva and oropharynx are collected (Marsilio et al., 2005). Because of the relatively low positive and negative predictive values of these tests in the clinical setting, the author seldom performs viral testing in the first instance especially in those circumstances where finances are restricted. If suspicious of FHV-1 rhinitis, it may be more cost effective (and relatively safe) to treat with the systemic antiviral, famciclovir (15mg-90mg BID-TID), over submitting potentially expensive and non-diagnostic viral samples.

Examination under general anaesthesia

For a complete evaluation of the nasal cavity, sinuses and nasopharynx the assessment should include repeat examination of the oropharynx/dentition, +/- skull and nasal radiography, +/- CT or MR imaging, +/-dental radiography and +/- rhinoscopy under general anaesthesia. Assessment of the oral cavity may reveal protrusion of the soft palate and indicate nasopharyngeal space-occupying lesions such as neoplasia and fungal granulomas (Photo 2).

2) Intraoral view of soft palate demonstrating ventral deviation of soft palate from nasopharyngeal space occupying mass

Imaging studies

Radiography is one of the principal diagnostic methods used in practice for the investigation of cats with chronic nasal signs. Radiography must be performed with the patient under general anaesthesia to ensure accurate positioning and should include lateral, lateral oblique, intraoral dorsoventral occlusal views, rostrocaudal open-mouth views and intraoral dental radiography, the latter if indicated. Rostro10°ventral-caudodorsal view ('skyline') of the frontal sinuses can be considered, however because of the domed shaped contours of the feline skull compared to dogs, it is much more difficult to obtain well-delineated frontal sinuses in the cat.

Nasal imaging can reveal increased density in the nasal cavity or bony lysis that could suggest a neoplastic process, turbinate bone destruction consistent with chronic rhinosinusitis or fungal disease, radiopaque foreign objects such as air gun pellets, or tooth-root abscessation. Radiography may be less useful as a means of distinguishing rhinitis from nasal neoplasia in cats than it is in dogs (Lamb 2003).

Positioning for radiography is very important to eliminate superimposition of the nasal cavity and frontal sinuses with other structures. Lateral radiographs are frequently unrewarding for assessing animals with unilateral lesions confined to the nasal cavity because superimposition of the normal half of the skull on the abnormal half tends to mask abnormalities. The lateral view aids identification of lesions extending through the nasal or frontal bones or cribriform plate. Lateral radiographs are also useful for identifying lesions affecting the nasopharynx, such as polyps and ideally should be extubated views. The difficulties of examining the feline nasal cavity radiographically were emphasised in a study that found radiographs of a few cats with non-nasal disease were interpreted erroneously as showing signs of intranasal disease (Lamb, 2003). This probably occurred because lesions affecting adjacent structures were superimposed on the nasal cavity in one or more of the radiographs evaluated.

Visual evidence of fractured maxillary teeth with pulp exposure, exposed dentin, tooth discoloration, shifts in dentition, excessive calculus, or periodontal pocketing exceeding >0.5 mm could suggest

periapical root abscessation, oronasal fistula or neoplasia. Dental radiography in these instances should be employed using intraoral films and bisecting angle technique.

Cross-sectional imaging studies

Computed tomography (CT) and magnetic resonance imaging (MRI) can be used for imaging dentition, nasal passages and sinuses. CT and MRI greatly enhance the ability to differentiate inflammatory from neoplastic disease, and contrast-enhanced CT and MR images show a patchy inflammatory response with either no or mild conchal destruction in LPR.

Cross-sectional imaging techniques, (CT and MRI) are increasingly used for investigation of nasal disease because both CT and MRI provide images without superimposition of structures and with better soft tissue delineation compared to radiography. Radiography is also more widely available as a diagnostic tool for general veterinary practitioners. Furthermore, contrast-enhanced CT and MRI are useful to distinguish between vascularised soft tissue and mucus accumulation.

MR imaging has the advantages of exceptional soft tissue contrast, multi-planar imaging capacity, and the lack of ionising radiation and bone beam-hardening artefact. CT and MR imaging, therefore provide slightly different information. There are no large studies using both modalities to suggest that one is inherently better or more accurate than the other (Windsor 2006). CT is currently the most popular imaging technique due to its lower cost and reduced time under general anaesthesia compared to MRI.

Laryngoscopy and pharyngoscopy

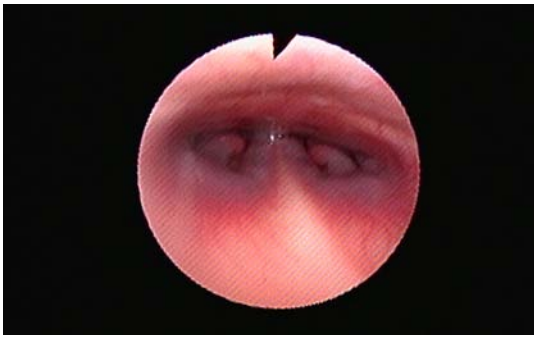
Laryngoscopy is certainly indicated for those patients with a history of stridor, changes in phonation (ie 'lost miaow', high pitched purring and changes in pitch to vocalisation), gagging/coughing and retching especially when eating, drinking or purring.

This examination should be assessed under a light plane of anaesthesia so that the patient can still swallow. There should be no masses, oedema, nodules or irregularities affecting the arytenoids or surrounding tissue. In normal respiration, the arytenoid cartilages should abduct (move away from paramedian position) during inspiration, and return to paramedian position during expiration. It is vital for an assistant to 'announce' the phase of respiration and to not confuse normal movement to paradoxical movement found in complete laryngeal paralysis.

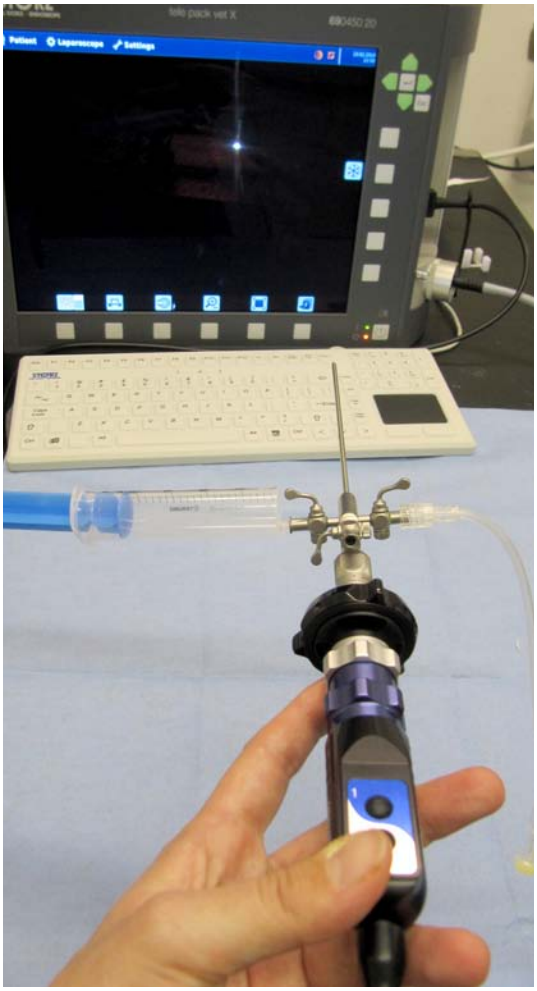
Caudal (flexible) nasopharyngoscopy/ rhinoscopy:

Caudal rhinoscopy is commonly performed with the patient in sternal recumbency; however, there are practitioners who also utilise alternative positions such as lateral or even dorsal recumbency to assist with this examination. At the beginning of the procedure, a retroflexed examination behind the soft palate should be performed to detect mass lesions, deformities, or foreign bodies. A dental mirror and bright light source can sometimes provide an image of this region. A specialised instrument with light source and a flexible mirror can be obtained from commercial vendors (eg straight laryngeal mirror) may also be used (Photo 3). Rostral retraction of the soft palate will aid in visualisation;

3) A straight laryngeal mirror with integrated light source can be a valuable tool for assessing behind the soft palate



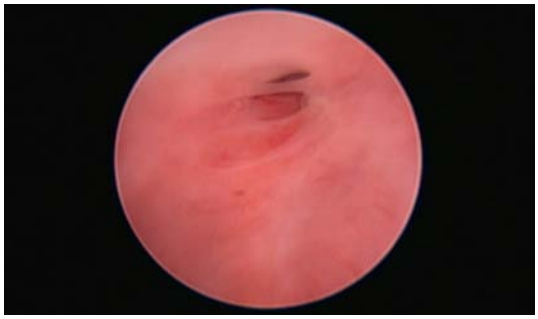
4) Normal view of choanae in cat showing prominent caudal nasal tissue orientation of retroflexed views on monitor top (ventral), bottom (dorsal), left (right), and right (left)



5) Photo showing how to connect camera, light source, irrigation (ingress port) and syringe for forceful flushing on egress port

however, it can be very challenging to obtain an adequately sized biopsy sample, or retrieve a foreign body from this region without the availability of a flexible endoscope. A 3.5mm-4.0 mm diameter 2-way deflection endoscope can access the nasopharynx in all but the smallest cats. Signs of diseased tissue include friable, irregular, nodular and hyperaemic tissue. There should be minimal secretions and the choanae should be patent (ie appear 'black' with a hint of caudal nasal mucosa protruding from the choanae) (Photo 4).

Various methods used to obtain tissue samples include aggressive flushing and suction using aspiration catheter, biopsy forceps for guided samples of mass lesions and brush samples for cytology. Vigorous nasal flushing can be useful to dislodge mass lesions or foreign bodies in obtaining a definitive diagnosis because they are less affected by inflammation or bacterial inhalation in the rostral nasal cavity.



6) Anterograde view of nasopharyngeal stenosis from right nasal cavity seen from rostral direction prior to laser ablation

7) End of pampas grass blade surrounded by purulent material in LEFT caudal nasal cavity. Note: Image on monitor orientation will appear 'upside down' and 'reversed' ie left side of monitor is patient's right, right side of monitor is patient's left, top of monitor is ventral and bottom part of image is patient's dorsal

Anterograde (or rostral) rhinoscopy)

Endoscopic examination of the rhinarium and frontal sinuses is referred to as anterograde rhinoscopy. Anterograde rhinoscopy can be performed using a rigid telescope. Small diameter flexible endoscopes such as bronchoscopes and cystourethroendoscopes can in theory be used to examine the nasal cavity and sinuses in larger canine patients; however, in feline practice, the major limitations encountered in using flexible endoscopes for anterograde rhinoscopy include poor light transmission, poor image quality, small biopsy channel size and the need for a high-pressure fluid pump to flush sufficient volumes of fluid to clear discharge and haemorrhage. As an alternative, rigid rhinoscopy can be performed quite easily on most feline patients using an integrated 1.9mm 30° oblique endoscope for feline rhinoscopy. Two-way stopcocks allow for continuous fluid ingress and egress to remove blood, mucus or other tissue debris from the field of view (Photo 5). Another advantage of continuous fluid irrigation is that it can act as a superior medium and enhance tissue magnification compared to that of air. The entirety of both the dorsal and ventral nasal meati can be examined adequately to the level of the ethmoid turbinates. Given the minimal trauma to the nose when performing rhinoscopy, coupled with constant irrigation of the field of view, the visualisation is in many ways superior to that of traditional open surgery. Some endoscopists will use a diode laser fibre within the endoscope to remove polyps and tumours without the need for aggressive open surgery.

8) Seven pampas grass blades removed from choana and rostral nasal cavities from same patient in Image 7

9) Aspergillosis granulomas prior to debridement (Photo: Elise Robertson)(Tamborini et al 2016)

Rhinoscopic evaluation of the nasal cavity is performed after radiographic or tomographic imaging in order to avoid induction of hemorrhage that would alter imaging findings.

The following structures should be visible during anterior rhinoscopy:

- **nasal septum** (vertically aligned, opposite of turbinates)
- **turbinates** (dorsal and ventral chonchae), all arise from lateral aspect of the nasal cavity
- **meati** (dorsal, middle, ventral) – it's important to note the meatus size if possible
- **ethmoidal labyrinth** caudally

Typical lesions or abnormalities encountered during anterior rhinoscopy include:

- mucosal abnormalities: inflammation, hyperaemia, increased mucosal fragility or friability, lymphoid follicle development and nasopharyngeal stenosis (Photo 6)
- **increased** amount of visible space: turbinate loss, chronic inflammation secondary to bacterial infections/turbinate bone osteomyelitis, eg due to tooth abscess, foreign body or feline viral infection
- **decreased** amount of visible space: the normal air space (meatus) is filled by secretions, tissue (tumour, granuloma, polyp), or foreign body (Photo 7) (Photo 8) (Photo9)

Biopsy

Upon completion of a thorough examination, biopsy samples can then be collected. These samples can be collected from the nasal mucosa, masses, plaques, or polyps. The operator can collect biopsy samples either through the instrument channel (this will result in very small samples) or by using a pair of 3-4mm rigid cupped biopsy forceps. Biopsy forceps can be placed in a premeasured depth (not to exceed the length measured from the tip of nose to medial canthus of eye). **Do not exceed this depth due to high risk of inadvertent penetration through the cribriform plate and into the frontal lobe of brain.** Samples should be carefully decanted into a sterile saline urine pot until the end of the procedure. The excess saline can then be syringed from the pot to approximately 3cm to the level of the samples and then transferred directly into an appropriately labelled formalin pot. The author will also save a fresh biopsy sample to submit for bacterial culture and sensitivity testing. The author will also collect a fresh biopsy sample which is placed directly into a charcoal culture media for bacterial culture and sensitivity testing.

Post-operative care

Having completed the rhinoscopic examination, and prior to recovery, the nose should be lowered, any pharyngeal packs removed, counted and the oropharynx swabbed/suctioned before extubation. Some authors advocate the use of pseudoephedrine or applying external pressure until the cat has recovered from anaesthesia.

Complications

Haemorrhage is the most common complication of anterior rhinoscopy but is rarely long lasting or significant in most feline patients. Aspiration of fluid can be prevented by fitting an appropriately sized endotracheal tube (the author does not cuff the tube in cats) and packing the pharynx with swabs, leaving adequate space for the free flow of irrigant fluid over the free edge of the soft palate and out through the mouth. The nose should be lowered on recovery and during endotracheal tube removal to prevent caudal accumulation of blood/clots/mucous or fluid in the pharynx.

Conclusion

In conclusion, the author's experience using rigid endoscopy has provided an easy and rewarding minimally invasive alternative to traditional diagnostic and surgical interventions for upper respiratory conditions. If rigid endoscopy is going to be profitable, quality equipment and training is essential. The equipment and expertise needs to be readily available and used on virtually every appropriate patient seen in the practice. Endoscopy can be an extremely valuable and versatile part of clinician's diagnostic and therapeutic armamentarium.

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Elise Robertson

BS BVetMed MACVSc(Feline) DipABVP(Feline) AFHEA MRCVS

Elise operates a peripatetic feline medicine and endoscopy/endosurgery referral service (canine and feline) for over 80 practices in SE England. She also offers a quarterly referral service from hospitals based in both Singapore and Kuala Lumpur. She's received her formal training in medical endoscopy and 'key hole' surgery from well-known human and veterinary academic institutions based in the UK, France, Germany, Italy and United States.

She currently divides her time between clinical work, teaching/lecturing and publishing within the subjects of feline medicine, endoscopy and endosurgery. She's Head European Mentor for ISFM/ University of Sydney Distance Education in Feline Medicine.

All the latest news from Cats Protection

The Association of Charity Vets conference

The Association of Charity Vets (ACV) provides support and information for vets, vet students and vet nurses who work with or for animal welfare charities, rehoming centres or low-cost clinics. The Association's fifth annual conference was held at Wood Green's Godmanchester centre in February and saw over a 100 delegates attend lectures, workshops and tours around the centre.

Rachel Dean, the chair of ACV updated delegates on business matters, explaining that the association now has an accepted constitution and all delegates automatically became members of the association. Elections will be held at the next AGM to elect a chair, treasurer, secretary and other members including a vet nurse and a student. The aim is to get affiliation with BSAVA.

First to lecture was Zoe Belshaw who gave a thought-provoking presentation on the philosophy of animal quality of life. It became clear that 'good quality of life' is a lot more than purely an absence of negative experiences such as hunger or pain. Yes, the basic welfare needs must be met, but additionally, animals must have positive experiences to ensure a 'good quality of life'.

A practical recommendation was to get clients to video their pet's behaviour at different times, especially ones with more chronic issues. In these cases of eg osteoarthritis, there may be day-to-day changes in eg behaviour, mobility and pain which may be more clearly assessed via daily video footage and give a better overall impression of the animal's quality of life or 'happiness'.

Bev Panto, a wildlife specialist, discussed things to consider when dealing with wild birds and hedgehogs. She stressed the importance of species specific treatment in the case of birds – not an easy task, considering that there are 599 bird species found in the UK. Another important point to always remember is that treated wildlife cases treated need to be able to live a normal life once returned to the wild.

Delegates could attend workshops during the day, such as PDSA's PetWise Welfare consultation, Animal CSI – a lesson on the use of forensics in non-accidental injury cases, FeLV/FIV testing and ophthalmology on a budget. All of these workshops were interactive and informative alike and were well attended.

Lunchtime allowed delegates to join tours of Wood Green's facilities and explore the different types of housing and upkeep provided for the various species cared for at the centre, as well as the on-site veterinary facilities.

The day was rounded off by Ian Ramsey's talk on diagnostics on a budget, which focussed on effective in-house tests. He explored the advantages of investing in a microscope for in-house use and taking digital images that can easily be emailed to obtain a second opinion. This talk was appropriate not just for those in charity work, but also for those with clients where funds are limited.

To keep the momentum going in this developing organisation anyone who didn't attend the meeting but who is interested in becoming a member can do so free of charge for 2017. Enthusiastic and motivated people are also needed for the committee. For further information email Dr Maggie Roberts on **maggie.roberts@cats.org.uk**

Air guns campaign

Please sign and share Cats Protection's petition calling for air guns to be licensed in England and Wales.

In 2016, 202 cats in the UK were reported in the press as being shot with an air gun. This is likely to be an underestimation of the actual numbers. Crucially, 90% of these attacks were in England and Wales. Northern Ireland led the way in restricting air gun ownership in 2004 and Scotland adopted similar legislation in 2017.

One victim was Chaos who was shot between her eyes in September last year in Neath, South Wales. The pellet miraculously missed her brain and lodged in the muscle between her spine and gullet, where it remains. Her story is typical of the many sad cases we hear about.

Cats Protection is calling on England and Wales to follow Northern Ireland's and Scotland's lead on air guns. Air gun regulation is a reserved matter in Wales which means it is dealt with at Westminster. No matter where you live in the UK you can sign our petition here: **www.cats.org.uk/airgunspetition**

If vet practices could sign and share our online petition this will really help us to get the thousands of signatures we need to put pressure on the government to change gun laws in England and Wales.

Vet practices were very helpful with our last campaign about kittens sold for profit. Your support will make a real difference. Thank you.

Chaos' x-ray

Chaos shot in the head

Initial vaccination course for kittens and cats in CP care

Cats Protection has been made aware by new owners of CP cats that a number of vets are recommending that kittens receive a third vaccination after homing and that the initial course is finished at 16 weeks of age. At Cats Protection we take the following stance:

WSAVA (World Small Animal Veterinary Association) guidelines recommend that the vaccination schedule for the core vaccination of kittens should be completed at 16 weeks of age or older. By this recommendation, when vaccination is started at eight or nine weeks of age, vaccinations are repeated every three to four weeks to end at 16 weeks of age or older. This means a course of three vaccinations may be needed. When a vaccination is started at six or seven weeks of age (for example, in the face of a local outbreak of disease), a course of four primary core vaccinations would be administered to finish at 16 weeks or older. A number of vets have since adopted this protocol as part of their routine vaccination of kittens.

WSAVA has issued this guidance in response to some studies which suggest that the presence of maternally derived antibodies will interfere with the effects of vaccination. It may take 16 weeks for these maternal antibodies to disappear. However, WSAVA acknowledges that the studies were carried out in a relatively low number of purebred cats and that the guidance may not be fully applicable to the wider feline population.

CP is currently using Purevax (Merial) for cats in our care. The datasheet recommends two vaccinations in the core vaccination course, given at eight to nine and 12 weeks. CP's current guidance to both CP branches and adoption centres (and to vets treating cats in CP Care is that vaccination is done in accordance with the manufacturer's datasheet. As such, cats and kittens in CP care are vaccinated only twice unless there is a particularly high risk such as an outbreak locally.

Once cats are homed, the new owner's vet may recommend a third vaccine. The decision to administer a third vaccine would be made by the new owner and this would be paid for by the new owner.

True Cost of Kittens campaign – thank you to all the vet practices that helped – we did it!

On 1 February the Government set out its proposals for new licences in England governing 'animal activities' and that includes pet sales. We did it! They propose including a ban on the sale of kittens under eight weeks as a licence condition and removing the old legal loopholes that allowed repeat breeding for sale to occur without licence. Business activity involving the sale of cats and kittens will need a licence.

To the thousands of vet practices that returned campaign postcards and got behind this campaign – thank you. We also had tremendous report from our volunteer branches, volunteers, shops and adoption centres up and down the country. Our Facebook and Twitter followers helped too sharing our e-letter and campaign video which was viewed by over 200,000 people. It was amazing. In total over 47,000 messages of support went to the Government and that included over 40,000 e-letters to MPs and 7,000 campaign postcards. We were overwhelmed and it seems the Government listened.

Cats Protection is now involved in drawing up the detail of the new licensing provisions and Cats Protection has been invited by the Government to join an expert panel to take forward the Government's plans. We will also press for similar licensing proposals in the rest of the UK. Read more about how you helped at: **www.cats.org.uk/truecostofkittens**.

Or read our news story issued to the press: **www.cats.org.uk/news/cats-protection-welcomes-proposals-to-close-legalloopholes-on-kitten-sales**

Richard Clare, Advocacy Officer and Jacqui Cuff, Advocacy Manager delivering the giant campaign postcard to Defra in London.

EMS Awards

And the winners are...

The winners of the annual vet student Extra Mural Studies (EMS) Awards have been announced.

The awards, organised jointly by Cats Protection and Dogs Trust, gave veterinary students the chance to get hands-on experience specialising in feline or canine shelter medicine during work placements at a centre with either of the two charities.

Following the placements, students were asked to submit reports on a relevant subject detailing their findings to be in with a chance of winning one of two prizes of £500 or two runners-up prizes of £250.

For the Cats Protection award, Miranda Bowden-Doyle, 23, was chosen as winner in recognition of her report titled *Feline Neutering Scenarios in a Shelter Setting*, while Colette Angel was selected as a runner-up for her paper *What makes a cat-friendly home? A discussion worth having during cat consultations.*

Miranda, who is in her final year of studying at the Royal Veterinary College, spent a week on placement at Cats Protection's National Cat Centre in Sussex before writing her winning report.

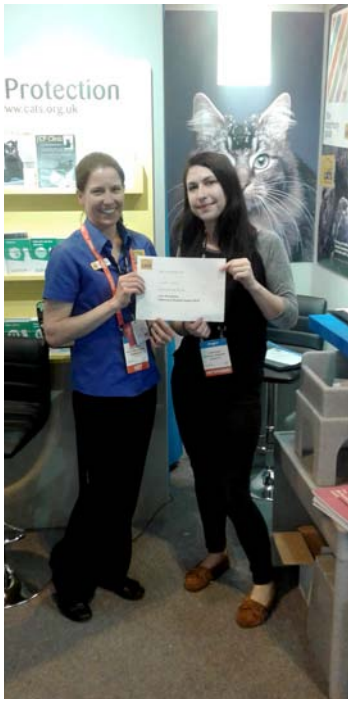
She said: "I'm thrilled to receive this award. As a cat lover, I was excited by the prospect of spending a week focusing on feline medicine, but during my time at the National Cat Centre I discovered a new found love of charity practice and a desire to bring neutering concepts from charity and private practice together so we can give our patients the best care in every situation."

Runner-up for the Cats Protection award, Colette Angel, 29, who is a final year student at the Royal (Dick) School of Veterinary Studies, said: "As a self-proclaimed crazy cat lady, I was surprised to acquire some new pearls of wisdom about cat behaviour and husbandry during my placement at Cats Protection. It reminded me that there is always room for growth; even in areas you may feel confident. For that reason, I chose to write a report highlighting the basic needs of cats, including the new insight from my placement, and emphasising how a veterinarian's advice can positively impact a cat's life at home and reduce relinquishment."

Cats Protection's Director of Veterinary Services, Dr Maggie Roberts, said: "We were hugely impressed with the standard of this year's entries and the obvious dedication to feline welfare expressed by the students who spent time on placement with us. Although all the reports submitted were excellent, Miranda and Colette's insights really stood out. They both have a great future as veterinarians ahead of them and we wish them all the best with their studies."

The two articles in question will be published in the summer edition of *CP Clinic*.

Left to right: Katie (Head nurse) with Winner Miranda and Lucinda (NCAC vet)



Left to right: Sandra (Education Vet) with Runner-up Colette at BSAVA Congress 2017