

# CAUSES, TREATMENT, MONITORING: FELINE OROFACIAL PAIN SYNDROME

**Author :** CLARE RUSBRIDGE, SARAH HEATH, DANIELLE A GUN-MOORE, NORMAN JOHNSON

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CLARE RUSBRIDGE, SARAH HEATH, DANIELLE A GUN-MOORE and NORMAN JOHNSON consider a syndrome that may have important implications for breeding cats, and provide suggestions for easing self mutilation problems

**FELINE orofacial pain syndrome (FOPS) was first recognised in the early 1990s and is seen predominantly in Burmese cats ([Figure 1](#)).**

It is characterised by face and tongue mutilation and affected cats are commonly presented with exaggerated licking and chewing movements, with pawing at the mouth.

More severe cases have mutilation of tongue, lips and buccal mucosa (-). Oral lesions and environmental stress can precipitate the condition. The disease is most likely to be a neuropathic pain disorder similar to trigeminal neuralgia.

## Pathogenesis

It is hypothesised that this condition is caused by dysfunction of the processing of sensory trigeminal information within the brain, in combination with damage and/or sensitisation of the endings of the trigeminal nerves. The trigeminal nerve conveys sensory information about the face and mouth, such as pain and touch, to the brain.

It has been suggested that affected cats have an underlying disorder processing sensory trigeminal information, so that when trigeminal nerve endings are sensitised, such as by dental disease, the consequence is a neuropathic pain disorder.

Conditions of neuropathic pain can be greatly influenced by many internal and external factors. For example, individuals with poor social coping strategies may be more vulnerable. FOPS is thought to be similar to orofacial pain disorders seen in humans, such as trigeminal neuralgia. Trigeminal neuralgia is characterised by severe pain in the distribution of the trigeminal nerve, usually the mandibles and/or maxilla. The pain is precipitated by trigger factors, of which the most common is facial movement (such as chewing). A more unusual human facial pain syndrome, part of the spectrum of trigeminal neuralgia, is glossodynia (burning mouth syndrome). This is described as a burning or prickling sensation of the oral mucosa, most commonly at the front of the tongue. In many affected cats, tongue discomfort seems to be the primary problem.

## Signalment

The Burmese cat is over-represented - comprising 92 per cent of cases in a recent study. However, the disease has also been recorded in Siamese, Tonkinese, Burmilla and domestic shorthair breeds. Any age of cat can be affected, but many cases will first show signs when erupting permanent teeth. There may be a slight bias towards males, but a sex predisposition has yet to be proven.

## Causes and risk factors

Predilection to the Burmese cat (all colours) and its crosses suggests a hereditary susceptibility for some cases ( ). Predisposing factors are oral lesions - in particular, erupting permanent teeth, dental disease (especially periodontal disease and dental resorptive lesions) and mouth ulceration.

The condition can also be triggered by routine dental treatment, including dental extraction. A recent study found that, for one in five cases, environmental factors influence FOPS and individuals with poor social coping strategies in multi-cat households appear to be more vulnerable to this condition.

## Clinical signs

The main presenting signs are exaggerated licking and chewing movements, with pawing at the mouth. There may be self-induced trauma to the face and oral cavity, especially the tongue. Neurological examination is normal; in particular, there are no motor or sensory trigeminal deficits.

Discomfort appears to be confined to the oral cavity and lips - there is no apparent discomfort elsewhere in the distribution of the trigeminal nerve, such as the nose or eyes. Typically, the

discomfort is unilateral or worse on one side.

The cat remains alert and can be distracted, although with considerable difficulty in some cases. The cat may be anorexic and/or unwilling to eat.

Clinical signs can be episodic or continuous. In episodic FOPS, distress is often triggered by mouth movement, such as eating or grooming. Episodes last between several minutes to several hours and are often preceded by a short period of behaviour that would suggest anxiety. With continuous FOPS, affected cats appear to be in discomfort all the time and signs increase in intensity when they are excited or stressed or after mouth movement. These cases are at risk of severe oral cavity or face mutilation.

## **Diagnostic investigation**

There is no definite diagnostic test for this disease and the diagnosis is made on the basis of appropriate signalment, elimination of other explanations and identification of contributory causes. The main differential diagnoses are an oropharyngeal foreign body and other neurological diseases causing a dysfunction of the processing of sensory trigeminal information within the nerve or brain. The most significant other cause of trigeminal lesions in the cat is neoplasia.

The affected cat should be investigated for predisposing medical problems, especially dental disease. Good-quality dental radiographs are recommended and it is worth seeking a specialist opinion.

It is also recommended that serum biochemistry and haematology be performed to rule out other systemic disease. A neurological examination should be performed, with particular emphasis on cranial nerve function. Routine neurological investigation - for example, MRI and cerebrospinal fluid analysis - is normal in cases of FOPS. These investigations are useful to rule out other causes of trigeminal disease and are recommended in any cases with abnormal neurological examination, especially abnormal facial sensation, movement and jaw tone.

Further investigation is also recommended for cases with discomfort in a more unusual distribution, such as the eyes or nose. As environmental factors can influence this condition, it is important to explore the history for possible contributory factors like social stress.

Identification of social incompatibility in a multi-cat household is a key step. Factors that are worth considering are:

- does the cat have its own secure core territory (such as its own litter tray, feeding area and private space)?;
- visual access into the home (can the affected cat see another cat through a window?);

- points of entry and exit (does another cat block access going in, out or even within a territory?);
- is there adequate provision of privacy?; and
- is the cat able use its natural behavioural strategies for coping with stress, such as hiding, elevation and distancing?

Referring the patient to a specialist in behavioural medicine is worth considering.

## Treatment

Until discomfort can be controlled, mutilation should be prevented by using an Elizabethan collar and/or paw bandaging. “Soft claws” are an additional method of controlling self mutilation and any dental disease should be appropriately treated.

It is worth considering referral to a veterinary dentist, as inappropriate and overly traumatic dental surgery can aggravate this condition. Feline dental resorption lesions are a considerable challenge to treat.

Dental atomisation of retained roots should be avoided, as the operator is unable to ensure avoiding collateral damage to surrounding bone. In addition, neurovascular bundles are present only 1mm to 2mm beyond the root apices.

This appears to be a condition of neuropathic pain and analgesia should be provided. Licensed analgesics, such as a combination of NSAIDs and opioids, should be tried first.

If this is ineffective, consider prescribing anti-epileptic drugs that have an anti-allodynic effect and are effective for neuropathic pain syndromes. None of the anti-epileptic drugs are licensed for use in cats and owners should be made aware of the risks and sign an appropriate disclaimer. Phenobarbitone (dose rate 2mg/ kg to 3mg/kg bid) is preferred to diazepam because of the greater risk of idiosyncratic hepatic failure with the latter.

The drug can be given by the intramuscular route to provide more immediate relief. An alternative is carbamazepine (100mg/5ml solution at a dose rate of 25mg bid), which is a common first-line therapy for neuropathic pain in humans and has been used experimentally for neuropathic pain in the cat. However, no long-term studies on the pharmacokinetics or safety of carbamazepine in the cat have been done. Regular monitoring of haematology is advised; this drug’s main adverse effect in humans is haematological. Other anti-epileptic drugs with an anti-allodynic effect, such as gabapentin, pregabalin and levetiracetam, may also be useful to treat this condition.

Environmental factors should be addressed. It is essential that there is appropriate distribution of the five essential feline resources: food, water, resting places, latrines and points of entry and exit

into the territory.

The cat should also have a private area and the ability to hide and elevate to control stress. Use of commercially available feline facial pheromone F3 can be useful.

## **Monitoring and management**

All cats receiving anti-epileptic drugs should have haematological and biochemical parameters regularly monitored. Anti-epileptic drug serum concentrations should first be assessed two weeks after initiating the drug and annually thereafter if the cat is receiving long-term treatment and is otherwise clinically healthy. More frequent assessment may be advised, especially if the cat becomes unwell.

Most cats require a serum phenobarbitone concentration of 20mg/l to 25mg/l (100µmol/l to 120µmol/l) to control episodes. The dose of phenobarbitone should be adjusted as appropriate. For other (human) anti-epileptic drugs, the authors aim for a serum concentration from low to midway in the human therapeutic range.

Episodes of discomfort should be lessened within three days of starting anti-epileptic drugs and are usually absent or infrequent after seven days of therapy. Occasionally, lifelong therapy is required. However, remission is common and attempts should be made to wean the patient off medication after four weeks - especially if the predisposing causes have been treated or resolved.

For immature cats erupting permanent teeth, the discomfort will resolve when the permanent dentition is fully erupted. Recurrent episodes are common and kittens that present with FOPS during teeth eruption are highly likely to present again as older cats. Therefore, prophylactic dental health care, maintaining oral health and preventing periodontal disease is advised. Environmental stress should also be limited - the numbers of cats within the household should be restricted to socially compatible levels and careful attention should be paid if further cats are to be introduced.

Over-representation in one purebred population suggests a hereditary predilection. Pedigree analysis of 36 Burmese cats indicated that 30 had three common early ancestors. The remaining six cats (red and brown colour) were of different lines.

It is difficult to select disease-free stock for breeding purposes because environmental factors, such as dental disease and stress, influence the disease - not every animal with an affected genotype will necessarily have clinical signs. In addition, signs of the disease might occur after the animal has been bred. It is hoped that the disease gene can be identified, thus enabling easy screening for potential breeding stock. In the meantime, breeders are advised not to use any cat that has had signs of the disease, even if the signs are not persistent, such as avoiding the use of kittens that showed signs when their permanent teeth were erupting.

It would also be wise not to use the tom and queen of affected cats, especially the tom, as his genetic influence can be far-reaching if used to sire many litters.

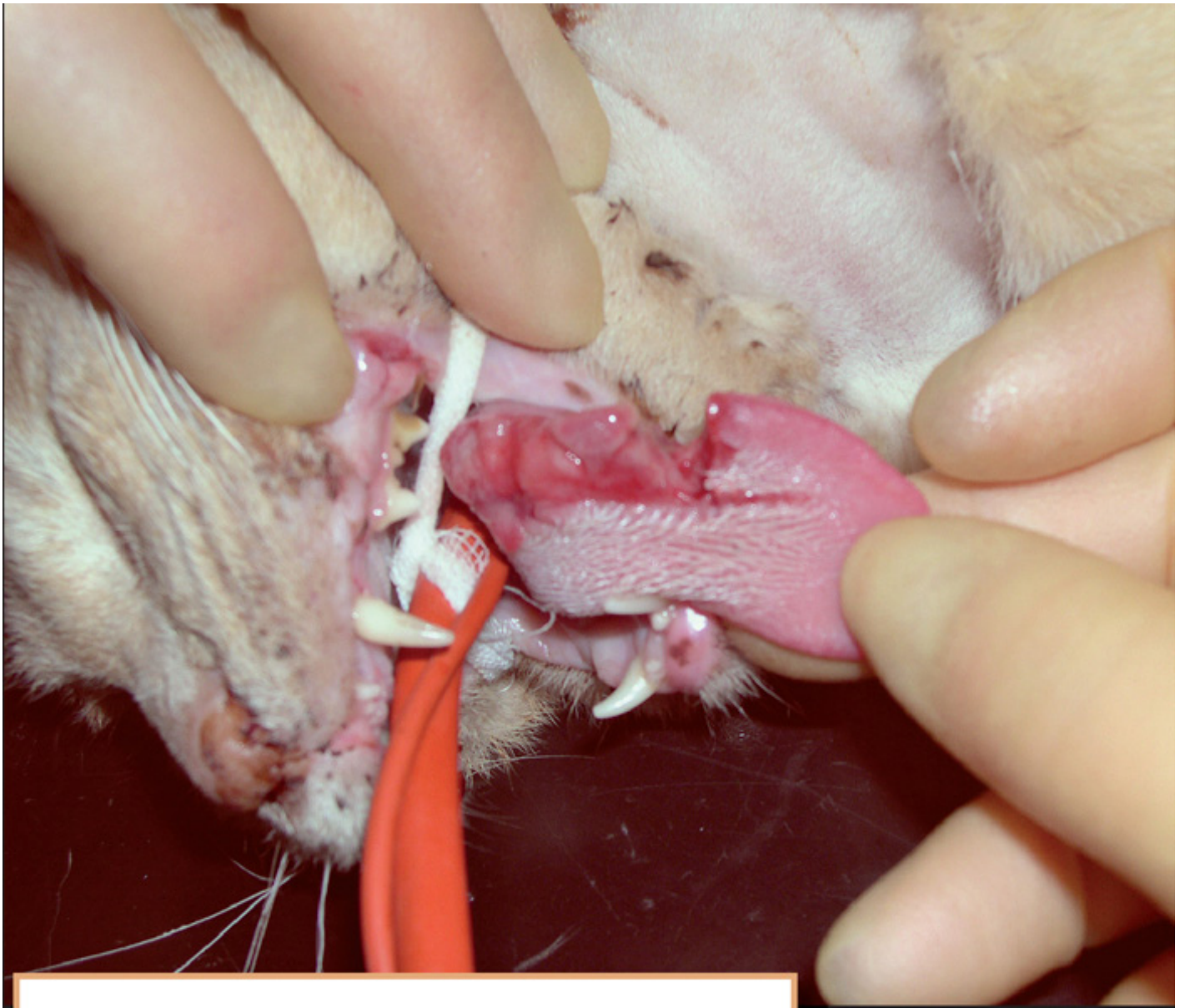
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***Figure 1. A Burmese cat with FOPS wearing a buster collar to prevent mutilation. The underlying discomfort should also be addressed - it is not sufficient to just prevent the behaviour.***

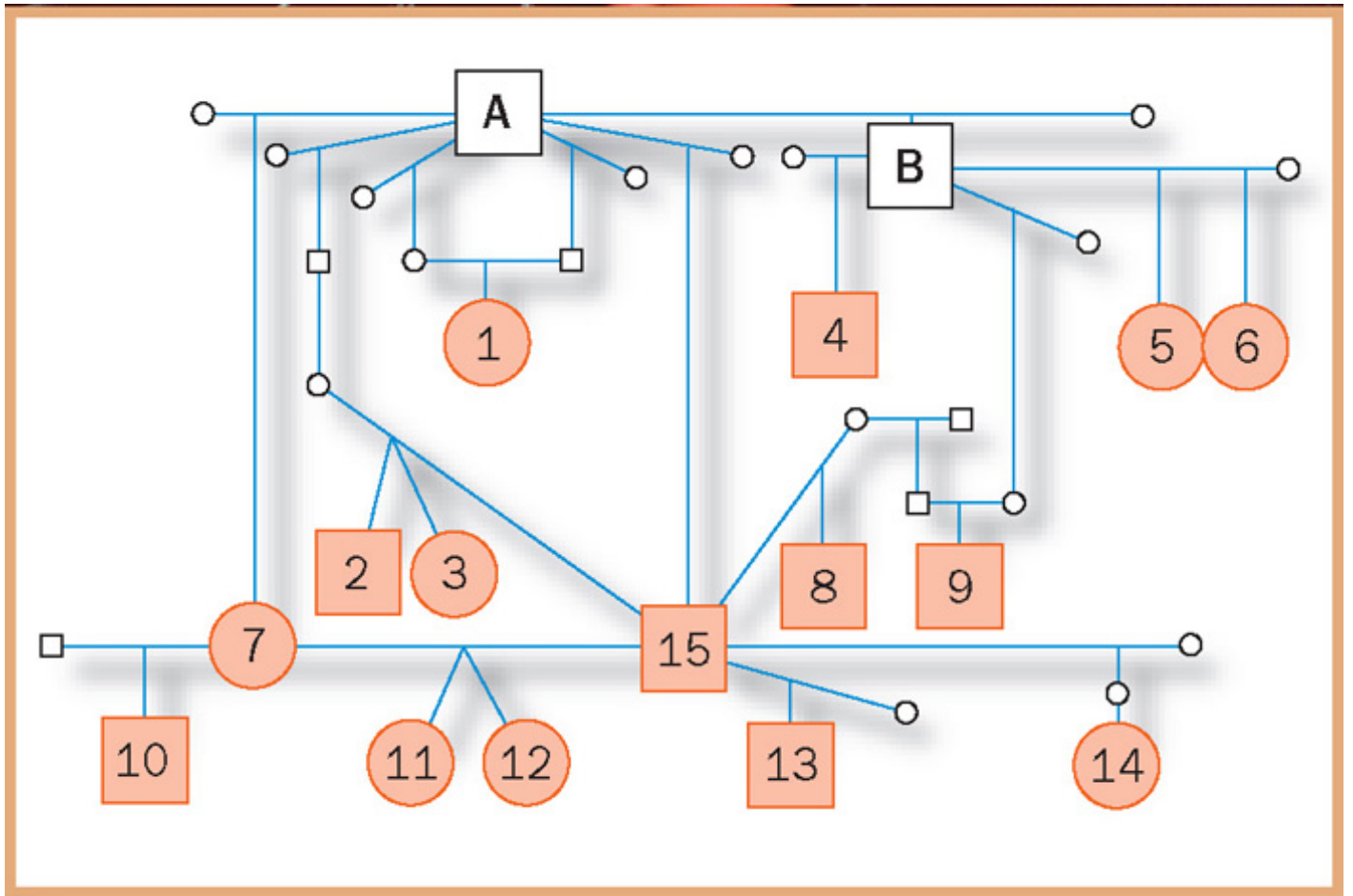
Photo courtesy of: JUDITH CORNISH-TRESTRIL AND CHRISTINE STALKER.



***Figure 2 (above). Tongue mutilation in a Burmese cat. In cases of severe mutilation, surgical repair and, possibly, parental nutrition may be required until the tongue lesions have healed.***

Photo courtesy of: JAMIE PELOSO.





**Figure 3 (left).** Familial relationship between 15 cats with FOPS cases. Circle = female, square = male, red fill = affected with FOPS, small unfilled circle or square = clinical status unknown.

Image created by: PENNY KNOWLER.

