Animal Behavior Case of the Month

A cockatiel was examined because of repetitive chewing of the third digit of the right foot.

Signalment
The bird was a 3.5-year-old white female cockatiel (*Nymphicus hollandicus*).

History
The bird had been purchased from a pet store at 3 months of age. It had been hand-raised from the time it was a hatchling and was weaned at the time of purchase. The bird lived with a female owner, who was the bird’s primary caregiver, and the female owner’s husband, who was the bird’s secondary caregiver. The female owner worked at home, but traveled for a week each month. If both owners were away, their daughter cared for the bird. The bird was neither aggressive nor timid with family members and familiar individuals and was removed from its cage several times daily to interact with the female owner. However, no formal commands had been taught. The owners maintained a consistent daily schedule with the bird, including regularly scheduled meals, playtimes, naps, and time outdoors.

The bird’s enclosure was approximately 0.8 × 1 × 1.2 m and was kept in the owners’ bedroom at night and in a sunroom during the day. Perches with various textures were provided, along with a variety of plastic toys. The owners lived in a rural area near a lake, and the bird’s cage was placed outside on a deck twice weekly. The owners had noticed intense toe chewing when the bird was anxious, such as during visits to the veterinarian, but would occur in the absence of any obvious stress-inducing stimuli. The behavior was not dependent on the presence or absence of either owner. The owners had noticed intense toe chewing when the bird was in its cage outside on the deck and a hawk approached a nearby wild bird feeder. Intensity of the toe-chewing behavior also increased in response to certain loud unfamiliar noises from the television. The owners were able to temporarily disrupt the behavior by calling the bird’s name. They had tried distracting the bird, ignoring the behavior, moving the cage to different rooms, and verbally reprimanding the bird, but there had been no improvement. The bird engaged in the toe-chewing behavior approximately 50% of the time during the initial 3-hour behavior consultation. The bird appeared to be fully conscious during the behavior.

According to the owners, the behavior had first been noticed 4 months earlier, and several events were associated with the onset of the behavior: the male owner had been ill, the female owner had been traveling more than usual, and the bird had been treated for a respiratory tract infection. At that time, the bird had been examined by the referring veterinarian because of open-mouth breathing and clawing at its beak. Results of tests for *Aspergillus* spp and *Chlamydophila* spp infection were negative. Respiratory tract infection was suspected, and the bird was treated with enrofloxacin. The dyspnea resolved but recurred a month later, and a second course of enrofloxacin was given. The bird was examined by an avian practitioner a month after this because of the toe chewing. Oral examination performed by the avian practitioner while the bird was anesthetized did not reveal any abnormalities. Results of cytologic examination of fluid obtained by flushing the sinuses with saline (0.9% NaCl) solution were normal, and trimethoprim-sulfonamide (27 mg/kg [11.4 mg/lb], PO, q 12 h) was prescribed while results of bacterial culture of the fluid were pending. No abnormalities of the digit or foot were seen, and mild bacterial sinusitis was suspected. Results of a CBC were unremarkable, and blood zinc and lead concentrations were within reference limits.

*Staphylococcus epidermidis* susceptible to trimethoprim-sulfonamide was cultured from the sinus flush fluid, and antimicrobial treatment was continued for 14 days. During a recheck examination 2 weeks after treatment was discontinued, there was no evidence of sinusitis and sinus flush fluid was clear. The bird was referred for a behavior consultation because of the persistent toe chewing.

Physical Examination Findings and Laboratory Results
On initial examination during the behavior consultation, the bird weighed 95 g and was bright and
alert. There were no ocular or nasal discharges, and results of auscultation of the heart and air sacs were unremarkable. No plaques or ulcers were seen during oral examination. Cytologic examination of choanal swab specimens stained with Gram and modified Romanowsky stains did not reveal any abnormal yeast, bacteria, or fungi. The third toe of the right foot was hyperemic on the lateral surface, but no other skin lesions were seen, and there was no evidence of secondary infection. Results of cytologic examination of a cloacal swab specimen stained with Gram's stain and fecal flotation were unremarkable. Survey radiography did not reveal any abnormalities.

**Diagnosis**

Differential diagnoses that were considered included compulsive disorder, attention-seeking behavior, separation anxiety, acute conflict behavior, lack of environmental enrichment, and operant conditioning. Infectious, parasitic, and toxin-induced medical conditions were ruled out with appropriate laboratory tests. A veterinary dermatologist examined the bird and indicated that allergic and pruritic skin conditions were unlikely.

The behavior was repetitive, intentional, unvarying, and out of context, making compulsive disorder the most likely diagnosis. Acute conflict behavior was ruled out because the bird engaged in the behavior in the absence of stress-inducing stimuli. Separation anxiety and attention-seeking behavior may have been important factors in the development of the behavior because when the bird first began the behavior, it elicited substantial attention and concern from the female owner. However, the behavior did not currently appear to depend on these factors, as it occurred regardless of whether the owners were present or absent. The cause of the compulsive behavior was probably multifactorial, involving neurochemical changes, learning or owner reinforcement, and anxiety-induced displacement activity. The influence of the respiratory tract infection on the development of the behavior was unknown, but the infection could have contributed by increasing stress or directing attention to the oral cavity or sinuses.

There is no information regarding a genetic predisposition for compulsive behavior in this species; therefore, the role of genetics could not be determined. A species predisposition for compulsive disorders, such as self-mutilation and behavioral feather picking, has been reported for cockatoos, conures, and African gray parrots. Boredom (ie, a lack of environmental enrichment) has been implicated as a cause of stereotypic behaviors in captive and domestic animals. However, no environmental enrichment was deemed necessary for this bird, other than provision of chew toys.

**Treatment**

Since the female owner's job required her to travel, it was suggested that the male owner begin interacting more with the bird and assist with its care. The bird was to no longer be allowed visual access to wild birds and other potential predators and was to be taken outside in its cage only when directly supervised. The owners continued to provide the bird with a predictable environment and consistent pet-owner interactions. The bird was to be taught basic commands, such as step up, step down, stay, and come, with food or object rewards used on a continuous reinforcement schedule.

Toe chewing and other inappropriate behaviors were to be strictly ignored to avoid reinforcing these behaviors. Whenever a situation arose in which the bird was likely to engage in stereotypic behavior, it was directed to perform an alternate behavior that was incompatible with the stereotypic behavior (ie, response substitution or counter-conditioning). The bird was to be given 1 or 2 toys that provided targets for appropriate behavior, including a food-stuffed toy, alfalfa cubes, rawhides, a whiskbroom, and straws. These toys were to be rotated on a regular basis.

Desensitization to loud noises in combination with counter-conditioning was recommended. In essence, the bird was positively reinforced for playing or obeying commands while the sound level of disturbing noises was gradually increased. Rewards were to be given and exercises were to progress only if the bird remained calm.

The referring veterinarian had started treating the bird with fluoxetine prior to the initial behavior consultation. Because fluoxetine has been used successfully in other species for treatment of compulsive disorder, administration was continued at a dosage of 1 mg/kg (0.45 mg/lb), PO, every 24 hours. It was recommended that a serum biochemistry profile be performed before treatment was continued, and the owners were informed that this was an extralabel use. Although the pathophysiology of compulsive disorder is not well understood, an interaction between opioid receptors and dopaminergic and serotonergic neuron systems is suspected. Other medications that have been used for the treatment of compulsive disorders in psittacines are haloperidol, a dopamine antagonist; naloxone, a narcotic antagonist; and clomipramine, a serotonin-selective tricyclic antidepressant.

**Follow-up**

Two weeks after the initial consultation, the owners reported that the toe chewing had almost completely ceased, even though the female owner had been traveling much of this time. The owners had provided the recommended toys and were ignoring inappropriate behavior. They had not begun any training exercises yet.

One month later, the bird had completely stopped toe chewing and knew several commands. The male owner had become more involved in the bird's care, and the bird did not appear to be anxious when the female owner was away. After 3 months, the owners began to decrease the dosage of fluoxetine, and by 5 months, administration was discontinued.

---

**References**

3. Rosskopf WJ, Woerpel RW. Feather-picking and therapy of


