Ultrasound Training of Black Rhinoceros (*Diceros bicornis*) at Disney's Animal Kingdom

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At Disney's Animal Kingdom (DAK), training is as fully integrated into our black rhinoceros management program as other basic husbandry practices such as exhibit cleaning and maintenance, diet presentation, and behavioral observation. Our training program is designed to comply with AZA standards for rhinoceros management and to meet our husbandry and propagation goals. The focus of the training program is using operant conditioning techniques to train routine husbandry behaviors and facilitate veterinary procedures. One procedure important to our management program is performing transrectal ultrasonography on non-anesthetized animals. Using ultrasound to assess reproductive function in rhino species may be considered to be a critical component to any captive breeding program. It is possible to visualize and measure all critical components of both the female and male reproductive tract, providing an accurate reproductive profile. Assessments of reproductive health, sexual maturity, and pregnancy can be verified immediately, and monitored over time.

DAK currently houses 3.2 Black rhinoceros. Our three males are aged 12 years, 5 years, and 6 months. Our two females are aged 8 years and 5 years. All animals participate in the training program, and ultimately all rhino will be trained for the ultrasound procedure. This presentation will focus on the training of our 8-year old female, Kit, who is the first animal with whom we achieved this goal.

Each team within Disney's Animal Kingdom organizes their training program based upon the most effective method of achieving their husbandry goals. These goals are determined collectively by the entire animal management team, which includes keepers, managers, curators, and veterinarians. For the

black rhino, the veterinarians compiled a list of requested procedures. Then, with input from managers and keepers, this list was further prioritized for each animal. This individualized list was based upon the animal's health history, current training status, and the specific desired goals for that animal. It then became the responsibility of the keepers to achieve progress toward those goals, with assistance from the managers and veterinary staff as required.

The Ituri Forest team, responsible for the black rhino, assigns each animal a training team composed of three members, one of who is designated as team coordinator. Each member of the team has a clearly defined role, and the team coordinator is responsible for overseeing all issues related to the training of their animal.

All rhino are expected to first learn basic body positioning behaviors, such as "Come", "Target", "Steady", "Back", and "Over". These behaviors are critical to the success of many veterinary procedures, such as blood and temperature collection, annual vaccinations, and of course, ultrasounds. These behaviors allow us greater flexibility in working with the rhino, as we are able to perform procedures either in the stall or in the adjustable restraint chute. Without these behaviors, positioning the animal in the stall for safe access to them is much more difficult. Training our rhino to perform these behaviors allows us to easily and quickly accomplish many routine husbandry procedures in the stalls.

Although we have a restraint chute in the black rhino barn, the decision was made to begin training Kit for the ultrasound procedure in the stall. This was due to minor modifications necessary before the chute could be successfully utilized, and a belief that she would willingly participate in the training without being restrained. This would not have been possible without Kit knowing the basic body-positioning behaviors described earlier.

The training for the ultrasound procedure incorporated three elements: ensuring the rhino was capable of reliably performing each of these body positioning

behaviors, rectal desensitization for the sensations felt during the procedure, and environmental desensitization for the atmospheric stimuli experienced during the procedures. At the time training for this procedure began, this animal was reliable on the positioning behaviors "Come", "Target", "Steady", and "Back". The behavior "Over" was in the process of being shaped, with Kit stepping to her right when cued, and learning how to step to her left on cue. Progress on this behavior continued while rectal desensitization training began. The animal was reliably performing this behavior, stepping in either direction on cue, by the time the first ultrasound was attempted.

Rectal desensitization approximations included: tactile around the rectum, holding and manipulating the tail, application of ultrasound gel, progressive insertion of the arm up to the shoulder, repositioning of the arm, hand movement, withdrawal of feces, and pressure applied with the hand. The first two approximations were trained by the entire training team. The training of the remaining approximations was restricted to our veterinarian advisor and the training team coordinator, who received instruction on the appropriate methodology. This restriction was necessary to insure consistency with the progression of sensations the animal would be feeling, as well as concern that only specially trained individuals would be allowed to participate in this type of invasive procedure.

Environmental desensitization included: increasing the number of people present during sessions, increasing the number of people directly behind the rhino, increasing noise levels during sessions, increasing the amount of equipment present during sessions, and increasing the movement of people and equipment around the rhino while she maintained her body position. It was imperative that the rhino maintain a strong focus on the trainer in the midst of these distractions, and additionally that she remain stationary and focused for a duration of approximately 30 minutes.

It was decided by the veterinarian and the training team that desensitization of

the ultrasound probe would be accomplished by the veterinarian performing the actual procedure. This was due to the difficulty of finding a suitable substitution for the head of the probe, the desire to avoid using the expensive equipment itself, and the possibility of losing or damaging the equipment during the desensitization process.

Throughout the entire training process, the veterinarian advisor frequently attended training sessions. This enabled the vet to assess the animal's progress, and advise the team on adjustments that would more accurately simulate sensations experienced by the animal during the procedure. Additionally, frequent attendance of training sessions enabled the veterinarian to familiarize herself with the behavioral idiosyncrasies of the animal, and plan for how to accommodate them during the procedure.

As training progressed, it became necessary to adjust our training to accommodate challenges we had not anticipated. For example, an unforeseen necessity was training the rhino to accept warm water enemas. We found it necessary to do multiple enemas prior to the procedure. The initial enema was used to clean the rectum of fecal matter. To obtain a clearer picture, a final enema was done immediately before the procedure to provide a better medium for transmission of the ultrasound waves. Approximations for the enema included: moving the hose in close proximity to the animal, running the water behind the animal, shallow insertion of the hose with the water off, deeper penetration of the hose with no water, and finally, insertion of the hose and running the water. Training for the enema proved relatively easy. Our biggest challenge was keeping the animal in a steady position with the sound of running water behind her. Our rhino are given baths as enrichment, and are not required to be under stimulus control at that time. When enema desensitization began, Kit would anticipate a bath at the sound of the water, and attempt to move out of position.

The first few ultrasound attempts yielded valuable information about how to improve upon our process. Adjusting the temperature of the water before each enema facilitated Kit's acceptance of them. In between enemas, the water in the hose cooled down. This seemed uncomfortable for the rhino, as she was more likely to move out of position unless we adjusted the temperature. We were able to conduct enemas much more easily with a water temperature similar to the body temperature of the animal. We learned that performing the ultrasound within one half hour of an enema was necessary, as a longer period of time would require an additional cleansing enema. Finally, stationing a second person at the animal's hip became an important factor in easing communication between the trainer and the veterinarian. Communication between these two individuals was critical, with the vet alerting the trainer to upcoming movements and sensations the animal would be feeling, and the trainer providing information to the veterinarian on Kit's attitude and cooperation level. This detailed communication allowed us to maximize the success of each ultrasound.

It is difficult to approximate a time frame for the entire training process for this procedure. On average, our rhinos are trained for approximately 15 minutes twice a day, or a total of 3.5 hours per week. However, training for the ultrasound procedure did not preclude training for other procedures or behaviors, or preclude routine husbandry practices such as blood collection. In other words, no additional time was allotted to train for this procedure; the time spent training for the ultrasound was incorporated into our regular training schedule. Although the body positioning behaviors were critical to the success of the procedure, as mentioned earlier, the majority of these behaviors were reliable by the time we began the desensitization process. With regard to rectal and environmental desensitization, training began in April of 1999, and our first ultrasound attempts began six months later in October 1999. Enema desensitization began in January 2000, and we considered the entire ultrasound procedure reliable by April 2000.

The ultrasound procedure has been a tremendously useful management tool for us. We were able to confirm and monitor Kit's first pregnancy, and have, since parturition, been able to view and monitor an intrauterine mass, and observe evidence of renewed estrus cycles. To date, we have performed approximately two dozen ultrasounds on Kit. We have conducted them as frequently as once a week, or as infrequently as once every two months. No additional training has proven necessary to maintain her cooperation with this procedure. Additionally, the human participants in this procedure may be interchanged freely with no adverse reaction from Kit.

At DAK, meeting our husbandry and propagation goals for black rhinoceros is facilitated by the incorporation of training into our management program. Behavioral training of rhino to participate in transrectal ultrasonography should be viewed as an important component of successful captive propagation programs. Ultrasonography is an important tool for verifying reproductive health, sexual maturity, and pregnancy. More widespread use of reproductive examinations via transrectal ultrasound will be instrumental in establishing and maintaining the success of additional captive propagation programs.

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