

A REVIEW of RHINO FOOT PROBLEMS

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Captive rhinos are vulnerable to many serious and life-threatening diseases and conditions: hemolytic anemia, fungal pneumonia, idiopathic hemorrhagic vasculopathy syndrome (IHVS), and ulcerative dermatitis, to name a few. It is almost surprising in animals of such size, weight, and activity levels, that rhinos do not suffer from major foot diseases more frequently. The rhino foot is subject to many stressors such as trauma, substrate impact, climate, obesity, and nutritional imbalances. Conditions that cause lameness affect the quality of life, inhibit breeding programs, and may lead to more serious illnesses.

The Fort Worth Zoo exhibits three species of rhino, Black, White, and Greater One-Horned. This discussion will focus on foot problems we have experienced over the past ten years : nail cracks, laminitis, and chronic foot disease.

Early detection by daily observations of the feet and gait is important. Rhinos in zoos are usually tractable and will often cooperate with invasive procedures such as foot trimming and even blood collection without immobilization. Building a relationship based on trust allows keepers to form bonds with their animals which will assist with treatment options. Conditioning and consistent training are also valuable tools in manipulating behaviors and communicating with the rhinos.

Prevention is undoubtedly the first step in dealing with foot conditions and literally begins from the ground up. Suitable substrate is vital to the health of the rhino foot since extremely hard or abrasive surfaces can damage the soles and nails. Routinely wet or muddy enclosures can be a source of infections or overgrowth from lack of normal wear. Year round access to a combination of smooth, firm ground and softer, grassy areas with good drainage would be ideal. In addition, pools or mud wallows which can be drained are essential. Ample opportunity for exercise is beneficial for natural trimming of the nails, weight control, and stress reduction. When rhinos are confined to winter quarters, behavioral enrichment helps reduce stereotypic pacing, pawing, and swaying by relieving boredom and stress. Heavy duty rubber matting and abundant bedding provide protection from concrete flooring. Proper nutrition also has a direct bearing on the overall health of rhinos, and a deficiency or imbalance in vitamins, minerals, protein, and fats may compromise the condition of skin and nails.

Nail Cracks :

The most common problem seen in all species is vertical cracking in the nail wall, which can range from mild quarter cracks to more extensive splitting up to the corona. Trauma to the bottom of the nail or the coronary band can generate cracks, and concrete flooring aggravates this by wearing and thinning the nail walls of the lateral toes while the rhino is laying down.

Hooves have a natural waterproof, external layer called the periople which provides a protective coating and regulates evaporation or absorption. The periople can be damaged by concrete, sandy soils, chemicals, or improper filing. Dry, brittle nails lose resiliency and are more prone to splitting. Excess moisture can also cause damage. This moisture balance is influenced by the external environment or affected by an inappropriate diet. Less prevalent are horizontal cracks in the nail which may occur after a serious illness, laminitis, or nutritional disorder.

Treatment for cracked nails starts with cleaning the foot and carefully removing mud, grit, or feces. This allows for closer inspection and keeps debris from wedging and opening the crack further. Topical antiseptics may be prescribed to prevent infection. Commercial hoof dressings should only be used with veterinary approval since some of these products contain turpentine or petroleum compounds, and the splitting nails may not be caused by dryness. Corrective trimming by experienced personnel could be used to relieve pressure on the bottom of the nail and enable the crack to grow out. However, by making changes in environment and husbandry most of these cracks can be allowed to grow out without intervention.

Laminitis :

Also referred to as founder, laminitis is a metabolic and vascular disease which can affect rhinos and other hoofstock. The disease begins when the blood supply to the corium, the sensitive laminae of the foot, is interrupted. Damage to the coronary corium causes bands of irregular horn growth called laminitic rings. In severe cases the union between the horny and sensitive laminae breaks down and progresses to separation of the nail at the coronary band. Some common causes of this disease are excessive feeding of concentrates, enteritis, chronic renal failure, and IHVS.

An occurrence of laminitis at the Fort Worth Zoo resulted from a case of IHVS in a Black rhino. IHVS is identified by acute swelling of the neck, shoulders and limbs, lameness, oral or nasal ulceration and non-hemolytic anemia. The first signs of laminitis are lameness and inflammation or discharge at the coronary band. Gradually a gap appears at the top of the nail. It is possible for the affected nail to remain while the new nail grows and displaces it. With total separation the nail is only attached at the sole and tends to fold under the foot as the rhino walks. In this case, the nail is removed under anesthesia. Post-op treatments include good hygiene, keeping the foot and exposed laminae clean, topical antiseptics and pain management. New nail growth is usually completed in six months.

Chronic Foot Disease :

Chronic foot disease (CFD) involving the sole or nail/sole junction is a common problem in Greater One-Horned rhinos and can become a significant disability. According to an international survey conducted in 1996, this disease affects nearly twenty-five percent of the captive population. Male rhinos are twice as likely to suffer from CFD as females. CFD usually occurs in one or both hind feet, but all four feet are vulnerable.

The primary characteristics of CFD are fissures in the foot pad behind the middle toe and excessive tissue growth between the toes. These cracks in the pad initially appear as ragged edges of overgrown sole. Trauma to the loose edges expands the opening and promotes separation, with resulting scar tissue. The lesions may be exposed to secondary bacterial infection due to their location. A majority of cases also document overgrowth of the toenails, although it is not certain whether this is a cause or a consequence of pad separation. Pain associated with CFD will cause lameness or frequent weight shifting from the affected feet. Pressure sores on the flanks also develop due to the animal's reluctance to stand.

Various reasons are proposed as the cause of this disease. Overgrowth of the toenails is cited as a source of infection and fissure development, promoted by wet, muddy enclosures. These elongated nails may put added stress on an area of the pad which is inherently weaker. Another possible cause of CFD is persistent trauma to the feet from abrasive or extremely hard surfaces such as stony ground or concrete. The higher incidence in males may be explained by their greater weight, and increased agitation and mounting when females are in estrus. It has also been suggested that a lack of humidity in heated winter quarters can reduce the elasticity of the foot pads. Since the natural habitat of the Greater One-Horned rhino is grassland in flood plains, limited access to pools for wallowing may contribute to chronic foot disease.

Treatment for CFD is complicated by the location of the lesions and the temperament of the rhinos. Training the rhinos to accept routine footwork such as trimming and applying topical medications is very important and may prevent the need for more drastic surgery under chemical immobilization. Boots and bandages have been tried but do not last and can increase the risk of infections. Providing soft surfaces such as deep sand and twenty-four hour access to pools aids the healing process and assists in prevention of future episodes.

As the name implies, CFD can become a lifelong problem for the Greater One-Horned rhino. It can result in deep seated soft tissue and bone infections needing multiple veterinary interventions, can interfere with breeding programs, and in severe instances can cause the death of the animal. Knowledge and use of appropriate management is essential for the prevention of chronic foot disease.

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