

The AAZK Behavioral Husbandry Committee Presents

Training Tales...



Training Bears for Voluntary Blood Collection

By

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Introduction

*"...I approach every bear with the same two questions on my mind: Who are you?
and What can I do for you?" – Else Poulsen, "Smiling Bears".*

Bear caregivers know that these animals are clever, complex and sociable. This combination of traits signifies a very real need for dynamic enrichment and operant conditioning (training) programs for captive bears. Over the last few decades, advances in captive animal management and increased longevity have shaped a need for proactive, long-term husbandry guidelines. Incorporating regular training into the routine of bears (or any animal for that matter) improves caregivers' relationships with their charges, reduces the need for anesthetics, providing less invasive options for observation and treatment of potential medical and behavioral issues.

Several years of presenting training workshops for animal caregivers, and more recently bear-specific workshops, have provided me with a clear and concise view of what tools are most frequently requested to manage shrewd, yet dangerous species like bears. General husbandry techniques, such as shifting and cooperative feeding usually come first, but inevitably questions are raised on how to train for procedures such as voluntary injections or blood collection. A complex and marginally invasive voluntary medical technique, blood collection is a challenging yet valuable management tool. Obviously venipuncture is not the first step in a training program, but an attainable goal once a basic understanding of reinforcement and training expectations is established with each individual animal.

Why train bears for voluntary blood collection? A few excellent reasons are:

- Improved care/husbandry; more flexibility in management
- Routine or situational diagnostics
- Medical care (e.g.: vein access could provide opportunity for IV injections, administering fluids in a compromised animal w/ out anesthesia)
- Build trust between the animal and caregiver
- Voluntary cooperation and decreased immobilizations

Ultimately voluntary venipuncture provides caregivers with one more management tool, while reinforcing each animal's desire to cooperate with a consistent valued reward system. It is easy to teach the association that a little pain = big gain.

Know Your Bears

Having worked with all eight extant bear species, I have observed amazing differences between each

group. Some basic generalizations (from personal observation and discussions with other caregivers) can be made about the differing species. For example, polar bears (*Ursus maritimus*) and grizzly bears (*Ursus arctos horribilis*) appear extremely focused and intense when engaged in training. They spend most of their time on the ground, and while they are able to manipulate items with their paws, they are generally less adroit than most of their smaller, more arboreal cousins. These are clearly very common sense remarks, but the natural history of each species plays heavily into a successful training program. Trying to train a polar bear, with its enormous paws that are less finely tuned for climbing or grasping, to place a limb through a sleeve for blood draw training is very likely going to prove both frustrating and fruitless. Assessing each animal's natural history and personal preferences will allow a trainer to better judge various aspects of training, from choosing motivating rewards to appropriate positions for procedures.

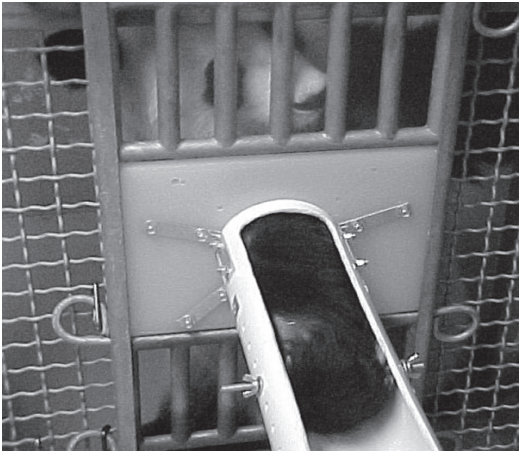


Fig. 1: A giant panda trained to use a blood sleeve at Zoo Atlanta. (Photo by author)

Natural and personal histories taken into consideration, the animal's physical capabilities must be assessed in conjunction with the existing environment. Are there geriatric considerations? Is the goal to draw from the forelimb, the neck, or a hind foot? This is where looking around the environment with an open, creative mind comes into play. Can maintenance crews cut training panels or holes that will not compromise human or animal safety? Can a blood draw sleeve be constructed from readily available materials (Figure 1)? Is there a low spot in a transfer area that a paw could slide under, or bars where a bear lying on its side could flop a hind foot through? Existing squeeze/crate/chute facilities are extremely useful. Can it be used in a non-restraining manner to aid positioning? There is no one correct way to train a desired behavior, and any number of options (Cecil, Kezer, Pratte, 2003). Flexibility in training is essential, as one specific method will not prove successful for every bear.

Personal observation and research to date lend support to three successful venipuncture sites: the cephalic vein on the underside of the forelimb; the dorsal pedal (metatarsal) vein on the hind foot; the jugular vein on the neck (Figure 2). These methods are not exclusive, as there are as many means of training as there are bears, trainers, and willing veterinarians or vet techs. Based on the usable space in the environment and each bear's natural and individual history, assess which of the three methods will work best.

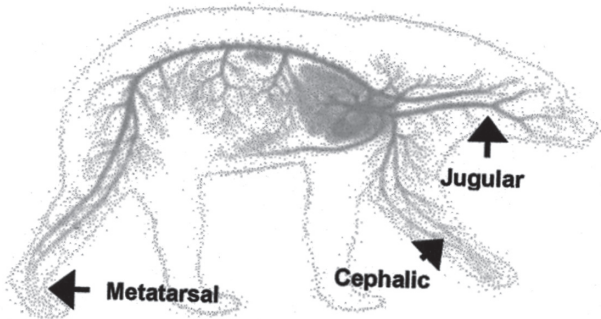


Fig. 2: Vein location for training voluntary blood collection (From www.inberg.ca)

The Plan

It is essential to involve managers and veterinary staff in the planning stages of training. Managers absolutely need to buy in if they are expected to provide support, time and materials. The veterinarian should describe preferences on animal positioning for maximum effectiveness and which tools they will require for the end goal. This allows the trainer to obtain the tools early in the process for desensitization training (“The act of pairing a negative or aversive event, with positive reinforcement until the event loses its aversive quality. The resulting behavior can be maintained through the use of positive reinforcement.” AAZK/AZA, 2003). Veterinary staff also needs to agree to participate in training, to build their own positive and trusting relationship with the animals. If the veterinarian’s presence elicits fear or anxious behavior, a voluntary draw will likely not occur.

Management and vet staff have approved the training plan. The bear’s favoured rewards and individual limitations are known. The environment is conducive to shaping the appropriate behaviors. A basic training program should now be implemented if one is not already in place. This step is vital, as the easiest road to successfully teaching an animal a new, complex behavior is by incorporating existing ones into the process. Bears that already understand what to do with a target, or that reliably get rewards for shifting, will respond quickly to learning more complex behaviors.

Behavior based husbandry (Poulsen, 2009) boils down to knowing your animal well enough to learn from what they are telling you through their actions. If they settle into a specific position comfortably, move ahead with the next step in training. If they fidget, move, or do not respond to a known cue, stop and assess what might be affecting them. Responding to the needs of your bear will progress the training faster than anything else. Bears need to be recognized, rewarded, engaged and comfortable in a training setting. This is especially important when desensitizing and habituating them to new experiences. A calm, comfortable animal will comprehend that good things will occur during training.

Basic Behaviors

The most effective behaviors that aid in training for a blood draw procedure are simple to teach. If you have associated a primary reinforcer (usually favored food) with your bridge (clicker/whistle), you can bridge and reward immediately when your animal exhibits a desired behavior. The following is a list of behaviors that lay the foundation for blood draw procedure training and a brief suggestion on how to train them:

- Target
- Sit Up
- Stand Up
- Paw Presentation
- Lay Over (on side)
- Lay Down (sternal)
- Hold (Stay or Steady)
- Release

Target: Target training is simple and fast, and can be utilized to shape a myriad of other behaviors. Place a ball on the end of a stick, and you have a target. Present the ball to the bear, say “target” and when the bear sniffs the ball or moves to investigate it in any way, bridge and reward. Very quickly the bear will learn that when it sees the target and hears the cue, touching the target with its nose elicits a reward. The target behavior can then be used to shape various positions.

Sit Up, Stand, Down, Side: For training the “Up” behavior, move the target upwards; the bear needs to sit or stand to reach it. For “Down”, move the target downwards, and reward any position changes until the bear is lying on the floor. As the bear starts exhibiting the new behavior, add in new verbal and physical cues. It is best to use cues that simulate the movement you make with the target, and add whatever verbal cue you like (Pratte, 2009). One key point to remember with bears: bears will exert as little effort as possible to maximize rewards (personal observation). Use this to your advantage in training. If you want the bear to sit, move the target and watch how they reposition themselves. If you want them to flop onto their side from a “down” position, move the target just a bit at a time.

The bear is more likely to just slide or roll onto its side, as opposed to getting up and walking over, then lying down again.

Paw Presentation: When asking a bear to sit or stand up, it will usually place paws against the mesh. When this occurs, quickly add in the new cue for “paw” (visual, verbal or both) by giving the cue as the behavior occurs. After pairing the behavior with the cue and reward, the animal should eventually understand this stimulus as a signal for “paw present”. A method that I have used with big cats is a simple ruler with a different color of paint on each end to act as a paw target. One end was yellow and paired with the verbal cue “paw” for right foot; the other end was red and “foot” was used for the left cue. These cues were presented to the appropriate side of the animal when asking for each foot. Any distinct cue will work. Once the bear understands the concept of front paw presentation, they may quickly learn to do the same with rear paws. Shaping the paw presentation behavior will prepare them for blood sleeve training.

Hold: Of utmost value and importance is an intermediate “Hold” or “Stay” behavior. This cue can be used in conjunction with any other. For example, teaching a bear to “Target” and then “Hold” keeps the bear in one spot, allowing better physical inspection of the head and body. “Paw” and “Hold” teaches them to keep a paw presented for inspection, nail trims, or any other procedure, and prepares an animal nicely for using a blood sleeve (a device that aids in access to the cephalic vein on the arm). “Up” or “Down” and “Hold” teaches them to stay exactly as they are. “Hold” is simple to train: the animal executes the requested position cue, which is immediately followed with “Hold”. Any longer increment of time should be rewarded well. Then to achieve a desired time frame, only reinforce longer and longer time frames in the specified position. This is known as “selective or differential reinforcement” (The act of reinforcing specific criteria of desirable responses to shape a specific behavior; the reinforcing of selected responses of higher quality to improve performance. AAZK/AZA, 2003).

Release: Often in training programs, the bridge is used as a releaser at the end of a desired behavior. Personal experience has led to great success with the implementation of an additional release cue. The trainer is essentially adding another step in using a release cue; yet, providing the animal with another chance to earn a reward. A separate cue is given to signal that they can move from the specific position that they are holding. Once they release on cue, they should be bridged and reinforced. “Okay”, “All right”, “Done” or any variation works. The point is to communicate to the bear “you can stop holding now”. Initially, cue a behavior, ask for “Hold” and when you know the animal is reaching its current limit (likely very short at the onset), cue your release command and step back, signaling that no further cues will be forthcoming. When the bear releases the position, reward it well. This will quickly teach them that when they release on your cue there is a distinct benefit. Once the concept is grasped, reward only those times the bear released on cue. You can periodically reward for holding position, provided the bear remains in place until released. In the final stages of a blood draw, it is essential that the bear holds still until the draw is complete. Training a release cue that is well reinforced will provide appropriate known information at the end of a complex behavior chain (strings of learned behaviors executed sequentially to achieve a final goal). The benefit to using a release cue, as opposed to allowing the bridge to become a releaser, is that the bridge is used throughout various other behaviors while you are training the animal. By adding a release cue and rewarding it appropriately, the trainer lessens the chance that a bridge given during the procedure, or for maintaining a “Hold” command, will inadvertently cue the animal to release at an undesirable moment.

These few basic behaviors can now be incorporated into the chain that leads to the goal of a voluntary blood collection.

Method Mechanics for Blood Collection

Now that you and your bear have proceeded through the planning stages towards your goal, you need to choose the most practical method of blood collection for your individual animal. The three most commonly used methods of collecting blood from bears are (See Figure 2):

- The blood sleeve (used to access the cephalic vein on the foreleg)
- Hind foot presentation (to access the dorsal pedal or metatarsal vein)
- Neck/jugular presentation

Blood sleeves: Used extensively with large non-human primates, a blood sleeve allows excellent access to the cephalic vein of an animal's forelimb. The goal is to have the bear slide the front limb into a sleeve, and curl the forepaw around a pin or bolt. This grasping with the paw accomplishes two things. First the animal's paw is engaged, and when rewarded for holding this position it becomes obvious if the bear is going to move; trainers/vets have time to move out of harm's way. Second, the grasping hold causes the blood vessels to stand out, and once the limb is shaved there is easy access to a vein.

A simple PVC tube of appropriate diameter for the species you are working with, a means of mounting the tube in the desired location (den, chute, training area), and some inexpensive pieces of hardware can be constructed into a safe, functional sleeve (Figure 3). The sleeve should be of simple, sturdy construction, easily cleaned and free of any sharp edges. The grasping pin should be adjustable, so that a growing bear or bears of various ages/sizes can comfortably rest the forelimb in the sleeve and hold on. The more comfortable the sleeve and position, the more willing the bear will be to remain in the position. The sleeve should be removable so that the animals are unable to interact with (and possibly destroy) it when unsupervised, and so it is easily cleaned, adjusted or repaired. Work with veterinarians to align an opening over the desired venipuncture site and allow extra space to shave, apply pressure and search for usable blood vessels.

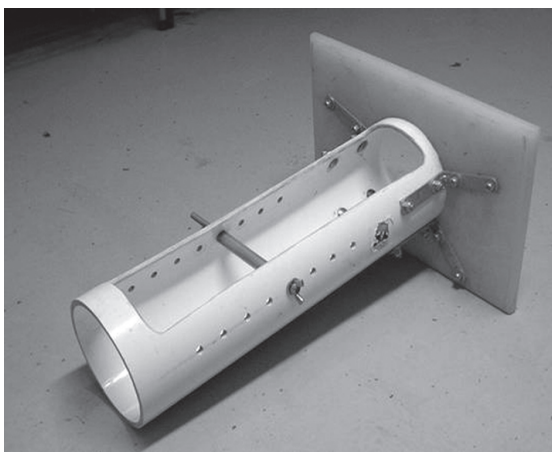


Fig. 3: Blood sleeve construction. (Photo by author)

A sleeve is useful with smaller bears that are mobile, often semi-arboreal, and possess a wide range of carpal movement/rotation. Examples are sun bears (*Helarctos malayanus*), spectacled bears (*Tremarctos ornatus*), possibly American black bears (*Ursus americanus*), and most definitely giant pandas (*Ailuropoda melanoleuca*). The basic method results in the bear sitting down, resting their weight comfortably on the floor, placing their forelimb into the sleeve that is mounted at an appropriate height. Access to the bear's mouth is essential for periodic reinforcement of holding the desired position and for rewarding shaping/desensitization steps. This is a straightforward training progression: target, sitting up, paw, hold. When these behaviors are reliably given when cued, introduce the blood sleeve. Once the initial curious investigation of the sleeve wanes (be prepared and watch for the correct limb going in and heavily reward or "jackpot" to capture this behavior), the known "paw" cue should begin to solicit a paw into the sleeve. Shape this into grasping the pin from underneath, exposing the underside of the forelimb in the cut out section of the sleeve. The necessary desensitization can be trained once this new position is reliably taught and held. Adding a new cue such as "sleeve" or "paw out" is helpful.

Hind foot presentation: A less mechanically challenging method is to plan on drawing from the dorsal pedal (metatarsal) vein on the top of a hind foot (see Figure 2, Figure 4). Train the behavior in any area where one trainer can be in front of the bear, with a second person along side of the animal. A corner chute/hall or corner of a den or enclosure works well. Two positions can be used for this: either lying on the bear's side with a foot sticking out or sitting up, holding onto the mesh (Figure 4).



Fig. 4: With access to the hind foot, blood can be collected from the dorsal pedal vein.

(Photo: Becky Wanner, St. Louis Zoo)

and recommended to have two trainers for this: one to issue cues and rewards at the bear's head, another to work with the foot.

An alternate form of this method that works for smaller bears that will sit upright is to have them sit on a platform facing the mesh/bars (Figure 5). If shaped correctly through targeting into an upright position, the hind feet will pop forward through the bars, or panels/holes cut in for training. If the bear is comfortable (particularly being able to rest forepaws or grab onto something) and rewarded for maintaining this position, desensitization to touching the feet can occur. Provided the forelimbs cannot reach the trainer or vet, this can be a safe method and taught by one person.

Neck presentation: Working with the neck and jugular vein can be risky, but fast and rewarding with skilled veterinary staff. Positioning is simple: the goal is to have the bear present the underside of its neck. This method works well with chain link or mesh sided enclosures, where holes can be cut in that would permit access to the animal, but do not permit the bear to reach out and possibly injure someone. For safety, these holes

The lying down method works well for older individuals that may be uncomfortable sitting up, and for more grounded species like polar bears, grizzlies and Asiatic blacks (*Ursus thibetanus*). The final behavior for the side position has the animal lying on its side, allowing a hind foot to fall through bars or panels/holes cut into the side of the enclosure. Depending on the set up, a support may be needed for the foot to rest on for comfort of the bear. (e.g.: a small platform, or something as simple as an overturned five-gallon bucket works), and while the trainer directs the bear from the head, the foot can be safely manipulated on the platform. This method can be quickly trained by teaching an animal: target, down, roll over/side, hold. Gentle touch with a rod/pole to the hind foot (associate with a cue, to provide the bear information regarding what is about to happen) desensitizes to touch, and eventually will allow the foot to be drawn out onto the platform. Even better, teach the bear to touch a second target with the hind foot and put it out on cue. It is easiest

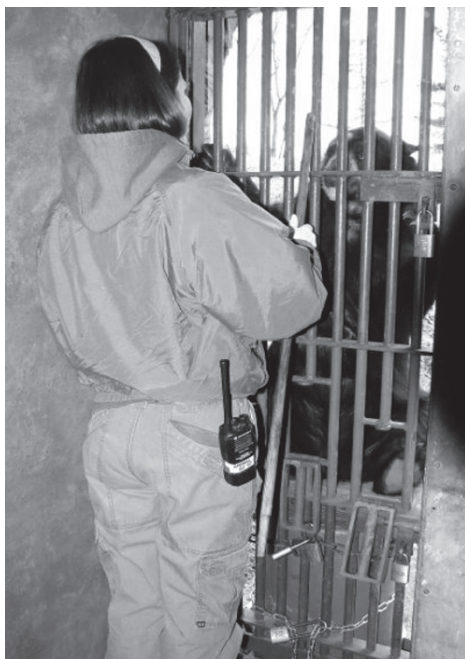


Fig. 5: The sit up position can be used for a dorsal pedal or jugular blood draw.

(Photo: David Morales, Queens Zoo)

can be covered with doors when not being used. The behavior can be accomplished once a few simple behaviors are taught: target, sit up, and hold. Once they are in an appropriate comfortable position, using a rod/pole gently touch the chest and add a cue for “neck”. Shape the bear into leaning forward into the chest target while extending the muzzle straight up or to the side by holding the pole slightly in front of the chest. If the animal moves toward the target, reinforce this behavior and approximate the chest to the desired location. If there is an appropriate opening at neck height, when the bear’s muzzle is safely pointed away, desensitization to touch can occur.

I would highly recommend assessing whether or not it would be feasible to train for foreleg or hind leg draws first. With the sensitivity of the jugular region and the potential for blood flow after a draw from the jugular, it is crucial that the trainer or the veterinarian are able to apply pressure to the site post-draw to close off blood flow. This extra time in the desired position needs to be factored into the training goals.

Be aware that with any of these positions the trainer (or designated assistant) should always be focused on keeping the animal’s attention. This is particularly important when another person is accessing any part of the animal’s body. One easy method is to periodically ask the bear to “Target” or perhaps present a paw while it is holding the position, and provide small rewards for complying. The bear will quickly learn that these small rewards will continue until you cue the release. This method also greatly increases the amount of time an animal is willing to remain static in one place.

Desensitization to the procedure: Once you have trained for a specific position and the bear reliably holds until released, desensitization to the venipuncture procedure can begin. Desensitization to new experiences is the key component at this point in the training, and requires a significant level of trust on both the trainer and the animal’s behalf. The people who will be involved in the blood draw itself need to be present regularly for training sessions. The bear needs to associate everyone involved with reinforcement, especially if the animal displays any learned aversive responses to veterinarians or equipment. The first thing to focus on is desensitization to having a person touch the intended collection site, adding in a cue to signal what is about to happen. Reward for not reacting or pulling away, until you can touch with no adverse response. Slowly increase pressure and duration until you are eventually able to apply significant pressure with a thumb, or with two fingers (firm, constant pressure, not a jab or poke). It is not recommended to use any form of device or tourniquet to tie off the area for a blood draw. If the animal pulls away they will take the device with them, which could be destroyed or possibly injure the animal. The person applying pressure can achieve a similar end.

Introduce the tools you will be using to the bears in a positive way, allowing them to see and smell them through the caging. This includes clippers, syringes, vacu-tubes, vet equipment/boxes. Reward any positive non-averse interactions. When the animal is comfortable, turn on the clippers, then off, then reward for desired behaviors until clippers can be run with no reaction. This process needs to occur for each step. Do not surprise the animal with novel objects or sensations. Once desensitization to the sight of the tools and people is complete, introduce the tools while the animal is holding the necessary position, and again reward cooperation. Touch the vibrating clippers to the area, and reward accordingly until you can shave the area for the blood draw. Introduce rubbing alcohol (or whatever disinfectant you will be using). The bear will react to the smell and the cooling sensation. Follow the same process as the pressure and clippers until minimal responses are observed. One side note: bear species (pandas in particular) that self-anoint (rubbing of appealing scents or odors into the fur of the body) may take longer to desensitize to disinfectants if the bear decides it likes the specific smell. Be patient.

Desensitization to the needle should start out with a pinch, or pressure with a fingernail. Reward desired responses, and move to a straightened paper clip or blunted needle attached to a syringe; be sure not to break the skin. When the bear holds position through the desensitization procedures, plan to perform the first stick with the gauge of needle you are eventually going to use for the

draws; quickly in, then out. Reward heavily for any level of cooperation. The gauge required by the veterinarian for the venipuncture procedure will likely vary based on their personal preference, but should remain within the 21-23-gauge range. If the needle is too small, cells can be damaged; too large and the site will need to have pressure applied for a longer time after the venipuncture to halt bleeding (personal interview: Zoo Atlanta veterinary staff). This will increase the length of time required for the bear to remain in one position, increasing the chance of premature or non-cued release. As sessions progress under veterinary supervision, reward for allowing the needle to remain in for longer periods before release. The blood draw can be done using a straight needle and syringe or a butterfly cannula, based on veterinary preference.

The final chain of behaviors will look something like: position (sleeve, side, and neck), hold, touch, clippers, disinfectant, pressure, needle stick, draw, clean, release. As long as the bear is holding position throughout, praise them with “good hold/stay” and rewards, and always provide a big, valued reward upon release at the end of a successful session. Always monitor the area after any type of needle use for irritation, infection, or hematoma. If something occurs, the blood draw training will allow you to easily treat any afflictions.

Conclusion

There are a few main points to take away from this paper. Communication between everyone involved, including the animals, is essential. Everyone should know what to expect, and have a clear idea of what is coming next in any training or blood draw session. Record progress, and do not be afraid to take a few steps back if things go awry. Records allow you to document the steps taken, which could help future trainers or with other animals. They also allow you to demonstrate to managers, coworkers, veterinarians and peers the value of behavior based training and management. The ideas presented here have proven successful, but are not exhaustive. Use these ideas and the feedback provided by your coworkers and the animals to shape your own successful program. Most importantly, keep the experience positive for yourself and the bear. Know who the bear is and what they need, and what you can do for them. If they want to cooperate, and working with you is engaging and rewarding, there is nothing you cannot accomplish together.

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