CAPTIVE ELEPHANT FOOT CARE: NATURAL-HABITAT HUSBANDRY TECHNIQUES

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Many factors, including environment, diet, and management, determine the psychological and physical health of captive elephants. When these factors are suboptimal, resulting in stress, the captive elephant's response will manifest in disorders of the mind and/or body. The link between these disorders and an unhealthy environment, inadequate diet, or inferior management techniques is not always obvious; but often it is painfully obvious.

For the purpose of this chapter, "natural habitat" is defined as a vast space of diverse terrain and natural substrate, complete with wetlands, seeded and volunteer pastures, wooded areas, natural year-round water sources (including spring-fed ponds, washes, streams, and dry creek beds), and a wide range of live vegetation suitable for the species being maintained.

ENVIRONMENT Much of my experience has been with captive elephants in zoo and circus environments. Because many of these elephants are restrained by chains for many hours and housed in relatively small concrete or dirt yards or in barns with concrete floors, they will require more foot care than elephants living in a natural-habitat environment.

Freedom Versus Confinement Freedom of movement and access to a variety of natural substrates and live vegetation is essential for maintaining good foot health as well as optimal mental and physical well-being. Because an elephant in a natural-habitat environment is not confined to areas contaminated with waste and spends its day walking, eating, dusting, grazing, foraging, digging, bathing, and napping in a vast area, its psychological and physical needs are satisfied. In a confined situation, solid waste can be removed but liquid waste contaminates outside yards. The contaminated soil deteriorates foot pads and nails and harbors bacteria that can cause foot infection, which necessitates trimming. Unintended and frequent trimming can create a thin and/or smooth pad, providing little or no traction. As the pad becomes thinner, the chance of bruising and lameness increases. Foreign objects can easily penetrate a thin pad and become a site of bacterial infection.

Pastures and Natural Manicures In a natural-habitat environment, pastures can be a combination of both seeded and volunteer grasses. At The Elephant Sanctuary in Hohenwald, Tennessee, the pastures are comprised of fescue, Timothy hay, clover, sage, Japanese stilt, orchard grass, Johnson grass, Speroidea lespedeza, winter wheat, and bamboo. When grazing, elephants use their feet, specifically their toes, to strike and sever the bamboo or coarse blades of grass. This continual striking across the abrasive grasses benefits the feet by wearing the area between the toes, where nails and cuticles can overgrow. Routine grazing aids foot health by naturally manicuring cuticles and nails.

Even a moderately active elephant in a natural-habitat environment requires little foot care (as little as one to two hours each year). In captivity, poor foot health usually implies neglect, but minimal foot care is a by-product and benefit of the natural-habitat environment. One way to evaluate if the environment is in balance with the elephants' needs is with an examination of the condition of their feet, while also determining the amount of foot care required and how quickly their feet return to health after treatment. The time that is required for an unhealthy foot to return to health in a natural-habitat environment is relatively short. Minor pad and nail overgrowth and cracks will be alleviated within weeks. With attention to stress reduction and a healthy diet, a severely infected and overgrown foot can be completely healed within a few months. Not only is recovery complete, but also there is no chronic recurrence of the foot problem. Although the time of recovery alone may not be impressive, recognizing that little time is required for trimming is noteworthy.

Forests of Benefits In the natural habitat, trees provide a valuable source of nutrients as well as an opportunity for foot conditioning. Leaves, young branches, bark, and roots are all eaten on a regular basis, which supplements the elephants' mineral and nutritional requirements. In temperate regions, most vegetation becomes dormant during the winter and elephants spend more time foraging. An elephant will use one foot to secure a fallen tree while using the other to step on, smash, and tear away at the tree bark and root system. Tops and bottoms of the toes are utilized to pry the bark and roots from the tree. Often the foot and toes are used in a repetitive dragging motion that eventually disintegrates an area of the tree and enables the elephant to peel the bark or pull loose the root with its trunk. Every part of the foot and nail are used in this
activity, which helps prevent nails and cuticles from becoming overgrown.

**Working the Soil** Soil rich in minerals is also consumed by elephants in a natural-habitat environment. They use their feet, specifically their toes, to tear away vegetation and uncover and loosen the soil. When a particularly rich deposit is found, the elephants will focus on mineral excavation. Using their foot like a shovel, the elephant can unearth a large area in only a few minutes. This digging activity stimulates blood flow, works the muscles, tendons, and joints of the foot, and wears the pads and nails.

**The Benefit of Creeks** A creek bed is composed of many different sized rocks, from boulders to grains of sand. Some areas are dry, while others are spring-fed and flow year round. With this variation in substrate, the elephant's entire foot gets a good workout as the animal walks over and drags its feet through the rocks. In addition to walking through the creek bed, elephants spend a great deal of time digging. When they find a sand pit, they sink their feet in deep, twisting each foot back and forth. This movement is equivalent to the elephant wearing a sandpaper mitten on its foot and benefits the foot by removing debris from the nails and pad. When the elephant exits the creek bed, its feet become coated with mud, which conditions the elephant’s foot and protects it from becoming dry and brittle.

**Moisture Is Good** In a natural-habitat environment, an elephant’s feet are seldom completely dry. The time that an elephant is in the barn should be the only time that their feet are not exposed to moisture. The idea that an elephant’s feet must be kept dry in order to remain healthy is a misconception. Actually, noncontaminated moisture benefits their feet and helps to maintain a healthy pad. The moisture that the feet are exposed to during a day spent walking across pastures and through washes and streams is essential for optimum foot health. When an elephant’s foot is depleted of moisture by unnatural surfaces, such as concrete, the pad becomes dry and brittle and problems can develop.

Most natural substrates contain moisture, and live vegetation retains moisture inside and out. Even on a hot summer day, moisture can be felt in the undergrowth of healthy pastures. In a natural-habitat environment, the majority of the elephant’s walking hours is spent walking through moist areas. The moisture does not contribute to the decay of the foot pad but acts as a conditioner, softening dry areas and keeping the pad healthy. As the pad becomes more supple, foreign material will dislodge and overgrown areas will wear down. Any debris that has accumulated on the foot will be washed clean as the elephant moves through water. While in a pond or stream, moving the foot over and through natural substrates further aids in removal of embedded objects and debris.

**DIET** Poor diet and/or poor assimilation of nutrients is reflected in an elephant’s foot condition. Slow growing nails and pads, nails prone to splits or cracks, excessively thin pads, and soft nails can all be the result of a poor diet or a diet that requires significant energy to digest.

In a specific case, an elephant, which had suffered low body weight for 10 years and was kept in a confined situation, did not have sufficient nail growth in 5 years to necessitate trimming because the nails and pads were not growing at a normal rate. Blood work supported the fact that this animal was not able to fully use its nutritional intake, which resulted in low body weight and overall poor body function and condition. When she was moved to a natural-habitat environment and her dietary deficiencies were addressed, she began to assimilate nutrients and the condition of her feet improved within weeks. Not only were normal nail and pad growth observed, but also nails and pads that previously had been soft and spongy became supple and healthy.

**MANAGEMENT** In a natural-habitat environment, the elephant is never chained. Free-choice access to the indoor facility enables the elephant to come and go at will. With free-choice access, elephants spend the majority of their time engaged in activities on natural substrate. With the absence of concrete, their nails and pads remain supple, nor dry. Pads wear in an even fashion, leaving the necessary amount of texture to ensure traction for daily activity. Infected crevices and tracks do not develop. Legs and feet do not become fatigued nor do joints stiffen, as is observed in chained elephants that are forced to stand for long periods of time on concrete. Chaining has many negative effects on foot health. Not only are elephants forced to stand in their own excrement, but they also rock and sway unnaturally. This movement applies torque pressure on feet and nails, which can cause tissue damage as well as irregular wear and thin foot pads.

**CASE HISTORY** Jenny is a female Asian elephant born in 1970 in Southeast Asia. She was trained for the circus, where she performed for 26 years. Jenny arrived at The Elephant Sanctuary in Hohenwald, Tennessee, on 26 September 1996. The Elephant Sanctuary is the nation’s first natural-habitat refuge for old or sick elephants retired from zoos and circuses. Jenny arrived in poor physical health but with a stable mental condition. Her captive life had been spent traveling and performing in circuses.

On arrival at the Sanctuary, Jenny’s pads and nails were severely overgrown. Her pads were spongy and had numerous infected tracks, 1 inch wide and several inches deep (Figure 6.1). Her cuticles were 1 inch long, dry, and cracked. Several nails were 2 to 4 inches overgrown; five nails were severely infected and appeared...
to be sloughing. The heels of her pads were dry and split with deep vertical cracks.

The deteriorated and infected condition of Jenny's feet appeared to be causing her extreme pain. Her behavior pattern after arrival was to lie down every 20 to 30 minutes to avoid the pain she experienced while standing. At every opportunity, Jenny would submerge in one of the ponds or the creek. The cool water appeared to help relieve her pain, and because she was buoyant, she was not putting weight on her feet. As days passed, Jenny showed marked improvement, indicated by less time spent reclining and the recovering condition of her pads and nails.

Jenny was conditioned to place her infected feet into tubs of lukewarm, diluted apple cider vinegar twice a day. Being a natural remedy, apple cider vinegar works exceptionally well in stopping infection as well as conditioning the flesh of the foot. After the initial soaking, necrotic tissue was trimmed to expose the infected areas. During a series of three trimmings over a 6-week period, more than 2 inches of foot pad was removed. Following the foot soaks and trimmings, Kopertox was applied generously. Immediately following treatments, Jenny was released into a 40-acre natural-habitat yard. Her daily activity included mud bath excavation, spring water swims, digging, dusting, napping, grazing, foraging, and tree felling. Over the course of each day, Jenny walked many miles, repeatedly submerged herself in fresh water, and moved several hundred pounds of earth and vegetation.

Pad trimming was discontinued after three sessions (6 weeks). Daily Kopertox application continued for 6 months, and apple cider vinegar soaks continued for 1 year. Jenny's pads have required no further trimming since her arrival 2 years ago. Her pads and nails remain at optimum length and condition and have shown no cracks, splits, overgrowth, or infections. Her pads and nails are supple and healthy (Figure 6.2).

ENVIRONMENT, DIET, AND MANAGEMENT
When a natural-habitat existence is not possible, every effort can be made to imitate the environment and diet of the wild. Natural substrates can be added. For indoor facilities, floors can be remodeled with a more suitable surface. Diets can be modified to include live vegetation and daily supplements of fresh-cut browse. With minimal effort, most facilities can be converted to a chain-free management system. Diminishing stress by attending to the natural and basic needs of the elephant will help to ensure healthy feet as well as overall mental and physical well-being.