# RAPTOR

### **Bumblefoot: How Bad Can It Be?**

#### Kit Lacy & Laura Farah

Cascades Raptor Center. Eugene, OR

#### Photos courtesy Cascades Raptor Center

The word "bumblefoot" (or ulcerative pododermatitis) strikes terror into the minds of most bird trainers — and for good reason. Treatment and resolution of the issue can be extremely stressful for the individual animal, but unsuccessful treatment can end in debilitating, life-long foot health issues, and even death. All too often, it is seen as (and can sometimes be) the result of the level of care provided for the bird from obesity, to substandard perching, to a lack of trainer attention to overall health and behavior changes.

These infections are hard to overcome, due to the lower blood circulation in the bird's foot, where most of the space is composed of bones and tendons. Prolonged pressure can lead to degeneration of underlying tissues of the affected foot, and sores may then develop on the unaffected foot due to increased weight bearing. In some cases, this infection can even lead to cardiovascular disease because of prolonged bacterial infection of the foot. Unchecked, the infection can move into the bones and erode them. Finally, even when caught in time, full recovery can often take months.

Peregrine Falcons are considered heavy-footed and carry more weight for their size. Add to this the possibility of obesity and birds that are not flying as much as their wild counterparts – possibly not flying at all due to a wing disability – this species is particularly susceptible to this condition in human care.

So why would an organization agree to add a hatch-year Peregrine Falcon (*Falco peregrinus*) that was diagnosed with bilateral ulcerative pododermatitis to the collection? The answer to that question is complicated, but a series of factors played into our facility's decision to take on this challenge. First, our facility has prevented any serious occurrence of bumblefoot in its over 30 years. From monitoring healthy weights, diligent perching design, training for voluntary foot checks and the application of protective cream to foot pads; we have never had to surgically deal with any serious case of poor foot health among our resident birds, though we have had experience with it in wild birds brought in to the hospital. How bad could resolving this problem be? The answer to that question is that it can be very, very harrowing.

This individual falcon was hatched in human care and hand raised from 20 days old by a licensed falconer who has never - in their decades of



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raising and flying falcons - had any foot-health issues. Husbandry did not seem to be the cause of the condition, but this falcon did have a rough start with some early health issues unrelated to the feet. We may never know the reason the condition began but once it started, it did not resolve. After consultation with several raptor veterinarians, the recommendation in this case was euthanasia. A few described what the treatment could look like if we decided to undertake it and the team at Cascades was willing to take the chance on this young falcon. With this information, we believed that our in-house veterinary team and trainers could resolve the issue.

With this bird — now nearly one year old - one of the involved footpad surfaces was in much better condition than the other, which was a good start. No surgery was required on the right foot, which presented with only a very small scab. The skin healed well with just a daily application of a lanolin-based cream using the tip of a clean finger. The other (left) foot was in much more serious condition and needed surgery under anesthesia.

Once the bird was transferred to our facility, became familiar with our training staff, and comfortable participating in basic behaviors, our staff veterinarian scheduled surgery for the left foot. Under sedation, the scab on the left foot was debrided, the necrotic materials inside extracted, the wound flushed, and the surface cleaned. A sample of the removed material was sent in for a culture and sensitivity test to select the best antibiotic for treatment post-surgery. Two sutures were applied at the surgical site where the lesion was removed.



Bandages are no big thing!

Secondly, the team decided on a wet-to-dry bandage treatment. These bandages keep the surgical site soft and allow for healing to occur from the inside of the foot to the outside surface. If the outside heals first, the inside can become abscessed. Bandages would need to be changed at least twice a week until the condition was resolved.

Using a small sterile gauze pad, a small amount of Calendula-Echinacea-Hypericum (CEH) cream was applied to the surgical site. Next, thin <sup>3</sup>/<sub>4</sub> inch gauze padding was wrapped around and between the digits to provide padding to the foot (i.e., interdigital wrap – see side bar). Vet wrap (3/4 inch) was then used to strap the bandage to the foot. One half inch surgical tape then was used to prevent the removal of the bandage by the bird. Care was taken to leave enough space for his seamless identification band and grommeted anklet to move freely.

Toe position after bandaging maintained a natural position. The bird would need to be able to hold and manipulate food, and perch comfortably. Unfortunately, after he was returned to a recovery space and sedation wore off, he managed to remove the bandage within 2 hours.

Now our troubles were beginning; we had to physically restrain for another bandage application! And, as the bird was not under sedation, toe position and overall bandage application was not adequate because of the struggling and screaming falcon. However, no matter how much tape we used to secure the bandage, he just used that specially designed beak to remove the bandages again and again. We had to figure out how to keep the bandage on his foot.

While we tried to figure out how to best treat, we began wiping all the perches with dilute chlorhexidine to prevent any bacteria from entering the surgical site in between bandage applications. Having



Sedation recovery is hard and dangerous.

to physically restrain him and reapply the bandage was breaking our very short term-built relationship with this new team member. He was avoiding interactions and the trainers that were assisting with his treatment were not welcome around him. We were quickly losing trust and not making any progress on the treatment of the bumblefoot – at one point his foot condition began to worsen. We were sedating him way more than was comfortable because the bandages applied while he was not under sedation limited the mobility of his toes due to his struggling against restraint.

Eventually we had to schedule a second surgery because of the worsening foot condition and a large scab, but this time we came prepared with Gannick's bitter apple<sup>®</sup> (anti-chewing liquid for dogs), to apply over the bandage. Coupling bitter apple with frozen quail wings, we were finally able to keep a bandage on his foot. Frozen quail wings presented after bandage application – we believe – allowed him to displace some of his frustration on the frozen wing rather than the bandage. That combination of bitter taste and frozen wings helped keep subsequent bandages on his foot. However, our relationship was continuing to decline with each restraint (twice a week) for bandage changes. We were getting to a point where we wanted to leave the bandage off - as his foot was almost healed - but not wanting to take yet another step backwards by stopping the bandaging too soon. Instead, we decided to see if we could apply the bandage while the bird was being reinforced on the glove.

Luckily, the left foot was the foot that needed the bandage application. With the falcon perched on a trainer's glove, the affected foot was more easily accessible to the second trainer applying the bandage, as it was the foot positioned further from the body of the trainer rein-



Top left: Antecedent arrangement bandage changes become exciting days. Bottom left: Wrapping the gauze.

forcing the falcon. We had decreased the bandage changes to once a week, so additional time could be spent counterconditioning him to the bandage scissors (blunt tipped scissors used to remove bandages next to tissue). We had also done a lot of counterconditioning to foot lifts, foot/toe touches while he was standing untethered on a perch or glove. There were a lot of hands around his feet, so we would practice having two trainers touch his feet at once. All the while, reinforcing him for no reaction to novel objects or foot touches.

We were now at a point where we felt that we had done the amount of initial training we could afford. We did not know if it would be enough, but we had to try to change the bandage. He was vocalizing less at trainers he associated with the physical restraint, and he did not leave the training sessions or vocalize when we manipulated his feet, so we dove in to attempt the bandage change while he perched on the glove.

We did use jesses attached to the glove for the initial bandage changes, but they never came into play. We have been able to change the bandage without any attachment to the trainer's glove, as all parties become more adept at the procedure. He would sometimes look to the trainer who was cutting off the old bandage and applying the new one (occasionally vocalizing) and then turn back to the quail reinforcement in the glove and crunch away. Once we were able to change the



Top right: Early no restraint bandage change. Bottom right: Removing old bandage..

bandages without physical restraint and/or sedation, we saw a lot less beak manipulation of the bandage. If he did find a loose end, we could just put an extra piece of tape on while he was standing on a perch. Our hands near his feet no longer indicated we were going to physically restrain him.

Our main reason for sharing this story is this: when it is safe to do so, training for medical procedures can save even the newest of trainerbird relationships. While we would not train for unrestrained (i.e., sitting on the glove) beak coping, or intra-muscular injections due to the risk of beak breakage or breast muscle necrosis if the bird bated during the process, the risks of bating in this situation were slim to none. The worst-case scenario in our minds was that if he bated once the bandage was removed, he might contaminate the wound; we would then have to restrain, clean, and bandage his foot as we had been doing before.

The reward of being able to change the bandage once to twice a week without sedation, without physical restraint, and with no further relationship damage between bird and trainer outweighed the risks. If you are considering training for medical procedures, you should do so under the supervision of a veterinarian and reach out to other trainers who may have ideas for how to start the training process safely. Veterinarians and fellow trainers can also act as a safety valve for any possible complications that could arise from unrestrained medical procedures. One must always consider the worst-case scenario for a medical procedure and weigh it against occasional physical restraint for the bird's safety.

As most trainers know, bumblefoot prevention is the best strategy for the avoidance of this difficult-to- treat condition. Bird weight should be monitored, and trainers should know the healthy (i.e., not obese) weight range for each individual bird. Perches should be sufficiently curved to prevent pressure points on the plantar surface of the feet. Sufficient width of the perches helps spread the weight over the base of the foot and prevents talons from causing self-injury in the foot surface. A variety of perch shapes and sizes is also key. Platforms, medium sized perches, and large perches shift the body weight to different locations of the foot. If the bird has a favorite nighttime roost perch, be sure it is level, to avoid always having more weight on one foot. Uneven surfaces such as AstroTurf® also prevent pressure points and help increase air circulation. Damp feet can lead to bacterial build up which can lead to infection in small skin breaks. Astroturf® can also be disinfected regularly. Smooth, flat perches (like bare wood) can lead to higher pressure on the plantar surface, causing skin irritation. Perching considerations, along with the voluntary application of foot cream





and voluntary nail trims, also can promote life-long foot health.

Special thanks to Carrie Lorenz, Cascades staff trainer, who (temporarily) sacrificed her personal relationship with Jake to physically restrain him during medical procedures. Additional special thanks to Dr. Ulrike Streicher, Cascades veterinarian, for helping us treat Jake's bad feet.

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Left upper: Foot condition prior to surgery

Left lower: Getting so close! Below: Jake's foot as of October 28, 2020



## How to Apply an Interdigital Raptor Footwrap

#### **Materials:**

- Nonstick sterile gauze pad, cut to size
- Cream, medication, ointment
- <sup>3</sup>/<sub>4</sub> inch wide gauze strip about 10 inches long
- <sup>3</sup>/<sub>4</sub> inch wide Vet wrap strip about 10 inches long
- 1/2 inch wide bandage tape, ~3-4 inches long (two to four strips)



ment to the affected area on plantar surface of the foot.

Start the gauze from between D1 & D2 on the medial side of the foot.

Wrap the gauze laterally across the plantar surface of the foot and pull it up between D1 & D4

Pull the gauze up over the top of foot and pull it down between D2 & D3 (Image 2)

This is the beginning of an X formation the wrap will make.

Pull the gauze end from between D2 & D3 (image #3), under the footpad back between D1 & D2 (crossing where you started) (Image #4)

You will then pull it up over the top of the foot to make the X and pass it between D3 & D4 (image #5)

Pull the gauze down between D3 & D4, wrapping underneath, to come out between D4 & D1 (image #6)

Then wrap OVER D1, behind the tarsus, lateral to medial. (image #7)

Pass the gauze underneath the foot between D1 & D2, pulling it up between D2 & D3. (image #8)

Pass it over the top of the foot to pass between D4 & D1. (image #9)

From here the gauze strip will pass underneath the footpad to end near its original starting point on the plantar surface of the foot, either in the middle or medially. (image #10)

Follow this same pathway with the Vet wrap, covering the gauze, to se-

- D1 = Digit 1 or the hallux
- D2 = Second digit, the inner toe
- D3 = Third digit
- D4 = Fourth digit (smallest toe)

Apply your nonstick gauze pad with appropriate cream/medical oint-



cure the gauze padding.

Use bandage scissors to cut any excess gauze/ Vet wrap remaining. (Image #11)

\*\*Very important that you NEVER loop all the way around a toe. Wrapping all the way around a toe risks cutting of circulation if any end of the gauze or Vet wrap is tugged on\*\*

Use the bandage tape to secure the wrap taking care to keep tape off the foot scales. With three or four strips of tape, create another X over the top of the foot. Wrap the tape strips so the ends finish on the plantar and lateral sides of the foot. This will make tape ends less accessible to picking falcon beaks. Cut any excess tape with bandage scissors.

















