

Behaviors to train for veterinary care of important diseases and disorders in captive elephants



Elephants are susceptible to a variety of diseases and disorders. Some, like tuberculosis or herpes virus are caused by infectious agents. Others, like broken tusks or foot problems may be due to trauma or management. All elephants in captivity will require veterinary care during their life-times.

Veterinary procedures can be very stressful for elephants that are not used to them. In contrast, elephants that have received positive reinforcement training to facilitate veterinary care will cooperate with treatment procedures, thus reducing stress and making successful treatment more likely.

Elephants are highly intelligent social animals and enrichment is important to ensure their welfare in captivity. Positive reinforcement training is a highly enriching activity. Elephants are eager to learn new behaviors. Teaching elephants to cooperate for procedures that will be necessary when they become ill or injured can be life-saving.

Some of the major health problems of elephants are described below together with important behaviors that will provide elephants with the skills they will need to voluntarily cooperate with veterinary care. At the end of this document the type of medical interventions, the type of training and the frequency of training are summarized.

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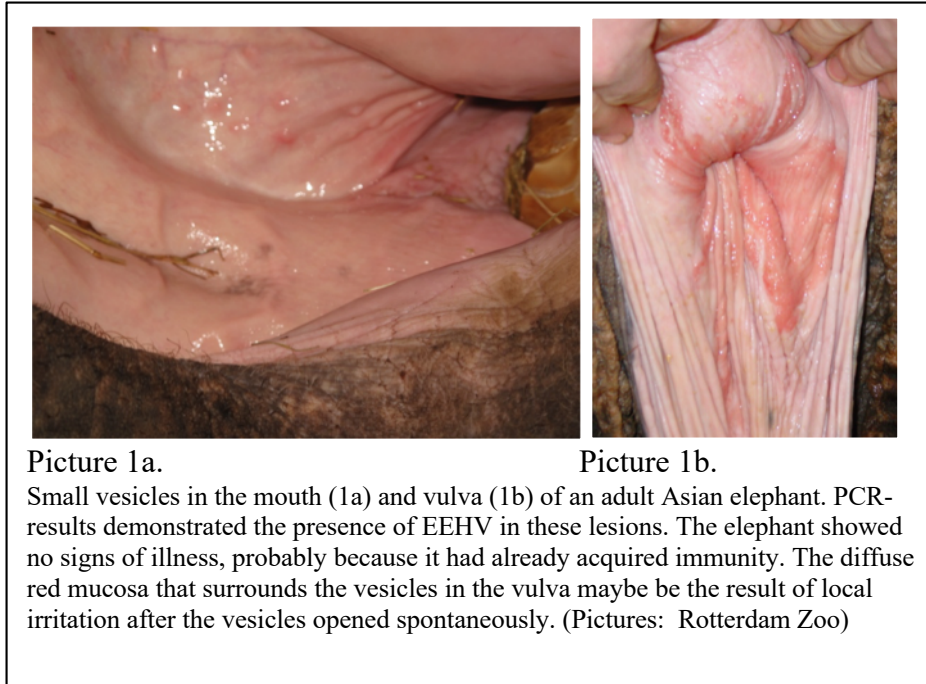
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Elephant Endotheliotropic Herpes Virus (EEHV)

EEHV is a virus that can cause serious disease in young elephants, between 1 and 8 years of age. EEHV-hemorrhagic disease is commonly fatal unless recognized early and treatment initiated immediately. Most elephants are carriers of EEHV and regularly shed the virus. It is not understood why some elephants become clinically ill and others do not.



Picture 1a.

Picture 1b.

Small vesicles in the mouth (1a) and vulva (1b) of an adult Asian elephant. PCR-results demonstrated the presence of EEHV in these lesions. The elephant showed no signs of illness, probably because it had already acquired immunity. The diffuse red mucosa that surrounds the vesicles in the vulva maybe be the result of local irritation after the vesicles opened spontaneously. (Pictures: Rotterdam Zoo)

Clinical signs caused by EEHV may include:

Usually **not** a life-threatening condition:

- Small vesicles in the mouth or vulva (probably only in immune elephants).

Life-threatening EEHV-hemorrhagic disease may present:

- Loss of appetite, depression
- Edema (swelling) in the head, neck, or forelegs
- Cyanosis (blue color) of the tongue
- Small hemorrhages on the tongue or in the mouth

It is important to realize that once signs are observed, the disease process is well underway and death is almost always imminent. We now know that a sudden decrease in monocytes and platelets occurs **before** we see any of the signs listed above. Platelets are the cells that help blood to clot. As they decrease to a critical level, hemorrhages start to occur throughout the body, damaging important organs like the heart, liver, kidney, and brain.

The sudden decrease of platelets is the first strong signal that we can detect before the elephant shows any signs of disease. Therefore, it is highly recommended to take small EDTA-blood samples every week from calves between 1 and 8 years of age and measure the number of platelets.

EEHV treatment is very intense and requires the cooperation of the elephant:

- Oral or intravenous anti-viral medications
- Anti-inflammatory drugs
- Administration of fluids (usually given rectally)
- 24-hour care



Picture 2. Edema in the head, neck and forelegs of a 3-yrs-old Asian elephant calf suffering of clinical EEHV-HD (Picture: Khajohnpat Boonprasert)



Picture 3. Small hemorrhages on the tongue of a 3-yrs-old Asian elephant calf suffering of clinical EEHV-HD (Picture: Khajohnpat Boonprasert)



Picture 4. Cyanosis of the tongue due to heart failure in a 3-yrs-old Asian elephant calf suffering of clinical EEHV-HD (Picture: Khajohnpat Boonprasert)

**For more detailed
information about
diagnosis and treatment
please refer to the
EEHV Guidelines
*for Asia***

What can elephant caretakers do to ensure that an elephant with EEHV-HD is diagnosed early and that the elephant will cooperate with treatment?

- Observe the behavior of the elephant:

Is there a change in its sleeping pattern? Is the animal too quiet? Is he less hungry? Does he show signs of pain in the abdomen? Is he suddenly showing signs of lameness (caused by bleedings in the joints). Are his head, neck or forelegs swollen? Are there any small bleedings in the tongue or the gums?

- Train the elephant from the age of 1 year to cooperate for the following veterinary activities:
 - a. Collection of blood samples from the ear: **Weekly training.**
 - b. Inspection of the entire oral cavity (entire tongue, gums: vesicles, bleedings, blue/purple color?): **Daily training.**
 - c. Removal of feces from the anus and rectum (to treat elephants for EEHV, large amounts of fluids must be given through the rectum). **Monthly training.**
 - d. Swallowing of bitter tasting tablets and pills (use a wooden mouth gag). **Bi-monthly training.**

Tuberculosis (TB)

Tuberculosis is a chronic bacterial disease that affects many mammalian species, including humans and elephants. The causative pathogen is Mycobacterium tuberculosis-complex. An elephant becomes infected by contact with people or another elephant that has TB. The time between when the elephant is infected and the occurrence of the first symptoms is variable and may be several years or sometimes even decades.

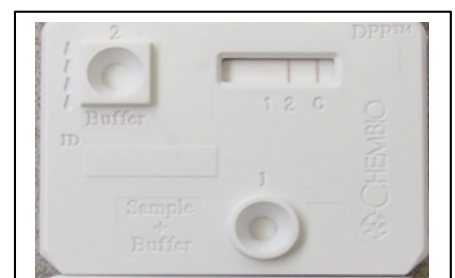
Clinical signs of TB may include:

- Weight loss
- Respiratory discharges
- Exercise intolerance

In most elephants, signs of TB are not seen until the disease is quite advanced.

TB can be difficult to diagnose.

The presence of active TB can only be determined in respiratory samples collected from the trunk (trunk wash). Trunk washes can easily be trained and are practiced in many zoos worldwide. The sample is sent to a laboratory that can culture TB-bacteria. Unfortunately, the ability of the trunk wash to accurately identify an infected elephants is very poor and many samples are needed. A negative culture result is no guarantee that the elephant is free of TB; it only tells us that there were no TB-bacteria in the sample at that particular moment. A positive result, however, is proof for a TB-infection and that the elephant is spreading the disease through its trunk by spraying or coughing.



Picture 5. DPP test showing one control line (C) and one line that represents a positive test result (2)

A blood test (the DPP VetTB test) has been shown to be an early indicator of TB. It is a screening test licensed in the U.S. It detects antibodies to TB, not the actual organism.

Elephants that are TB-culture positive form a risk for other elephants as well as for the people around and should not be kept with other elephants. The elephant care takers should be tested for TB and the elephant should be treated. The treatment is very long (12 months or longer) and costly. The same kind of antibiotics as used to treat TB in humans is also used to treat TB in elephants.

What can the elephant care takers do to prevent the elephants from becoming ill or even die from tuberculosis? And what can the caretakers do to make it possible to treat the elephant when he has become ill?

- Observe the elephant's body condition for weight loss
- Note any unusual discharges from the trunk
- Follow instructions regarding segregation of any elephants with confirmed or suspected TB
- People with active tuberculosis should not be in contact with elephants.
- Train the elephant to cooperate for the following veterinary activities:
 - e. Collection of blood samples from the ear: **Bi-monthly training.**
 - f. Trunk wash: **Monthly training**
 - g. Removal of feces from the anus and rectum (to treat elephants for Tuberculosis, antibiotics are often given through the rectum): **Monthly training.**
 - h. Swallowing of bitter tasting tablets and pills. **Bi-monthly training.**

Tetanus

Tetanus is an infection by bacteria that produce a toxin which causes uncontrolled, strong contractions and spasms of all the muscles of the body. The bacteria enter the body via a deep wound. This can be a small wound like when the elephant steps on a nail that penetrates the foot pad. When the first symptoms appear, treatment comes usually too late. Treatment consists of the administration of antitoxin injections and antibiotics, and sedation. Vaccination with a tetanus-vaccine developed for horses is well tolerated and provide protective immunity. Follow the instruction of the manufacturer of the vaccine. Elephants should be vaccinated annually.

What can the elephant caretakers do to prevent the elephants from becoming ill or even die of tetanus? And what can the caretakers do to make it possible to treat the elephant when he has become ill?

- Observe the elephant's behavior: any spasm of muscles must be reported. Especially the third eye lid must be checked.
- Train the elephant to cooperate for the following veterinary activities:
 - Allow intramuscular injection (vaccination): **Monthly training**

Molar problems

Elephants have one molar in each arcade. Each molar develops in the caudal part of the jaw and maxilla and moves slowly in anterior direction. The molar consists of several segments. When the new molar erupts, it pushes the old one forward and the anterior segments of the old molar will break off. Generally, one can observe 2 molars in each arcade: the old one in the front and the new one in the back. Sometimes the change of molars can be painful, as sharp edges can cause wounds on the gums around the molars. Molars can fracture or its roots can become infected. Sometimes a molar has grown in a wrong position (see picture 6). In that case it does not make contact with the opposite molar and will continue to grow. Mastication is disturbed and long, undigested fibers can be found in the feces (see picture 7).



Picture 6. Very long molars that showed no signs of wear because of their wrong position in the jaws. Picture: Willem



Picture 7. Long undigested fibers in the feces of an elephant with chronic molar problems. Picture: Willem Schaftenaar

What can the elephant caretakers do to prevent the elephants from becoming ill because of molar problems?

- Observe the elephant's feeding behavior: is he avoiding hard food items? Is the appetite reduced? Can the mouth be closed in a normal way? Are the feces normal?
- Train the elephant to cooperate for the following veterinary activities:
 - Oral examination: **Weekly training**

Tusk problems

The most common problem with tusks is a fracture. When the pulp cavity is opened, it will result in a bacterial infection of the pulp. If not treated properly, the tusk may die. Female elephants have small tusks that often fracture without any consequences.

What can the elephant caretakers do to prevent the elephants from becoming ill because of tusk problems?

- Inspect the tusks with special attention to the presence of cracks (fissures).
- Inspect the tusk base by lifting the skin flap (pus, infection, Cobboldia parasite eggs).
- Train the elephant to cooperate for the following veterinary activities:
 - Inspection and palpation of the tusks and the surrounding tissue: **Weekly training**

Foot problems

Foot problems are quite common in captive elephants. In captivity it is not always possible to duplicate natural conditions. Foot problems can result from inappropriate soil/substrate (too hard or too wet), insufficient exercise, stereotypic behavior, food quality, trauma.

What can the elephant caretakers do to prevent the elephants from becoming ill because of foot problems?

- Provide as much exercise as possible
- Inspect the legs and feet for abnormalities: swelling, pain, wounds
- Inspect the nails for cracks, abscesses and overgrown cuticles
- Train the elephant to cooperate for the following veterinary activities:
 - Raise foot and place on foot stand, wash foot, touch with foot care tools, allow trimming with foot care tools, duration of each component: **1-2 times per week training**
 - Place one foot in a bucket of hot water for several minutes (each time a different foot): **Monthly training**
- Inspect the pad for overgrowth and wounds
- Routinely file the nails
- Inspect the soles daily for stones

Medical behavior training

Table 1. Medical issues in captive elephants and the behaviors that elephants need to learn to allow diagnosis and treatment.

Medical Issue	Symptoms	Behaviors Needed for Diagnosis	Behaviors Needed For Treatment
EEHV	Change in sleeping pattern, lethargic or less energetic, not eating, pain in the abdomen, lameness or swelling in the head, neck or forelegs, something “off”	Oral Exam, Blood Draw	Accept Oral Meds, Rectal Fluids, Blood Draw (possible IV)
Tuberculosis	Ranging from no symptoms to chronic wasting	Blood Draw, Trunk Wash	Accept Oral meds, rectal fluids, rectal meds
Tetanus	Spasms of muscles (protrusion of third eyelid is often first symptom)	Observation (movements and third eye lid)	Injection (prevention)
Molar teeth	Food not masticated (long fibers in feces), lack of appetite, choosing softer forage,	Oral Exam	
Foot	Cracked nails, swelling, heat, injury, pad over growth,	Foot presents, Foot Work, Foot Soak	Same?
Tusk	Cracked or broken tusk	Tusk radiographs, allow touch the tusks	possible trim needed or injection for sedation
Eyes	Watery, cloudy, infiltrating blood vessels in (white) sclera	Eye open, pen light	Allow instillation of eye medications
Abscess	Swelling, painful and/or warm to touch	Lean in, allow touch of area	Application of hot compress, flushing after incision, debriding
Kidney disease	Weight loss	Urine collection, blood draw, transrectal ultrasonography	Accept blood draw, transrectal ultrasonography and urine collection on demand.

Table 2. Training schedule for captive elephants to allow a number of medical interventions needed for providing optimal health care

(Note: The frequency is to maintain the behavior, if the treatment calls for daily, then the behavior would be done daily.)

Medical intervention	Behavior Components	Frequency (once the behavior is fully trained)
Blood Draw	Lean in, Ear Present, Wash Ear, Disinfect Veins, Insert Needle, duration, remove needle	Full Blood draw - every other week. Approximations - 2x per week Calves <9 years should be bled once per week for EEHV-monitoring
Oral Exam	Trunk over head or wrapped around a bar, lower jaw dropped, cheeks pulled wide, tongue out, touch inside of mouth	Daily (until risk of EEHV is reduced) Adults (weekly)
Oral Medications	Open mouth, swallow on cue, open mouth again	Bi-monthly
Tusk treatment	Palpation of the tusks and surrounding tissue	Weekly
Rectal Fluids	Stand still, allow tail to be raised, allow hand to enter rectum while relaxed, fecal matter removed, hose inserted	Monthly
Foot care	Raise foot and place in foot portal, wash foot, touch with foot care tools, allow trimming with foot care tools, duration of each component	1-2 times per week unless there is an issue being addressed, daily to address issue
Trunk wash	Trunk presented to trainer, trainer hold trunk, pour saline down trunk, elephant raise trunk high, trunk returned to trainer, bag placed over trunk, elephant blow saline into bag.	Monthly
Palpation on any side of the body	Elephant allow the touching of every area on the body while holding in the position asked for by the trainer.	Several times per week
Eye examination	Lean in, allow eye lashes to be moved out of the way, keep eye open, and allow light to be shined in the eye	Monthly
Eye drops	Lean in, allow the eyelashes to be moved out of the way, keep eye open as saline or medication is placed in the eye.	Monthly

Foot Soak	Place foot in a bucket of treated hot water, duration	Monthly
Urine collection	Urine is typically collected opportunistically or from the floor. The only way to train urine collection is to capture the behavior while the elephant is urinating. Reinforce the elephant for urinating, then add a cue pairing it with the urination and reinforcement. Once paired successfully, the elephant will urinate when you give the cue. This is incredibly time consuming, however, the samples collected mid-stream are preferable to those collected from the floor.	Initially, daily training is advisable. Then, depending on the elephant, training could be reduced to weekly or bi-monthly. Once trained, the behavior needs to be requested periodically to be maintained.