



MEDICAL MANAGEMENT OF ASIAN ELEPHANTS AT THE HOUSTON ZOOLOGICAL GARDENS

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INTRODUCTION

The Houston Zoo manages 2.4 Asian elephants in a protected contact system. This program was initiated with the adult bull, Thailand, and the adult cow, Indu in 1992. The remaining three animals were brought into protected contact in March of 1993 and Singgah, the youngest member of the herd, was born in December of 1993. Many changes have occurred within the program since protected contact was initiated. Safe access to the elephants was limited by the design of the original facility which was completely renovated in December of 1994. The new facility offered many new training opportunities that were previously not possible. Once the elephants adapted to their new environment, our jobs as trainers became very exciting and challenging. As with any management program, a protected contact elephant program should focus on preparing the animals for a variety of husbandry and medical procedures. This paper will focus on four case studies and discuss the training that made the procedures possible.

CASE STUDY #1

The first case study to be discussed is the 33-year-old bull, Thailand. Thai has had chronic nail cracks in his front feet for over fifteen years and abscesses for ten years. Prior to protected contact, Thai was maintained in a no contact system, but as his nail condition worsened, his feet were treated through a large foot hole in the barn door. His nails were treated as they could be, but actual foot trims were difficult and dangerous for the keepers. One of the initial goals of the protected contact program at the Houston Zoo was to enable the staff to care for the husbandry needs of the bull. The most immediate need was for foot care; Thai was easily trained to present his feet through an opening in the training wall or the barn door.

Over the past five years, various trimming techniques and treatments have been tried, but the abscesses have proven difficult to successfully treat due to the location in the feet. Fully opening the abscessed areas would involve a large percentage of the nail surface and depth as the abscesses are located between the nail and the central part of the foot pad. Thai tolerated a great deal of routine trimming as well as deep trimming into the abscessed areas. Trimming the areas was not providing the desired results, so Thai was trained to soak his feet; a process which was made much easier once the new training area was available. Thai's feet were soaked in either Epsom salts or Nolvasan and warm water one to two times daily for ten minutes. Radiographs were taken to determine the depth of the infected tissues and specifically to see if there was any bony involvement. Radio-opaque dye was injected into the hole in Thai's foot so that the tract could be identified.

Thai was trained for the procedure by first teaching him to extend his leg through the foot hole and place his feet, one at a time, on a custom built foot rest. The foot rest was designed so his foot could rest at a comfortable angle for him while allowing for all the necessary angles of shots. Once he was comfortable with placing both feet flat on the foot rest, an old radiograph cassette was used to train him to hold steady with the plate in a variety of positions under and around his feet. The final step in the training was to move the large machine in Thai's view while he placed and held his foot in the proper positions. The machine was moved closer until it was in the position that would be necessary for the procedure. Thai is accustomed to working with numerous people around him, so it was not necessary to include this in his training.

Currently, Thai's feet appear to be on the road to recovery; foot soaks were discontinued this May. Granulation beds have formed where the abscesses were; only a small hole is visible on the left foot and a slightly larger hole on the right. Currently the only treatment Thai's feet need are routine trimming and foot care. Thai's feet are likely to be continued concern, but through techniques such as routine radiographs and good foot care, the problem should not become a serious one again.

CASE STUDY #2

For over fifteen years, Methai, a 29-year-old female has shown physical symptoms of arthritis in both of her back legs. Until three years ago, Methai appeared to only exhibit changes in her behavior and mobility due to the arthritis during the cold, damp winter months. Within the past several years, her movement and agility were affected more frequently by the what appeared to be pain. Behaviorally she appeared stubborn or disinterested in training sessions. Although she remained cooperative for routine husbandry care, she showed less enthusiasm for learning new behaviors compared to the other five elephants. Physically, her comfort level when she moved about the yard, especially first thing in the morning, seemed compromised. In order to evaluate and document the extent of the proliferative bone reaction and lysis in the joints, radiographs of her legs were taken.

The first radiographs were taken about three years ago when her condition first worsened. Methai was trained to extend her rear legs between the bars that divide the stalls of the barn. A trainer was positioned at her head, gave her commands and rewarded her appropriate responses. Methai's training consisted of desensitizing her to the equipment, numerous staff behind her, and training the proper leg position with the radiograph cassette in various positions. The most difficult part of her training came when we introduced the machine to her; she seemed wary of this large object immediately behind her. Although she could see the machine the whole time, she was much more comfortable when she was asked to move into the proper position with the machine several feet away, then it was moved into place right behind her. The hip joints are impossible to radiograph due to the amount of tissue, but the radiographs of the hock joints clearly showed extreme proliferative bone reaction.

Several oral treatments were tried with disappointing results. Cosequin, a nutraceutical, affective in the treatment of arthritis in some animals was an ineffective treatment for Methai. Torbutrol, a narcotic analgesic, was tried but also proved ineffective. In November 1995, Methai was started on aspirin therapy. She received three large animal

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2

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boluses twice daily in peanut butter sandwiches. This treatment resulted in a change in her movement; she also became eager to participate in training sessions and learned many new behaviors and performed some established behaviors such as 'stretch' and 'down' that she had not done consistently for several years. Unfortunately, this July, Methai's blood chemistry showed her to be anemic. The aspirin therapy has been discontinued as it may contribute to her anemia; therefore, the veterinary staff is working to determine if there is a correlation between the treatment and the anemia. Currently, the veterinary staff is investigating alternative treatments methods including light therapy. Alternative oral pain medications are not a viable option due to the side effects (aspirin derivatives) or ineffectiveness for the treatment of joint inflammation (Tylenol). Methai continues to participate in training sessions, but some days she is very stiff and sore and is not asked to do behaviors that may cause discomfort. We hope to have a treatment plan back in place soon.

CASE STUDY #3

In December 1987 a male calf, Kiba, was born. His umbilical stump was excessively long and became infected. Although it was treated daily with Betadine, the infection persisted. A cantaloupe sized bulge remained present on Kiba's abdomen. In February 1992, a team of specialists from Texas A & M University came to Houston to perform an ultrasound exam on the herniated area, specifically, to check the integrity of the abdominal wall and the potential for entrapment of intestinal loops. This procedure was performed before Kiba was managed in protected contact and therefore he had to be sedated for this procedure. The ultrasound was successful and showed the area to have healed well.

In November 1995, Kiba's umbilical area appeared very swollen. The immediate concern was that a loop of bowel had become trapped in a previously undetected defect. The team from Texas A & M came to Houston again. This time, the elephant staff had the opportunity to train Kiba for this procedure. This was accomplished by having Kiba present his body parallel to the training wall, in a 'lean-in' position and simulating the procedure. Kiba was trained to accept the steps that would be necessary for the ultrasound exam. These included desensitizing him to having the area palpated first by individuals with whom he is both very comfortable and familiar and then by less familiar individuals. The next steps were done simultaneously and included acclimating him to the presence and proximity of the equipment and to the feeling of the contact gel and firm pressure of the transducer.

Kiba is an extremely responsive and eager to please elephant; he tolerated the stimuli very well and was ready for the ultrasound within days. Fortunately, the ultrasound showed no loops of bowel or defects; the swelling was likely due to mild trauma and caused no serious injury. The swelling decreased within two weeks and has not reoccurred. The umbilical mass is formed of fibrous tissue and has no abdominal wall extending into it.

CASE STUDY #4

In January 1996, the decision was made to sedate the 32-year-old female, Indu, for dental surgery. Indu has had a history of poor molar and tush condition. She has historically had infections in her tushes and her molars have worn irregularly making floating and filing them necessary on numerous occasions. Her molars were last filed in 1990 and she was last recorded to have shed a molar in early 1991. By 1995, the condition of her molars

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had worsened to the point that filing them was no longer an option, leaving a sedation for dental surgery as the best option. Due to the fact that she had not shed her upper left tooth as the new one grew in, an irregular wear pattern developed resulting in the severe malocclusion that resembled a train wreck. The misaligned teeth did not allow her to chew normally and therefore interfered with her ability to properly process her grain and hay.

Because of the severity of the malocclusion, all the molars were not visible when her mouth was opened, making a thorough diagnosis difficult. Several consultants, experienced in elephant dental procedures and anesthesia, assisted the veterinary team; these included: Dr. Boyd Welsch, dental consultant from the University of Florida College of Dentistry, and veterinary anesthesiologists, Dr. Darryl Heard of the University of Florida College of Veterinary Medicine, and Dr. Sandee Hartsfield of Texas A & M University.

The elephant staff's primary focus for the months preceding the sedation was to prepare Indu for the entire process she was about to experience. With the consultation of Alan Roodcroft, a plan was developed that would meet the needs of the veterinarians and dentists, and would allow for Indu to be positioned and restrained safely. The First step to prepare Indu was to condition her to wear chain bracelets and accept chaining restraint, something she had not done in over six years. The duration she was asked to wear the chains was gradually increased one leg at a time, then the process was repeated working up to both fronts and one rear leg chained.

Trainers also worked with Indu so that she would open her mouth to allow it to be rinsed with a garden hose mister. This was to prepare for the possibility of tooth extractions that would result in large holes in her mouth that could be kept clean by rinsing.

The majority of Indu's training occurs in the training yards; these off exhibit yards offer a good working environment for both trainer and animal. The flexibility that is inherent in the design of the yards allows for the training of many husbandry behaviors, but this was not the ideal area to perform this procedure, so the sedation took place in the cow exhibit yard. Indu was put on restraint chains in the training yard and then moved through the cow barn into the cow yard. Rear leg ropes controlled her forward movement; as she advanced the slack in the fronts was taken up to prevent her from backing up. Once in the cow yard, she was positioned so that when she laid down, her left side, which needed the most dental work, would be up.

Immediately after Indu was down, her vital signs and respiratory rate were checked prior to administering any additional anesthesia. Indu's severely malformed teeth prevented insertion of the trachea tube, so tubes to deliver the gas anesthesia were placed in her trunk. Once stabilized, the dental team moved in to begin the surgery and discovered the "train wreck" in Indu's mouth where the upper left molar had not shed causing the new molar to become misshapen as it grew in behind the existing tooth and fused to it. This prevented Indu from masticating properly, which resulted in severe overgrowth and malformation of the remaining molars. Fortunately, the teeth were all healthy and extraction was not necessary. The dentists were able to reshape the teeth by chiseling off portions and filing to shape.

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4

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Indu responded well to the antidote drug and was standing in a matter of minutes. She showed no adverse effects from anesthesia and was immediately responding to commands, including open mouth. The following day, Indu was reintroduced to the herd and she interacted normally. Everything appeared normal and Indu seemed comfortable until the third day following the procedure; the analgesia affect of the sedation drugs had worn off. It was apparent that Indu was in pain as her behavior changed; she became intolerant of conspecifics and was not responding to commands as readily as she had been. On this third day, we began treatment with the narcotic analgesia, torbutrol. She responded so well to the treatment that it was discontinued after only three days with no further signs of pain.

This sedation procedure proved to be successful without requiring major surgery to repair Indu's molars. Although her teeth are far from normal and will need long term monitoring, she is in better overall physical condition as a result of her improved ability to process her full diet. Currently the elephant staff is taking steps to help Indu wear her molars properly. She is offered various browse items including thick pieces of oak and hackberry to chew on. We are also working on behaviors and modifications to the existing facilities that will enhance our ability to work with Indu's teeth.

CONCLUSION

This paper outlined four medical cases that occurred at the Houston Zoo. These cases were handled under a protected contact system of elephant management. The staff had time ranging from several months to several days to prepare the animals for their respective procedures. The key to successful medical and husbandry procedures is preparing ahead of time as thoroughly as possible. Regular blood collection, foot care, skin care, and full body exams including the mouth, eyes, tusks, and ano-genital exams, and restraint either by chaining or in a crush must be a part of regular care and training. From these basic husbandry behaviors, elephants can easily and quickly be trained for emergency medical procedures.