



Compulsive Disorders in Dogs

Before understanding compulsive behaviors, one must have some understanding of how normal behavior is driven by our central nervous system. There have been several proposed ways of trying to understand how the CNS influences normal behavior. The approach discussed in these notes is the systems approach which is based on psychopharmacological models, human patients with brain disorders and animal models. The systems approach has an executive system which is subdivided into two subsystems, the contention scheduling system (CSS) and the supervisory attention system (SAS).

How the CNS influences normal behavior

The executive system is ultimately responsible for keeping a person or animal “on track”; therefore, an individual is able to accomplish tasks throughout the day without getting distracted yet is able to shift to a new task or plan if and when appropriate to do so. Within the executive system there are two subsystems that each serve its own purpose but needs the other system to work appropriately; hence the systems are complementary.

Contention Scheduling System

- The one subsystem, the contention scheduling system (CSS) is responsible for selecting and sequencing behavioral responses. For example, if someone wishes to pick up a glass from a table there are numerous ways to physically accomplish this task. The CSS, based in the basal ganglia, will select which movements can accomplish this task in the most efficient manner while also providing feedback inhibition once the task is completed so the movement is not inappropriately repeated. As the system chooses which movement(s) is most appropriate, it is also inhibiting all competing responses.

Supervisory Attention System

- The second subsystem, the supervisory attention system (SAS) is rooted in the prefrontal cortex and is responsible for sequencing and inhibiting abstract goals, abstract internal information, and cognitive attentional sets. For example, if one wants to go shopping, that individual must recall what items he is going shopping for and what shops he must go to get those products. On his way to the shops he must not be distracted by every

possible side road or exit. The SAS is responsible for allowing the individual to focus on the goal without being redirected by external cues (i.e. exits, other stores etc...). Another example of the SAS system at work is when an individual must choose between two items on a menu or when playing games such as poker where more abstract goals are involved. In order to carry out the goals of the SAS, whether it is picking up a new hand of cards, the menu, driving the car to the shops, the CSS system is needed to help carry out the physical movements involved.

Understanding how this results in Pathology

It is important to understand these systems and their neuroanatomical origins as this is key in trying to understand the underlying pathology/mechanisms associated with abnormally repeated behaviors. There are behaviors that are inappropriately repeated motor patterns with no apparent goals and behaviors that are inappropriately repeated goals. Pathology or disease in the basal ganglia systems which is where the CSS is rooted and responsible for initiating physical movement patterns is likely responsible for inappropriate repetitive motor patterns such as rocking back and forth, pacing, weaving, and other stereotypies. Pathology in the prefrontal cortex which is where the SAS is rooted and responsible for carrying out abstract goals likely results in goals being inappropriately repeated such as feather pulling in parrots, shadow chasing, spinning, flank sucking in dogs and other compulsive behaviors.

A Little History

In the early 1990's Luescher and colleagues claimed that many of the repetitive behaviors commonly assumed to be partial seizures may in fact be more similar to the stereotypic behaviors seen in farm and zoo animals. The National Institute of Health has recognized similarities with human obsessive compulsive disorders. More recently Leuscher and Mills have proposed that within the veterinary community, veterinarians need to use specific language to describe certain behaviors so there can be clear communication as to what behavior problem being observed actually is. This is important because veterinarians use names to diagnose problems and with that diagnosis, there is an implied underlying mechanism of disease. As with other diseases processes, different underlying mechanisms may indicate different treatment plans and or different prognoses. Leuscher and Mills are proposing that the term "stereotypic behavior" be used as an all encompassing descriptive term for any and all repetitive behaviors such as dermatitis is used to describe inflammation of the skin. Dermatitis does not imply the underlying cause of the problem but merely describes what the clinician sees. Under the umbrella term of stereotypic behavior should be the diagnoses of "stereotypy" and "compulsive".

Defining the Terms

Stereotypy refers to a motor pattern that is repeated inappropriately with no apparent function or goal. The behavior is invariant with each repetition. A **compulsive behavior** is defined as a goal that is repeated inappropriately. The behavior may be flexible and goal directed but with each repetition, but may become secondarily invariant so may mimic a stereotypy. There may be overlap between compulsive and stereotypy behaviors and it may not always be clear.

There are many potential causes for stereotypic behaviors including but not limited to stress, genetics, environment in which the animal was reared, conflict, frustration, and medical causes (viral, tumor, seizure). *More recently, the first genetic locus has been identified for any animal compulsive disorder.* This was found on chromosome 7 at the CDH2 region. This genetic study was done on a population of Dobermans who exhibited blanket sucking and flank sucking.

A working clinical definition of compulsive behaviors for our pets is as follows: a goal directed behavior that is originally associated with conflict or frustration, but subsequently is shown out of the initial context, and abnormal seeming because out of context, repetitive, exaggerated or sustained.

Compulsive behaviors can be categorized into different categories including locomotion, oral, aggression, vocalization, and hallucination. Different categories may have different presentation with respect to how quickly they start or in which contexts they start. Different categories are also likely to involve different neurobiological pathways. For example, locomotor behaviors typically start in one context and generalize to other contexts and are likely to involve the nigrostriatal dopaminergic system whereas oral compulsive behaviors tend to display suddenly without an identifiable cause and are applied at constant rates and likely involve mesolimbic dopaminergic systems.

There are breed dispositions for certain compulsive behaviors as noted in a chapter by Luescher and Mills:

- Doberman Flank-sucking/Blanket
- English Bull Terrier Spin in tight circles/head in objects
- Staffordshire Bull Terrier Spin in tight circles
- German Shepherd Tail chasing
- Australian Cattle Dog Tail Chasing
- Miniature Schnauzer Checking hind-end
- Border Collie Visual fixation (shadow staring)
- Large breed dogs Persistent licking
- Siamese/Burmese cat Wool sucking

Making a Diagnosis

Diagnosis is based upon a thorough behavioral history , physical exam, and video. Further work up will depend upon the behavior being shown and will therefore dictate which system (neurological, dermatological, gastrointestinal) to work up further if indicated.

The behavioral history should include: an early description of the behavior, a current description of the behavior, situations that may trigger the behavior, any unique behaviors or situations that occur prior to the behavior problem. The owner should be asked about their own behavior before and after the behavior problem, the frequency and duration of the behaviors, and the ease at which the animal can be distracted, age of onset, time and location of incidents and all treatment previously tried to help the problem.

Treatment

Treatment for compulsive behaviors may include psychopharmacological treatment, behavioral modification, and environmental modifications. Ideally during the treatment program, you should not allow the animal to practice the compulsive behavior. This may be accomplished by applying a head collar on the dog so the behavior can be gently interrupted and then the animal should be taught to perform a behavior that is incompatible with the compulsive behavior. For example, if the dog is a spinner he should be taught to “down” and “stay” and be rewarded for that. One must be careful when trying to interrupt a dog performing a compulsive behavior as some dogs may get frustrated when thwarted from their goal and aggress. A very rigid daily structure/routine should be implemented and all interactions between the dog and family members should be a response-command format.

Two medications, **clomipramine**, a tricyclic antidepressant, and **fluoxetine**, a selective serotonin reuptake inhibitor, have been studied for the use of compulsive behaviors in dogs. Both studies showed efficacious results. The goal is to wean the dog off of medications but without the owner implementing other aspects of the treatment plan, weaning may not be possible. **Not all dogs may need medication, for some, the other aspects of a treatment plan may be sufficient.** It is currently thought that the sooner the dog is treated for a compulsive behavior problem the better the dog’s chances are of being cured.

At any time one suspects a compulsive problem but is unsure if it is a compulsive behavior vs. a stereotypy vs. a medical problem, that dog should be referred to a veterinary behavior specialist and NOT a trainer.

Copyright 2010, Emily D. Levine DVM MRCVS Dipl. ACVB Fairfield NJ Reprinted here with permission. All rights reserved. May not be reproduced in whole or in part or distributed for other uses without permission from the author.