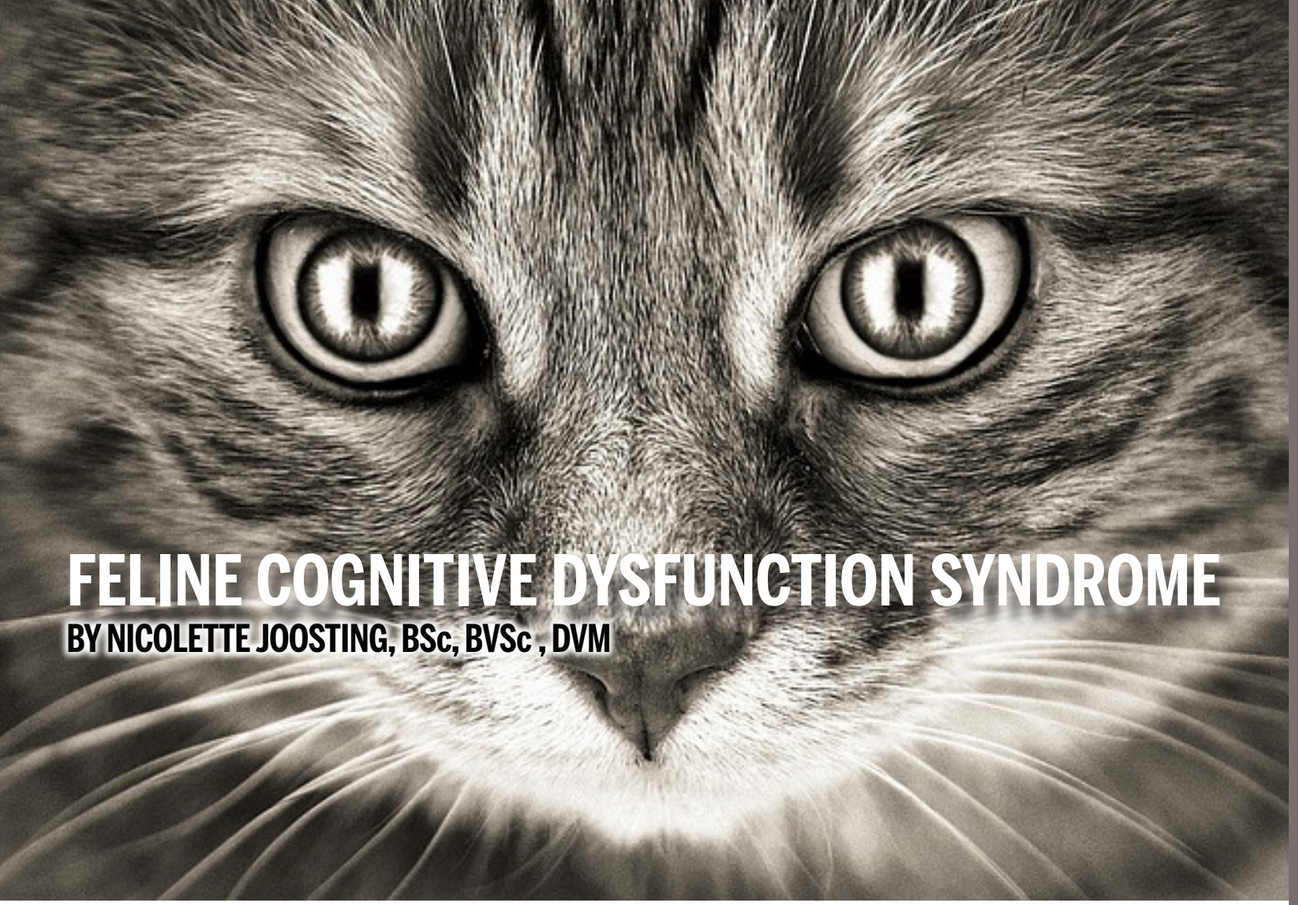


FELINE COGNITIVE DYSFUNCTION SYNDROME

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Aging cats show significant behaviour changes. The most common of these are reported to be inappropriate vocalization (especially at night), increased affection, and house-soiling (see Box 1). By considering these behaviours not as problems but as clinical signs that require a thoughtful approach, we are able to identify manageable conditions that would otherwise be dismissed as "normal aging."

One of these conditions is feline cognitive dysfunction syndrome (FCDS), an age-related decline in cognitive abilities, characterized by certain behavioural changes that cannot be attributed to any other medical condition.

Feline cognitive dysfunction syndrome, with all its similarities to Alzheimer's and non-Alzheimer's dementia in humans, can progress at varying rates and in my experience, occurs over a wide range of ages. It has been suggested that at least a third of cats aged 11 to 14 years, increasing to more than half of cats 15 years and older, may be showing at least one clinical sign FCDS.

We can use the acronym VISHDAAL, proposed by Sordo and Gunn-Moore in 2021, to describe the behaviours seen in cats with FCDS: excessive Vocalization, alterations in Interactions (e.g., increased affection), changes in the Sleep-wake cycle, House-soiling, Disorientation, alterations in Activity levels, Anxiety, and Learning and memory. The behaviours included in this acronym (as opposed to DISHAAL, which was developed for dogs), are more specific to cats and are listed in order of prevalence.

The diagnosis of FCDS can only be made by ruling out other potential causes of the behaviour changes (see Box 2). Complicating this, some of these conditions may be concurrent and exacerbate the behavioural signs of FCDS. Senior cats frequently suffer from concurrent interacting conditions, which may be underdiagnosed, and by including questions on age-related behaviour changes as well as a mobility questionnaire in the history, together with a logical diagnostic workup, we may be able to identify when the cat has "dementia" concurrent with hypertension, hyperthyroidism, kidney disease, or any of the other differentials. In a cat showing any of the behavioural signs of FCDS, a minimum database would include a full physical examination, retinal (fundic) exam, blood pressure, hematology, serum biochemistry including thyroxine, and urinalysis. Additional diagnostic testing when indicated may include urine culture, free thyroxine, and abdominal and/or cardiac ultrasound. A CT may demonstrate brain atrophy, but it is rare that this diagnostic step is achieved. Immediately address pain as a cause with an analgesia trial, preferably with opioids. Initiate accessibility and comfort changes in the home. If clinical signs of FCDS persist despite treatment of concurrent illness, pain, and environmental changes, address the possibility of cognitive dysfunction.

Cognition in cats, as opposed to humans, is poorly understood. This makes it difficult to measure changes in cognition, especially since these may be subtle or unrecognizable by owners and clinicians. While there are some laboratory-based protocols developed to try to assess and measure cognitive dysfunction, these are not practical in a clinical setting. Our clinical indication of progression or successful management (there is no cure) is based on clinical signs—the behaviour of the cat, along with pain scores and mobility scores, as reported by the owner.

Potential treatments (see Box 3), few of which are proven, are based on our limited understanding of the neuropathology. As for humans, it is thought that a combination of oxidative damage, vascular pathology, and compromised cerebrovascular blood flow contribute to the alterations seen in the brain. Stress, aging, disease, and environment are factors. The changes seen in the brain include atrophy of the cerebral cortex and basal ganglia, region-specific neuronal loss, increased ventricular size, vascular and perivascular changes, lipofuscin accumulation, beta-amyloid deposition, and tau hyperphosphorylation.

Appropriate environmental management, which is integrated into the accessibility changes all older cats need, can reduce the clinical impact. Before starting on drugs, supplements, and dietary changes, it is essential to encourage the owners to make key environmental changes for their elderly cats that greatly affect their quality of life. Owners can keep to one change at a time, to avoid exacerbating confusion and stress.

Any intervention needs to take into consideration both the cat and the owner. Elderly cats do not take oral medication well, nor do they readily accept supplements to their food. Dietary changes rarely go over well—older cats need to be fed what they prefer to maintain muscle and body condition score, and a diet change can exacerbate illness. Owners may not be able to give medications. Consider alternative medication routes, if applicable, such as transdermal or subcutaneous, which most cat owners manage very well. Determine which treatment will have priority—that is, what will make the most impact to the cat's life, given all the issues the cat is currently experiencing. How much can the cat and the owners tolerate? Treat the concurrent conditions first, especially osteoarthritis pain, hypertension, and kidney disease, with a focus on managing hydration, controlling nausea, maintaining normotension, and supplementing B_{12} in all older cats. Cure hyperthyroidism with radio-iodine therapy whenever possible.

When discussing treatments for FCDS, advise owners that there is little evidence for the treatments, this is trial-and-error, and be prepared for significant placebo effect or progression.

While the behaviour changes can be frustrating or upsetting for the owner, it helps both cat and owner when the behaviours are "rewarded" with understanding and love, rather than the cat being punished by being shouted at, ignored, or locked out of a room. Night-time vocalization, with the resulting sleep disruption, requires an understanding on the owner's part that the cat is asking for help. Management of vocalization is multi-factorial—give the love and attention, offer and provide additional food resources, provide warm comfortable beds, treat the pain, do the simple environmental changes, and in desperation, wear earplugs.

House-soiling—being unable to find or use the provided litterbox—may be simply solved by providing additional "hobble-in hobble-out" litterboxes or pee-pads, in the same room or space where the food, water, and sleeping area (with a heated bed) have been placed, as well as in other areas of the home. In this case, all potential medical issues, including osteoarthritis, must be considered when discussing litterbox accessibility with the owners. In my experience, there is no such thing as "everything being done," but it takes a fair amount of follow-up and individual problem-solving for the household to find an acceptable solution.

It is important that the VISHDAAL behavioural signs are not simply dismissed as FCDS. Each time there is a change, owners need to consider that their cat may have developed another manageable or curable illness. Older cats find veterinary visits stressful and painful. To encourage the owners of an older cat to consider the diagnostic workup and veterinary care, train yourself and your staff in cat-friendly and cat-gentle techniques, and show owners how to make the trips into the clinic more comfortable and less stressful for the cat. Follow-up assessments on home care, behaviour, pain management, and mobility scores can be done by phone, video, text, or email.

Discuss euthanasia trigger points with owners. They may not recognize that the endless pacing, head-pressing, or getting stuck for periods of time is a problem. Usually, the cat can be clinically well, if the concurrent medical issues are well managed, but the cognitive decline at the end can reduce quality of life to such a degree that euthanasia is the humane option. In discussing quality of life on the follow-ups, consider whether the cat is aware of their surroundings, or if their dementia has progressed so far as to put them in a bare survival mode. This is where a home visit or a video call is most useful, as it is very difficult to assess feline behaviour and cognitive function in the clinic.

An integrated veterinary approach that takes into consideration the medical issues, home, and relationships that surround the aging cat may significantly reduce the suffering many aging cats experience.

Increased **v**ocalization, especially at night.
Altered social **i**nteractions and relationships, either with owners or other pets. May be attention seeking, aggression, hiding/decreased sociability.
Altered **s**leeping patterns.
House-soiling.
Spatial **d**isorientation or confusion. Getting lost, trouble finding litter/food/water.
Temporal **d**isorientation. Forgetfulness—such as asking for food right after eating, decreased eating and drinking.
Altered **a**ctivity. Increased or decreased activity, pacing, wandering. Appetite changes. Repetitive behaviours. Decreased grooming.
Anxiety. Irritability, nervousness, hiding or remaining in one spot.
Altered **l**earning and memory. Being startled by objects they should be familiar with, loss of routine, trouble finding resources.

BOX 1: Common behavioural changes in aging cats. These symptoms are often described with the VISHDAAL acronym. (Adapted from Sordo and Gunn-Moore, 2021. See references.)

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Medical differentials
Pain—multitude of causes, many of which may not be immediately obvious
Osteoarthritis, degenerative joint disease, other musculoskeletal problems
Hypertension
Chronic kidney disease, urinary tract infections, urinary tract neoplasia
Hyperthyroidism
Diabetes mellitus
Gastrointestinal disease, including IBD, lymphoma, other neoplasia
Chronic liver disease, including biliary cystadenoma, cholangiohepatitis, pancreatitis, neoplasia
Central nervous system, including CVA/stroke, neoplasia, cognitive dysfunction syndrome
Infectious disease, including lung infections (parasitic, fungal, viral and bacterial)
Sensory loss—progressive or acute—vision, hearing, smell, whisker
Social, environmental, and emotional differentials
Attention-seeking or resource-seeking (inadequate attention or resources)
Acute frustration—inability to access desired resources
Chronic frustration—inability to perform species-specific behaviours
Socioenvironmental stress—change in environment, diet, owner routine; conflict with other cats; traumatic event; owner conflict
Generalized anxiety
Separation anxiety
Sound sensitivity
Grief—loss of a bonded cat, other pet, human

BOX 2: Common causes of altered behaviour in aging cats. (Adapted from Miele et al., 2020. See references.)

Dietary supplements	
S-adenosyl-l-methionine (SAMe)	Improved cognitive function in elderly cats, best given early in FCDS.
Antioxidant supplements	Either not trialled in cats or contain ingredients toxic to cats.
Melatonin, plug-pheromones, suntheanine, milk protein hydrolysate (Zylkene), essential oils, amino acid/herbal combinations	May help with sleep-wake cycles and reducing anxiety. Check ingredients for toxicity.
Commercial diets containing fish oils, antioxidants, arginine, B-vitamins, and other supplements such as l-tryptophan, milk protein hydrolysate, chondroprotectants	No specific diet designed for FCDS in cats, consider any supplemented mature cat formulation that the cat likes to eat.
Drugs	
Selegiline	All studies in dogs, off-label use with anecdotal positive effects.
Propentofylline	All studies in dogs, off-label use with anecdotal positive effects.
Antidepressants and anxiolytics—fluoxetine, trazodone, gabapentin, benzodiazepines, buspirone	Check drug interactions and contraindications. Have been used to treat clinical signs of FCDS in cats. Be prepared to discontinue, as sedative effects and other side effects may be undesirable.
Donepezil	Not tested in cats.
Telmisartan	Seems to benefit rats, study in cats in progress.

BOX 3: Non-environmental interventions for feline cognitive dysfunction syndrome. (Summarized and adapted from Sordo and Gunn-Moore, 2020. See references.)

FURTHER READING

- https://icatcare.org/advice/senility-dementia-or-cognitive-dysfunction-syndrome
- https://icatcare.org/advice/elderly-cats-special-considerations

To save space, the references for this article are made available on the Chapter's website at www.canadianveterinarians.net/sbcv/west-coast-veterinarian-magazine. WCV