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Repair of a Non-union Radius and Ulna Fracture in a Timber Wolf (*Canis lupus*)

By Mitchell Bush, L. M. Neeley and Clinton W. Gray, Washington

With 3 Figures

Abstract

The surgical correction of a non-union radius and ulna fracture in a female timber wolf is described. A 3 month conservative treatment of the compounded comminuted fracture by splinting failed due to a bone defect. A rib graft was utilized to fill the defect and the fracture site was stabilized by extensive internal and external fixation.

History

An adult breeding female timber wolf was reported to have suffered a broken leg. On visual examination there was a compound fracture of the right radius and ulna. The wolf was excited and fence-running, continually traumatizing the fracture site with resulting hemorrhage. Restraint for examination was obtained with 25 mg promazine, 25 mg phencyclidine, and 0.6 mg atropine delivered by a projectile dart.[1]

Initial treatment

The wolf was intubated and anaesthesia was maintained with halothane and nitrous oxide. The injured leg was clipped, washed, and the major lacerations were approximated with interrupted sutures. Radiographs of the leg revealed a comminuted fracture of the radius and ulna. Due to gross contamination of the fracture site internal fixation was not attempted at this time. An external coaptation splint was applied to stabilize the fracture and allow the skin wounds to heal before attempting internal fixation. The animal was given oral antibiotics in her food.

Course of treatment

The initial cast was not tolerated and was severely chewed. It was replaced by a plaster of Paris cast which was also multilated by chewing. A Modified S—T splint was then applied over the plaster cast and the wolf received tranquilizers orally until she accepted the cast.

The wolf was restrained at 7—10 day intervals by an injection of phencyclidine and promazine via a projectile dart for examination and splint change. The plaster coaptation splint was replaced with an Orthoplast[2] coaptation cast after 6 weeks. The lacerations were sutured periodically as required.

Three months following the fracture the wolf was immobilized and the fracture site palpated and radiographed. The leg wounds and pressure sores from the splint had healed. The wolf was in good physical condition with the exception of a marked disuse atrophy of the right shoulder muscles. There was a nonunion of the fracture.

[1] Palmer Chemical and Equipment Co., Douglasville, Georgia 30134.

[2] Johnson and Johnson, New Brunswick, New Jersey.

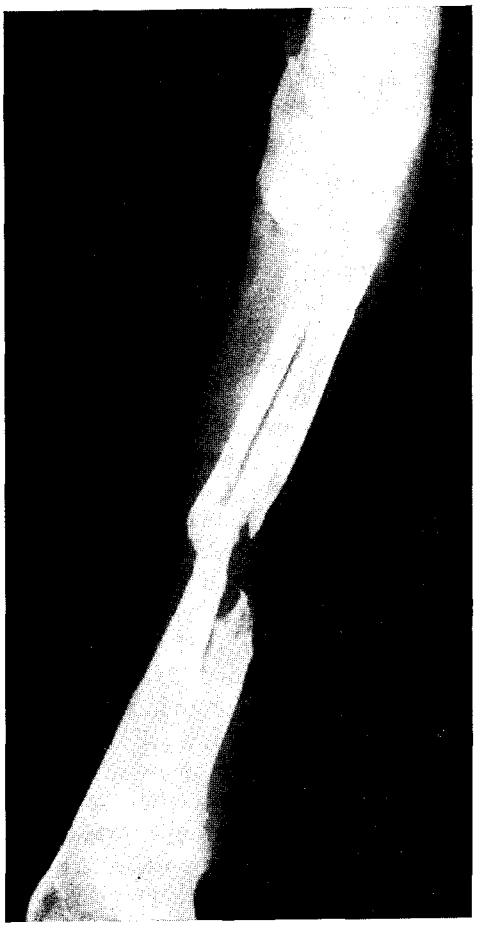

Fig. 1

Fig. 2

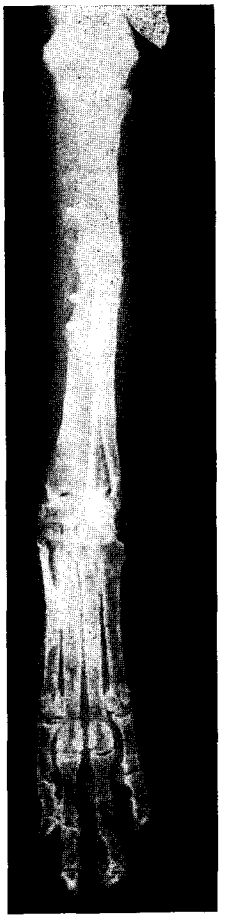

Fig. 3

Fig. 1. The right foreleg of an adult female Timber wolf (*Cania lupus*). This radiograph was taken 3 months following the fracture. Note the defect in the radius and the fibrous callous of the ulna

Fig. 2. Post-operative radiograph of the female Timber wolf showing an IM ulnar pin. The bone plate is bridging the radial defect. Note the bone chips of the rib graft filling the defect

Fig. 3. Anterior-posterior radiograph of the female Timber wolf 8 weeks post operative. Note increased density in the area of the previous radial defect

The radiograph showed a fibrous callous of the ulna and an 8 cm defect of bone missing from the midshaft of the radius (Fig. 1). It was apparent that surgical intervention would be necessary to re-establish function.

Surgery

Anaesthesia — Restraint with phencyclidine and promazine was sufficient to allow tracheal intubation. General anaesthesia was established and maintained with halothane and nitrous oxide.

Surgery — The right foreleg and the area over the right 7th rib was clipped, washed, and draped for surgery. The 7th rib was removed by making an incision through the periosteum and reflecting it. The rib was placed on a sterile saline moistened sponge and covered until it was to be used. The periosteum was closed with continuous 000 chromic catgut and the skin was closed routinely.

The radius and ulna fracture sites were exposed through a lateral incision. Extensive fibrous callouses were broken down at both fracture sites and the ends of the bones were debrided.

A Steinman pin was placed in the ulna in a retrograde manner. The density of the ulna was less than expected. The radius was exposed and a 6 hole bone plate was secured with 2 screws in each end of the radius. The center 2 holes could not be utilized due to the defect. An cancellous screw was used on the distal fragment because the regular screw thread became stripped in the less dense bone.

The rib was minced and packed in the radius defect and around the ulna fracture. The skin was closed routinely and post operative radiographs were taken (Fig. 2). Fixation was solid and the leg was placed in a reinforced "orthoplast" spling molded to her foot and covered with a Modified S-T splint. Recovery from anaesthesia was slightly prolonged but uneventful and the wolf was maintained on oral antibiotics.

Post-Surgical care

The splints were changed at weekly intervals or more frequently if required.

At 8 weeks post-op, the fracture site was solid and radiographed (Fig. 3). The pin in the ulna was removed 10 weeks post-op and the splints were replaced. At 12 weeks post-op the splints were removed and 3 weeks later she was seen touching the foot to the ground. She was released into the collection and is continuing to make a satisfactory recovery.

The gratifying recovery in this case resulted from the ability to apply orthopedic techniques and materials to exotic animal surgery. The use of immobilizing drugs was also a key factor in the successful outcome. The animal was immobilized a total of 21 times with moderate tolerance developing to phencyclidine necessitating a dosage increase of 25%.

The fracture site fixation following the surgical procedure required a combination of stablizing splints which had to be monitored closely to prevent the development of pressure sores in an intractable patient.

Dr. Mitchell Bush,
L. M. Neeley,
Dr. Clinton W. Gray
National Zoological Park
Smithsonian Institution
Washington, D.C. 20009 (USA)