and/or the orientation of toes, which again, adds variety and helps to preserve the integrity of the plantar skin.

When it comes to raptors, bumblefoot will always be a trending topic. The consequences of severe cases of infection can be overwhelming for birds as well as animal care specialists. Aside from the veterinary hurdles that ailing birds face, frequent negative interactions with people during post-surgical recovery can cause inappetance, aggression and many other unintended problems. Improving the physical fitness of captive raptors will go a long way, directly and indirectly, toward combatting bumblefoot. But in order to be effective, the application of an appropriate conditioning program should absolutely be measured in days; not weeks, months or seasons.

COPING – A BEGINNER'S PRIMER

Amy Fennell, CPBT-KA
Natural Encounters, Inc.
amy.m.fennell@gmail.com

I have always been passionate about beaks. Shape, size, function, color… anyone who looks at a toucan, a pelican, a flamingo, or a woodpecker can't help but notice the wonderful variability and amazing adaptations that allow these animals to function so efficiently within their diverse ecological niches. A beak is incredibly important to the health and welfare of the animal it belongs to, and damage to the beak of a wild bird may result in significantly lowered life-expectancy. A healthy beak is required for proper feather care, efficient feeding, and—in some cases—protection and/or breeding success. You get it: they're important. And so is their maintenance.

For plenty of birds, life in human care involves few particular requirements when it comes to beak health. Many species found in zoological or institutional settings require little or no direct intervention or provision to ensure that their beaks—along with the rest of them—have good welfare, so long as the environmental and nutritional needs of those birds are being met. Ideally, our goal as caretakers should be to ensure that this is the case for all of our birds, but there are some species which demonstrate a higher need for human-assisted beak care than others. The reasons for this are many and varied, and outside the scope of this article, but birds of prey often sit squarely at the top of this list. The act of trimming a bird's overgrown beak back to its natural shape is referred to as 'coping', and for many in the animal care field, it is an intimidating task to undertake. For the unprepared novice, coping can be a terrifying experience, and the results of poor coping can damage bird and handler both.

Before we get started: this article focuses only on coping birds of prey. While other species

may also require beak care, and some of the methods may be similar to those described within this writing, it is not meant to be applied to non-raptors without additional discussion. Parrots, in particular, rarely need coping unless they have a permanent malocclusion or other deformity, and should self-maintain their beaks if provided with good nutrition and a constant supply of materials to bite, chew, and manipulate. Once you begin coping a parrot, it often leads to the need for further human intervention in the future.

Additionally, this article contains only my own preferences, experiences, and suggestions. My goals are to save others from experiencing the mistakes I made earlier in my coping career and to help ensure your raptors receive the best and safest cope possible, when and if they require it. If you currently cope birds and have tools or methods which you use successfully but which I have not discussed, please continue to do what you find successful — it is imperative when coping a bird that the individual is practiced and confident with their tools and methods. One of the most skillful coping jobs I have ever witnessed was a veterinary pathologist with a great-horned owl tucked under his arm using a sharp pen-knife to whittle away the overgrowth; while I would never promote this method or use it myself, his skillful speed and accuracy were undeniable. My advice: know your tools, know your bird. For those of you who are just starting out or are hoping to increase their skills in this area, I hope the following information is of some assistance to you.

TRAINING YOUR EYE

In my opinion, this is by far the most important piece of advice I can give to anyone learning to cope a bird of prey: before you attempt to work on any live raptor, you must know what a healthy and properly-shaped beak should look like.

While this seems a no-brainer, it is surprisingly difficult to do. It takes time and effort to specifically study what a healthy beak should look like. On the other hand, it is surprisingly easy to look at a bird you work with frequently and still have difficulty noticing any overgrowth, since the growth process is gradual, and your eye adapts to their daily appearance. Additionally (and for much the same reason that some of us may not notice the haircuts of our spouses or co-workers), it takes a particular level of observational awareness to see changing physical details in those we spend a lot of time with… but it is good practice to keep that observational awareness sharp and to make a point of looking closely at your bird (or spouse) to make sure you can catch those changes as early as possible. Not noticing a new chip or crack in a peregrine's beak may lead to severe consequences for the bird if left long enough.

So how do you learn what a beak should look like, and how your own bird compares? The 'ideal beak', of course, varies by species; the best source of information on what a beak should look like are good, clear photos of a variety of wild birds matching the species of the

bird you want to cope. While it is possible for a wild bird to have an overgrown beak, most wild raptors keep their beaks in excellent shape, and they are a much better source of information than any captive bird. Of course, specificity matters: looking at a bald eagle's beak will not give you a particularly good example of how to shape a red-tailed hawk's beak, just as a peregrine falcon's beak does not look like a great-horned owl's. Get to know what your bird's natural beak should look like, how it compares to other species, and ways in which it tends to overgrow. Having an innate knowledge of that ideal shape will not only be your guide to shaping an overgrown or damaged beak, it will also help you recognize more quickly when your bird is in need of attention in the future.

A selection of beaks that need attention.

Once you are thoroughly familiar with the healthy shape of, say, a red-tailed hawk's beak, then you can spend time comparing it to your bird's individual beak and identifying the areas which should be shaped or removed. Every bird is an individual, and every bird's beak—even within the same sex and species—will have different requirements.


Healthy tomium.

Note that falcons large and small have an extra notch on their beaks (called the 'tomial tooth' or 'tomium') that introduces an extra challenge when coping these birds. The tomium is easy for a novice to accidentally remove, or to improperly shape or shorten. Overgrown tomials are prime candidates for chips, cracks, and flakes that may undermine the stability of the rest of the maxilla. Because of this, and because smaller beaks require more precision and steadier work, the most difficult species to cope properly in my opinion are small falcons such as kestrels, merlin, Aplomados, and the like. If at all possible, spend time working on larger and 'simpler' beaks and honing your stability and skill before working on falcons, if you are new to coping.

TOOLS

Coping can be done with several different tools and in several different ways. The tools needed for my preferred method are as follows:

- Dremel (tip dependent on size/shape of beak – conical or cylindrical grinding or sanding bits can be used)
- Guillotine-style clippers
- Side shears
- Scalpel
- Quick-stop/cautery/styptic pencil
- Natural oil (jess grease, vitamin E oil, etc)
- Small clean cloth
- Towel
- Scalex or other anti-insecticidal spray (optional)

You may also find other tools useful if they fit your specific circumstances. These may involve hoods, small wooden dowels or other padded rods to hold open the beak, small precision files, etc. I do not usually use these, but others have and do with great success, so I encourage you to outfit yourself with the tools you find most suitable and the ones that are safest to use with your bird.

METHODOLOGY

Disclaimer: The process described below is not meant to be used as a 'how-to' guide, since coping is a complex and inherently visual process. For more information, access the IAATE-produced "Bird Grooming Tips - Coping, Nail Trims and Bathing Options" Webinar, which includes video and verbal explanation of the process. It can be found at https://iaate.org/resources/webinar/webinar-recordings

Coping requires that the bird be in the hand and safely restrained, and so generally (my tale about the veterinarian whittling the great-horned owl notwithstanding) involves at least two people: one to restrain, and one to cope. A third person on standby to fetch any needed tools or act as another pair of hands whenever required is often useful but isn't usually mandatory so long as you're prepared and have all of your tools within easy reach. Your first concern should always be the safety and comfort of the bird being worked on, as well as the safety of all individuals involved. Be prepared.

A note: training a bird to accept voluntary coping is not recommended, especially when it involves power tools, as the close proximity of the eyes to the beak and possibility of damaging the bird due to its unexpected or involuntary movement makes the risk too high to support. A standard chest restraint is best, as the bird is upright in a mostly natural position and can breathe as freely as possible. This should be done in an area that is relatively quiet, with good lighting and temperature control. It is easy for a restrained bird to overheat, and if you are working on a beak the bird may not be free to thermoregulate through gular fluttering. Ensure a fan or an air conditioner is nearby so that the bird's temperature does not climb too high.

Once the bird is comfortably in hand with all supplies in close proximity, the first step should always be to trim the talons—this ensures that if the bird struggles and/or balls

their feet at any point, it is less likely to self-puncture. Once complete, the person in charge of coping can control the bird's head with their non-dominant hand, leaving their dominant hand free to use tools as necessary. Take care not to touch or brush against the bird's eyes or to allow dust or debris to contact them. Avoid covering the nares. Some prefer to use a hood; personally, I find it difficult to fully access the beak when the bird is hooded and have found greater success without it, but it is certainly a useful tool to have at hand. Instead of using a dowel or other foreign objects to hold a bird's mouth open, I prefer to use the tip of my index finger in the very corner of the commissure (the 'corner of the mouth', where the hard beak transitions into soft skin). Doing so ensures that the bird's mouth isn't forced open any further than is necessary, and that no rough or hard surface causes scraping or bruising on sensitive skin. Some use their thumbs; unless I am working on an eagle I still prefer to use the tip of a finger, since a thumb often forces the beak to open excessively, especially in birds of red-tailed hawk size or smaller.

Look at the beak thoroughly and from all angles—check for symmetry, for cracks and chips, for overall shape and the amount of material that needs to be removed. Is the tip of the beak long and thin? Is it heavy and thick with a lot of excess material? Are the sides of the maxilla completely occluding the mandible? Are there flakes or signs of cracks that need to be addressed first so that further damage isn't done? Is it a falcon with overgrown tomials or who has chipped off a single tomium? Each bird is an individual, and there is no single method to approach every overgrown or damaged beak.

Bald eagle before and after.

That said, my general method is to remove tip length with trimmers first. As with talons, the beak has a blood supply or 'quick' that will bleed if disturbed, and a beak that is particularly overgrown may need several coping sessions to be worked back to its ideal length in order to avoid cutting through the quick. I have heard that some individuals intentionally cut the beak to the point of drawing blood, to 'help the quick recede'. This should be avoided. The blood supply will recede naturally without the need to directly damage it, and the pain it causes the animal is unnecessary. Regardless of their apparent stoicism, a bird who has had their beak 'tipped' in this manner will be in discomfort until the injury heals.

Tools, as noted, should be extremely sharp and in good repair. Dull tools will crush the beak instead of cutting it cleanly and may cause cracks or damage nerves within the live portions of the beak. I do not try to remove all excess tip length with the trimmers, instead trimming it about 2/3rds of the way to my intended length. Trimming all the way risks hitting the blood supply, while using the Dremel solely to remove large portions of overgrowth may heat the beak up through friction, and it introduces a significant amount of dust that can get in the bird's eyes and mouth. Hence my preference: use the trimmers for the majority of the length, then remove the rest with the Dremel.

When using the Dremel, I work first on one side, then the other, and checking for symmetry frequently as I follow the natural shape of the beak whenever possible and use short, steady strokes. Never 'freehand' a rotary tool—always brace your hand and maintain at least two points of contact at all times. This may involve you getting quite 'close' to the teammate who is restraining the bird. To achieve the correct angle and bracing, it is not uncommon for me to position myself, the bird, and my coping partner like a collection of elaborate mannequins! While you should have full control of your bird's head and the tool you're using, always expect the bird to flinch or move at any time and be ready to back off whenever needed. Take care not to press too hard with the Dremel or allow it to contact the beak for long periods of time to avoid excessive heat transfer. The gentle curve (or 'festoon') found on the sides of the maxilla in most hawks and eagles should be preserved if at all possible, but often needs to be raised on both sides. Take care not to abrade the roof of the mouth or hit the tongue with the tip of the Dremel or any other tools.

The maxilla generally requires the most work. In most cases, the mandible requires less or no attention, though the sides may begin to curl inwards (anecdotally, this seems particularly prevalent in great-horned owls) and the tip may need to be shortened or lightly smoothed.

Take care not to leave the tip of the beak excessively thick. Trimming the tip of the beak without further shaping leaves a blunt surface that will not grow out properly; the thick

material behind the tip needs to be removed as well, and the tip of the beak should be returned to its previous taper and thickness.

Overgrown versus normal.

Once the shape of the beak is as desired, any surface flaking or ridging can be addressed using a small back-angled razor or scalpel to scrape (not cut) the excess material off from cere to tip. Using a Dremel for this step instead may remove excess material too quickly, causing bleeding, and is not recommended. Once complete, check the beak a final time for symmetry, shape, and length. Use a very small amount of a natural oil to condition the beak—I generally use jess grease or another natural oil that is solid at room temperature, but vitamin E oil or other options will work just as well. Whatever you use, make sure to wipe off excess oil carefully with a light clean cloth so that it does not get accidentally get preened into feathers by the bird later on. The surface of the beak should feel smooth to the touch when complete, and you should not have residual oil on your skin.

A juvenile African fish eagle, before and after coping

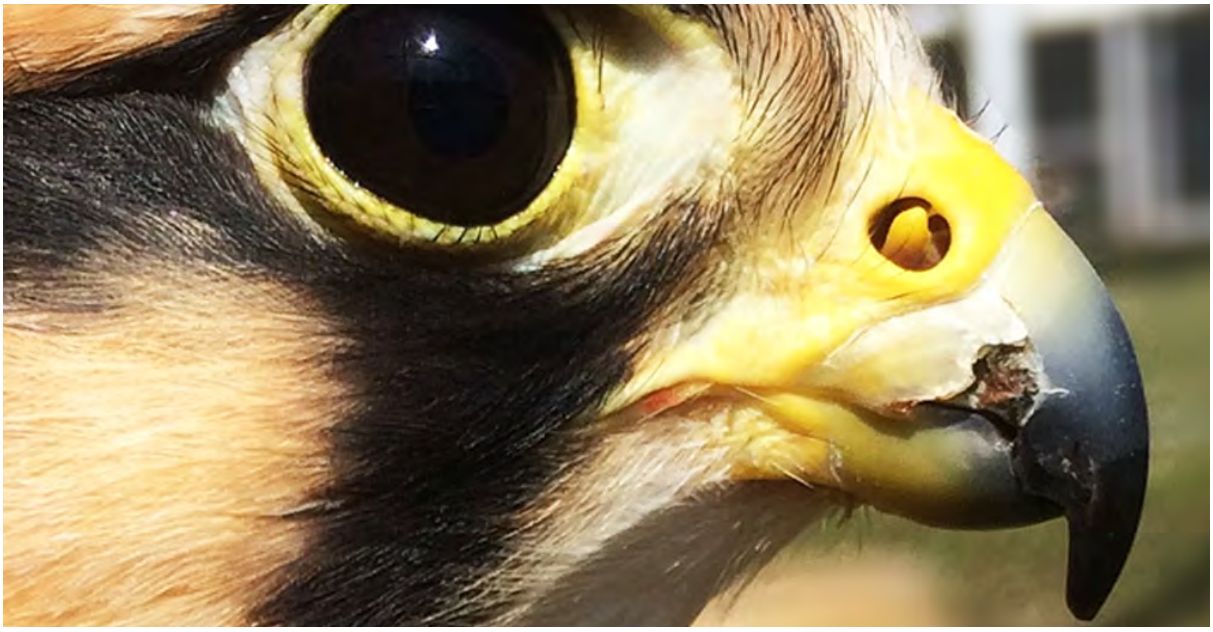
Once your beak is complete, continue with whatever other tasks you'd like to accomplish with the bird in hand—we generally spray with a preventative insecticidal liquid any time we have a bird in hand, do a quick physical exam, and a thorough check of any equipment the bird may be wearing. Now is the time to address those issues so that the bird does not need to be in hand any more frequently than is absolutely necessary. For working or ambassador birds, you may choose to have individuals not normally involved with their training be the 'bad guys' who have to restrain and/or cope your bird. That said, I am frequently involved in coping birds that I train daily and find that the

relationship—if affected at all—is quickly repaired if you have a high trust account with the animal.

CONCERNS AND POTENTIAL PITFALLS

Here are some miscellaneous things to consider when coping birds of prey using the method described above:

- Tie long hair back!
- When using corded Dremels, be aware of the cord so that it does not get caught or jostled during work. For battery-powered Dremels, make certain the Dremel is charged or you have a backup nearby.
- If a solid Dremel tip is dropped, do not use it. Replace it, as it may have fractured and could fragment during use.
- Tie long hair back! (It's worth repeating!)
- As mentioned, rotary tools produce heat through friction. Be very cautious not to press too hard or too long. If unsure, test on your own fingernail.
- Be very cautious about using a Dremel around feathers; brush rictal bristles and other feathers that may be close to the beak out of the way and always be aware of their movement and positioning. As with human hair(!), feathers can get caught in a Dremel and a clump can be ripped out in an instant—the skin beneath is fragile and the resulting damage to your bird could be severe.
- If you accidentally tip the beak and it begins to bleed, stop coping and control the bleeding. Slight bleeds can be stopped with styptic powder, severe bleeds may require cauterization. Do not continue to shorten a beak that has been tipped. If the bleeding is minor and stops quickly, you can continue to shape the rest of the beak. Otherwise, seek veterinary care if you cannot control the bleeding.
- Tie long hair back! (Seriously. Learn from my mistakes.)
- Take good care of all your tools. Replace them when they break, so that they're present when you need them.
- If you have trouble guiding or using the Dremel, practice different grips and styles of rotary tool until you find one you are comfortable with. I use a small battery-powered Dremel that I can hold like a fat pencil, which gives me the control I need. One of my mentors is most comfortable with a larger corded Dremel and is capable of wielding it with the same dexterity. Experiment with wood or other (non-avian) materials until you find something you like. If you have access to them, practice on cadavers.
- If in doubt, do some further research. When working on a new species or a species I haven't coped in a few years, I will always take another look at wild beaks and make sure I know what I'm aiming to accomplish. An African fish eagle has a very long tip that looks overgrown if you're accustomed to bald eagles. Gyrfalcons have longer tomials than peregrines. Know your species.



This Aplomado falcon's beak flaked, leaving a raw area beneath. With careful attention, it healed over a few months.

PARTING THOUGHTS

I have been privileged throughout my career to have had the opportunity to cope species ranging all the way from kestrels and gyrfalcons to eagle owls and harpy eagles, and each bird and beak present a unique problem to solve. Overgrown beaks are like broken tail feathers—a warning sign that something isn't quite right in that bird's situation, and whatever that 'something' is, it needs to be addressed. From that perspective, I cannot deny a certain satisfaction in seeing a bird with a nicely shaped, healthy beak—regardless of whether its shape is due to expert coping or to natural management. To that end, coping is a skill that anyone working closely with birds of prey should consider developing, as the closer a bird can physiologically be to their wild counterparts—arguably, at least— the better.

While the ideal situation would be for birds of prey under human care to always have their nutritional and environmental needs perfectly fulfilled in a way would allow them to self-maintain their beak health, the reality is that many birds require regular coping, and many birds—when coped—are coped by individuals who are not always confident in their skill level. This is not ideal for the bird, certainly, but it is also immensely stressful for the person who finds themselves doing the coping! As someone who learned the hard way and made many of the errors I outlined above (and now keep my hair quite short, as a side note), I empathize with those of you who need to cope a bird but don't always have the luxury of being directly taught by an expert. If you are one of those individuals, I encourage you to take the time to practice those skills whenever possible without a bird in hand. As noted above, use the Dremel on wood or other materials until you can produce smooth gradients and your hand is steady and stable. Play with it. Get comfortable with it. Spend time looking through raptor photos online until you can identify beaks that are overgrown or otherwise in need of attention from beaks that are in good shape. Educate your hand and your eye, so that the next time you get a bird in hand, it is significantly less stressful for you, and an easier experience for your bird.

Keep an eye on those amazing beaks, and happy coping!