

# TRAINING MULTI-TASK MEDICAL BEHAVIORS IN THE BONOBO (*PAN PANISCUS*)

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## ABSTRACT

The bonobo training program at the Milwaukee County Zoo (MCZ) began in 1993. Currently, the bonobos voluntarily participate in medical behaviors that involve performing several tasks simultaneously. This advanced level of training relies upon important groundwork, which was developed during the first three years of the program. These multi-task behaviors are performed without anesthesia and have generated some much needed baseline medical data on this species. To date, we have compiled three complete sets of obstetrical ultrasound measurements, have trained five bonobos to participate in cardiac ultrasounds, and can routinely draw blood on six bonobos. We are also training the bonobos to voluntarily accept confinement and squeeze restraint in a portable loading crate. This advanced level of training has enhanced our ability to manage complicated medical and behavioral problems. These include a bonobo with severe cardiac disease, a diabetic bonobo, a deaf and blind bonobo, and a bonobo with severe psychological problems.

The bonobo training program at the Milwaukee County Zoo, (MCZ) began in 1993. The first three years of training established the groundwork for future advanced multi-task behaviors. These multi-task behaviors require the bonobos to perform several behaviors simultaneously without the use of restraint or anesthesia. Currently, much of the training program is focused on training medical behaviors and generating baseline medical data.

Prior to training, the group of 3.3 bonobos (*Pan paniscus*) were difficult to manage and exhibited many undesirable behaviors toward the keepers. These behaviors included routinely urinating on the staff, spitting, screaming, throwing feces, and grabbing aggressively at the keepers. Providing the bonobos with medical care proved difficult due to the inability to separate animals for examination and their tremendous fear of the veterinarians. The bonobos also had an intense fear of anything novel, and variation in their routine brought immediate panic and aggressive behavior. Keeper and veterinary staff often relied upon trickery or bribery to manage the animals. Thus, the relationship between bonobo and caregiver was one built upon mistrust and fear. With the possible addition of more bonobos to the collection, it was necessary to develop a safer working environment and a less stressful existence for the bonobos. We decided that a positive reinforcement method of training would be implemented.

Several factors contributed to the eventual success of the bonobo training program. A professional marine mammal trainer from Oceans of Fun, Inc., an on-site marine mammal educational program at MCZ, was hired for consulting purposes. Using a training consultant helped establish training goals and provided the keeper staff with a realistic time frame in which to achieve those goals. Members of our keeper staff also attended the Primate Training and Enrichment Workshop in Bastrop, Texas in 1993 and 1994. Three keeper/trainers invested an average of two hours per day developing training skills, planning each training session, and discussing the day's training events. Oceans of Fun consultants were used twice weekly for an hour per session. The commitment of keeper time, managerial, veterinary, and financial support, and most importantly, keeper dedication and determination, were all necessary components that contributed to the success of this training program.

Before beginning to train even the simplest of behaviors, keepers first had to establish a safe, positive working relationship with

the animals. This was achieved by consistently rewarding desirable and nonaggressive behaviors. Undesirable behaviors were ignored and most were extinguished in four to six weeks. We introduced simple concepts like name recognition, targeting, stationing, separations, and proper shifting. These early behaviors provided the building blocks for future complex behaviors.

During the second and third year of the program many behaviors were expanded upon by increasing their duration and by modifying them slightly to accomplish various medical tasks. Safe presentation of parts of the body, learning the concept of left and right, and an introduction to medical equipment were part of the daily training sessions. Equipment such as latex gloves, syringes, and stethoscopes all had previously a negative association to the bonobos. Much time was spent desensitizing the apes to medical props and procedures such as hand injections. Our veterinarians made frequent visits and often handed out treats to the animals. This simple connection was critical to overcoming the fear and negative history associated with past veterinary experiences. The veterinary technicians were similarly integrated into the training program.

It was important for the bonobos to accept unfamiliar people as part of their routine and every effort was made to introduce new people to the bonobo troop in a positive manner. The acceptance of strangers allowed us to use medical consultants. Obstetricians, urologists, plastic surgeons, dentists, and ultrasonographers were all able to safely conduct examinations on the bonobos.

Constant change in the daily routine provided the bonobos with much needed mental stimulation. The bonobo has a fission-fusion society (Kano 1987, 1992). Bonobo communities split into temporary associations or parties which fluctuate in size and composition depending on ecological and social conditions (Kano 1987; White 1988). By varying shifting patterns and by frequently changing group composition, the bonobos enjoyed flexibility in group size and continually changing social dynamics, thereby simulating the natural group dynamics more closely. This also provided us with a tremendous increase in training flexibility and in management options.

According to Bloomsmith (1994), training may make an animal's environment less stress-inducing and more stimulating. After three years of consistent training, the keepers/trainers began to notice significant results. The level of trust between keeper and

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bonobo had increased, and the stress-related behaviors exhibited several years prior to training had definitely decreased. The bonobos demonstrated better listening skills. Several of the bonobos, who previously had limited attention spans, now exhibited more patience and did not become frustrated as easily. The decrease in aggressive outbursts resulted in increased keeper safety when training and caring for the animals. Most importantly, the keepers developed a deeper understanding of each bonobo personality and their unique learning patterns. The bonobos had changed from animals that were fearful, guarded, and often extremely dangerous, into animals that were tractable, eager to please, and mentally prepared to embrace some very advanced multi-task behaviors.

Since 1995, the MCZ bonobo training program has been successful in generating some much needed baseline medical data on the bonobo. The program has focused on two main areas of research: obstetrics and cardiology. To date, three complete sets of ultrasonographic measurements of fetal growth have been compiled along with five sets of cardiac ultrasound evaluations. These data were obtained using a standard ultrasound machine with the probe inserted between the mesh, using only positive reinforcement training methods. This noninvasive technique eliminated the need for anesthesia or restraint.

Monitoring pregnancies in the bonobo captive population, which has a limited number of reproductive females, is critical for the survival of the species. The ability to predict a parturition date can be particularly useful when animal management changes are planned for the periparturient period (Teare 1996). Checking for gestational problems, evaluating fetal growth and development, and estimating gestational age provide the veterinary staff with needed information to assess the overall health of the female and fetus. In the event of a gestational problem, the data obtained by ultrasonography allows for informed decisions to be made regarding the need for veterinary intervention.

In 1995, when Laura, a 32-year-old bonobo, became pregnant, we decided to try to obtain ultrasonographic measurements of fetal growth. In order to obtain reliable results, Laura had to be trained to perform several behaviors simultaneously. She needed to comprehend the terms for her body parts and be willing to lie in several positions in an overhead transfer chute. Laura also had to be desensitized to two different ultrasound machines and the noises that they make, to ultrasound gel on her abdomen, and to two ultrasonographers and one obstetrician. Laura was able to remain relaxed, listen to directions, and pay close attention to her keeper/trainer during all this activity. Laura's four year old son often needed to be distracted and kept out of the way during the sessions. Laura needed to have enough trust in her trainers to allow him to be out of her sight for several minutes at a time. Laura's gestational ultrasound measurements were the first ever obtained on an awake and unrestrained bonobo.

In December of 1998, Maringa, a 25-year-old bonobo, became pregnant. She had previously shown great interest in observing Laura's gestational ultrasounds. Thus, keepers began her ultrasound training in 1995. Maringa was also conditioned to accept a vaginal ultrasound probe, which could be used to monitor the ovarian changes throughout her cycle. Complete gestational ultrasound measurements were collected throughout Maringa's pregnancy, which provided MCZ with its second set of obstetrical data. Laura became pregnant again in November 1997, which allowed us to compare fetal measurement from two separate pregnancies in the same animal. Ana Neema, an eight-year-old nulliparous female, is currently being trained in the overhead transfer chute to tolerate an ultrasound probe on her abdomen.

In 1995, Kidogo, a 23-year-old bonobo male, came to MCZ with congestive heart failure secondary to advanced cardiomyopathy. Serial echocardiograms were necessary in order to monitor the disease and its treatment. Repeated anesthetics are considered risky in an animal with this advanced condition, therefore attempts were made to train Kidogo to cooperate for cardiac evaluation without anesthesia.

Due to the severity of Kidogo's cardiac condition and grave prognosis, all of his behavioral training was focused on performing cardiac ultrasound examinations. Kidogo was unique in that he was a highly tractable animal in very poor health. This allowed keepers to expedite a training program for him that was limited to only those behaviors needed to evaluate his cardiac health. During Kidogo's ten months at MCZ, he learned to position for cardiac ultrasound and to tolerate electrocardiogram pads placed on his chest. All of Kidogo's training sessions were limited to only five or ten minutes to accommodate his weakened condition. He often was paired up with Lody, a 27-year-old male bonobo, who was very advanced in his training. Kidogo definitely learned through example and by observing Lody's work. Unfortunately, Kidogo died before completing his echocardiogram. The severity of Kidogo's heart condition made us realize the importance of training all of our animals for cardiac evaluations. Cardiac disease can go undetected for years, and echocardiograms provide a useful diagnostic tool in monitoring this disease.

Training the female bonobos to position in the overhead transfer chute for a cardiac ultrasound was simplified due to their previous obstetrical training. They only needed to be desensitized to the probe on their chest instead of on their abdomen. Due to the smaller chest size of the females, minimal work in positioning the chest was needed. The heart was easily seen, as long as the chest was pressed completely down in the chute, and the ultrasonographer was able to place the probe around the left nipple. The males, however, proved to be more of a challenge. The larger barrel shape of their chest required the males to lie sternally and twist the left hip downward while extending the left arm to spread the ribs. All of the male bonobos had to reposition frequently from a sternal position to left lateral position. The desensitization steps used in the cardiac evaluations were identical to those used for the gestational ultrasound workups. To date, five bonobos have cooperated for complete cardiac evaluations.

We have also used the overhead transfer chute as a safe place to position the bonobos for a complete body examination. The apes can be stretched out while lying in a sternal or dorsal position and are conditioned to tolerate palpation of all body areas. Another benefit of working an animal in the overhead chute is that their elevation in relation to their trainers often gives a reluctant animal additional confidence.

A beneficial diagnostic tool for the veterinarian is the ability to reliably draw blood on the bonobos. A six-inch diameter PVC blood sleeve was constructed in 1995, and currently six bonobos will reliably participate in a blood draw. We desensitized the bonobos to alcohol swabs, syringes, blood collection tubes, and the process of shaving their arms. They were trained to present both right and left arms for a needle stick, to remain focused, and to hold their arm steady in the sleeve for up to four minutes. The trainers worked to desensitize them to the discomfort of a needle stick by pulling on their hair or pinching the skin on their arm. A productive blood draw always ends with special food rewards and lots of praise.

The blood sleeve has other advantageous uses besides blood collection. It can be used for bonobo TB tests, injections, and follow up evaluations of the injection site. Daily physical therapy was per-

formed through the sleeve on a bonobo's wrist and thumb after major reconstructive surgery. Radiographs were successfully taken on a suspected hand fracture of an adult bonobo. Although in obvious discomfort, the bonobo cooperated with positioning his hand in the sleeve. A portable x-ray machine was placed above the sleeve and the film was positioned below. In the future, since the blood collection sleeve provides safe access to the forearm, we hope to develop a safe method of blood pressure collection.

Another versatile training tool has been the portable loading crate. Since 1996, the bonobos have been learning to comfortably enter and accept confinement in a 56"x32"x46" aluminum metabolic squeeze crate. The cage has been modified to securely attach to one of the shift doors in the bonobo holding facility. Every effort was made to make the crate a very positive experience. Initially, the bonobos were allowed to explore the crate in small group settings. Special food rewards were given to those who did enter and once the bonobos became relaxed, simple training sessions were conducted. Eventually, a second trainer was used to control the door movement while the other trainer worked with the animal. Possible uses of the crate in the near future include conditioning the animals to voluntarily accept manual squeeze confinement and also as a place for anesthetic recovery. With minor modifications, the crate could also be used for standing thoracic chest x-rays. Currently, we have two bonobos who will allow the crate door to be closed, but several others are progressing rapidly.

The advanced bonobo training program at MCZ has given us the skill and expertise to work with several bonobos who have come to us with very special needs. Kitty, a blind and deaf 49-year-old bonobo with a seizure disorder, has challenged us with her extreme handicaps. An occupational therapist, a special education teacher, and a neurologist have all been consulted in order to create a special training program for Kitty. She continues to lead a very high quality life in spite of her advanced age. Linda, a 45-year-old bonobo, has diabetes and has to be monitored very closely. Her glucose level is under control because she is willing to provide a urine sample on request or a finger stick for blood. Kidogo, the 23-year-old male bonobo mentioned previously, challenged our training skills with his serious cardiac disease and very weakened condition. We had to learn how to focus on only those behaviors that were truly necessary to keep him alive. Kidogo only lived with us for ten months until his death, but his life had quality, and he died with dignity. Most of all Kidogo gave us a lifetime of training wisdom during his short time with us.

When Brian, a ten-year-old bonobo, came to MCZ in 1997, our training skills, patience, and empathic understanding were tested

beyond words. Brian suffered from severe self-mutilation, bulimia, and many developmental deficits. Through consultations with a psychiatrist, drug therapy, and behavior modification training, we have been able to salvage Brian. He now is fairly integrated into the bonobo troop and continues to improve.

The bonobo training program at MCZ has forever changed the way we care for our closest living relative. Our caregiving style is one of quality for both the physical and psychological needs of the bonobos. Training has given the keeper staff much patience, empathy, humor, and a deep connection with the animals. Both keepers and bonobos have learned to be flexible and to "not sweat the small stuff" in their lives. In return, the bonobos contributed greatly by providing us with some much needed baseline medical data, which in turn helps benefit the bonobos in the wild and in captivity. We hope that in years to come our bonobos will continue to contribute data to the world which will contribute to a better understanding of this very dynamic species.

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