
Diabetes in cats

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Introduction

The incidence of feline diabetes mellitus is on the increase, a recent UK survey suggesting that nearly 1 in 200 cats are diabetic. Despite being so common, feline diabetes is often surrounded by much confusion; the disease has many differences when compared to diabetes mellitus in dogs and people, it can be difficult to manage, and owner compliance and homecare forms an important part of the management. However with the right information and support from the veterinary practice, most owners will cope well with treating a diabetic cat and owners play a vital role in maximising the chance of successful treatment.

Did you know?

- Obesity is a common cause of diabetes so preventing obesity can prevent diabetes in some cats
- If diabetic cats are treated appropriately, some of them may only be transiently diabetic (i.e. they won't necessarily need insulin for the rest of their life). It is however unpredictable as to which cats will fall in to this category – many cats will require lifelong treatment
- Cats that are at a higher risk of developing diabetes are middle aged cats (7-10 years), male neutered cats, Burmese cats, indoor cats, obese cats and cats receiving certain drugs (e.g. corticosteroids)

Treating diabetes

Treatment of diabetes involves daily insulin injections, weight control and dietary management, in addition to recognising and treating any complications as early as possible. In many cases it may take 2-3 months to fully stabilise a diabetic cat (i.e. achieve blood sugar levels at a consistent level, low enough to cease signs of diabetes). Successful treatment involved more than simply giving an injection every day. Key to the success of management, is vigilant monitoring, and adjusting treatment as required.

Monitoring diabetic control

There are 4 main aspects that need to be considered when monitoring longer term diabetic control:

1. OWNERS OBSERVATIONS REGARDING THE PRESENCE AND SEVERITY OF **CLINICAL SIGNS**. THIS IS A VITAL PART OF MONITORING AND IT IS USEFUL FOR OWNERS TO KEEP A DIARY RECORDING:

- Weight & body condition score
- Demeanour
- Appetite
- Thirst (just a subjective assessment by the owner is usually helpful if it is not practical to measure water intake)
- **Coat condition**
- Urination (weighing the litter tray regularly at the same time of day can give a useful subjective indication of changes in urination)

It is also extremely important that owners are aware of the signs of **hypoglycaemia (low blood sugar)**, so that they recognise any hypoglycaemic episodes as soon as possible, and are aware of the best course of action to take. A fairly standard instruction sheet should be issued to all owners with diabetic cats with the basic information that they need to know, and the clinical signs that they need to monitor. More detailed information sheets are also useful to assist in educating the client about the disease and how it can be appropriately managed.

2. Serum **fructosamine** concentrations. This gives an approximate measure of the average blood sugar levels over the previous 2 weeks. This can be measured monthly during the initial months of stabilisation

3. **Serial blood glucose concentrations** – frequent monitoring of blood glucose measurements throughout the day can give the most information about how effective the insulin is, and how long it is lasting, however there are complicating factors in interpreting blood glucose curve results and caution needs to be taken

4. Monitoring for **diabetic complications** – this includes progression to diabetic ketoacidosis if diabetes is not adequately controlled, periods of hypoglycaemia particularly if the cats insulin requirements are variable, conditions that may increase insulin requirements such as urinary tract infections, or result in variable insulin requirements such as pancreatitis.

In the longer term, once stabilized, diabetic cats should be reassessed at least every 3-6 months. At each check, the following should be performed as a minimum:

- Discussion with owner re diabetic diary, any changes in clinical signs noted
- Full physical examination
- Weigh, body condition score and calculate % change since previous visit
- Serum fructosamine

In addition, the following other tests would also be useful where possible:

- Blood pressure measurement
- Full urinalysis including bacterial culture
- Routine haematology
- Serum biochemistry

If the cat is free from clinical signs and physical examination is unremarkable, then adequate diabetic control is likely, and fructosamine will assist in confirming this. If fructosamine is low normal, it may indicate cessation of insulin requirements in a transient diabetic. If clinical signs of persistent hyperglycaemia or episodes of hypoglycaemia are reported, or if there is evidence of weight loss, or other complications such as a peripheral neuropathy, then further diagnostics should be performed.

Periodic **monitoring of urine for glucosuria and ketonuria** in the home environment can also be useful for monitoring glycaemic control. It is not particularly helpful for owners to frequently measure urine glucose as this often results in owners making their own adjustments in insulin doses. It is however useful in detecting the transient diabetic whose insulin requirements are reducing, as absence of glucosuria would make this likely. It is also useful for owners to periodically check for urine ketones, to try and detect developing ketoacidosis in the early stages before the cat becomes too unwell.

Frequently asked questions

It is often a lot for an owner to take in when they are told that their cat has diabetes. Frequently owners have many questions which they do not think about when they are with the vet, but all these concerns that arise afterwards can influence the way that an owner manages their cats diabetes. Some frequently asked questions that arise are as follow:

Will my cat need insulin injections for the rest of its life?

Many cats will need insulin for their whole life. However, when diabetes is detected early in the course of the disease, and optimal treatment (twice daily insulin injections) is started promptly, and close monitoring is carried out, then in up to 50-60% of cats, the need for insulin may actually resolve, often within the first few months of treatment. So being extra vigilant early on can really pay off!

Is one injection of insulin a day enough or does it have to be injected twice daily?

Your vet will instruct you on how often the insulin needs to be given as it will be partly dependent on the type of insulin being used, and your cats individual response to insulin.

However, if you can really only manage to give one injection a day then this is still going to be better than not treating the diabetes at all, and you may be able to get good resolution of your cats signs with once a day injecting. However twice a day injecting will increase the chance that your cats diabetes may only be transient and they will not need to have insulin lifelong, so it could be more difficult to manage in the short-term but worth it in the long-term.

I work shifts and so I can't give insulin every 12 hours every day, what should I do?

Don't worry, you can work around this. Although the absolute ideal is for insulin to be given at about the same times every day, 12 hours apart if twice daily insulin is being used, it will not be too detrimental if for example some days insulin is only given once a day, or there is a slightly longer gap between injections. At the end of the day the treatment has to be practical for you, and having a slightly different regime is still going to be better for your cat than not being treated at all. The only thing to be careful of is not giving the insulin too soon, so injections should not be given more frequently than every 10 hours. Discuss with your vet a treatment regime that will be most optimal whilst still being achievable for you.

What happens if I miss a dose of insulin?

Obviously you should aim to follow your vets instructions as closely as possible, but if you do miss a dose don't panic. As long as this is not happening very regularly, missing the odd dose of insulin will not be detrimental.

Do I have to feed my cat a special diet?

Research has shown that feeding a high protein and low carbohydrate diet in combination with insulin treatment will improve the control of diabetes and increase the chance of remission from diabetes. There are prescription diets available that are ideally formulated – you should discuss these with your vet. If for whatever reason you are unable to feed a prescription diet, then look for the supermarket diets with the lowest carbohydrate and highest protein levels, ensuring that you choose a complete diet. Wet diets will be lower in carbohydrate than dry diets so they are preferable. Usually higher protein diets are also more palatable, however if your cat is particularly fussy and won't eat a recommended diet, then don't worry, it is better your cat eats normal amounts of a diet that he/she likes, than ends up not eating enough because of not liking the diet.

My cat is overweight, how do I get it to loose weight?

Weight loss can be difficult to achieve in cats and it is important to set realistic goals. Situations where there is one obese cat in a multicat household are even more difficult to manage, but helpful tricks include feeding the other cats on a high surface that an obese cat can not jump on to, or feeding them in a box with only a small entry hole that an obese cat can not get into. An initial goal should be set at 15% weight loss over a period of 15-18 weeks (i.e. approximately 1% weight loss each week). This should be done by reducing calorie intake to about 75-80% of maintenance requirements. It is best to feed a diet restricted in calories, rather than just decreasing the volume of food, to ensure adequate intakes of protein and essential nutrients.

It is important to ensure that weight loss is not occurring too rapidly, since obese cats with rapid weight loss are at a high risk of developing hepatic lipidosis (a serious liver disease). It is therefore essential that cats are weighed every 1 - 2 weeks. Once the initial goal is reached, a new target can be set until the cat had reached an ideal body weight.

Cats that 'graze' their food throughout the day and/or night should be allowed to continue this; however cats that eat their food all at once should be given 2 meals (half of total calorie intake at each meal, at the time of insulin injections if on twice daily insulin treatment).

In addition to diet, exercise also forms a vital part of any weight loss programme. Most obese cats are extremely inactive and even just increasing their activity levels by 10-15 minutes a day can make a big difference. This can be done by increasing playing with the cat, making the cat walk up stairs or around a room to get its food, feeding in different places around the house, using 'puzzle' feeders to make them work a little to get their food etc.

Do I have to feed my cat at certain times?

Generally, you can just continue feeding at the same times that you fed your cat before they were diabetic. So, if your cat grazes food throughout the day, it is fine for this to continue. The only exception is if your cat is on a weight loss or calorie restricted diet and would eat their whole ration all at once, then this needs to be divided. The precise feeding times can be tailored to you and your cat – discuss a feeding regime with your vet

Can I still give my cat treats?

If your cat is on a calorie restricted diet then any treats need to be 'counted' in his/her daily ration so discuss this with your vet. However in principal yes it is fine to still feed treats. However avoid treats that are high in carbohydrates and instead choose treats that are high in protein, such as chicken/fish/prawns

How long will it take on treatment until my cats diabetes is controlled?

Unfortunately this is very variable and so your vet will not be able to give you a precise answer for this. Cats can be very unpredictable and variable in their response to insulin, the type of insulin that they need, and the dose that they need. While some cats will become stable very quickly, others can take months to stabilise. This is important to understand, as although it can be frustrating, it is vital that we don't get impatient and increase the dose of insulin too quickly or too frequently, as that can lead to serious problems, and can end up then causing more problems and taking even longer to stabilise the diabetes. A very low dose of insulin is always used to begin with and then depending on your cats response this is increased by a very small amount, no more frequently than every 3-5 days. Don't get frustrated if it is taking months to stabilise your cat, this is normal and you will get there in the end; patience definitely pays off!

How often will I have to take my cat to the vet?

This will vary between different cats, but generally you may need to take your cat to the vet at least weekly in the early stages of treatment, but this will be tailored to suit you. If a weekly visit is impossible, a schedule with less frequent veterinary visits can be discussed. It is important that you are honest with your vet in how often you can bring your cat for a check up so that they tailor the treatment accordingly. Closer monitoring (frequent check ups) in the early stages will increase the chance of your cats requirements for insulin actually resolving, but this is not possible for all owners, and good control with resolution of the signs of diabetes is still possible with less frequent check ups. Once your cats diabetes is stable, then check ups with your vet every 3-6 months are recommended.

What is involved in monitoring my cat, what do I need to do at home?

Parameters that are useful for you to monitor are detailed on the enclosed owner instruction sheet. The more of this information that you can give your vet, the more help it will be in treating your cats diabetes. Discuss monitoring requirements with your vet, as this will vary with every cat, and a realistic schedule of what you can monitor can be decided with your vet, so that this is tailored to your lifestyle and your cats needs. For example, some owners may do as much as measuring their cats blood sugar levels themselves at home, whilst other owners will simply monitor whether their cats appetite and thirst is increasing or decreasing. In addition to parameters such as these that are monitored at home, regular check ups with your vet will be required, as detailed above.

My cat has been diagnosed with diabetes, what is the prognosis?

The long-term outlook for cats with diabetes mellitus varies according to how easy it is to stabilise their diabetes, whether they have any other diseases and how severe these are. Cat and owner compliance also plays a large part in determining the prognosis in each individual cat. Many diabetic cats have an excellent quality of life and are extremely rewarding cases to treat. The most common cause of death in diabetic cats appears to be related to pancreatitis, urinary tract infections, renal disease and cardiac disease.

Constipation in cats

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The digestive tract functions to break and digest food material into component parts (fat, sugars, carbohydrates and proteins). These are then absorbed into the body to provide substrates for energy production.

Part of the digestive tract, the gastrointestinal tract consists of several parts (stomach, small intestine and large intestine) that each contribute to this process. Food enters the stomach from the oesophagus, where strong muscular contractions and gastric acids digest the food into slurry. This slurry moves into the small intestine where digestion continues to break particles into smaller sizes. These particles are then absorbed across into the blood stream. The remaining material then moves into the large intestine where water and electrolytes are absorbed. The material is then passed out of the colon as faeces.

Constipation is the production of dry, hard faeces that are passed less frequently or with more difficulty than normal. Constipation may occur due to a variety of different causes including:

- Mechanical causes e.g. hair matting or ingestion of foreign material
- Metabolic causes e.g. dehydration from various disease processes such as kidney failure or low potassium levels (causing muscular weakness)
- Drugs e.g. diuretics causing increased water loss
- Neoplasia causing physical obstruction to the colon or poor motility of the intestine
- Psychological causes e.g. litter box dissatisfaction
- Pelvic fractures causing a narrowed pelvic canal
- Inflammation of the large intestine e.g. colitis or perineal (around the bottom) inflammation
- Neurological disorders causing poor intestinal motility or reduced knowledge of the need to pass faeces

Clinical signs of constipation include decreased frequency of defaecation, discomfort during defaecation and the production hard and dry faeces with excess mucous. Some cats will become have a reduced appetite, depression and may vomit.

It can be difficult to identify whether a cat is straining to pass faeces or to urinate. Defaecation posture is typically a high squat with an arched tail, whereas urination posture is a low squat with a straight tail.

Various diagnostic tests may be performed by a veterinarian to assess why a feline patient has become constipated. These may include abdominal palpation, rectal, neurological and orthopaedic examination, blood tests, abdominal and pelvic radiographs (x-ray) and even endoscopy and colonoscopy.

Medical treatment for constipation is often not disease specific and revolves around increasing the water content of faeces and increasing or decreasing the volume of faeces produced. Compounds used include lubricant laxatives (e.g. Katalax) which soften and lubricate faeces making them easier to pass.

Bulk forming laxatives (e.g. Peridale, Isogel) increase faecal volume. This in turn stimulates the colon to contract and expel the faeces. These medications can be contra-indicated in patients with pelvic canal narrowing where increased faecal bulk can contribute to further obstruction.

Osmotic laxatives are poorly absorbed compounds that pass through to the colon. Here they act to retain water within the colon and also to encourage water movement from the surrounding tissues into the lumen (e.g. Lactulose, Micralax). It is important that patients have ready access to water if these medications are used.

Low residue diets are also very useful to reduce faecal bulk. Wet diets are preferred to help increase the water content of faeces (e.g. Hills i/d, Royal Canin Sensitivity Control).

Drugs can also be used to increase colonic motility (e.g. Cisapride, Bisacodyl). These drugs are only available by prescription from your veterinary surgeon and are only used in rare circumstances where other treatments have failed to work.

Although surgical procedures to treat constipation are occasionally necessary the majority of cats, regardless of the underlying cause can often be managed well with a combination of laxative therapy and dietary manipulation.

Emerging vector-borne and parasitic diseases of cats

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Emerging diseases

There are many factors associated with emergence of infectious diseases. Changes in climate and environment are particularly important drivers for emergence of vector-transmitted and parasitic diseases in cats as they have effects on wildlife populations including prey and intermediate hosts. Travel of infected cats into the UK may allow establishment of previously unrecognised imported infections. The UK Pets scheme has facilitated the movement of companion animals and although the majority of animals travelling under PETS are dogs, more than 15, 000 cats have entered the UK since 2000. There is also a resurgence in companion animal parasitology associated with molecular diagnosis and epidemiological approaches which are encouraging re-evaluation of the clinical/ importance of nematode parasites.

Feline heartworm disease

Heartworm disease (dirofilariasis) is caused by the nematode parasite, *Dirofilaria immitis* which is transmitted by mosquitoes of many species. Dirofilariasis is common in southern Europe, USA, Canada, Australia and south-eastern and eastern Asia including Japan. In Europe it is prevalent in Portugal, Spain, southern France, Italy, Greece and other peri-Mediterranean countries.

The dog is the primary host for *Dirofilaria immitis* but heartworm disease in cats is being increasingly recognised. The microscopic larval parasites are transmitted by mosquitoes into the skin, migrate through subcutaneous/mesenchymal tissues and in most cases target the pulmonary artery. In this site, may mature to adults (up to 30 cms) but as cats are not the normal hosts for heartworm, they rarely complete the full life cycle. The immature nematodes may wander into other organs such as the brain or eye where they cause severe inflammation. The adult parasites contain Wolbachia symbiont bacteria and host inflammatory and immunological reactions to the bacterial proteins can result in exacerbations of disease especially associated with treatment of adult worms.

Clinical signs of infection can occur in cats even with low worm burdens. Difficulty breathing, coughing, weight loss, vomiting and sudden death may occur. Diagnosis is by demonstrating worms in the pulmonary artery using ultrasound, thoracic radiography, antibody testing and PCR. Infection is harder to diagnose in cats than dogs.

The drugs used to treat heartworm infection in dogs are toxic in cats and it has been suggested that it may be best to treat cats symptomatically until the worms die naturally. There is current work in canine heartworm disease investigating the use of preventative doses of the avermectins (ivermectin, moxidectin) in combination with doxycycline (to kill Wolbachia and thus disable the worms). This may offer scope for management of infected cats. Corticosteroids and supportive oxygen in severe cases with cage rest are advocated. There are several drugs available to prevent feline heartworm including selamectin, milbemycin and moxidectin.

Dirofilaria Repens: Subcutaneous Dirofilariasis

This mosquito-transmitted filarial parasite is being increasingly reported in endemic areas of southern Europe (Italy, Spain, Greece, France, Balkans, Russia). It is now established in Germany and is likely to spread through travelling infected dogs which are reservoirs of infection. Although dogs and wild canids (as with heartworm above), are the main primary hosts, wild and domesticated cats are infected in areas of high prevalence.

The clinical significance of infection to cats varies but nodular skin lesions and abscesses are reported. It may infect humans, and although most infections are asymptomatic, reports of clinical disease are increasing. The biological life cycle is similar to *D. immitis* except that the adult worms primarily reside in subcutaneous tissues. Aberrant migration of adults can also occur particularly into the ocular tissues. The adult parasite and microfilariae contain *Wolbachia* symbiont bacteria and as in cardiopulmonary dirofilariasis, host inflammatory and immunological reactions to the bacterial proteins can result in exacerbations of disease. In humans, both nodular skin, subconjunctival and other ocular lesions are being increasingly reported.

Tentative diagnosis is by detection of microfilaraemia in absence of *D. immitis* positive antigen testing and/or demonstration of adult parasites in biopsies from nodular lesions. Adult worms may be macroscopically identified in subconjunctiva of dogs with eye lesions. PCR testing is available in some research centres but commercial testing is not available at this time. Differentiation between the filarial parasites of dogs will become increasingly important in areas where their distribution overlaps. Chemotherapeutic regimes for *D. repens* are as for *D. immitis* as well as surgical removal of the adults from subcutaneous lesions. To date there is no specific recommendations for prevention of infection in dogs although this may change particularly as the number of zoonotic infections is expanding.

Aerulostrongylosis revisited

Aerulostrongylosis abstrusis is a nematode parasite well recognised in cats. As for angiostrongylosis in dogs, larval development within intermediate hosts (molluscs, primarily) is essential. After ingestion of intermediate hosts (or their products) and migration from the gut, larvae target the terminal respiratory bronchioles and alveoli where adults develop and produce eggs which embryonate and hatch. Larvae are coughed up swallowed and then passed in faeces to then infect intermediate hosts.

Aerulostrongylosis is considered endemic in many countries including the UK. However, its distribution is very focal and like canine angiostrongylosis, reports of infection in other European countries have escalated during the past 5 years. A combination of climate change effect on L1 larvae and the intermediate host as well as increased opportunity for movement of cats and /or the infected intermediate hosts throughout Europe have been implicated.

In common with other cardio-pulmonary nematodes, infection can be asymptomatic but development of clinical signs is a greater risk in young or immunologically naive cats, those animals undergoing immunosuppressive therapy or those with intercurrent hypersensitivity or immunosuppressive disease. Clinical signs are predominately coughing, dyspnoea, and in more chronic cases weight loss, depression and lethargy. Pleural effusions/pyothorax with secondary viral/bacterial infections may mask the underlying cause.

Definitive diagnosis may be difficult. Routine faecal flotation techniques lack sensitivity. Demonstration of larvae in faecal samples using the Baermann technique, is the diagnostic test of choice. However, larvae may be identified in samples from bronchoalveolar lavage or aspirates of pulmonary nodules. Once the presence of larvae is confirmed, parasitological expertise is required for accurate morphological identification. Faecal PCR is under development.

Treatment:

- fenbendazole as an oral paste for 3 consecutive days is effective and safe
- spot-on moxidectin (in combination with imidocloprid ; Advocate, Bayer) is as safe and effective given on a single occasion.
- spot-on emodepside (in combination with praziquantel; Profender, Bayer) is as safe and effective given on a single occasion.

No products are licensed for prophylaxis and protocols involving regular administration of the spot-ons. Prevention involves avoidance of the intermediate host.

Infection with *eucoleus aerophilus* (previously *Capillaria aerophilus*)

Infection of cats with this nematode has long been recognised but largely overlooked as part of the pathogenesis of broncho-pulmonary disease. Infection is relatively widespread throughout Europe in many wild canid/felid species as well as domesticated dogs and cats. A recent survey of culled foxes in the UK revealed that 213/546 were positive for *Eucoleus aerophilus*. Unlike *Aerulostrongylus*, *Eucoleus* has a direct life cycle dependent on ingestion

of the L1 larvae in faeces (although earthworms may act as paratenic hosts). Migration of the larvae occurs through the intestinal wall, liver and then into the pulmonary tree. Eggs are coughed up, swallowed and passed in faeces. Development to L1 larvae occurs in the faecal environment. Emergence of infection in the domesticated cats could be related to climatic factors and increased survival of the L1 larvae as well as increased contact between cats and fox populations particularly in urban areas.

Recent publications from Italy have associated coughing and dyspnoea in cats with infection but also signs related to the upper respiratory tract (sinusitis, rhinitis) such as sneezing. Co-infection with other respiratory pathogens (viral/bacterial) exacerbates clinical signs.

There are zoonotic implications for this infection. Even if cats do not show clinical signs requiring veterinary attention, they can be excreting L1 larvae in their faeces. Pulmonary/respiratory disease is reported in predisposed /immunosuppressed humans.

Diagnosis using faecal zinc sulphate flotation is still the major diagnostic method. A confirmed diagnosis requires morphological identification of the eggs.

Information focussed on treatment of this infection is limited but recommendations at present are as for *Aerulostrongylosis*.

Leishmaniosis

Leishmaniosis is caused by a sand fly-transmitted, intracellular protozoan parasite of the genus *Leishmania*. Natural infection and clinical disease in domestic cats caused by *Leishmania* species appears uncommon. Whether the low prevalence of infection/disease in endemic areas is due to under-reporting is unknown. However, cases of systemic clinical disease and asymptomatic infection due to *L. infantum* and other species are reported and feral cats have been incriminated as reservoirs for human leishmaniosis in endemic Mediterranean countries.

The clinical presentation is similar to that seen in dogs. Cutaneous lesions include diffuse areas of alopecia and granulomatous dermatitis of the head, scaling and pinnal dermatitis, ulceration and nodules. Jaundice, vomiting, hepatomegaly, splenomegaly, lymphadenomegaly, membranous glomerulonephritis and granulomatous gastro-enteritis have been reported with systemic *L. infantum* infection.

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Diagnosis is made by the microscopic demonstration of protozoal organisms in skin, bone marrow or lymph node biopsy specimens and PCR.

No therapeutic agents are licensed for feline leishmaniosis. The use of common insect repellents may be toxic in cats and keeping cats indoors between 7pm and 7am may be the only option.

Fat cats – top tips for losing weight

Alexander German, Royal Canin Lecturer in Small Animal Medicine, University of Liverpool

Introduction

Obesity, defined as an excessive amount of body fat, is one of the most common medical diseases in cats, and provoke a number of medical conditions. The major disease associations reported include diabetes mellitus, lameness, problems with the urinary system, skin complaints, and some types of cancer. Achieving successful weight loss in an overweight cat, therefore, can have a positive effect on health and welfare. The current talk will discuss treatment of feline obesity and provide useful tips to maximising success.

Initiating discussions with the owner about obesity

Since weight problems can frequently be a sensitive issue for many clients, veterinary staff often find it difficult to initiate discussions about a pet's weight, not least if the client themselves is overweight. In fact, this is often less of a problem than it is perceived to be, and most clients do not get offended by such a topic. It pays to concentrate discussions on the cat, and make no mention of the owner's circumstances. Also, it pays to avoid assigning any blame on the part of the owner; for me, this is easy since the first patient at our weight management clinic was my own cat Clarence! Thus, I know how easy it is for problems with obesity to develop, and also how tricky successful weight loss can be!

Establishing owner understanding and commitment

The success of any intervention is dependent upon the commitment and motivation of the owner. It is, therefore, essential to verify that the owner is fully motivated and acceptant of the need for intervention or the whole programme is likely to fail. The initial level of owner motivation depends on the way in which the case initially presents to the veterinary practice, and possibilities include:

- **Owner driven.** The owner seeks advice about a possible weight problem.
- **Associated disease.** The owner presents the cat for condition that is potentially related to obesity.
- **Unrelated visit.** The obesity problem is an independent observation e.g. during an annual vaccination or routine health check.

The first scenario is the easiest in terms of client management but, unfortunately, is the one that is least likely to occur. By definition, these owners are already motivated and have accepted the need for intervention. The next easiest are those cats that have an associated medical problem, and weight loss is required as of treatment. In these cases, it is important to spend time convincing the owner how the excess weight may have caused or contributed to the disease in question, and thus how it is an essential part of maximising response. Communicating that the obesity is a medical, rather than cosmetic, problem increases owner motivation and compliance.

Unfortunately, by far the most common scenario, and incidentally the most difficult to approach, if occurs where obesity is diagnosed in an apparently healthy cat. Initiating discussion in these cases can be problematic because the reaction of the owner is less predictable. Some may simply not believe that there is a problem. The focus of discussion should be on the health of the pet including any existing morbidity and the potential for future health problems as a result of continuing obesity. Sometimes owners are not convinced by an argument about problems in the future, if current health appears (to them) to be normal. In these cases, it may be sensible to focus on ways in which the obesity might be affecting current quality of life e.g. fitness, physical activity and grooming.

In some situations, the owner may not be convinced straight away. Since owner motivation and compliance are essential pre-requisites for successful weight management, and without them there may be little point in embarking upon a weight reduction program at that time.

Setting owner expectation

Successful weight loss depends mainly on owner commitment, so it is vital to ensure that the owner has realistic expectations from the outset. The timescale of treatment, the level and rate of weight loss, cost of therapy, behavioural changes in the pet, the time commitment for lifestyle changes (e.g. exercise), and any other potential pitfalls should be discussed. The aim should be to make sure that the owner has is fully informed of all eventualities so that there are no unexpected surprises!

Calculating target body weight

One should always begin a weight management programme with the end in mind or, put another way, it is essential to know (or be able to estimate) the ideal weight of an overweight pet. Various approaches are possible, but the most commonly-used is to estimate of ideal weight can be made from the current body weight and body condition score: if a 9-point body condition score system is used, then each point roughly correlates with ~10% excess weight. Thus, with a simple calculation, target weight can be estimated. Computer software for weight management often does this calculation automatically.

Achieving optimal rates of weight loss.

The recommended rate of weight loss remains a controversial issue in veterinary medicine. Studies have shown that excessively rapid weight loss can have deleterious consequences. Work in colony cats has shown that excessive dietary restriction (e.g. feeding approximately 45% of calories required to maintain body weight) leads to more rapid weight loss (~1.3% per week) compared with a less severe restriction (e.g. 60% of maintenance energy requirements which leads to ~1% body weight loss per week); however, the consequence is that more lean tissue (muscle mass; 18% vs. 8%) and less fat tends to be lost. Therefore, the current recommendation is to aim for more gradual weight loss e.g. ~1% body weight loss per week. Nonetheless, the exact rate should be tailored to each individual case, and slower rates of weight loss are acceptable if tolerated by client and veterinary team.

Weight management strategies

Although there may be drugs licensed for weight loss in both humans and dogs, none of these are licensed, or indeed safe, for cats. Instead, feline weight loss strategies usually involve a combination of dietary caloric restriction and lifestyle changes (aimed at increasing energy expenditure by increasing physical activity). For any intervention to be successful, close monitoring is vital. The approach chosen for anyone case may vary and, as a result, the following guidelines are deliberately general.

Dietary management

It is inadvisable to use a standard maintenance ration for weight loss; this is because most nutrients are balanced to the energy content of the food and, when this is restricted, there may be the potential for states of malnutrition to develop. Instead, the use of a diet purpose-formulated for weight loss is recommended. A variety of diets are available for use the main method of caloric energy restriction. Although formulations may vary, most have some or all of the following characteristics:

- *Reduced energy density*, usually through a reduction in fat content.
- *Increased micronutrient (vitamin and mineral) content* relative to energy content.
- *Optimal balance of protein and fibre (moderate-high levels of protein, high fibre).*
- *Supplemented with L-carnitine.*

In order for weight loss to progress, the number of calories fed must be restricted. ***It is essential to base the calculations on the target body weight and not the current weight.*** The exact allocation will vary depending upon the characteristics of the patient, the chosen diet, and other factors (amount of and ability to exercise etc). The initial allocation is only a starting point; during the weight loss program, the level of allocation usually needs to be modified, usually by decreasing the amount given. Weighing the daily food ration out on electronic weight scales is strongly recommended, since other methods of determining the amount to feed (e.g. measuring cups) can be unreliable.

If possible, insure that the owner does not give (or the cat does not steal [!]) any additional food on top of the recommended daily ration. Owners often under-estimate their contribution: it helps to remember that what may seem like a tiny treat to a person can be massive treat to a cat; one ready rule is to get the owner to imagine eating a portion 7 times the size! However, healthy treats (e.g. dental chews) may be allowed as this also enables the owner to maintain their bond with the cat. These should, of course, be factored into the overall calorie provision and not on top of it. Owners should also be made aware that liquids (e.g. milk, cream etc) can provide energy are part of the diet and so the caloric value of drinks must be included as part of the overall plan.

Lifestyle alterations

Alterations in lifestyle include changes designed to increase energy expenditure (e.g. increasing level of physical activity, introducing regular play sessions), improve quality of life (e.g. regular play activity in cats), and changes in feeding pattern (e.g. accurate measuring [and recording] of daily food intake, avoiding uncontrolled feeding of extras).

Monitoring

It is essential to follow the progress of patients regularly during any weight management programme, particularly during the initial period, since this is when owners need the most support and when problems are most likely to be encountered. Regular reassessments enable verification of compliance with the plan, the ability to deal with any issues or concerns (especially 'begging' behaviour), and to provide feedback, encouragement and support.

The frequency of return visits during treatment is critical: a check every 2-4 weeks is ideal; if check-ups occur less frequently than every 4 weeks, compliance with the program will slip. It may also lead to a delay before a change is made, meaning that weight loss does not continue at an optimal rate. Each return visit should include weighing and a physical examination as well as a general discussion about behaviour (exercise/treats etc) and progress. Body weight is the principal outcome measure of interest and used to decide upon whether changes to the plan are required (reduction in amount of food fed, increase in dose of medication). In order to minimise variability amongst measurement, the same set of electronic weigh scales should be used, and regularly calibrated.

In addition to the results for the bodyweight measurement, a tape measure can be used to record the animal's girth (e.g. thoracic circumference, abdominal circumference) Changes in this measurement help to relay success in terms that the owner will understand (e.g. this is a decrease belt size in people). Periodic photographs also provide an excellent visual demonstration of success.

All measurements and comments should be recorded and used to provide positive feedback, wherever possible, for the owner. As mentioned above, it may be worth asking owners to record daily food intake, and this information can be reviewed at each visit. Incentives, such as 'slimmer of the month' awards or achievement certificates are used successfully as motivational tools in human slimming programmes, and are therefore worth considering for pets. Follow-up by phone, for example by a nurse responsible for overseeing the programme, is an excellent additional means of checking on progress, enhancing compliance and addressing any problems as early as possible.

The involvement of other members of the veterinary team is a good way to boost success and make owners appreciate the commitment of the practice.

Successful weight maintenance

Although the main medical benefit of a weight reduction program is a long-term reduction in adipose tissue mass, of greater importance is the permanent switch to a healthy lifestyle. Like in people, there is often a tendency for weight to rebound after weight loss if preventative steps are not put in place. Therefore, success should not just be judged by reaching the target, but also by maintaining weight in the long-term. Maintenance strategies rely on continuing dietary control and maintaining steps to insure a healthy lifestyle (see above).

In short, a permanent change in the attitude and behaviour of the owner is required to ensure so that any weight loss is maintained long term.

Once target weight has been achieved, regular check-up should continue, as well as the support and encouragement for the owner. Cats should be fed at maintenance, rather than for weight loss. One method of transition is to increase the food intake by 10% every two weeks until no further weight loss is achieved. This will enable you to set the exact daily caloric requirement to prevent. Visits every 2-4 weeks should continue until you are satisfied that weight is being maintained. Thereafter, the interval between weigh-ins can gradually be extended but should not be less frequent than once every 3-6 months.

The choice of diet for the maintenance phase is less critical than that used for weight loss. There should be no need to feed a diet purpose formulated for weight loss, long term. Diets are available for use in the post-weight loss phase, and contain many desirable characteristics, including reduced energy content and increase fibre level (to promote satiety).

Home management of the cat with heart disease

Kerry Simpson, FAB Lecturer in Feline Medicine, University of Edinburgh

Cats can suffer from a wide range of heart diseases which can result in a wide range of clinical signs. Often cats don't show any signs of having heart disease until their heart decompensates and then signs may arise rapidly, and require emergency veterinary treatment. Therefore, it can be useful to monitor for these signs and recognise them as serious complications.

Recognition of Congestive Heart Failure

Cats with congestive heart failure often have difficulty breathing (dyspnoea). In this situation it is not uncommon for fluid to accumulate in the chest cavity (usually between the body wall and the lungs), rather than in the lungs themselves. As the cough receptors are located within the lungs themselves, this means that cats with cardiac disease rarely cough. Congestive heart failure is not the only cause of breathing difficulties in the cat, but any problems breathing should be investigated by a veterinarian. If there is fluid accumulation outside the lungs, this may need to be removed, so that the lungs can expand properly and therefore oxygen transfer can occur.

Early recognition of dyspnoea can be useful in cats with pre-existing heart disease. Therefore, if you have a cat with heart disease it is useful to count the number of breaths that he/she takes in a minute when at rest, and also get used to looking at the way that your cat breathes, as the respiratory pattern is also altered in dyspnoea. If the pattern is altered and the rate increases (even only a small amount), there may be the start of fluid accumulation either in the lungs or around them, and your cats medications may need altered.

Thromboembolism

Cats with heart disease can form clots within their heart. When this happens pieces can break off and enter the circulation, where they can lodge in the arteries. This typically occurs in the arteries supplying the hind limbs, but can occur in the arteries supplying either of the front legs too. If this happens it is initially very painful, and cats will go off one or more leg, and often vocalise. At this time the affected paw(s) will be cold and have a bluish colour. This also requires emergency treatment, to ease the pain, and manage the consequences of reperfusion. In addition, drugs that decrease the cats ability to clot its blood are useful as these can stop further expansion of the blood clot, therefore, aiding the reperfusion of the affected limb(s).

Cats with Known Heart Disease

In addition to monitoring for the complications mentioned previously, managing a cat with known heart disease can have other difficulties. In many cases cats will be prescribed several medications, making medicating these cases a challenge. As every cat is different, it may be a case of working out how best to medicate your own cat. Some cats are easier to give a single capsule, which can be made up especially and may contain several medications in it. Other cats will prefer liquid medications. These can also be useful in small cats, as many cardiac medications are in fact made for humans, and breaking them into cat-sized pieces can be problematic. Of the more common cardiac medications, Frusemide is available as a liquid medication (Frusol), as this is made for infants, it is often easier to dose in cats than the tablets.

There are some cardiac medications formulated for cats which are designed to be palatable, although not every cat agrees! Fortunately, for many of the cardiac medications there are several different formulations and in many cases it is just a case of finding the best 'fit' for you and your cat. If your cat is particularly fussy, it may be beneficial to have you vet send the medications to be reformulated (i.e.: into a chicken flavoured syrup), this can be done by a reformulating company such as Nova Laboratories (tel: 0116 2230099).

If your cat is having problems breathing, it can be very hard to give oral medications, and there is a greater risk of your cat inhaling these medications. In such instances it is usually advisable that your cat is hospitalised so that it can receive oxygen therapy and injectable medications.

In cats which have had a blood clot or which have lots of fluid accumulation within the abdomen, making the intestines swollen and therefore absorption of medication difficult, injectable medications may be prescribed. These are administered under the skin, in much the same way as insulin.

Other Considerations

Cats with heart disease do suffer from arrhythmias and can have myocardial infarction (heart attacks). Therefore, it is best to avoid known stressors. However, these are rare complications and not all stressful situations can be avoided without compromising the cats' lifestyle.

Veterinary Examinations

Your vet will best advise you how frequently your cat should be re-examined, as this will vary greatly depending on the type and the severity of the heart disease. In generally asymptomatic cats, with stable disease may only need annual check ups, unless there is any change in their status, whereas cats which have signs attributable to their cardiac disease may require more frequent monitoring.

Capturing wildcats on film/Scottish Wildcat update

Andy Langley, Wildlife cameraman and producer, Wild Media Foundation

At the end of the last Ice Age four large predators roamed the forests of the British Isles – wolf, lynx, bear and the Scottish wildcat. Now only the wildcat remains. Most people have never even heard of a wildcat let alone seen one. Many believe it is panther-like, or another name for the ‘beast of Bodmin Moor’. Others believe it is a domestic cat gone feral. In truth it looks very much like a large tabby with a blunt and ringed bushy tail. But there the similarities end.

No one has ever domesticated a Scottish wildcat – they cannot be stroked or even approached without severe threat of personal injury. This fierce, independent nature has made the wildcat a Scottish icon - in the words of wilderness author Mike Tomkies ‘They epitomize what it means to be truly free’.

Wildcats have endured centuries of habitat loss; they’ve been hunted for fur and have been killed as vermin. Here in 2009, you’d think they would enjoy a brighter future yet they’re more threatened than ever. Disease, and vehicle collisions take their toll but they also interbreed with domestic cats, diluting their genetic purity. It’s much rarer than the Bengal tiger. In fact, experts believe there could be as few as 400 left in the wild.

So can anything be done to save our forgotten cat?

Wildcat History

The wildcat, *Felis sylvestris*, has a broad geographical distribution covering much of Europe, Africa, and Asia. However, the three continents gave rise to different subspecies. The European subspecies is the largest and most heavily built, with a thicker more heavily marked coat, as well as a much thicker, blunt tail. The domestic cat originated from the African subspecies *Felis sylvestris lybica* and subsequently spread with humans throughout the world.

Wildcats colonised Britain after the end of the Ice Age, over 9000 years ago, when there was still a land bridge to the Continent. They then followed the spread of suitable habitat and prey so that by the time Britain became an island, they occurred over its length and breadth.

During their millennia of isolation, wildcats here are considered by some to have become a separate subspecies *Felis sylvestris grampia*, commonly known as the Scottish wildcat. In recent centuries, habitat destruction, hunting for their fur and persecution saw their distribution contract. Wildcats were extinct in southern England by 1800, but survived in southern Scotland until 1849, northern England until 1853, and Wales until 1862. By the late 19th century wildcats in Britain were found only in remote parts of the Scottish Highlands but only in very low numbers. Numbers of wildcats began to recover after the First World War and they spread quickly across northern Scotland.

With this recovery came a new threat – increased hybridization with the domestic cat. The domestic cat is thought to have lived alongside humans in Scotland for around 2000 years and it can and does readily inter-breed with the Scottish wildcat.

Differences with the domestic cat

Wildcats are usually larger and more robust-looking than domestic cats, although castrated male domestic cats can become as large as wildcat toms. Internally, wildcats have shorter guts, larger skull capacity and longer leg bones. Scottish wildcats are also thought to have denser fur (up to 30,000 hairs per cm² in winter!) than domestic cats, which are descended from wildcats from the warmer climes of Africa and the Middle East. There are differences in eye biology between the two, suggesting that wildcats have keener eyesight than domestic

cats, both at night and during the day. Domestic cats can be very variable in their coat (pelage) markings but tabby forms can look similar to wildcats. Wildcats, however, have distinctive bushy ringed tails with blunt black tips. A total of seven key pelage markings are thought to allow wildcats to be differentiated from domestic cats and hybrids.

Preferred Habitat and Food

Wildcats favour wooded landscapes with a mosaic of habitats especially semi-natural woodland, conifer plantation, scrub, moorland and pastureland. Although they have been recorded at over 800m above sea level, they are usually found below 500m. Rabbits (especially in the eastern Highlands), hares, voles and mice are overwhelmingly the principal food for wildcats although they will supplement this with a wider range of food including birds, amphibians, reptiles, insects and vegetation.

Social organization

Wildcats are solitary and territorial. Males have larger home ranges than females, and may overlap with more than one female. There is little overlap between home ranges of wildcats of the same sex. Home range size varies according to prey availability in the landscape. In the eastern Highlands where rabbits are relatively numerous, male home range size is typically around 4.6km², with female home range size at around 1.8km². In the western Highlands, where rabbit densities are lower, then average male home range size in winter was around 14.3km², with females at 9km².

The wildcat year

Between 2 and 4 kittens (although it can vary from 1-7) are born typically April-May in a den amongst rocks or in an abandoned fox earth, badger sett or rabbit warren. Births later in the year are possible if an earlier litter is lost. Their mother brings live prey to the den from about 3 weeks, and stops feeding with her milk at around 6-7 weeks. Kittens may follow their hunting mother around from 10 weeks old. Kittens start to leave their mothers from about 5 months old to find their own home ranges over the winter, but don't stop growing until about 10 months old. Some kittens may travel as far as 55km from their mother's home range. Longer winter fur develops during September. Both males and females can breed at 1 year old, although males in particular are unlikely to breed until they have established their own home range. Mating takes place in February to March and the gestation period averages 65 days. Once born, the kittens will have very little if any contact with their father. The adult winter coat is cast in favour of a shorter summer coat during the spring moult in April.

Legal status

Since 1988 the wildcat has been a protected species, listed on Schedule 5 of the Wildlife & Countryside Act 1981. It is therefore illegal to kill a wildcat except under licence. As a result of the species' vulnerable status across Europe, the wildcat is also a European Protected Species under the Habitats and Species Directive.

How can we save our Forgotten Cat?

The wildcat is undoubtedly one of the most iconic and evocative mammals of both the Cairngorms National Park and Scotland, and yet is on the brink of extinction. Following a conference held in Aviemore in April 2008, which heard from a wide range of experts, it was concluded that the main threats to the future survival of the species in the National Park and elsewhere in Scotland were:

- introgressive hybridisation with domestic (especially feral) cats;
- confusion in identifying wildcats during otherwise legal predator control activities.
- fatal diseases spread by domestic cats;

The conference tapped into the views of a great variety of people, all of whom agreed we have to act NOW to save the wildcat.

Following on from the conference, a partnership of organisations including the Cairngorms National Park Authority (CNPA), Forestry Commission Scotland, Royal Zoological Society of Scotland, Scottish Gamekeepers Association and Scottish Natural Heritage, bolstered by a wider circle of supporting organisations, came together to design a conservation project for wildcats in the Cairngorms. The Project named, 'Highland Tiger', aims to tackle the threats facing wildcats by:

- raising awareness of the plight of the Scottish wildcat.
- encouraging responsible domestic cat ownership (i.e. increased neutering and vaccination) in the Cairngorms National Park.
- supporting the work of cat welfare organisations, which neuter feral cats around towns, villages and farms.
- working with land managers to ensure that predator control is wildcat-friendly.
- monitoring the wildcat population and the extent of both hybridisation and disease with the input of land managers and the public.

This Highland Tiger project will work with a range of partners and interest groups to safeguard surviving wildcat populations and create favourable conditions for the species to thrive in the Cairngorms National Park, and beyond, in the future.

Saving the wildcat is not a five-minute job. It needs lots of help from lots of people. If we fail, the wildcat becomes extinct – it's that simple.

References and Credits:

Highland Tiger Project: www.highlandtiger.com

Scottish Wildcat Association: www.scottishwildcats.co.uk

Tooth & Claw: www.toothandclaw.org.uk

Wild Media Foundation: www.wildmedia.org

Acupuncture in cats

Mike Dale, Acupuncture specialist, North Kent Referrals Veterinary Specialist Centre

What is Acupuncture?

Acupuncture is the insertion of a solid needle into the body for the purpose of therapy, disease prevention or maintenance of health. Acupuncture has been around for thousands of years in human and veterinary use. It evolved as one part of Traditional Chinese Medicine (TCM) whose philosophy is crystallised in the teachings of the Yellow Emperor (over 2,500 BC).

TCM recognises that all diseases originate from

- Environmental conditions (wind, rain, cold, heat)
- Excess emotion (joy and anger)
- What we eat and drink
- Our home environment
- Incessant worry and sudden fear.

Very briefly, TCM is divided into principles of: -

- Ying and Yang: the dynamic balance of opposites
- Qi: an essential energy in the body having many manifestations
- Blood: representing all essential fluids in the body
- Meridians: Through which Qi is meant to flow smoothly and continuously for good health to prevail. (The concept of Meridians is now largely discredited as a misunderstanding of translation of Chinese Texts)
- Acupuncture points: numerous specific sites in the body where the insertion of a needle or application of pressure can influence the flow of Qi.

The TCM model of medicine has been and continues to be highly successful in the treatment of certain human conditions.

Acupuncturists today seem to be divided into those who pursue a totally Traditional Chinese Medical approach, those who are exclusively "Western" (i.e. work solely according to neuro-physiological principles and knowledge) and those who have a foot in both camps. TCM itself is divided into different schools including Five Element Medicine and Ying Yang theory.

I cannot go into the differences here. Suffice to say that TCM is based on a very broad holistic examination of the patient's history, environment and emotional condition. Minute examination of history and clinical signs such as pulse quality, condition of the tongue, skin, eyes etc in expert hands can elucidate startlingly accurate clinical assessments when compared to a more scientific work up.

A large part of TCM is the use of herbs both internally and externally. Most ancient Chinese doctors would have used a mixture of herbs, acupuncture and ungloned advice about how the patient should conduct their lifestyle.

Earliest application of Acupuncture in Animals is recorded three and a half thousand years ago. Veterinary Acupuncture as practised today derives primarily from American interest following the Sino-American cultural exchange initiated by President Nixon in the 70's.

How does acupuncture work?

Within a few years, challenged by the drive for evidence-based medicine, a wealth of research and experimentation began to unravel the neuro-physiological basis of how sticking a needle in a specific part of the body evokes a chemical or neural response elsewhere.

Essentially, acupuncture works on the following levels:

Locally :-

1. Needles placed close to a source of disease or pain cause the release of anti inflammatory and analgesic neuro-transmitters and other chemicals.

2. Needles place directly into myofascial trigger points produce rapid relaxation of the associated pain and spasm. This can be dramatically useful in animals with muscle pain.

Segmentally:- Needles placed in the same somatic segment as the source of pain or disorder will similarly cause anti-inflammatories to be released and can have a blocking effect (like pain gate) on the neural pain signals heading up the spinal cord.

These effects have been shown to have somatic-visceral properties.

3. Systemic Release of Endorphins.

What use is it in cats?

- Reading the above it is easy to see where TCM, and in particular acupuncture, could be indicated in the therapy and health maintenance of our domestic cat population. So many of them are exposed to frustrations of normal behaviour (“excess emotion, environmental stress, sudden fear and incessant worry”).
- In addition, feline patients have particular contra-indications to most of the practical day-to-day pain management drugs and an alternative source of analgesia is handy.
- They suffer from a number of under-diagnosed painful conditions that are more likely to be elicited during a relaxed TCM examination lasting forty minutes than in a conventional “hurley-burley” consultation of normal general practice.

What conditions can be helped with acupuncture?

- Musculo-skeletal conditions such as osteoarthritic pain, post surgical rehabilitation, spinal disease.
- Conditions exacerbated by stress: Colitis, FLUTD, IBD.
- Symptoms of rhinitis and asthma.

How do you use acupuncture to treat a cat?

It is important that the client understands exactly why you have chosen to use acupuncture, what it involves and what the expected outcomes are, both immediate and longer term. It is especially desirable to start by having a diagnosis. There is the danger that an owner requests acupuncture treatment because they feel conventional treatment is not working or is too expensive. There is a responsibility here to ensure that every effort has been made to pursue a proper diagnostic workup. The “suck it and see” approach is not good for the cat and rarely good for the reputation of acupuncture, especially if a glaringly obvious differential has not been either investigated or at least considered.

The process

I rarely examine a cat on the consulting room table and often end up on the floor. My initial consultation will last for up to an hour. During this time the cat is allowed to come out of its carrier in its own time. Curiosity overcomes most patients after I have been chatting to the client about the cat’s lifestyle and medical history for about twenty minutes. (during this period the client, too, relaxes, remembers more useful bits of history and begins to telegraph less anxiety to their pet).

Even if I have to lift them out of the carrier I immediately release them to do their own thing for a bit. I observe Movement, Mentation, Mobility and Morphology.

As with any hands-on examination of a cat I try to be as hands-off as possible. During the contact that I *can* make I will do all the usual clinical checks but before getting too invasive, like opening the mouth checking ears etc. I will have palpated as many potential trigger point sites as I can. It is remarkable how many cats with a reputation of being grumpy actually have sore backs, necks or pelvises and occasionally a sore bladder.

Having arrived at a diagnosis or treatment plan the choice of which points to use is very much down to the cat.

An important thing to establish is, "Who is going to needle whom?" If a patient is all flat ears and hissing at every hint of my approach there is no point trying anything without sedation. That said, I have only ever sedated one cat for acupuncture and the subsequent treatments were done without.

An alternative is to use a laser pen on the points but this seems less satisfactory as you can only stimulate one point at a time and cats hate wearing the protective goggles. It is better than doing nothing, though.

My first one or two needles are always in points known to produce a good endorphin response. GV20 is relatively simple to slip into a cat that enjoys being stroked and if left for five minutes very often induces relaxation. It is worth noting here the importance of keeping the owner very relaxed too. Explaining absolutely everything that you are going to do, or may have to do, beforehand avoids surprises and therefore reduces emotional reaction.

Subsequent points are chosen according to the condition and I use a mix of local, segmental and general. Bladder conditions require some midline abdominal needles and these sites usually become more accessible late in the procedure or at the second or third consultation when the cat has begun to associate you with nice endorphinic feelings.

Again, depending on the condition, the number of treatments varies. Most musculo-skeletal conditions, if they are going to respond, show positive signs after two or three. Anxiety related problems like FLUTD may require more. Often a satisfactory response is achieved and the patient just needs a "top up" every three to ten weeks. About eight to ten percent of patients do not respond and you have to take that on the chin.

I always warn the owner that, particularly for arthritic issues, the cat may be worse the next day but that it is a good indication for subsequent improvement. I believe this occurs particularly when long-standing trigger points have been needled and the area is sore for a day or two. The ensuing muscle relaxation and pain relief can produce dramatic improvements in mobility and temper.

This is very much a brief overview of a modality that has thousands of years of history and in the last century has attracted increasingly critical research. In my modest experience it has quite definitely improved the quality and length of life of a number of my patients.

If you wish to learn more I suggest you contact the Association of British Veterinary Acupuncturists and look at some of the following references.

Veterinary Acupuncture: Ancient Art to Modern Medicine (Hardcover) Allen M Schoen DVM
MS

Essentials of Western Veterinary Acupuncture (Paperback) by Samantha Lindley (Author),
Mike Cummings (Author)

The Dao of Chinese Medicine D E Kendall Oxford University Press

Pain and the feline amputee

Lyn Forster, Veterinary Clinical Sciences, Royal Veterinary College

Phantom Limb Pain in Humans

In humans, amputation almost always results in some degree of phantom limb pain, a condition where the sufferer experiences the sensation of pain seeming to arise from the limb that has been removed. The pain is usually intermittent, but can be very severe or irritating, and as there is no actual limb to target for treatment, preventing or reducing the pain is very difficult.

The cause of phantom limb pain in humans is not currently known. Several theories have been proposed, but none can explain all the circumstances where phantom limb pain occurs. As a result, it is believed to be caused by dysfunction at several levels of the nervous system;

- Sensation – damage to the nerve endings may result in random firing of nerves; the sufferer can experience these abnormal impulses as pain.
- Modulation – the spinal cord normally modifies the signals received. This modulation can become abnormal and hypersensitive following periods of traumatic pain or nerve damage.
- Mapping – the part of the brain responsible for knowing where each body part is may adapt abnormally following removal of a body part, and may for example attribute a normal touch sensation signal from the face as pain from an absent hand.
- Psychological – in humans, depression and mental status does seem to influence the occurrence of phantom limb pain.

Feline Amputees

It is traditionally believed that most feline amputees adapt reasonably well, however there are some that seem to show pain or irritation long after their amputation, and it is these cats that we are hoping to understand in order to improve their welfare. We don't yet know if cats experience phantom limb sensation or pain; even though some of the differences between human and animal brains have been investigated, without knowing the exact cause of phantom limb pain in humans we can't make assumptions regarding cats. Clearly, we can't ask cats what they are experiencing, so instead we need to work out other ways to assess them for pain and discomfort.

Assessing Pain in Cats

Assessing pain in cats can be difficult. Unlike children or dogs, cats don't tend to display what they are feeling overtly. The signs of pain they do display can be very subtle and may be masked or mimicked by signs of stress.

Within veterinary medicine the use of pain scales is receiving increasing attention; until recent years any pain scales used were borrowed from the human medical field and were not species specific. Most human pain scales are intended to be used by the sufferer themselves and involve verbal communication, although there are several pain scales for babies and children available to medics. Several species specific pain scores have been developed for veterinary species in recent years, but the field is a new one and there is scope for further work on cat-specific pain scales.

Focus of Interest

Our studies so far have been aimed at investigating how amputee cats change their behaviour, and whether these behavioural changes could be indicators of pain. We have produced a questionnaire, asking owners of amputee cats to help us identify behavioural changes in their cats, and let us know of other information on how their cat has adapted to its amputation.

Preliminary results suggest that cats that are thought to be in pain by their owners have worse coat condition, change their grooming frequency and are felt to be less 'happy'. It is not clear whether these signs truly relate to pain however, as much of the interpretation remains subjective, based on the owners' interpretation of whether their cat is in pain or not, and as previously mentioned, this is particularly difficult to assess in cats. Further work will follow to see if we can establish a link between these behaviours and pain in amputee cats, and in cats in general.

In the meantime we are continuing to receive questionnaires from members of the public – if you have an amputee cat and would like to help, a copy of the questionnaire can be downloaded from <http://www.fabcats.org/owners/disabled/amputee.html>.

In addition we are particularly interested in hearing about cats that attempt to 'use' their missing limb after amputation, for example attempting to play with a toy, scratch their ear or scratch in the litter tray. If you have an amputee cat and have spotted anything like this with your cat, please email lforster@rvc.ac.uk.

In summary

Phantom limb pain is a serious problem faced by human amputees, yet we assume that the majority of feline amputees are not similarly affected. Identifying pain in cats is a challenging, and it is not known whether cats experience phantom limb sensation or pain. Although most cats do seem to adapt well following amputation, some show signs of pain that does not seem to be associated with surgical or healing issues, and it is these cats that we hope to understand better, with a view to improving their quality of life.