

# OPERANT CONDITIONING OF APES TO FACILITATE MEDICAL PROCEDURES AND IMMOBILIZATIONS

Dodi Seiver,<sup>1</sup> Pattie Walsh,<sup>1</sup> Barb Weber,<sup>1</sup> and Marty MacPhee<sup>1</sup>

## INTRODUCTION

Operant conditioning is a key tool used in the management of the apes at Disney's Animal Kingdom. The primate team, under the direction of the Curator of Behavioral Husbandry, Marty MacPhee, has developed a training program that is currently being applied daily. Through the process of developing, conditioning, shaping and maintaining behaviors, the primate team, working with the veterinarian staff, has been able to successfully facilitate several medical procedures and immobilizations in a noninvasive, less stressful way. Our operant conditioning program requires a strong commitment from the keepers as well as cooperation and support from staff members, management and the veterinarians. These factors are key to maintaining the success of our program.

To reduce the stress of a physical or chemical restraint, many primates can be trained for routine medical procedures. The animal care staff has incorporated training into the daily routine with favorable results and minimal time. Practice and repetition of conditioned husbandry behaviors will increase the success of achieving the goal when needed. It also allows the animal time to desensitize itself to the elements of a medical procedure or immobilization through the introduction of unfamiliar props or medical equipment, staff members, observers and veterinary staff.

An understanding of the animals' behavior and biological limitations governs the approach a trainer can select. Keeping in mind the animals history and past experiences with animal care staff and veterinarians, the trainer should adapt to each animal's individuality. Positive reinforcement is a successful method used in our training program to modify and shape the animals' behavior. Successful approximation steps towards a behavioral goal aid in easing the animal and the trainer through challenging, more difficult behaviors.

A husbandry training program provides all the members of the animal care staff an educational opportunity to learn and better understand the animal's physiological and psychological well being so they can be better managed within an *ex situ* setting. Institutions should strive to work as a team with all personnel to develop a program to monitor the condition of the animals (National Research Council 1998).

## TRAINING APPROXIMATIONS

When beginning to train any new behavior, the animal keeper will use steps or approximations to begin, develop, shape and maintain the desired behavior. First, the animal keeper will prepare and submit a form indicating the particular individual that will be trained, the desired behavior that will be trained and all the approximated steps to reach the behavioral goal. They will then begin training the animal, using the approximation steps created. For example, the behavior of *injection* begins with conditioning the animal to present a desired injection site such as the thigh, shoulder or posterior. Once this behavior has been established and is being offered consistently by the animal, an empty syringe is introduced into the

process. The animal, once comfortable with the new prop, is asked to tolerate being touched by the syringe at the desired injection site. A capped needle is then added to the syringe and the animal is again asked to tolerate the prop at the injection site. Once this step is established, the needle may be uncapped and again placed at the desired injection site. The next step is to deliver a prick from the needle to the outer layer of the skin. After this step has been established and is offered consistently, a small amount of sterile saline solution can be injected. The saline amount may slowly increase over a period of training sessions to the appropriate amount of liquid necessary for the animal to be vaccinated or anesthetized.

As this example is only an approximation, the progress to reach the desirable goal can vary depending upon the particular individual being trained, the difficulty of the behavior, unpredictable external factors, the trainers experience or even time constraints. These steps are simply a premeditated guideline and may proceed as originally written, be changed, rearranged, simplified or even passed over to reach the final behavioral goal. This entire process can span various amounts of time to achieve a single behavior. Once a desired behavior is obtained it is then shaped to the proper cue and criteria and props may be introduced (see Table 1 on pages 106-107). Once the animal is offering the behavior consistently without hesitation, it is then placed in a maintenance mode and should be retrievable by someone other than a primary trainer. A behavior is in maintenance when it is being offered correctly and consistently without hesitation by the animal. Certain behaviors may be of more urgency than others and should be trained accordingly. However, behaviors more easily attainable and of less difficulty should be the base of training until the animal and the trainer are comfortable with the training process and each other.

## TRAINING TO FACILITATE MEDICAL PROCEDURES

The primate team has specific cues and criteria for the training behaviors used in facilitating medical procedures and immobilizations. These behaviors are conditioned, applied and maintained daily. They are developed to allow the staff to view and manipulate various body parts, administer medications, collect weights and urine samples, body temperatures and more. They not only assist in facilitating medical procedures but also offer preventative health measures for the animals on a daily basis. Procedures that reduce the reliance on forced restraint and reduce invasiveness are less stressful for the animals, the staff, safer for both and generally more efficient (National Research Council 1998).

The primate team conditions the animals to behaviors and procedures during daily training sessions lasting approximately 10-15 minutes. In these training sessions, the animals are asked to offer maintenance behaviors, develop new behaviors or have innovative sessions. Innovative sessions allow the animal to choose behaviors to present to the keeper during the session. The trainer is able to ac-

<sup>1</sup>Disney's Animal Kingdom, Lake Buena Vista, Florida



cess key points all over the animal's body from which to check for any abnormal signs, cuts, swellings or symptoms of concern. Once a desired behavior is in a maintenance mode, props can be slowly introduced into daily training. Props such as a syringe, stethoscope, toothbrush, gauze and tongue depressor are essential in a training program. They enable the trainer to safely examine an animal while giving the animal time to familiarize and desensitize itself to medical equipment that may be used in any procedure. Training with these props will assist in the animal's comfort and trust levels with the trainer and enable the desired goal to be attained. Prior to undergoing a medical procedure or immobilization, the animal should be comfortable with the trainer and the props in order to attain the behavioral goals necessary.

To help decrease the stress and tension among the individual and the group, the primate team has created mock medical situations. In these sessions, a designated animal and keeper are placed in a mock situation to resolve. The situation may range from a simple wound needing a topical ointment to a more serious situation such as an emergency separation of an individual from the group. Mock situations are extremely helpful by creating a more realistic situation for the keepers as well as reaction from the animals. They develop problem-solving techniques and solutions to assist in facilitating actual medical procedures if and when they may arise. They also aid in reducing the predictability of the sessions from day to day. Through the use of these pro-active training sessions, we have been successful in facilitating many medical procedures.

Administering medications to an animal when necessary can sometimes be a trying task. Abruptly offering a food item or reward may be cause for suspicion by the individual or the group, resulting in reluctance to accept the medicine. By offering a hand fed item or liquid on a daily, routine basis to each individual, animals become accustomed to this practice. It enables medicine to be added, if necessary, without causing alarm to the individual or the group as well as promoting a cooperative feeding situation among the group.

Injection training has not only assisted the primate team in facilitating immobilizations but has enabled infant vaccinations to be delivered to two of our infant western lowland gorillas (*Gorilla gorilla gorilla*). The vaccinations were delivered during daily training sessions after conditioning the infants and the parents over a period of time and building a bond of trust. Through the use of the training program, anesthesia was not necessary for the parents or the infants. The vaccinations were delivered in a comfortable, cooperative situation without incident or stress to the family unit. As well, it is a means of taking a proactive approach to an inevitable medical procedure with results that clearly benefit the animals. The use of injection training has also been successful with our white-cheeked gibbons (*Hylobates leucogenys*).

As a means to avoid a hand-rearing situation, operant conditioning played a key role in a particular incident involving one of our adult female western lowland gorillas. This female had a history of exhibiting undesirable behaviors of maternal care with previous infants. With the training program established and hand-rearing being a last resort, the female gorilla was coached over a period of time by the trainers to exhibit appropriate and desirable behaviors of maternal care through positive reinforcement. The training was a success and the infant was able to remain with the mother in the family unit. The mother since has exhibited great maternal skill on her own and the infant is developing in a social environment necessary for proper development and mental well being.

A recent injury involving one of our juvenile western lowland gorillas enabled us to facilitate another medical procedure using the

conditioning process. The juvenile had sustained an injury to his hand and it was unclear how extensive the damage was. With the use of a portable x-ray machine, the juvenile's knowledge and cooperation of the conditioning process and the staff's dedication and determination, we were able to successfully retrieve a radiograph of the injured hand without the use of anesthesia. The procedure was facilitated and achieved with the cooperation of the juvenile and the group in a familiar, safe environment. Over a period of training sessions we were able to obtain a radiograph of the hand, which had sustained only minor injuries. Without the use of the conditioning process, an immobilization was inevitable.

### FACILITATE IMMOBILIZATIONS

The primate team, working along with the veterinarian staff, has facilitated immobilizations through the use of conditioned and maintained behaviors. Two different styles of delivery for immobilizations are used—oral and hand injection. Oral immobilizations involve the trainer conditioning the animal to consume various types and amounts of liquid delivered orally via syringe. The oral anesthesia is then added to a syringe prior to an immobilization and the desired behavior is retrieved. Injections are delivered to designated areas such as the posterior, shoulder or thigh. Through training the animal will become desensitized to the injection process and the behavior can be retrieved when needed. Conditioning the animal to voluntarily enter a crate is another means useful in the immobilization procedure. When facilitating an immobilization, the animal is first hand fed an oral sedative while the group is given a placebo food source. Then, a routine conditioning session will occur with the group. The animal to be anesthetized is asked to voluntarily separate from the group into a room and allow all the doors to be closed. The behavior of separation should be in a maintenance mode prior to the actual immobilization. Until this point, the group remains together, which in turn reduces stress and allows the individuals a degree of control in the procedure. The ape will then be asked to offer the behavior for an injection or oral immobilization. The entire process, having been assimilated and implemented in training sessions, is achievable and of somewhat routine to the animal. Once the chemical is delivered, the veterinary staff is notified and the group conditioning session ends. The group is given access to the habitat while veterinary staff carries out the medical procedure.

### CONCLUSION

There are many benefits of using operant conditioning to facilitate medical procedures and immobilizations. Most importantly, the animals benefit directly from an established program, while the animal care staff and the veterinary staff benefit as well. Everyone involved experiences a reduction in stress during procedures through a facilitated, routine conditioning process. The animals acquire a strong relationship with the keepers and the veterinary staff. Minor medical procedures can be accomplished in the animals' environment without causing a disruption in the group. Through daily training sessions, the animals are observed thoroughly and preventative measures are taken to provide the best animal care possible. Training sessions are also used to break up an animal's daily routine and provide environmental enrichment necessary for their psychological well-being. It is important to be aware that social interactions with familiar human caregivers can have marked positive effects (Baker 1997) and, conversely, that an animal can behave quite differently, even somewhat abnormally, toward unfamiliar persons (Chamove et al. 1998; Miller et al. 1986). The veterinary staff

and the animal care staff develop a stronger relationship with each other as well as with the animals. This relationship in turn provides an educational opportunity for both to learn more about the responsibilities each have.

In many cases this conditioning process eliminates the need to anesthetize an animal for a procedure that may only last a few seconds. It reduces the time required to take a sample, reduces the pharmacological restraint agents, and more important, gives the animal a degree of control over the situation (National Research Council 1998).

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## References

- Baker, K.C. 1997. Human interactions as enrichment for captive chimpanzees: A preliminary report. *Am J Primatol* 42:92 (Abstract).
- Chamove, A.S., G.R. Hosey, and P. Schaetzel. 1998. Visitors excite primates in zoos. *Zoo Biol* 7:359-369.
- Miller, L.C., K.A. Bard, C.J. Juno, and R.D. Nadler. 1986. Behavioral responsiveness of young chimpanzees (*Pan troglodytes*) to a novel environment. *Folia Primatol* 47:128-142.
- National Research Council. The psychological well-being of non-human primates. National Academy Press. 1998.