

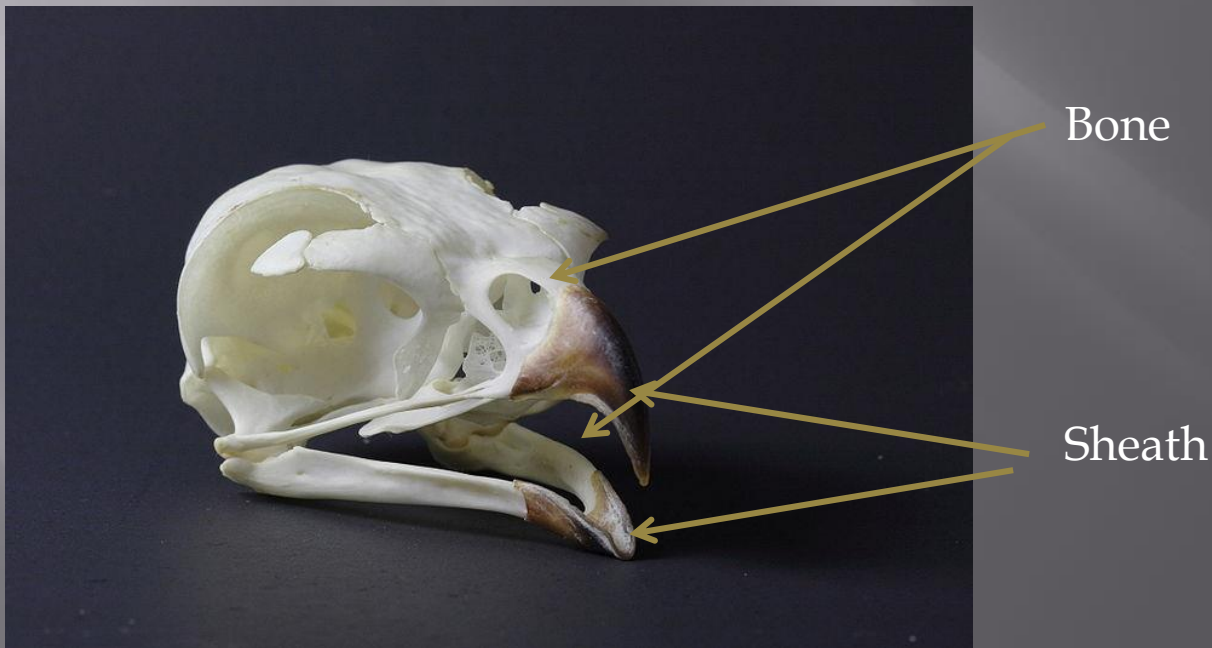
# THE MAKINGS OF A BEAK

Anatomy,  
Injuries,  
&  
Coping

By Betty O'Leary

# Anatomy

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 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).



The upper portion of a bird's bill is called the maxillary rostrum and the lower portion of the bill is called the mandibular rostrum. But they are commonly called the upper and lower mandible.



Maxillary rostrum

Mandibular rostrum



Cere  
Nares

The cere is the fleshy tissue that covers the bone at the junction of the beak and the skull. The nares are the opening that leads to the sinus cavity that is located within the bony area of the beak. Birds breathe through the nares when the beak is closed.

Jaw

The jaw is located fairly far back. Almost below the back edge of the eye.



# Injuries

There can be several types of beak injuries. The most common are:

- Cracks to the sheath
- Part of sheath broken off.
- Tissue damage to the cere.
- Fractured bone.
- Asymmetrical beak.
- Part of bone broken off.



# Sheath injuries



Cracked



Hook broken off  
(exposing bone)



Chip missing

When the sheath is cracked, chipped, or the tip is missing, it will normally grow out with time. But the beak will need to be coped on a regular basis while it is growing out to help form its natural shape.



Try to smooth any edges around the chip or crack. This will help prevent food from getting stuck in the crack and will also reduce the risk of the crack getting larger.

Super glue, dental acrylic, and nail acrylic have all been used successfully for repairing some cracks in beaks.





# Cere injuries



Some cere injuries can be severe and expose the bone underneath.

They can grow back with time. But there is a risk of the bone dying if not protected.





Also, severe damage to the cere can damage the germinal cells from which the beak grows. This can lead to beak deformities, but it mostly affects the appearance of the surface of the sheath and not the length or shape of the mandible.



# Fractured bone



The bones of the beak can be broken in multiple ways.



Some are very obvious such as a deep crack or displacement.

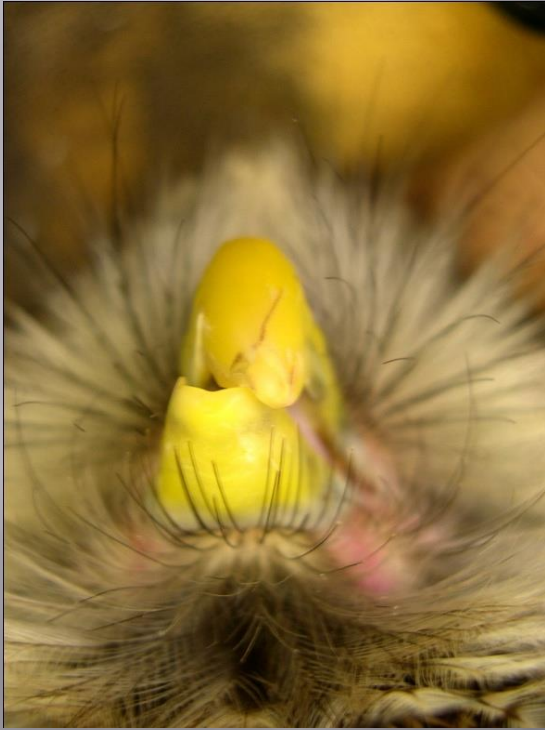
With some you will notice the beak is slightly asymmetrical.



With some you might not see any abnormalities of the beak. But upon exam you can feel them. That is why you should always manipulate the mandibles independently of each other during an exam.



# Asymmetrical beak



Sometimes you will have a bird that has a asymmetrical beak, but no movement can be felt. This is normally caused by an older healed fracture.



Sometimes coping can reshape the beak back to normal. But other times it can not be corrected and the beak will continue go grow asymmetrically.

# Bone missing

Sometimes it is not just the sheath that is broken off. But also the bone underneath. 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 the beak is broken 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.



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.



# Sinus cavity



The bony core will be mostly solid until you get to the sinus cavity.



If the beak is broken to the sinus cavity, it will never grow back normally and the bird should be euthanized.

# Beak Growth

The sheath 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 underlying 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 sheath.



# Coping

Coping is process of shaping a birds beak back into it's proper shape. It is normally needed when a birds beak has been injured or is overgrown.

Looking at the shape and length of a wild birds beak is the best way to learn what the proper shape of a birds beak is supposed to be. Remember, each species can be different.



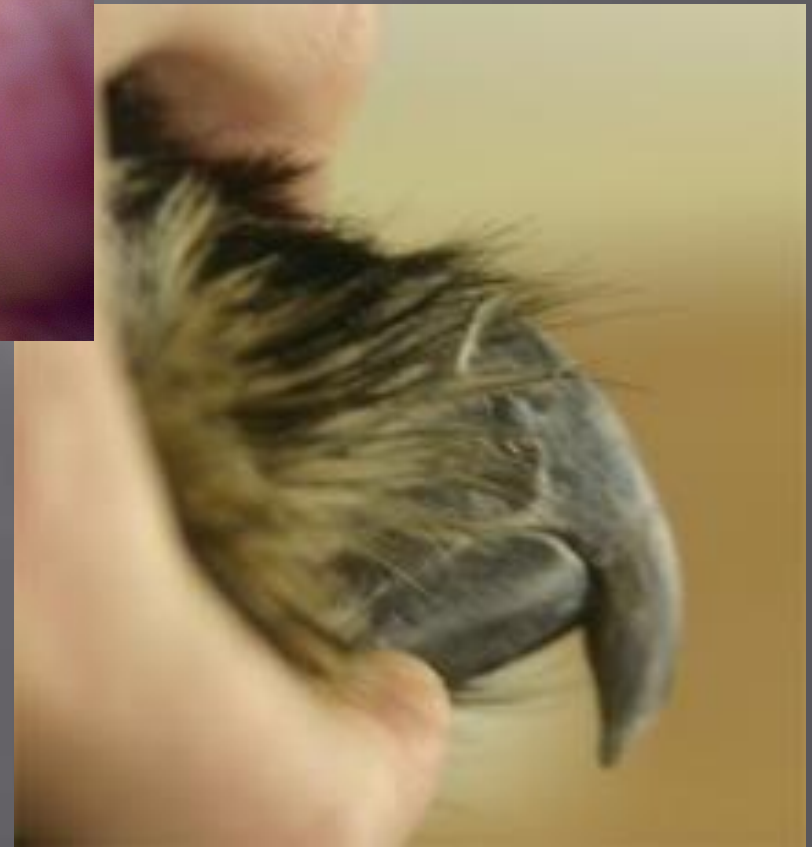
Normal Red-tailed hawk beak



Beaks may need to be  
coped to repair an  
injury,



or because the beak has  
become over grown.





Before and after examples









Clippers can be used to remove excessive growth to the length of the beak. A Dremel can be used for shaping and thinning the thickness of the beak.



# Credits

Special thanks for providing pictures:

- Mathias Engelmann and Dave Scott DVM,  
Carolina Raptor Center,

[www.carolinaraptorcenter.org](http://www.carolinaraptorcenter.org)

- Jean Chamberlain

- Lauren Schulz, “Volunteers for Wildlife”,

<http://www.volunteersforwildlife.org/>

Good web sites for more information:

<http://icb.oxfordjournals.org/cgi/content/full/40/4/461#SEC4>

<http://www.avianmedicine.net/ampa/24.pdf>