Training Birds and Small Mammals for Medical Behaviors

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INTRODUCTION

Operant conditioning with a focus on positive reinforcement is commonly used in zoos and aquariums to train zoo animals to perform a variety of behaviors on cue. These behaviors can be used to educate the public, facilitate daily husbandry tasks, enrich the animals' lives, and expedite medical care. At Point Defiance Zoo & Aquarium (PDZA), keepers in several different areas of the zoo have trained a myriad of medical behaviors. Articles published in conference proceedings and publications of the Animal Behavior Management Alliance, the International Association of Avian Trainers and Educators, and the American Association of Zoo Keepers, among other organizations, indicate they are not alone. The impetus to train animals to participate in their own medical care is to reduce stress for the animals, caretakers, and veterinarians and reduce the risk of injury. Training birds and small mammals to perform a variety of behaviors can result in improved preventative medicine regimens because they are easier to implement. Some medical behaviors take very little time to train, whereas others may take more time and effort.

KEYWORDS

- Operant conditioning
- Birds
- Small mammals
- Medical behavior
- Positive reinforcement
- Husbandry behavior

KEY POINTS

- Operant conditioning can be applied by animal caretakers to successfully train medical behaviors.
- Training birds and small mammals to perform behaviors that facilitate medical examinations can reduce stress for the animals, caretakers, and veterinarians and reduce the risk of injury.
- Training birds and small mammals to perform a variety of behaviors can result in improved preventative medicine regimens because they are easier to implement.
- Some medical behaviors take very little time to train, whereas others may take more time and effort.
research purposes, insight into the training of medical behaviors in a zoologic setting may provide inspiration or guidance for animal caretakers in many different fields.

Although the level of difficulty of training an animal to participate in its own medical care is related to the personal history and prior learning experience of both animal and trainer, some behaviors are generally easier to train than others. Medical behaviors can be divided into 3 categories: foundation behaviors, intermediate behaviors, and advanced behaviors.

- Foundation behaviors are those that are usually easy to train and are often useful in a variety of ways. They typically do not require a large time commitment to establish and can be maintained during routine husbandry. Examples include crate and scale training.
- Intermediate behaviors may require a longer amount of time to train. Once established, they are maintained by practicing the behavior regularly but less frequently than foundation behaviors. Examples include voluntarily participating in nail trimming and restraint procedures.
- Advanced behaviors may require a longer amount of time to train and may require a strong history of positive reinforcement to maintain the behavior. These behaviors often involve requiring the animal to endure a small amount of pain or discomfort. Examples include training an animal to accept an injection or masking for anesthesia without restraint.

**FOUNDATION BEHAVIORS**

**Kennel Training**

At the Wild Wonders Outdoor Theater (WWOT) at PDZA, nearly all of the animals are trained to enter and exit a kennel or crate. These animals are used in educational programs and need to be comfortable traveling in a kennel. Learning to calmly enter a kennel and stay there for a period of time has been relatively easy for most of the animals in the collection to learn. Kennel training can facilitate veterinary medicine in numerous ways. Crate training allows the following:

- Transport to the veterinarian
- Anesthesia in which the kennel acts as a chamber
- Anesthesia in which the kennel limits animal movement and allows for an injection
- Observation of the animal as it goes under and recovers from anesthesia
- Observation of the general physical condition of the animal

At WWOT, kennel training often begins the day an animal joins the collection. Kennel training is generally a combination of classical conditioning, in which the kennel is paired with preferred food items independent of the behavior of the animal, and operant conditioning, in which appropriate behavior by the animal is marked with a bridging stimulus and reinforced with preferred food items.

**Shaping Plan for Training an Animal to Enter a Kennel**

- Place the kennel in the enclosure. The kennel may be left outside of the enclosure if the animal exhibits any overt signs of discomfort with its presence. The door of the kennel is either closed, removed, or propped open so that it cannot accidentally trap the animal inside the kennel.
- Put part of the animal’s normal diet near the kennel. Offer additional pieces of food when the animal approaches the kennel.
- Put the normal diet in the front of the kennel.
• Put the normal diet in the back of the kennel.
• Touch the door while the animal is inside kennel. Whistle and offer a preferred food item from outside of the kennel.
• Close the kennel door part way. Open the door. Whistle and offer a preferred food item from outside of the kennel.
• Close the kennel door all the way. Open the door. Whistle and offer a preferred food item from outside of the kennel.
• Close the kennel door all the way. Wait a few seconds. Whistle and offer a preferred food item from outside of the kennel.
• Close the kennel door all the way. Increase the amount of time the animal spends inside of the kennel before it is reinforced.
• Touch the outside of the kennel while the animal is inside. Whistle and offer a preferred food item from outside of the kennel.
• Move the kennel a short distance. Whistle and offer a preferred food item from outside of the kennel.
• Move the kennel a longer distance. Whistle and offer a preferred food item from outside of the kennel.

After enough repetitions, the behavior will become fluent. Smaller approximations and/or changing the arrangement can be used for animals that show a fear response to the kennel. For example, a trainer may take the door off the kennel or even take off the top of the kennel. Different styles of kennels may be used. Making the kennel more appealing by using different substrates or changing its color may also help.

Scale Training

Scale training is another behavior that is generally easy to train an animal to do. Training strategies may vary because animals and scales come in many different shapes and sizes. A scale fitted with a t-perch can be used for birds (Fig. 1), whereas a flat perch can accommodate an animal trained to stand directly on it (Fig. 2) or while in a crate (Fig. 3). Some scales are specially designed to accommodate larger birds (Fig. 4).

Scale training is particularly important for birds. Bird body condition is difficult to visually evaluate. Many species of birds are adept at hiding signs of illness, and a drop in weight is often the first observable indication of a potential health problem.

Scale training is a variation on stationing or targeting. A tawny frogmouth (Podargus strigoides) was trained to stand on a scale after more than 15 years of being caught and placed in a cardboard box to be weighed. Instead of grabbing the bird (which was very comfortable around humans), the trainer put a hand up to the bird’s feet and touched them gently. The bird responded by lifting a foot and placing it on the hand. By slowly lifting her hand upward, the trainer encouraged the bird to step entirely onto her hand. Desired food items were offered to the bird when it stood calmly on the hand. The bird quickly learned to step onto the hand to receive the preferred food items. The trainer was then able to place the bird on a t-perch on a scale and get an accurate weight with no stress to the bird or the trainer.
For larger birds and mammals, a scale with a flat surface is often used. An Abyssinian ground hornbill (*Bucorvus abyssinicus*) was trained to step onto any perch that the trainer pointed to in its enclosure (Fig. 5). The perches in the enclosure were changed regularly. The bird learned to step onto short stumps, tall stumps, large polyvinyl chloride tubes with flat tops, and many different branches. Because the bird was trained to station on many different types of objects, stepping onto a flat scale was not a difficult transition, even though it had a shiny metal surface and provided less traction than the normal stations.
INTERMEDIATE BEHAVIORS

Training an animal to stand on a scale or enter a kennel can be valuable. These two behaviors enhance husbandry and medical care and are generally easy to train. However, there are some behaviors that are more involved but still worth the investment of time.

Voluntary Nail Trims

Many types of animals are frequently brought to the veterinarian to have nails trimmed. Often the animal has to be restrained. The nails may have overgrown, which may make it difficult to avoid cutting into the quick. The animal may show fear responses or aggressive behavior in response to the procedure. The potential stress associated with this can be avoided by training the animal to allow its nails to be trimmed without restraint.

A North American porcupine (*Erethizon dorsatum*) was trained to allow its nails to be trimmed (Fig. 6). The porcupine was already trained to target, walk from point A to point B across a stage, go into a kennel, and participate in walks on zoo grounds. The animal had a long history of positive-reinforcement training with its trainers. This history facilitated training the animal to allow nail trimming without restraint.

Shaping plan for training a porcupine to allow nail trimming

- Introduce the nail trim station. The nail trim station includes a high bar and a low bar. The high bar is for the placement of the front feet. The low bar is for the placement of the back feet.
Bridge and offer a preferred food item for approaching the nail trim station.

Bridge and offer a preferred food item for putting the front feet on the top bar. Because the porcupine frequently stood on its hind legs to receive food items, the posture was easily captured.

Bridge and offer a preferred food item for lowering the hindquarters while the front feet remain on the top bar.

Bridge and offer a preferred food item for moving the hind feet toward the bottom bar while the front feet remain on the top bar.

Fig. 4. A king vulture (*Sarcoramphus papa*) stands on a large bird scale. (Courtesy of Karen Povey.)

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**Fig. 5. (A, B)** An Abyssinian ground hornbill stands on a variety of stations including a flat mat and a step stool. (Courtesy of Karen Povey.)
Bridge and offer a preferred food item for all 4 feet on the appropriate bars.

Touch the nail with nail clippers. Bridge and offer a preferred food item for maintaining the position. Trim the tip of the nail. Bridge and offer a preferred food item for maintaining the position.

Trim multiple nails. Bridge and offer a preferred food item for maintaining the position.

Several training challenges were presented. The first was that the porcupine showed more sensitivity about its right front paw being manipulated than the rest of its feet. The animal tended to hold food in that foot. Extra time was required to desensitize that foot to touching. The second occurred when the trainer cut into the quick of one of the nails. Fortunately, this did not occur during the initial stages of training. The nail bled and had to be cauterized to stop the bleeding. The behavior was reestablished after a few weeks of retraining. The long positive-reinforcement history with nail trimming helped the trainers quickly recover the behavior.

**Allowing Manual Restraint**

Many species of birds are restrained for medical behaviors. A towel or sheet is placed over a bird’s head and body. The head and body are firmly held. For raptors that are trained and handled for educational programs, toweling is often done while the bird is standing on the glove. Other birds may be captured in midflight or while they are standing on a perch or the ground. This maneuver often requires dexterity and good spatial skills on the part of the handler. Training a bird to maintain position and allow a towel to be wrapped around its body results in an efficient, effective, and less stressful restraint process. At PDZA, a green-wing macaw (*Ara chloroptera*) was trained to allow toweling while standing on a perch (**Fig. 7**).
Shaping plan for training a parrot to allow restraint in a towel

- Present the towel in front of the bird that is stationed on a perch. Bridge and offer a preferred food item for touching the towel with its beak. (At PDZA, the bird had been previously trained to target with its beak. It was a simple transition from touching a target with the beak to touching the towel.)
- Hold the towel between the bird and the trainer so that the towel is just above the level of the bird’s eyes. Offer the bird a preferred food item. Position the presentation of the food item so the top of the towel brushes the bird’s head as it reaches for the treat.
- Lower the towel so that the towel blocks the line of sight between the trainer and the bird. Bridge and offer a preferred food item when the bird pushes its beak underneath the towel toward the trainer or target. Lower the towel so that the bird must duck its head underneath to orient toward the trainer or target. Allow the towel to slide down the bird’s neck. Bridge and offer a preferred food item.
- Allow the towel to rest lightly on the bird’s back for several seconds. Bridge, remove the towel, and offer a preferred food item.
- While the towel rests on the bird’s back, slowly fold the sides in front of its chest. Bridge, remove the towel, and offer a preferred food item for maintaining the position.
- With the towel completely around the bird, the trainer gently presses on one wing. Bridge, remove the towel, and offer a preferred food item for maintaining the position.
- With the towel completely around the bird, the trainer gently presses on both wings. Bridge, remove the towel, and offer a preferred food item for maintaining the position.
- Wrap the bird in the towel, wrap the towel around the wings and the back of the head, and lift up gently. Stop before the bird shows any signs of discomfort. Bridge, lower the bird back onto the perch, remove towel, and offer a preferred food item for maintaining the position.
- Wrap the bird in the towel, position hands around the wings and the back of the head, and lift up gently until the bird lets go of the perch with its feet (Fig. 8). Stop before the bird shows any signs of discomfort. Bridge, lower the bird back onto the perch, remove the towel, and offer a preferred food item for calm behavior.

Fig. 7. A green-wing macaw (Ara chloroptera) allows a towel to be put around its body while standing on a perch. (Courtesy of Maureen O’Keefe.)
Advanced behaviors may take more time to establish and may be difficult to maintain because they often involve an element of discomfort. Because of this, trainers may want to evaluate if training these types of behaviors is an effective use of time. If an animal has to undergo medical procedures on a regular basis, it might be reasonable to train it to cooperate in the procedure. If the animal is healthy and only needs infrequent medical attention, it may not be practical to spend time training advanced behaviors. Each situation should be evaluated based on the veterinary needs of the animal and the amount of time and number of staff available to train. If an animal has a solid history of learning behaviors through positive reinforcement, advanced behaviors may be easily trained and may be useful for medical care.

**Stand for Injection**

Many animals have been conditioned to stand calmly and maintain a position for an injection at WWOT. For some, this is an extension of a station behavior. For others, it is something that the animal allows because of its long-term relationship with the caretaker. A Canada lynx (*Lynx canadensis*) at WWOT requires subcutaneous injections twice monthly. The animal has been handled on a daily basis in its role as a program animal since it was several weeks old. The lynx allows its handlers to administer the injection either while lying in the bottom half of a kennel filled with straw in its enclosure or while out on walks around the zoo grounds. The animal does not respond to food as a reinforcer but it is receptive to companionship and attention from staff members. This attention is paired with injections and has allowed staff members to provide the animal’s treatment without restraint. Similarly, a clouded leopard (*Neofelis nebulosa*) allows staff to give the animal an intramuscular injection to anesthetize the leopard for its annual physical examination. Staff members can enter the enclosure to administer the injection. One staff member uses gentle touching to reinforce calm behavior. During touching, the trainer can gently scruff the animal’s neck to momentarily restrict movement. The other staff member then gives the injection in the animal’s flank. The cat is permitted to walk away through a shift door into another enclosure, which allows staff members to safely exit the enclosure.
Some staff members do not have a relationship that allows them to enter the enclosure. They have been successful giving the cat an injection through the mesh of the enclosure. When the cat approaches the mesh, one staff member scratches the animal on the head. This practice usually results in the cat pressing its body against the fence, allowing the second staff member to give the injection in the flank.

Training an animal to stand for an injection can also be done with animals that do not have comfortable relationships with their trainers. Using a barrier and shaping the behavior with small approximations can result in a successful injection procedure for small cats. Depending on the animal’s comfort level, a barrier may not be required. Trainers will want to evaluate the animal and the environment to determine the safest option to successfully train the behavior.

**Shaping plan for training an animal to maintain position for an injection**

- Train the animal to go to a station.
- Give the cue to go to the station and then touch the animal on the part of the body that will receive the injection. Bridge and offer a preferred food item for maintaining the position and for calm behavior.
- Give the cue to go to the station and then touch the animal with a capped syringe. Bridge and offer a preferred food item for maintaining the position and for calm behavior.
- Give the cue to go to the station and then touch the animal with a syringe with the blunted needle tip. Bridge and offer a preferred food item for maintaining the position and for calm behavior.
- Give the cue to go to the station and then touch the animal with the regular needle tip. Bridge and offer many preferred food items for maintaining the position and for calm behavior.
- Give the cue to go to the station and then give the injection. Bridge and offer many preferred food items for maintaining the position and for calm behavior. If this is an injection for anesthesia, noningestible reinforcers may be required, such as tactile or enrichment items.
- Most training sessions should not involve actually inserting the needle, even after that step has been reached. Regular sessions whereby the animal only feels the blunt needle tip will help maintain the behavior.

Many animals respond well to adding another signal just before touching with the needle. A word like pinch or touch can indicate that the injection is about to happen. The animal can then choose to move away and not participate or stand still to receive the available reinforcers.

**Voluntary Anesthesia**

Some animals can be trained to allow a mask to be placed over the face for anesthesia. The green-wing macaw (*Ara chloroptera*) at WWOT that was trained to be towed was also trained to place its head into a mask for anesthesia (Fig. 9).

**Shaping plan to train a parrot to participate in masking for anesthesia**

- Show the mask to the parrot. When the parrot touches it with its beak, bridge and offer a preferred food item.
- Hold the mask with the open side toward the parrot. Bridge and offer a preferred food item when the parrot touches the inside of the mask with its beak.
Place a plastic bag over the mask. Fold it back to allow a small part of it to protrude beyond the mask. Bridge and offer a preferred food item when the parrot touches the inside of the mask with its beak.

Unroll the plastic bag to allow it to protrude farther beyond the mask. Bridge and offer a preferred food item when the parrot touches the inside of the mask with its beak.

When the parrot has its head inside the mask with the plastic bag around its neck, touch the back of the neck or head gently. Bridge, remove the mask, and offer a preferred food item.

When the parrot has its head inside the mask with the plastic bag around its neck, tighten the plastic bag around the neck and/or back so that the bag will not leak. Hold the wings against the body. Bridge, remove the mask, and offer a preferred food item.

When the parrot has its head inside the mask with the plastic bag around its neck, introduce a second person to work around the parrot to simulate turning on the anesthesia. Bridge, remove the mask, and offer a preferred food item.

When the parrot has its head inside the mask with the plastic bag around its neck, turn on a small amount of oxygen. Bridge, remove the mask, and offer a preferred food item.

When the parrot has its head inside the mask with the plastic bag around its neck, introduce the anesthetic gas. Hold the wings against the bird’s body and support the back of the head while the anesthesia takes effect.

At PDZA, the green-wing macaw trained for the procedure would sit comfortably wrapped in a towel and place its head into the anesthesia mask. The towel was added to this procedure because training with the anesthetic agent was infrequent. In the event that the bird showed discomfort with the procedure, the towel allowed the trainer to securely hold the parrot as the gas started to take effect.

**MEDICAL BEHAVIORS IN LITERATURE**

A review of conference proceedings and articles from animal care professional organizations shows that a wide variety of behaviors can be trained in an even wider variety of animals Table 1.
A wide variety of captive animals can benefit from being trained to participate in their own medical care. Operant conditioning is a powerful tool for animal care takers because it allows a complex medical behavior to be broken down into simple steps that can then be reinforced. Operant conditioning works for any desired behavior, whether it is jumping through a hoop, vocalizing on cue, or standing for an injection. From standing on a scale to allowing a blood draw without restraint, medical behaviors are within reach. With a long enough reinforcement history, cooperating in medical care can be as stress free to present as any other trained behaviors in an animal’s repertoire.

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