

Wildlife Rehabilitators of North Carolina

# The Making of a Beak

By Betty O'Leary

Everyone knows what a bird beak is, but may not have a clear understanding of its anatomy and how it grows. A bird's beak (and talon) is made up of a bony core, then a thin vascular layer of tissue with nerve endings and blood vessels, and then a hard outer keratin sheath (rhamphotheca). If the tip of the beak (or talon) is broken off or trimmed too far back, it will bleed when the blood supplied layer between the bone and the sheath is reached. It is possible that part of the bone could also be missing. If it is just a tiny amount of bone, the sheath will regrow and you will not notice any difference in the shape of the beak. If it is broken or cut farther back, more of the bone will be missing and the sheath may grow back misshapen or not grow back at all. The shape of the beak will depend on how much of the bone is missing. The end of the bony core may try to form a callus over the end that has been cut or broken off, but if too much of it has been removed, it will not grow back to its normal shape.

Basically, the bony core is the framework for how the beak will be shaped. Remove part of the template, and the shape will be different. Also, damage to the germinal cells from which the beak grows can lead to beak deformities (for example, severe avian pox virus lesions involving the cere). But this mostly affects the appearance of the surface of the sheath and not the length or shape of the mandible (for example grooves or ripples in the rhamphotheca).

Sometimes the beak sheath will be cracked, or the bone may be fractured with none of the beak missing. In cases like this, it is possible for the beak to heal without any permanent deformity to the beak. If the sheath is just cracked, it will grow out with time and should not be a permanent problem. You may need to keep the beak coped around the crack while it is growing out because sometimes food will get stuck in the crack, depending on its location and severity. Just like any other bone, when the bone in the beak is fractured, it should form a callus and the beak will be fairly normal again. You do need to be very careful with the bird's beak when it is fractured. It needs to be kept as stable as possible until the callus forms. So the bird should only be fed cut up bite sized pieces of food so it doesn't try to rip the food up with its beak when eating. Also, if the bird has to be given any oral fluids, meds, or food during this time, be very careful not to cause movement at the fracture site while holding the beak open. I have seen cases where the beak was broken part way across and the beak was able to form a callus and heal. So, it is possible as long as none of the bone is missing. Surgical repair to temporarily stabilize an unstable fractured or cracked beak may be helpful, but generally, beak prosthetics do not work very well, as they become unstable over time. The rhamphotheca grows in layers from the bony core outwards, with calcium deposited in between the keratin layers, making it hard and strong. As the beak wears down naturally from use, the outer layer is replaced by an underling layer. The beak wears down both in length and thickness. When birds clean their beaks after eating by feaking on rough surfaces, it helps wear down the outer layer of the rhamphotheca. That is why raptors in captivity can have overgrown beaks that are not just too long, but



also too thick. I have coped real overgrown beaks before where the keratin of the sheath came off in thin layers (like scales). It was ready to flake off, because it had gotten so overgrown and thick. A couple of times the outer layer of the sheath came off like a glove, exposing the "fresh" layer of the sheath that was supposed to be the existing outer layer. I would suggest that the next time you have a dead raptor, just take some clippers and start at the tip of the beak and slowly cut the beak back. You will see the white color of the bony core when you reach it in the center of the rhamphotheca. As you cut farther up the beak you will start seeing more of the bone, and then you will reach the hollow sinus areas inside the bony core of the beak. It is very interesting to look at, if you have never looked at it before! You can also remove the whole sheath from the bony core by soaking the head in a hydrogen peroxide solution for a few hours (remove the skin on the head first). Or, if the bird is fairly decomposed, it should come off without soaking. This way you can see the bony core intact.



A. Normal beak



B. Very tip of hook missing. Bone not compromised. Will grow back normally.



C. Can see bone core with a small amount of bone missing. Beak should still grow back normally.



D. More of bone is missing. Beak may still grow back fairly normally with time, but may be short or not as sharply hooked. Will need some coping to shape hook as it grows.



E. You can just see into the sinus cavity. The beak will probably not grow back normal in shape. Will be blunt and without much of a hook.



F. You are in the sinus cavity. The sheath may not even fully grow over the bone core. If it does, it will be short and blunt.



G. The beak is missing at the cere. The odds of the sheath growing over the bone are very slim.

*A, B, C are releasable.*

*D. May be releasable. Would rehab and give the beak time to grow out and see how it does.*

*E. More than likely not releasable. Could be rehabbed to see if it does grow back normally, but could easily be kept as a education bird, if the sheath grows back over the bone.*

*F. Bird not releasable. Would have a hard time eating on own even if kept in captivity. Suggest euthanasia.*

*G. Bird not releasable. Not a candidate for education. Suggest euthanasia*

Two good web sites for more info: <http://icb.oxfordjournals.org/cgi/content/full/40/4/461#SEC4>  
<http://www.avianmedicine.net/ampa/24.pdf>