**Head First: Caring for Traumatic Beak Injury**
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**Abstract**

As wildlife rehabilitators, it is our responsibility to undertake many traumatic injuries, but when handling an injury to a structure vital for survival, such as the beak of a bird, what steps can we take to ensure a return to normal function? A Red-tailed Hawk arrived at our wildlife center after flying head first into a building, resulting in the loss of approximately 1/3 of the maxillary rostrum, or upper bill. We were able to observe the slow yet successful reconstruction of her missing bill, while learning a lot of information on beak repair and health along the way. We aim to share the information we learned with other rehabbers about the steps we have taken in managing traumatic beak injury as well as create an educational dialogue with those who have experienced similar injuries.

**Background**

Understanding the structure and components of the beak is the first step for understanding how to care for traumatic beak injuries. The beak itself is made up of several parts; the jaw bones, and upper and lower bills. The upper beak, or maxillary rostrum, contains the premaxilla bone and the rhinotheca (the beak). The lower beak, or mandibular rostrum, contains the mandibular bone (mandible), and the gnatotheca (the beak) (Coles 1997, Bennett 2011).

The beak is constantly growing, on average about 1 to 3 inches per year (Coles 1997). The proximal end of the bird’s beak is the most sensitive, containing the blood supply and many nerve endings (Cousquer 2003, 2005). With an intact blood supply and intact jaw bones, the keratinized bills are able to grow from the base, underneath the outer layers (Cousquer 2003, 2005). This outer layer of keratin is shed and replaced by newly forming keratin. Recovery from traumatic injury to these parts all depend on the severity and the location of injury.

There are many injuries that can occur to the beak, such as impact injury, that will result in a loss of normal function and non-releasable status. For example, any injury, such as a major fracture that heals incorrectly or results in a deviation from normal beak shape or function, can have devastating effects on survival. However, as long as the beak is able to go through the process of granulation and epithelialization, just like skin and other tissue, then there is hope for recovery from traumatic injury (Cousquer 2003, 2005). It is important that a veterinarian get involved in your decision and provide advice for the best course of care. It is also important to seek out your overseeing veterinarian in order to provide radiography and possible CT scans so that you may better visualize the trauma, and form a treatment plan if one is possible. The very first step is determining whether there is chance for regrowth.

**Full timeline of care**

- **5/24/2016** – Admit to wildlife center. Struck a building window in Oakland, Pittsburgh, PA. Initial exam: BCS=2, ~10% dehydrated, mouth pale, very weak and unable to stand
up, lying on side, very slow reflexes / non-responsive to stimulus. Severe concussion and head trauma with massive injury to beak, bleeding. No visual impairments detected.

- Medications: Clavamox for 14 days for infection, daily wound cleaning and beak maintenance. Daily monitoring of possible granulation of keratin. Lactated ringers to correct 10% dehydration via gavage. Meloxicam as needed. Arnica and Aconite. Itraconazole was used as an aspergillosis prophylactic while housed inside.

- **5/25/2016** – standing up in the morning, eyes open, and alert. Bird received x-rays before continuing a treatment plan.

- **6/8/2016** - Only about 14 days later, the hawk ate on own overnight (small, cut up pieces of chicken / rat)

- **6/18/2016** – Moved outside, break continually growing, starting to self-feed more regularly. Maintained a physical record of feeding amounts.

  - In between **5/24 – 6/18**, hand feeding was carefully monitored. Bird was moved on to meat while hydration was being corrected. Bird would not self-feed. Hand fed small cut up pieces, once daily (or twice depending on stress levels), and carefully monitored by weighing and keeping a physical record. Every night, would leave some small pieces to promote self-feeding. Never whole prey foods that required ripping / tearing until beak wound began to heal.

- **6/26/2016** – coped beak for the first time, began to grow downward at the sides instead of out. Jill Argall reshaped the beak and trimmed any long unnatural growth.

- **7/3/2016** - Starting to offer and eat larger pieces of meat, ripping successfully.

- **7/28/2016** – Seemed to have stop growing outward at this point, @ the tip, but is filling in everywhere else. Almost created a small tunnel and the keratin started to heal AROUND the tip instead of filling in fully together.

  - Left alone to continue, did not cope
  - Started feeding whole prey

- **12/14/2016** - Final cope. Hardly needed to do anything at all. Had been on whole prey diet and provided a ton of different branches for shaping and wiping.

- **1/7/2016** – moved in to flight cage for pre-release. Beak checkup beforehand. Flying and live hunting successfully. Able to sustain flight, tested in our octagonal flight cage.
Conclusions and advice

There is not a suggested time limit to where a bird will be expected to fully recover and be releasable. Our red-tailed hawk patient was in care for approximately 8 months. Healing time will vary from patient to patient, and injury to injury. Knowing the basics first will aid you in your decision making and your program of care. When determining the hawk’s release status, we made sure to observe the following in regard to her beak: her ability to wear the beak down naturally, on her own, the ability to preen feathers, and the ability to hunt normally. We also ceased to cope the beak in the last few months, to assess whether or not the beak was growing in a regular pattern. Observing beak growth without intervention a very important step. We suggest that at least 4 months in captivity is necessary to assure beak function and growth are happening normally.

There are also great options for fracture repair by utilizing the expertise of a skilled veterinarian or dentist. Our wildlife center was able to get in touch with a retired pediatric dentist, who introduced us to new techniques for repair using dental acrylics and composites. He is on call for our center, and available to us to utilize should a situation arise. Dental acrylics will not work for complete fractures, but will help in cases where fractures are still semi-intact and require filling or holding until the deformity can grow out (Dr. Pechersky, personal communication, 2017). Though these techniques could not be used for the hawk, it is a great resource for any future traumatic injuries where this course of action is appropriate. For irreparable damage, prosthetic replacements are also an option (Fecchio, et al. 2010, Bennet 2011). While prosthetic beaks can be used in captivity for irreparable damage, they should never be utilized for birds that will be released into the wild. The sheer force of the beak itself, along with the powerful jaw muscle, may lead to prosthetic failure. Any bird that requires a prosthesis should not be released (Bennett 2011). Overall, patience and frequent observation, and regular intervention when necessary (such as coping and hand-feeding), is of the utmost importance when dealing with a traumatic beak injury.

References


Photographs