

Medical Management of Traumatic Toe Wall Injuries in a Southern White Rhinoceros (*Ceratotherium simum simum*)

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As the world's human population expands rapidly, the search for food and fuel continues to cause the destruction of natural habitats around the world. It has become apparent that animal breeding facilities may provide the last refuge to species faced with possible extinction. This has placed increasing responsibility on successful management of these animals in captivity.

White Oak Plantation, a private rare animal breeding center in northeast Florida, currently houses 2.2 Southern white rhinoceros (*Ceratotherium simum simum*), in a four-acre enclosure.

On 11 August, 1989, a 23-year-old Southern white rhinoceros was observed to have a non-weight bearing right hindlimb lameness of sudden onset. After cleaning the foot with water, a closer examination revealed that the outer wall of the right hind medial toe was missing, leaving the sensitive laminae exposed. The left hind medial toe was significantly overgrown and has been previously noted to step on the opposite foot; therefore, it was believed that the injury may have been self-induced.

The injured rhinoceros was isolated in a piped fence corral, but remained in visual contact with the male and female rhinoceros she had been kept with previously. Therapy consisted of Trimethoprim-sulfa (Tribrissen®) at a dosage of 20mg/kg (75 960mg) tablets twice daily for 7 days. Flunixin meglumin (Banamine® granules (1500mg) were given once daily for 3 days. Both medications were placed in the animal's pelleted feed and were readily consumed. Local treatment to the injured toe consisted of cleaning with hose water and then applying a 1% Betadine® solution via a spray bottle. Nitrofurazone (Topazone®) antibiotic spray and a fly repellent were applied to the area once it was dry.

To protect the injured toe from further trauma, a kickplate was developed. The plate was designed to be durable enough to withstand pressure from the other foot, facilitate easy cleaning and treatment and be lightweight so that the animal's normal movements were not hampered when the plate was in place. The kickplate was fashioned from the sides of a hard plastic feed bowl. A band of flexible rubber was riveted to the kickplate and secured around the animal's ankle by a rubber coated cable. The plate was utilized for a 30-day period until the outer wall of the toe had significant growth and the rhinoceros was no longer lame.

Two months after the initial injury the rhinoceros developed an intermittent watery stool with excessive flatulence. Three negative fecal flotations were performed to rule out gastrointestinal parasites. A wet mount of fresh feces revealed normal protozoal flora. The intermittent stool continued for 4 weeks. It was decided, at this point, to immobilize the animal to trim overgrown hooves and to further work-up the chronic diarrhea.

Azaperone (Stresnil®), a tranquilizing agent in the Butyrophenone family of drugs was administered IM at a dose of 160mg. The maximum effect of the drug appears to be between 15-30 minutes in the Southern white rhinoceros. Etorphine (M99®), at a dosage of 2mg, was administered IM via a dart 20 minutes after the Azaperone. Within 10 minutes the rhinoceros was in an extremely sedate standing position. A forklift, with a 5ft by 8ft platform, was maneuvered alongside the sedate animal. Pressure was exerted on the right side of the rhinoceros so that she fell into left lateral recumbancy. Ropes were placed to secure the animal and she was raised to a comfortable working level. At this time the rhinoceros still had considerable leg movement, thus Azaperone was administered IV. This provided a good plane of anesthesia for the procedures that needed to be performed. An IV catheter was placed to allow fluids to be administered throughout the anesthesia and to allow emergency drugs to be given rapidly, if needed. Nasal oxygen was provided throughout the anesthesia and the animal's heart rate and rhythm were monitored with an electrocardiogram.

The hooves were trimmed by using nippers to remove the large portions of the overgrown nail and followed with an electric grinder using a 36 grit pad. Utilizing the grinder significantly reduces the trimming time and provides a better end result when compared with hand trimming.

Blood was drawn from an ear vein for a complete blood count, serum biochemical profile, an equine viral serology screen and mycobacterium pseudotuberculosis, leptospirosis and encephalomyocarditis titers. A rectal biopsy was performed. Several pieces of rectal tissue were submitted for histopathology and special stains. Fresh feces were collected for salmonella, mycobacterium and pseudotuberculosis cultures.

A physical examination revealed the injured toe to be completely healed with no other abnormalities. After a 90 minute down time, 4mg of Duprenorphine (M50-50®) was administered IV. The animal was standing in 10 minutes. All laboratory work was unremarkable except for an elevated eosinophil count and a high leptospirosis titer. A leptospirosis titer was performed on banked serum from a previous immobilization revealing the same titer. Since there was no rise in the titer, the initial high titer was thought to be insignificant.

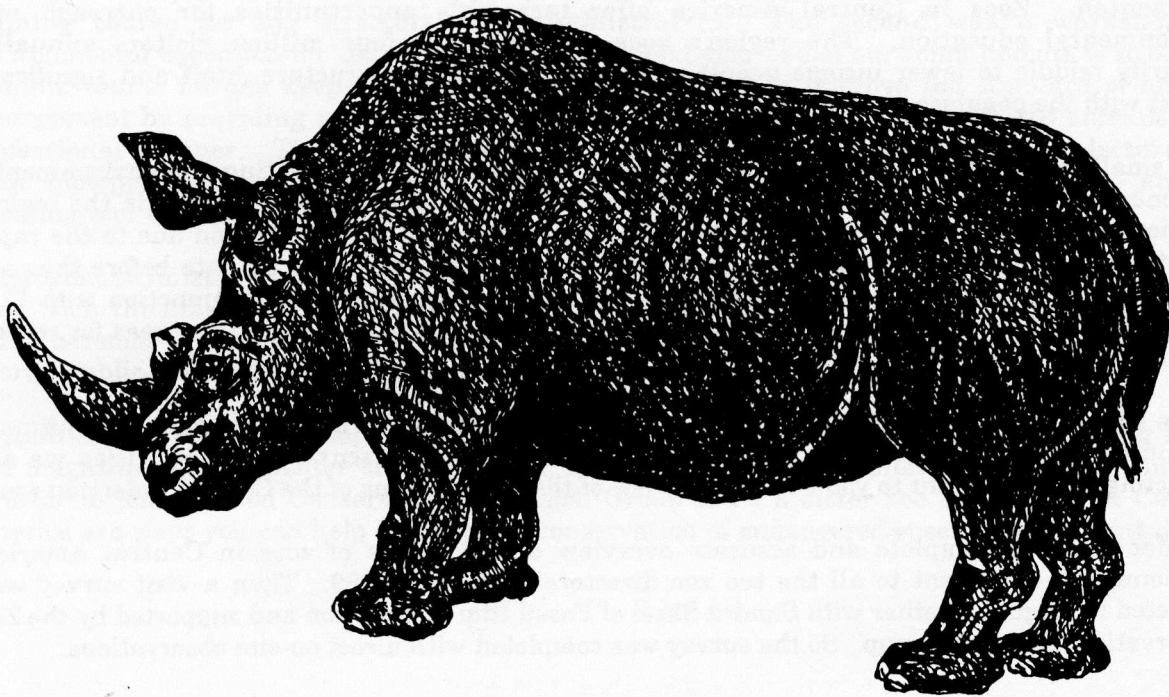
The animal was reintroduced to its pen mates 10 days later. Several months later the loose stools had resolved. The stress of isolation may have contributed to the abnormal stools.

Eight months after the initial injury, the rhinoceros was found with the entire outer wall of the right front foot torn away and hanging by a flap of skin exposing the sensitive laminae. She was extremely lame and in obvious pain. Since the injury was on the right front lateral toe, it was thought to have been caused by one of the other rhinoceros stepping on her toe. The next morning the rhinoceros was immobilized for further evaluation. Since she was already in sternal recumbancy, Azaperone was administered at a dose of 160mg by hand injection. After 15 minutes, 1mg Etorphine was administered IV via the ear vein. The toe was cleaned with hose water and a 1% Betadine® solution. The skin holding the outer wall was incised to allow it to be removed. Betadine® gauze was placed on the exposed laminae and the toe was bandaged with roll gauze, elasticon and duct tape. Banamine® (at a dosage of 20ml) was given IV to aid in reducing inflammation and to control pain. The rhinoceros was vaccinated with a 4-way vaccine (EEE, WEE, influenza, tetanus) which included tetanus toxoid. After 80 minutes, Diprenorphine was administered at a dosage of 2mg IV and 1mgSQ. The animal's head was up in 10 minutes, however, she did not stand up due to the pain.

The next day the animal was walked into a cable enclosed concrete slab to allow the bandage to stay dry and clean. The bandage was removed after 3 days and the toe was cleaned with hose water and a 1% Betadine® solution. A Furacin antibiotic spray and fly ointment were then applied.

The outer wall had significant growth by 10 days following the injury. The animal was allowed off the concrete slab after 14 days, however, cleaning continued for 16 additional days. At 30 days following the initial injury, the lameness was no longer evident and all treatment was discontinued. To this date, 6 months after the second injury, the rhinoceros remains clinically normal.

With the development of modern veterinary medical programs and the combining of these with innovative animal management techniques, the once trial and error veterinary management of large artiodactylids is becoming more and more of a predictable science.



GY Yoshimura
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