

# ELBOW ARTHRODESIS IN A BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*)



Douglas W. Folland, DVM, Dip. ABVP (Avian), M. Scott Echols, DVM, Dip. ABVP (Avian), and Michiko Wallace, CVT

## Abstract

An adult female bald eagle (*Haliaeetus leucocephalus*) of unknown age sustained a fractured right humerus and following surgical repair was deemed nonreleasable because of an inability to sustain flight accompanied by a severe wing droop. After relocation to a public aviary for display, the bird repeatedly caused self-inflicted wounds from standing on the malpositioned wing. Owing to the inability to hold the elbow in flexion, the bird would step on the distal aspect of the right wing with the talons causing deep penetrating wounds. Physical examination of the affected wing revealed no cause for the wing droop. Radiographic images revealed a healed fracture of the right humerus with significant remodeling of the bone around the injury. No other lesions were noted. Attempted arthrodesis of the elbow using cross pins and type I external fixators to immobilize the joint failed. The procedure was repeated with modifications of lag screws to fix the elbow and immobilization of the joint with intramedullary pins, which provided successful arthrodesis. The surgical intervention allowed the bird to avoid amputation, and after 5 years there has been no further incident of self-inflicted wing injury. Copyright 2016 Elsevier Inc. All rights reserved.

**Key words:** bald eagle; orthopedic surgery; elbow; arthrodesis

**A** 4.67-kg adult female bald eagle (*Haliaeetus leucocephalus*) of unknown age was examined for multiple abrasions and punctures on the distal right wing. Before presentation at the rehabilitation facility, the bird had sustained a wing injury, cause unknown. A spiral fracture of the right proximal humerus was repaired with a small titanium plate and external fixator, and she received supportive care while the injury healed. Osteomyelitis developed at the fracture site, which required 2 additional surgical procedures to treat and manage. Once healed, the eagle was deemed nonreleasable because of an inability to sustain flight and a marked drooping of the wing. Prolonged physical therapy produced no improvement in the wing malposition. The bird was transferred to a public aviary to be used as a display animal. At the new facility, the bird would accidentally step on the distal aspect of her right wing, with the talons causing abrasions and penetrating wounds. The injuries occurred more frequently when the animal was excited. The reoccurring injuries were noted multiple times over a 1-year period, necessitating bandaging the wing and treating the wounds for several weeks. Additionally, minor self-inflicted injuries were diagnosed but did not require medical treatment. At the time of presentation for the repeating wing wounds, the eagle had been in captivity for approximately 2 years.

A variety of modifications were made to the bird's enclosure in an attempt to mitigate the inciting causes of her excitement and subsequent

injury, without success. It was decided that a permanent solution to the drooping wing was necessary. A possible solution being considered

From the Parrish Creek Veterinary Clinic, Centerville, UT USA; and the Tracy Aviary, Salt Lake City, UT USA  
Address correspondence to Douglas W. Folland, DVM, Dip. ABVP (Avian), Parrish Creek Veterinary Clinic, 86N 70 West St., Centerville, UT 84014. E-mail: [dfolland@parrishcreekvet.com](mailto:dfolland@parrishcreekvet.com)  
© 2016 Elsevier Inc. All rights reserved.  
1557-5063/16/2101-\$30.00  
<http://dx.doi.org/10.1053/j.jepm.2016.05.003>

included identifying and correcting the underlying cause of the wing malposition, along with treatment options (e.g., ankyloses of the elbow, wing amputation, and arthrodesis). Initially, the wing was placed in a figure-of-8 bandage for 8 weeks with the hope of inducing sufficient elbow ankyloses to prevent the wing droop, but there was no improvement in the wing position once the bandage was removed. Radiographic images revealed a healed fracture of right proximal humerus that appeared to be in good alignment, but the cortical structure of bone was thin and irregular with the head of the humerus flattened. These skeletal abnormalities were believed to be associated with the previous bouts of osteomyelitis affecting those structures, but there was no evidence of active bone infection. No other skeletal abnormalities were noted. It was presumed that soft tissue injuries in the area of the fracture were responsible for the inability to hold the elbow in flexion. No specific, correctable cause for the wing droop was identified. Partial wing amputation, distal to the elbow in accordance with United States Fish and Wildlife regulations, was considered. Owing to the excitable disposition of the bird, there were concerns that amputation at or distal to the elbow would be susceptible to chronic traumatic injury at the surgery site. The authors have seen chronic trauma to the distal amputated margin of an amputated wing in other large birds of prey that required prolonged treatment and, occasionally, additional surgical intervention. Additionally, all involved believed the bird's use as a display animal would be best served with an intact wing. It was decided that arthrodesis of the elbow had the greatest chance of both eliminating repeated wing injuries and allowing for an intact bald eagle for display.

A preanesthetic injection of butorphanol 2 mg/kg (Butorphanol; Lloyd Laboratories, Inc, Shenandoah, IA USA), intramuscular was administered. General anesthesia was induced with 5% isoflurane and oxygen via face mask. An 8 mm Cole-style endotracheal tube was placed and anesthesia maintained with 1.5% to 2.5% isoflurane mixed with 100% oxygen at 1.5 L flow along with intermittent positive pressure ventilation. A 24-gauge intravenous catheter was placed in the left basilic vein and perioperative warmed normal saline administered at a rate of 10 mL/kg per hour. A 3-cm skin incision was made dorsally over the right elbow from the olecranon fossa of the humerus to the proximal ulna. The supinator, common digital extensor, ectepicondyloulnaris and extensor metacarpi

ulnaris muscle tendons were transected 4 mm from their origins on the dorsal epicondyle of the humerus. The joint capsule was incised to expose the articular surfaces of the humerus and ulna. The articular cartilage was debrided to bleeding subchondral bone using a round dental burr. The area was continuously flushed with sterile saline to cool the tissues and remove cartilage debris. The ulna and humerus were apposed with Kerr bone forceps and 2 nonthreaded intramedullary pins of 2.0 mm were placed, one from the distal caudal surface of humerus into the proximal ulna and the other from the proximal ulna into the humerus in crossing fashion (Fig. 1). The joint capsule was closed with 3-0 polyglactone (Securocryl; Securos Surgical, Fiskdale, MA USA) in a simple continuous pattern. The tendons were reattached using 3-0 polydioxanone (PDS\*II; Ethicon LLC, Guaynabo, Puerto Rico) in a Bunnell-Meyer pattern followed by skin closure using 3-0 nylon (Ethicon LLC, Guaynabo, Puerto Rico) in a Ford interlocking pattern. Intramedullary pins (2.8 mm) were driven perpendicular to the bone into the dorsal humerus about 10 and 20 cm from the shoulder and additional pins were placed into the dorsal ulna at similar distance from the carpus and adjacent to the humeral pins. A total of 2 type I external skeletal fixators were applied to adjacent pins from humerus to ulna by injecting an acrylic (Technovit, Jorgenson Laboratories, Inc., Loveland, CO USA) into 0.5 in diameter Penrose drain tubing, stabilizing the elbow in flexion. Following surgery the bird was placed on meloxicam



**FIGURE 1.** A dorsoventral radiograph of the right elbow of an adult female bald eagle (*Haliaeetus leucocephalus*). Arthrodesis of the elbow was attempted by debriding the articular cartilage of the ulna and humerus to subchondral bone. A total of 2 intramedullary pins of 2.0 mm were placed in crossing fashion to immobilize the joint. This configuration eventually failed.

Download English Version:

<https://daneshyari.com/en/article/2396779>

Download Persian Version:

<https://daneshyari.com/article/2396779>

[Daneshyari.com](https://daneshyari.com)