



# Itchy or twitchy?

Exploring feline hyperaesthesia syndrome



# Clinic

The feline magazine from Cats Protection for veterinary professionals

## **Surgery**

Non-invasive mandibular symphysis repair in a Bengal cat

## **Telemedicine**

How remote consults can be tailored to help feline patients

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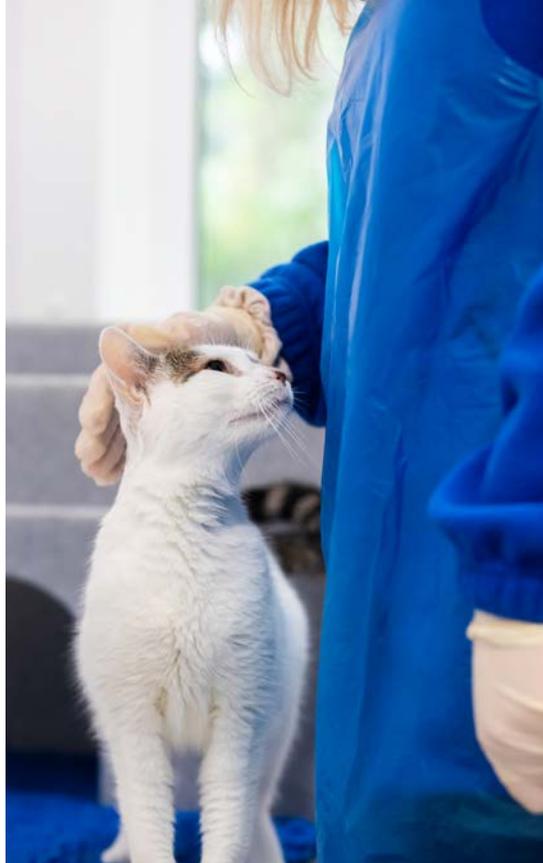
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## Meet the team



### Dr Beth Skillings BVSc MRCVS

**How long have you worked for Cats Protection?**  
15 years... wow, I still can't believe it's that long. I joined when Cats Protection's entire veterinary department comprised of two vets, three vet nurses and one administrator.

**What did you do before working for Cats Protection?** I spent seven years working in mixed and then small animal first opinion practice.

**What is your role within Cats Protection?**  
I am currently Cats Protection's Head of Veterinary Research, coordinating Cats Protection's involvement in the feline welfare research that the charity undertakes internally or funds, collaborates or facilitates with others. We are currently developing Cats Protection's prioritised research agenda and developing software to collect veterinary data on our cats, to enable shelter medicine research and maximise the impact of our limited resource in this area. Before this, I worked in other Cats Protection roles which included the management of clinical services at our National Cat Centre and our previous mobile neutering clinics, overseeing the procurement of veterinary medicinal products, guiding our fundraising and communication teams on all things veterinary, producing Cats Protection's *Veterinary Guide* and I was the inaugural editor of this magazine!

**What do you like most about your job?** It's so very difficult to pinpoint one thing. It goes without saying that I love the cats, but I definitely love the people too – over the years I have worked with some amazing people, some brilliant minds, some of the most caring and conscientious, fun and creative individuals. My colleagues span so many fields – those close to me in veterinary, welfare, research and behaviour, but also wider to lawyers, social scientists, specialists in learning and education and volunteering, designers, media, advocacy and communication specialists, operational staff, fundraisers, finance teams, property and facility designers, retailers, strategists and IT specialists. And our volunteers that give their time represent even wider fields still. In practice, I loved

the teams I worked with, and now I love the insight into other non-veterinary worlds too. I'm also lucky to be able to collaborate with other charities, other organisations and the veterinary profession to maximise our impact. We all work together to make a big difference for cats.

But if I had to pick one intimate moment of joy it is probably remembering the look on my son's face when I took work home and he helped to hand-rear an orphan kitten for the first time.

**What is your most memorable Cats Protection moment?** Too many to mention – many of them involve cats or cake or both.

**Do you/did you have a pet/pets?** I have my dear old boy Humphrey, a tabby DSH adopted from Cats Protection about eight years ago, Mina our very cheerful (and I'm proud to say slim) 11-year-old black lab (hopefully to be joined by another dog soon after losing her old companion) and four happy hens.

### What are your hobbies/other interests?

My world is mostly taken up with work, my husband and our two boys and our animals, school PTA work and chipping away at our project cottage. But I love walking, listening to music, reading books and playing the piano. And if I need a pick up, Bob Ross can always make me smile!

### Where is your favourite place to visit?

My happy place is anywhere outside really, but I spent every childhood holiday in the Preseli Hills in Pembrokeshire and still leave a little piece of my heart on Carn Ingli every time I visit Newport.

### If I wasn't doing this, I'd probably...

Be a teacher. With parents who were teachers of children with special educational needs, I grew up at a rural boarding school for 10-16 year old boys with emotional and behavioural disorders, sent away from their inner city London homes. I thought my sister and I had a secret pact that we'd never join the profession after listening to the frustrations and too much school politics from our parents over the dinner table, but as I was applying for vet school, she broke the pact, applied for teaching and is now a headteacher too. So I still have to tolerate the politics over Christmas dinner!

Or having visited the inspirational Dr Sarah Beynon's Bug Farm in St Davids a few times, I might be swayed to becoming an entomologist.

## Contents

<b>Medicine</b>	<b>04</b>
Feline hyperaesthesia syndrome	
<b>Surgery</b>	<b>10</b>
Non-invasive mandibular symphysis repair	
<b>Welfare</b>	<b>18</b>
Making the most of remote consults for feline patients	
<b>Medicine</b>	<b>25</b>
Novel treatments for FIP in cats: updates and exciting developments	
<b>Cats Protection news</b>	<b>32</b>
All the latest news from Cats Protection	

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# Feline hyperaesthesia syndrome

## – a rare but unique condition

Feline hyperaesthesia syndrome (FHS) is an infrequently diagnosed and poorly understood condition. It is also known as 'rolling skin disease' or 'twitchy cat syndrome'. First diagnosed in 1980, opinions differ as to whether the condition has an underlying neurological or behavioural basis. While rare, there may be certain 'red flags' in terms of clinical signs, that increase the likelihood of diagnosing the disease. Clinical signs may be severe and unlikely to spontaneously resolve; they may only minimise once a successful treatment regime is administered. However once established, FHS does not typically progress and the prognosis is in fact, quite reasonable.

### Pathophysiology

The precise pathophysiology of FHS remains unknown. Additionally, the variable and inconsistent response to differing medications only serves to increase confusion surrounding the disease. One theory is that FHS is a seizure disorder, another, that it is rather a compulsive disorder resulting in self-injury behaviour. Some individual cats may show aspects of both sorts of disorders.

The seizure theory arose because of the post-ictal behaviour that some cats appear to show after a FHS attack; coupled along with a positive response to anti-epileptic medication. No structural cranial (neither extra- nor intracranial) cause of epilepsy has ever been found.

The second theory pertains to a behavioural obsessive-compulsive disorder, where symptoms are thought to reflect displacement behaviour in response to certain stress factors or triggers. Such cats may exist in high and constant states of anxiety. Cats demonstrating FHS symptoms may partially or fully respond to behavioural modification and/or, the use of psychoactive drugs.

A third theory suggests that in fact, it may be a combination of the above diseases that causes clinical signs in cats, that environmental factors may contribute to altered behaviour and that some clinical responses are optimal when differing drug types are used. Some cats, will therefore, have a reliance on a combination of medications to control their clinical signs.

### Clinical signs

Young to middle aged cats are often affected. Potentially cats are of any breed, albeit a potential breed predilection exists within the Siamese, Burmese, Abyssinian and Himalayan breeds. Clinically, cats show a spectrum of signs such that many differential diagnoses understandably warrant consideration (and preferably, exclusion), before the clinician reaches that of FHS.

Clinical signs may occur multiples of times per day and can be triggered by exogenous or endogenous stimuli. Twitching of the lower lumbar back, particularly with characteristic 'rippling and rolling' of the dorsal lumbar skin can be seen. Such signs represent hyper-responsiveness of the cutaneous trunci muscle. This response worsens when the cat is actively petted or scratched by the owner.

A cat with FHS may aggressively self-scratch, bite, groom or attack their tail/lower back region and sometimes, show very marked self-mutilation. Overgrooming may also be marked and pronounced, causing significant alopecia in the tail/lumbar regions. Cats may stare intently at the lower back and tail. Frantic running around the house and vehement attacking of their backs and tails is also typical.

Such clinical episodes are periodic and with a return to complete normality in between times. During these clinical episodes however, affected cats are impossible to distract from their behaviour and may appear to be in a trance like state of consciousness. Additional signs may include mydriasis, salivation, vocalisation and uncontrolled urination. Whether injury serves as a potential initiating factor in certain predisposed cats (causing stress, anxiety and trauma) remains unknown. >

## Differential diagnoses

Understandably, given the overlap in symptoms, spinal, musculoskeletal and dermatological disease may be considered as differentials in the workup of these patients. Explaining this to clients early on can be advantageous, serving to aid communication and discussion regarding FHS, which may realistically prove, in time, to be a diagnosis of exclusion. It is therefore not uncommon that an initial (mistaken) provisional diagnosis involving one of these three body systems may need to be reviewed and revised.

Any skin disease causing pruritis and irritation warrants consideration. This may include (but not be limited to) ectoparasites, atopy, food allergy and fungal disease. A dermatological assessment and various tests may be indicated. Sellotape strips, coat brushings, fungal culture/PCR, trial ectoparasite treatments, food trials and blood allergen serology may all be considered.

Lumbar musculoskeletal or lumbar spinal pain are also differentials and as such, analgesic trials and diagnostic imaging (spinal radiographs or preferably MRI) may provide further information. Cerebrospinal fluid (CSF) may be collected for analysis, to rule out infectious or inflammatory disease. Spinal pain may also originate from intervertebral disc disease (IVDD), nerve compression, neoplasia and/or degenerative joint disease, albeit the signalment of most affected cats and intermittent nature of clinical signs make such differentials less probable. The interpretation of imaging and CSF analysis should be made with reference to systemic clinical signs and information obtained from a complete neurological examination.



Haematology, biochemistry and urinalysis are perhaps unlikely to directly contribute towards establishing a diagnosis of FHS. However, performing such tests allows for an assessment of the cat's internal health, rules out comorbidities (such as chronic kidney disease and/or a UTI) and ensures suitability for medications where they are needed. TT4 levels should also be checked in mid or older aged cats.

## Practically speaking...

Essentially therefore, making a diagnosis of FHS is incredibly difficult and relies upon elimination and exclusion of the causes of other similar clinical signs. Such a process is likely to be both time consuming as well as expensive; options which may not be practical or feasible to all clients.

Understandably, after an informed discussion, many owners may prefer to trial treatments sequentially, or in combination, to determine



whether this brings about an improvement in symptoms. Such treatment of the behaviour and clinical signs with a variety of staged therapeutic trials may be acceptable in many instances. Owners should, however, be made aware from the outset that different medications may need prescribing and that a 'response to therapy' retrospective diagnosis may only ultimately be made. A trial-and-error approach is not infrequently employed. The success of such an approach is likely to vary on a case-by-case, individual basis.

Acknowledgment and acceptance of an underlying behavioural component cause may necessitate consultation with a dedicated, suitably qualified, feline behaviourist. Environmental modification, enrichment and adaptation will likely form an essential cornerstone of therapy; with management aiming to reduce any contributory anxiety to the pathophysiology of FHS. Such behavioural management may include ensuring

regular feeding times, enabling periods of positive play and interaction with the owner and increased resource availability relative to the number of cats within the household (high and safe resting/hiding points, litter trays, food/water bowls, access points and scratching posts).

The contribution of diet to the condition remains unclear. However, as part of environmental optimisation, it may be prudent to ensure an affected cat is eating a moist, high-quality diet, with a high protein percentage. Conversely, a low-quality diet is thought to potentially create metabolic and physiologic stress.

## Medication options

In an ideal world, the investigation of cats with FHS will have ruled out any other treatable cause of hyperaesthesia.

The potential neurological basis of the disease is often treated with the use of an anti-epileptic medication. Phenobarbitone may be chosen as an effective option. Side effects associated with its use are often minimal, including a lack of hepatotoxicosis (unlike in the dog). A starting dose of 2-3mg/kg BID PO is reasonable, increasing the dose according to clinical need and based on the response seen. Therapeutic blood levels can also be measured.

Gabapentin, with its potentially additionally beneficial anxiolytic and neuropathic analgesic effects, is also worthy of consideration. Gabapentin is used at 10mg/kg BID or TID, PO.

Levetiracetam can also be considered (20mg/kg TID PO) albeit thrice daily dosing and the associated cost of the medication may prove less favourable with some owners. >

For anxiolysis, the main options to stabilise 'mood' would include clomipramine (as a TCA) or fluoxetine (a SSSR). With the use of these medications, consideration should be given to any potential interactions with other drugs. Clomipramine at 0.25-1mg/kg PO SID is often successful, although initial sedation and anticholinergic effects may be seen. Clomipramine may also potentiate other CNS active drugs. Fluoxetine at 0.5-2mg/kg PO SID is another alternative; however, it will inhibit the function of the liver cytochrome P450 enzymes and as such, care should be taken when prescribing other medications that rely on these enzymes for their metabolism.

Many of the above-mentioned medications are unlicensed for use in the cat. As such, informed (and signed for) owner consent should be obtained.

Acupuncture may be employed as part of the therapy of FHS since it may decrease the nerve windup of the neurological contribution of the disease.

Ongoing consideration should be given to providing adequate ectoparasite control, such that any pruritic tendency is prevented.

Where a successful medical regime is found, it is advisable that treatment continues for the life of the cat. Conversely, should treatment be discontinued, a recurrence of clinical symptoms is likely to occur. Treatment aims are to provide a good quality of life for the cat and a stress-free environment in which to live. As such, behavioural and medical aspects of management are likely to warrant consideration side-by-side. **C**



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Her current role is that of senior medical vet within a busy, independent RCVS accredited practice in Surrey. Here she enjoys the challenge of complex medical cases alongside performing advanced ultrasonography and endoscopy.

Her wide-ranging interests include endocrinology, cardiology and haematology.

Rebecca passed her MANZCVS exams in 2021 and is a member of the ISFM Academy of Feline Practitioners.



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# Non-invasive mandibular symphysis repair

This article showcases the case management of a 12-month-old male neutered feline Bengal who presented to the referral clinic for fixation of a mandibular symphyseal separation following the unfortunate failing of both fixation with cerclage wire and nylon suture.



## Background

The patient presented to the emergency clinic having returned home with blood around his face and showing signs of oral discomfort. Analgesia was administered and he was monitored closely for signs of cranial trauma. Once deemed stable initial skull radiographs and physical exam revealed a mandibular symphysis separation. Abdominal, pelvic and chest radiographs revealed no abnormalities.

The patient presented to us at the referral centre bright, in particularly good condition, without signs of dehydration. We must be careful when providing intravenous fluid therapy to our feline patients, as in comparison to dogs they can be easily overloaded, and cats have a higher incidence of non-symptomatic hypertrophic cardiomyopathy. Current recommendations are 3ml/kg/hr to avoid adverse effects (2020 AAHA Anesthesia and Monitoring Guidelines for Dogs and Cats).

## Analgesia and anaesthesia

An IVC should be placed in all patients receiving anaesthesia, a medial saphenous IVC placement may be better tolerated. This is a preferable IVC site, being further away from bacteria laden spray created during oral surgery.

After full physical assessment and blood results, if necessary, all patients should have a tailored premedication plan, comprising of both analgesic and sedative properties. Emergency drugs should be calculated prior to administration of any drugs for all anaesthesia patients, and the location of such drugs known to all (Duke-Novakovski, de Vries and Seymour 2016).

Our patient was particularly lively, so a lumbar intramuscular premedication regime was administered of medetomidine at 5mcg/kg and methadone at 0.2mg/kg. Methadone is a pure MU opioid, chosen as it can easily be titrated and provides excellent analgesia for oral surgery.

Medetomidine was chosen for its excellent sedative properties, the ability to antagonise if required, vasoconstriction which reduces peripheral heat loss and analgesic properties. It holds a swift onset, and a small volume can be administered, meaning less pain on injection (Duke-Novakovski, de Vries and Seymour 2016).

Patients must be monitored closely once an alpha 2 agonist has been administered. They may vomit, putting them at risk of aspiration, it can also have profound cardiovascular effects if used in high doses. Premedications will only work as well as their environment allows, so keep lights low and noise to a minimum.

Once our patient was appropriately sedated, and an IVC placed, alfaxalone was administered intravenously, slowly and to effect, the total dose administered 2mg/kg.

## Airway maintenance

Cats have a small and delicate airway, and the larynx and trachea can be easily damaged (Robertson, Steagall and Taylor 2018), Laryngospasm can occur in cats when the laryngeal tissues are irritated during intubation (Bryant 2010). Great care must be taken to avoid causing any trauma when intubating the feline patient. >

Once intubated, the ETT was secured with a plastic tie behind the ears, the plastic prevents water tracking up and saturating the patient and keeps the ETT stable.

A modified Ayres T-piece breathing circuit was connected to the ETT, using a capnography elbow adaptor to reduce drag.

## Monitoring

The use of modern anaesthesia monitoring devices can be problematic in smaller patients as they can be cumbersome and not offer accurate results.

During oral surgery we cannot rely on areas of the face we may usually apply a monitoring device or check a reflex (de Vries). Alternative areas to place the pulse oximeter are the vulva, prepuce, toe web, toes, or inguinal area.

Regular chest auscultation is vital to also assess the heart and lungs, which can tire during a lengthy anaesthetic, particularly if a patient is kept on one side for a prolonged time. It will also allow you to be aware of any heart murmurs or arrhythmias.

Although daunting, an electrocardiogram (ECG) will supply vital information so aim to use it on all patients.

Capnography should be used for all anaesthesia, it supplies vital information on respiratory status and rate and will alert you to a kinked, blocked, or disconnected ETT, all are common threats in oral surgery. Aim for an end tidal carbon dioxide (ETCO<sub>2</sub>) to remain within 35-45 mmHg (Welsh 2009).

Hypotension is a common occurrence under general anaesthesia. Oscillometric devices will not be as accurate as the doppler in felines, and some

studies suggest the doppler reading is nearer to the mean arterial pressure (MAP) in feline patients (Bryant 2010).

Cats are particularly prone to hypothermia under anaesthesia for a variety of reasons, however with the appropriate warming aids in place and constant temperature monitoring our patient remained normothermic throughout.

## Fixation of the mandibular symphyseal separation by the application of an acrylic splint

This technique can be applied to many mandibular or maxillary fractures. Further reading and education should take place prior to buying equipment and performing this technique.

*Veterinary Dentistry for the General Practitioner* by Cecelia Gorrel 2004 is an excellent resource, and I am sure many veterinary dentists would be happy to offer guidance/offer work experience at their clinics to watch new techniques.

The whole mouth must be assessed for further trauma prior to fixation with the use of dental radiography as a minimum.

For our patient, a wire splint was placed around 304 and 404 stabilising the separation of the mandibular symphysis, this was covered with an acrylic splint, to remain in place for four weeks.

The benefits of stabilising a fracture in this manner in comparison to other techniques are as follows.

- It is not invasive
- Technically easy to perform
- Requires less equipment
- Quicker surgical/anaesthesia time

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*Firstly, a wire splint is placed around 304 and 404 (note the chin wound is from the previous attempts to stabilise the jaw using suture)*



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*The acrylic splint in place – note how the patient will have normal occlusion with this in place, so can use their mouth to eat normally*



---

*Patient comfortably eating in the postoperative period. The patient can eat by themselves after application of an acrylic splint, so long as there are not any other oral concerns*





*Patient happily sleeping post operatively, note how the treatment performed does not prevent the cat from sitting in normal positions*



*Removal of the acrylic splint, four weeks after it was placed*



*The splint removed, note the dentition and soft tissue have not received any damage from this treatment. Two incisors have been extracted at this point due to sustaining fracture at the time of jaw fracture*

- Less financial burden to owner
- Reduced recovery time
- Well tolerated
- No need to crate
- No Elizabethan collar required
- Oesophageal feeding tube is not required post operatively, so long as there are not any other factors that may affect their ability to eat

(Gorrel 2004)

Once the acrylic splint is in place, we must check that we haven't caused a malocclusion. If the acrylic splint is too cumbersome or extends further than is necessary it can change the way in which the mouth closes, causing further tissue damage which we must avoid. We must also ensure the acrylic splint is smooth in all areas to avoid any further trauma. By making the acrylic splint as slimline and lightweight as possible (while still performing its job), it will be better tolerated by the patient and allow them to eat just as normally as if the acrylic splint was not there.

However, to check the occlusion, we do need to extubate the patient, so that we can see how their mouth closes with the acrylic splint in situ. The entire team must be prepared for this and to do so we should have ready:

- another ETT the size that the patient currently has in place
- another ETT one size smaller than what is currently in place
- sterile lubrication
- Intubeaze

- laryngoscope with the correct size blade, check the light is working
- ETT tube tie
- syringe/manometer to deflate/reinflate the ETT
- more induction agent
- sterile saline for intravenous flush
- an assistant to supply flow by oxygen

This part of the procedure may sound daunting but is imperative to ensure the treatment will be a success and avoids having to potentially re-anaesthetise a cross cat if they wake up with the acrylic splint not placed correctly.

We must ensure all steps are taken to protect the airway at this point and ensure the patient maintains their saturation and is extubated for the shortest period feasible. These steps could be followed:

1. Ensure you have all items as listed above to hand.
2. Switch off the inhalant.
3. Empty the reservoir bag of the breathing circuit.
4. Keep the patient's head raised and supported.
5. Remove ALL the air from the cuffed ETT.
6. Untie the ETT.
7. Detach the ETT from the breathing circuit.
8. Gently remove the ETT from the patient's trachea.
9. Offer flow by oxygen to the patient.
10. Check occlusion.

>

11. Regardless as to whether more work on the acrylic splint is required, your patient will need to be intubated.
12. Ensure the patient is at the right plane of anaesthesia to be reintubated, use a small amount of induction agent if needed, to affect. (The author is working on the basis that all patients should have an intravenous catheter in situ).
13. Use the laryngoscope and place a fresh ETT, you may need to use a size smaller than the original if some soft tissue swelling has occurred.
14. Secure the ETT once more, behind the ears is ideal.
15. Reconnect the ETT to the breathing circuit so your patient is receiving oxygen directly into the airway once more.
16. Re-cuff the ETT to the correct pressure.
17. Switch your inhalant back on (note you may not need the same percentage as before if you have administered more induction agent intravenously).

## Recovery

Prior to extubation the mouth must be checked thoroughly for any debris from the wire/splint, remove any excess water from the pharynx and mouth with clean swabs. Suction should be utilised and should always be to hand for any oral surgery.

Our patient had a smooth recovery, eating warm, soft cat food once he was able to sit up. He didn't display any signs of distress on recovery. The patient was discharged from hospital four hours after surgery with NSAIDs and a strict diet of wet food only.

## Conclusion

We kept in contact with the owners, he lived with three other cats and continued to live happily with them and could play gently with his toys. Cats must not be allowed outside to free range in case they cause further trauma to their jaw/break their acrylic splint. They do not need to be kept in a crate at all. Our patient was already lead trained and often went for gentle walks with the owner which continued during his recovery. One of the huge benefits of this technique being that it allows the patient to continue with all behaviours and social interactions were normal for him.

Four weeks after initial surgery, under general anaesthesia, post-operative dental radiography displayed the mandibular symphysis to be healed and so the acrylic splint was removed.

The benefits for patient, owner and team members that can be gained by fixating a mandibular symphyseal separation or a mandibular fracture with an acrylic splint in comparison to other more invasive methods are huge and an important note to take home. 

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Stacey qualified as an RVN in 2014 and the 'Referral Veterinary Anaesthesia and Dental Nurse' at Perry Referrals. Stacey works alongside Rachel Perry, both a RCVS and European Veterinary Specialist in Dentistry. She is extremely passionate about veterinary anaesthesia and analgesia, particularly within the dentistry world. Stacey provides bespoke in-house dental and anaesthesia training sessions. Her hope is to make veterinary nurses' lives that little bit easier by sharing the experience and education she has been able to gain along her own professional journey.

Feel free to get in touch at [Stacey@perryreferrals.co.uk](mailto:Stacey@perryreferrals.co.uk) or call 07885 478 277 or follow on Facebook and Instagram 'Stacey at Perry Referrals'.

A ginger cat is lying down with its head resting on the keyboard of a laptop. The cat's eyes are closed, and it appears to be resting or sleeping. The laptop screen is visible in the background, showing a blueish-grey color. The overall scene is warm and cozy.

# MAKING THE MOST OF REMOTE CONSULTS FOR FELINE PATIENTS

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Remote consultations are those where the communication is not face to face whether that is via phone, email or video platform. While these are not a new concept for the veterinary profession, typically they have only accounted for a small proportion of decision making consultations. However, during the COVID-19 pandemic, numbers of remote consultations increased massively as part of a strategy to reduce social contact and transmission of Sar-CoV-2.

Indeed, remote consultations were largely imposed on all pet owners as the first step of assessment (triage) and since the Royal College, at times during the pandemic, allowed prescriptions to be made following remote consultations, many patients assessed in this way had a diagnosis and treatment plan made as a consequence of the virtual consult alone. In 2022, as this article was being written, social distancing requirements reduced and the requirement for remote consultations has decreased since their height during 2020. However, moving forward, many cat owners and clinicians can see advantages of continued access to remote consultations, where appropriate. >

A significant limitation of remote consultations is the inability to perform a physical examination, however the author believes that the virtual consult can still be a hugely valuable route to clinical information gathering, patient monitoring, decision making and discussion. This article will seek to present the author's tips for successful remote consultations.

### Why choose a remote consultation rather than face to face?

For many cat owners and their cats, a visit to a vet clinic is stressful and difficult. Habacher and colleagues (2010) reported that 27% of cat owners stated that stress was a very important factor when deciding whether to bring in their cat for booster vaccination. A large United States owner survey also found that cat owners were more likely than dog owners to find vet visits stressful; 58% of cat owners stated that their cat 'hates going to the vet' and 38% of cat owners stated that just thinking about a vet visit was stressful for them (Volk et al 2011).

Stress experienced by cats at the clinic can make examination difficult and yield unreliable clinical and laboratory results such as tachycardia, situational hypertension, stress hyperglycaemia and stress leucograms (Quimby et al., 2011). Some conditions such as feline idiopathic cystitis are exacerbated by stress and therefore a clinic visit is potentially contra indicated. Remote consultations avoid the need for stress associated with placing the cat in the carrier, traveling to the clinic, spending time in the waiting room and the examination itself.

While very little research has been done assessing the success of remote consultations, one study reported no adverse impact on post-op checks following neutering in dogs (Bishop et al, 2018)



Fig 1. Investing in cat scales for home use can be worthwhile for carers of cats with chronic health conditions benefitting from long-term monitoring.

and behaviour consultations for separation anxiety and aggression have also reported no significant difference in the success of consultations whether in person or remote (Dodman et al 2005; Cottam et al, 2008).

Situations most suitable to successful remote consults are likely to be those where either history taking is an important component of the consultation or where discussion or sharing of advice/guidance is key. Therefore, monitoring and repeat prescription assessment of chronic conditions, preventative healthcare discussions, behaviour discussions and non-urgent advice consultations are all examples of situations where a remote consultation should work well. A follow-up recommendation to book a face-to-face appointment, if examination is deemed necessary, is an acceptable outcome to the virtual consult.

### Patient assessment via a remote consultation – what's realistic?

In most situations it is not specifically helpful to 'see' the patient via a video consult and the most important and helpful component of the consultation is the spoken dialogue with the carer. It should not be forgotten that a detailed clinical history is vital in decision making and this can usually be done just as well over the phone/video as it can be face to face. Indeed during the COVID-19 pandemic, mask wearing has often inhibited effective communication through impeding sound transmission and preventing lip reading and other interpretation of facial expression.

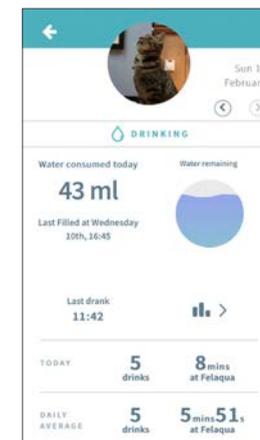
Prior to the consultation it can help to ask the carer to complete a general health assessment questionnaire (Table 1) which outlines their main concerns/reasons for the consult as well as providing basic information on the cat's health status, including a home-assessed body weight, where possible (Fig 1). Advance submission of the health questionnaire, where possible, allows the clinician to prepare for the consult.

Technological advances now allow objective and detailed monitoring of some clinical parameters at home. For example, Sure Petcare's range of products include their Felaqua drinker which provides day-to-day insight on water intake and drinking behaviour. This information can be valuable in alerting carers to development of new conditions and in monitoring pre-existing ones (Fig 2).

With ongoing case management, carers can be trained to provide detailed clinical reports from home, where appropriate (Table 2, Fig 3) and data gathered can form the basis of future discussions and decision making (Fig 4). >



Fig 2. Devices are now available that monitor drinking of cats in the home (i) and provide detailed daily information concerning frequency and amount of water drunk (ii).





# Cat Behaviour Conference:

Happy cat, happy owner –  
purrfect problem solving

Friday 2 September 2022

Get ready for a day of cat behaviour CPD, featuring expert speakers from around the world!

We're back again with a fabulous agenda packed full of inspiring talks! The day will be focused on feline behavioural issues, including practical advice and tips. Registration will be open to all members of the veterinary profession, as well as anyone else working with cats eg shelter staff and pet sitters.

**Can't make it to the live event?**

Don't worry, it'll be recorded and available to watch for six months after the event.

The conference will take place virtually. Please keep an eye on the 'For vets and nurses' section of our website for further details.

[www.cats.org.uk/cat-behaviour-conference](http://www.cats.org.uk/cat-behaviour-conference)



## Novel treatments for FIP in cats: updates and exciting developments

Feline infectious peritonitis (FIP) is a devastating systemic disease caused by feline coronavirus (FCoV). Historically it has been uniformly fatal, but in the last six months in the UK vets have been able to legally source effective treatments. In this article we briefly revise making a confident diagnosis of FIP and discuss the novel therapies and future directions. >

## Reminder of pathogenesis of FIP

FCoV is an alphacoronavirus that infects both domestic and wild cats. The enteric biotype (feline enteric coronavirus) is common, and frequently found in the faeces of cats, particularly if they live in multi-cat homes. In a small number of infected cats, the virus is able to replicate efficiently in macrophages and via a combination of the cat's ineffective immune response and mutation of the virus, FIP develops. A strong cell-mediated immune response towards FCoV seems to be protective, yet an antibody-mediated response may result in immune-mediated vasculitis typical of FIP. FIP is often described as 'wet' or 'dry' but there is much overlap and presentations can alter over time.

## Making a confident diagnosis of FIP

Now we have effective treatments for FIP we must balance the cost of expensive diagnostics vs preserving funds for treatment, a novel and difficult position in the management of this disease. Equally treating a cat without confidence of the FIP diagnosis risks disgruntled clients, equally big bills and cats that remain unwell. Certain clinical signs are typical of FIP, but one of the challenges of the disease is the difficulty making a confident premortem diagnosis in less clear cases. Exclusion of other differential diagnoses such as other infectious disease, neoplasia and immune-mediated diseases remains important. Classically, young cats present as pyrexia, with high-protein ascites, but many presentations have vague clinical signs and non-specific diagnostic test results. Viscous effusions are certainly typical (Figure 1), but clinical signs can occur as a result of granuloma formation in any area of the body. Cats presenting with ocular signs (Figure 2) (uveitis, keratic precipitates, hypopyon, hyphaema, chorioretinitis) and neurological signs (ataxia, seizures, nystagmus,

mentation changes) may pose more of a diagnostic challenge.

The ABCD website contains very useful algorithms for the diagnosis of FIP here: <https://bit.ly/3kqAlju>

Diagnostic clues on haematology include non-regenerative anaemia, lymphopenia, neutrophilia and on biochemistry; hyperglobulinaemia, a low albumin/globulin ratio (<0.4) and mild hyperbilirubinaemia. Inflammatory markers such as alpha-1 acid glycoprotein may be markedly elevated but none of these changes are pathognomonic for FIP. Tests such as serum protein electrophoresis are rarely helpful and consume more funds so consider each test carefully.

## Coronavirus serology and how it can mislead you

Coronavirus serology is included in some 'FIP panels' and titres are often measured in the work up of suspected FIP cases. Yet the result adds little to your ability to make a diagnosis of FIP. High titres are seen in cats with FIP, but also in healthy cats from multi-cat homes for example, as it simply indicates exposure, and these high titres can persist for months to even years. Rarely, cats with FIP can have negative titres, again confusing the picture. Tests with higher diagnostic yields should be prioritised, such as fluid analysis. Treatment with remdesivir and GS-441524 should never be prescribed based on antibody titre alone, and it is not useful to monitor during or after treatment of FIP.



Figure 1: Classic yellow and viscous effusion found in cases of FIP. Testing effusions is a vital part of making a confident diagnosis

## Value of diagnostic imaging

While some effusions are clinically obvious, small pockets of fluid may be found on ultrasound and can be sampled which significantly helps reach a diagnosis. Even without advanced ultrasound skills, checking the abdominal and thoracic cavity for effusions is quick and easy. Abdominal ultrasound may also reveal lymphadenopathy or lesions on abdominal organs and sampling for further tests can be very helpful (see later). Advanced imaging such as CT or MRI may be helpful in neurological cases, but it can be more cost effective to survey for effusions first.

## Further tests worth submitting

### Cytology

Cytology of effusions or fine needle aspirates (FNAs) remains very helpful in the diagnosis of FIP. Additionally, such samples may raise suspicion of other conditions that mimic FIP such as lymphoma. >

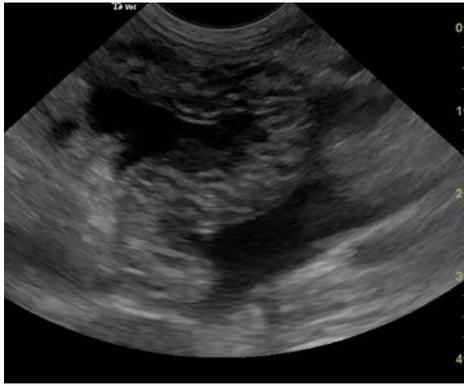


Figure 2: Pockets of fluid on ultrasound of the abdomen provide an opportunity to sample for further testing



Figure 3: Oral GS-441524 is now available for the treatment of FIP in the UK

Effusion cytology can be performed in-house and importantly make other diagnoses less likely, for example septic peritonitis or pyothorax. Protein levels in effusions can also be measured in-house, or at an external laboratory and finding a low protein level effectively excludes FIP. FNAs revealing pyogranulomatous inflammation are consistent and effusions often have a low cell count and mainly non-degenerate neutrophils and macrophages. Additional tests can then be performed to confirm the presence of FCoV in the samples.

### Detection of FCoV

PCR and immunocytochemistry/immunohistochemistry can be performed on various samples, to help confirm FIP by identifying FCoV in the samples. Quantitative qRT-PCRs allow you to see how much virus is present in the sample which can be helpful as false positives are possible, but much less likely if everything else fits the diagnosis of FIP. False negatives can also occur with both types of testing, but a negative

result should prompt a thorough reassessment of the case for other diagnoses too. PCR can be performed on effusions, CSF, aqueous humour, FNAs and tissue samples. A useful technique for ensuring adequate samples from FNAs is to place samples into a small amount of saline and repeat sampling until the sample is cloudy by sucking the saline in and out of the syringe and needle. Contact the laboratory prior to submission of samples for immunocytochemistry or immunohistochemistry as certain sample handling may be recommended, for example spinning down the effusion to make a 'pellet'. In the UK Liverpool, Glasgow and Edinburgh provide immunocytochemistry and immunohistochemistry and a wider range of laboratories offer PCR. Samples can also be sent from your usual lab to others for further testing if not offered in-house.

### Novel treatments and how to use them

Over the last few years various anti-virals have shown efficacy in the treatment of experimental and naturally occurring FIP but been frustratingly unavailable legally. The most promising was GS-441524, a nucleoside analogue that inhibits the viral RNA polymerase and in 2021 remdesivir (a prodrug of GS-441524) was made available in the UK from a specials manufacturer. Later that year, oral GS-441524 (Figure 2) was also launched as 50mg tablets. We have learnt a lot about these treatments from the experience of vets in Australia, who have had the drugs for longer, and now from cases treated in the UK.

### Which cases can be treated?

All types of FIP have been treated successfully with remdesivir and GS-441524, however, doses vary between presentations. For example, ocular and neurological cases require much higher doses. Cases can be treated prior to achieving a definitive diagnosis, for example, when effusions have been analysed in-house and found to be consistent with FIP and PCR results are awaited. We must be responsible with our client's funds, and mindful that viral resistance is a concern, hence do our best within financial/clinical limitations to confirm the diagnosis of FIP or at least exclude similar differentials before prescribing.

### Is a cure achievable?

Yes, cure rates around 80% are being reported but robust data is not yet available. Experience suggests that most cats respond well and completely, but that some cats do not, or relapse, and owners must be warned of these possibilities and discussions well documented in the clinical records. These drugs carry considerable cost and commitment for owners, guarantees cannot be offered, and we continue to learn how to best use the drugs.

### How long is the treatment course and what dose is used?

As mentioned, some types of FIP need higher doses (see table 1). The treatment course is 12 weeks, and we have the option of using remdesivir initially (SC or IV) and changing to oral GS-441524. When to move from injectable remdesivir to oral GS-441524 may depend on the cat's tolerance of injections (or oral administration of tablets), formulation price differences (including cost of needles, syringes, sharps disposal, wastage), and owner preferences and finances. Experience suggests this transition can be made between seven and 14 days of starting remdesivir. The change can be made directly; remdesivir is given one day and GS tablets started the next day. Currently we do not know if using an entirely oral protocol is an advantage or disadvantage but may be more suitable for some cases and seems effective. Important points on using these drugs are found in the box. >

## Practical use of remdesivir and GS-441524

- The course is a minimum of 12 weeks (extensions may be needed in cases not responding fully or relapsing)
- Only stop treatment once the cat has been normal (clinically and on serum biochemistry and haematology) for at least two, preferably four, weeks
- Cats should be regularly weighed, and dose adjusted as they are often young cats who gain weight over the 12 weeks
- GS-441524 tablets can be split, if between sizes dose higher rather than lower
- Very unwell cats can be treated with IV remdesivir initially (dilute into 10ml with saline and administer slowly over 20-30 minutes)
- GS-441524 should be given without food (or with the smallest coating to encourage compliance)
- Remdesivir can be painful on injection so should be warmed to room temperature, given with a new needle and anxiolytic/analgesics used to facilitate injection (gabapentin, trazadone, buprenorphine)
- An improvement in demeanour, appetite and resolution of pyrexia should be seen in the first 2-5 days with resolution of effusions around two weeks after starting treatment
- Globulins may initially increase when large volume effusions are re-absorbed but should then normalise over 1-3 weeks
- Lymphopenia and anaemia may take longer to resolve (eg six weeks)

## What adverse effects have been reported?

The treatment is generally well tolerated. Remdesivir injections may cause pain (see box) and mild elevations in ALT and eosinophilia have been recorded. In some cases, pleural effusions can worsen in the first couple of days necessitating repeat thoracocentesis. After IV treatment some cats can be nauseous or lethargic.

## What do I need to monitor during treatment?

Ideally, serum biochemistry and haematology are re-assessed after two weeks and then monthly, but this can be adjusted according to finances and for cost-limited clients, monitor weight/demeanour/effusions (eg by in-house scanning)/neurological signs/key biochemical abnormalities only (eg measuring just globulin, bilirubin or spinning microhaematocrit tube for PCV/TP/colour of plasma). Cats should be reassessed at least 2-4 weeks before they are due to stop treatment to ensure abnormalities have resolved. The author recommends re-assessment at six weeks to give an opportunity to increase dose for the second half of the course if abnormalities remain.

## What if the cat fails to respond, relapses or only partially responds?

In this situation review the diagnosis and ensure you are still confident the cat has FIP, consider further tests if not previously performed. If biochemical abnormalities (hyperglobulinaemia and abnormal albumin to globulin ratio in particular) remain present after 6-8 weeks, then increase dose by 3-5 mg/kg per day and continue the course, not stopping until parameters normalise for at least two weeks – this may well include extending the course over 12 weeks.

If relapse occurs after completion of treatment – restart treatment with remdesivir or GS-441524 at a higher dosage (typically 3-5 mg/kg higher per day than dosage used previously) and treat for another 12 weeks. The increased dosage used depends on the dosage the cat is on at the time of the relapse and the nature (eg severity and/or development of neurological signs) of the relapse, but can be up to that recommended for neurological FIP (20 mg/kg – see Table 1). It is possible some cats will respond to a shorter course but ideally treatment for relapse after completion of a course is continued for the full 12 weeks to limit repeat further relapse

## Adjunctive and future therapies

Other drugs have been proposed for relapsed or non-responsive cases. In general, a dose increase of GS-441524 or remdesivir is effective but for cases with limited funds or limited response mefloquine can be added and be reformulated to give cats 20-25mg PO SID (with food). It is likely other human anti-virals like molnupiravir will be useful but are currently unavailable in the UK for animal treatment. Further developments and recommendations, such as combining anti-virals with different mechanisms, are likely to be recommended in future.

## Conclusion

This is an exciting time for vets treating cats with FIP. We are likely to see many more cats survive and be cured over the next few years. A note of caution is to be as sure as possible of diagnosis before treating and use an adequate dose and duration. The drugs are expensive, and owners must be aware of costs from the start, and the risks of relapse and partial/no response. Further advice on case management can be obtained from [fipadvice@gmail.com](mailto:fipadvice@gmail.com) – a free advice email run by feline and internal medicine specialists who are happy to help. 



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Table 1: Summary of dosage recommendations for remdesivir and GS-441524

Clinical presentation	Remdesivir – by injection	GS-441524 – oral
Cats with effusions and without ocular or neurological signs	10 mg/kg once daily	10-12 mg/kg once daily
No effusion and without ocular or neurological signs	12 mg/kg once daily	10-12 mg/kg once daily
Ocular signs present (effusive and non-effusive)	15 mg/kg once daily	15 mg/kg once daily
Neurological signs present (effusive and non-effusive)	20 mg/kg once daily	10 mg/kg twice daily (ie 20 mg/kg given as a divided dose)

# news

Keep up-to-date with Cats Protection

## Scotland and Wales introduce new licensing laws

In September both the Scottish Government and Welsh Government introduced new licensing laws which ban the third-party sale of kittens. This means that pet sellers can no longer sell kittens that they have not bred themselves. This brings the devolved nations into line with England where this has been the case since 2018. In all three nations commercial cat sellers now require a licence and their licence number must be displayed on any advert for their kittens. In addition, the licence bans the sale of kittens under eight weeks of age.

In Scotland, the new licensing laws also go further and regulate cat breeding so that anyone breeding three or more litters of kittens in any 12-month period must be licensed and female cats are limited to having a maximum of two litters within a year. Breeders have also been banned from breeding cats with extreme traits which can lead to health conditions, such as the Scottish Fold.



Cats Protection has welcomed these new laws and hopes that they will help to stamp out rogue cat breeders and sellers who put profit before the welfare of kittens and cats.



## Benefits of pre-pubertal neutering

CatKiND (formerly the Cat Population Control Group) are pleased to share this brand new video resource discussing the benefits of pre-pubertal neutering. The link to the video is <https://youtu.be/eFHTRCqIMpo>

The key to preventing more unplanned litters of kittens being born is to make four month neutering the 'norm' for pet cats. A number of charities, including Cats Protection, are working together under the umbrella of 'CatKiND' to maximise the effectiveness of cat neutering through collaboration on research, joint projects and co-ordination of activities. We have been working to provide a 'one shop stop' for vets who are already neutering from four months or who are still neutering at six months but are keen

to introduce four-month neutering. As part of this activity Cats Protection launched the website 'KiND', now re-branded 'CatKiND'. Visit the website below for more information on pre-pubertal neutering, including:

- links and articles to the scientific evidence supporting four-month neutering
- a suggested anaesthetic protocol in a quick reference format
- the public and veterinary Kitten Neutering Database
- resources to help you train your team





## Cats Protection's new Feral Guide

Cats Protection's *Feral Guide* explains how feral cats think and behave and how their welfare needs differ from domestic (non-feral) cats. Because of their lack of socialisation to people, the care of feral cats must carry additional considerations in order to protect their welfare.

The *Feral Guide* sets out how Cats Protection approaches the care and management of feral cats and explains the unique considerations that arise when working with feral cats. It's a recommended read for all vets, and contains vital information if you are working with a local charity who are involved in trap, neuter and return work.

The *Feral Guide* is available in hard copy or online here: [www.cats.org.uk/feral-cats](http://www.cats.org.uk/feral-cats)



## Free CPD with Cats Protection's CPD Academy hub!

Our free CPD Academy is currently under development and can be found on our main website.

Our free online CPD courses are aimed at those working on a budget or with limited resources and require no login to access them. As we build this hub, it will feature webinars, videos, articles and podcasts that offer practical solutions to those medical and surgical conundrums when referral isn't an option.

It is hoped by providing this bespoke content, veterinary professionals will feel confident in offering a pragmatic veterinary service, while maintaining high levels of animal welfare and clinical excellence.

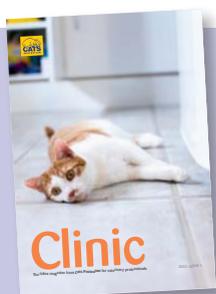
We've recently released a short series of webinars titled: *The top 5 things to know when performing Cats Protection work*. These short videos are aimed at veterinary professionals who are delivering Cats Protection work. They are listed as individual videos, so you can quickly refer to those videos which are relevant to you.

Please continue to monitor our CPD Academy, as new material will be being added soon! [C](#)



## Read our new Behaviour Guide

This guide has been produced for those working with rescue cats to promote a better understanding of cat behaviour.



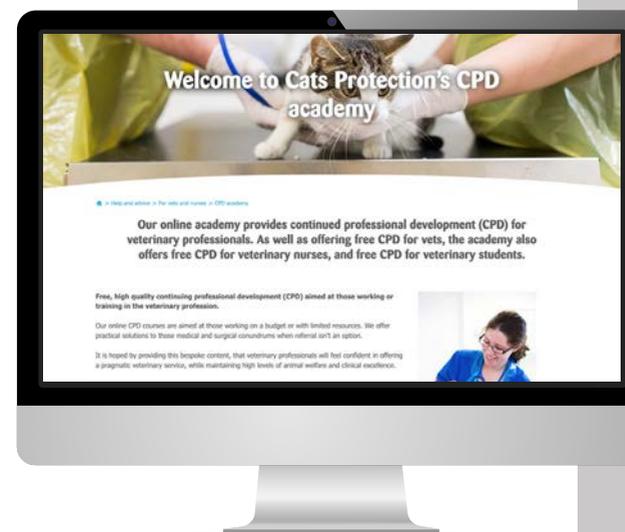
## Write for Cats Protection's *Clinic* magazine!

We are on the lookout for contributors to provide articles or case reports for future editions of *Clinic* magazine.

We are looking for cat-based articles or case reports of no more than 1,000-1,500 words that would be helpful for the general practitioner. We are particularly interested in articles looking at treating cats on a limited budget or in a shelter environment using evidence-based medicine and surgery. We feature articles on feline medicine, surgery, welfare and behaviour and pay £250 for each article published.

If you would like further information, wish to submit an article, or would like to sign up to receive future copies of *Clinic* free of charge, please do not hesitate to get in touch via [CPClinic@cats.org.uk](mailto:CPClinic@cats.org.uk)

We'd love to hear from you!



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The feline magazine from  
Cats Protection for veterinary professionals

