Bird Articulation Guide

Kelsey Blaze Miller

The University Of Montana, kelsey7.miller@umconnect.umt.edu

Follow this and additional works at: https://scholarworks.umt.edu/utpp

Part of the Ornithology Commons, Poultry or Avian Science Commons, and the Zoology Commons

Let us know how access to this document benefits you.

Recommended Citation

https://scholarworks.umt.edu/utpp/468

This Thesis is brought to you for free and open access by ScholarWorks at University of Montana. It has been accepted for inclusion in Undergraduate Theses, Professional Papers, and Capstone Artifacts by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.
BIRD ARTICULATION GUIDE
Welcome to the articulation guide!

The purpose of this booklet is to be an illustrated walkthrough of bird articulation. It is far from exhaustive, and probably shouldn’t be used as the sole information source for your bird articulating project. This guide was created as a Capstone project for graduation from the Davidson Honors College at the University of Montana. The actual bird articulation performed for this book was completed at the Philip L. Wright Zoological Lab with the help of my capstone project mentor Larry DePute.

So, you found a bunch of bird bones. Congratulations that’s so cool. I’m going to assume it is not a species that violates the MBTA (Migratory Bird Treaty Act) or you that have all the requisite licenses to possess the bird. For most bird species, bones and feathers are illegal to possess, that’s because back in the day (~1800s) people went way overboard with their hunting, feather hats, and fly-fishing lures, and as a result, a bunch of bird populations began to decline dramatically. The MBTA and lots of other state-level laws were put in place to protect birds from over hunting.

SO, with that out of the way lets articulate a bird.
This is a Chukar Partridge (*Alectoris chukar*) it is a member of the Pheasant family. The species is originally native to Eurasia but was introduced as a game bird to Western North America in 1893. They are the national bird of both Pakistan and Iraq. This specific bird was donated to the Philip L. Wright Zoological Museum at the University of Montana.
Step 1: supplies

you will need a few tools for this project, some more essential than others and some may depend on the size of your bird. At the end of the day, there’s not a lot of rules and whatever works works so get creative with your methods and improvise where you need to.

- Here’s the supplies I often use:
  - Super glue – thin, medium, and thick
  - Super glue drying accelerator spray
  - Epoxy
  - Electrical or washi tape
  - Scalpel
  - tweezers
  - Wire (for articulation and support)
  - Wire cutters / pliers
  - A Dremel / tiny drill
  - Hydrogen peroxide
  - Patience
Step 2: clean & sort

Clean:
Now if there’s still a bunch of “bird” on your bird bones, you’ll have to deal with that. There’s lots of methods: maceration in water, dermestid beetles, burial and retrieval, etc. But that’s outside of the scope of this book.

I’m going to assume your bird bones are at least pretty clean, at least not totally gross.

To whiten the bones you can put them in a jar of 3% hydrogen peroxide and leave them until they’re nice and pearly clean. Next, any cartilage and remaining connective tissue can be gently removed with a Dremel or a scalpel.

NOTE: never boil bones to clean them, especially not delicate bird bones, this can damage or destroy the bones.
**PRO TIP:**

Keep the toe bones separated left from right from the beginning! Speaking from experience, spending hours trying to tell the difference between the left and right toe bones at the end of the project is no fun.
Sort:

• Separate all the wing, shoulder, and leg bones into groups of left and right.
• Use electrical or washi tape to label all the right-side bones.
• How do you tell the difference between left and right-side bones? There are resources out there for this but I honestly just go off of vibes mostly.
The ribcage:

Now, I haven’t mentioned the ribcage, keel, vertebrae, and pelvis yet, that’s because this section often remains intact. There are a lot of strong ligament and tendon connections and often even some fused joints which help to hold it all together. When this is the case, all you have to do is drip some thin super glue between all the connection points.

- If it did not stay completely intact don’t panic, you can do it, this book won’t help at all but I believe in you.

- You’re going to want a chunk of foam to stick the keel in and some pins and tape to hold everything in place while you rebuild it.
Step 3: shoulder apparatus

- Use medium super glue and drying accelerator to attach the scapula, the coracoids, and the clavicle.

- Attach the coracoids to the sternum (keel), and adjust the position so that the wishbone fits between them.

- The scapula should attach to the shoulder joint created by the coracoids and clavicle, they should lay evenly on either side of the vertebrae.
Step 4: the legs

Birds have all of the same leg bones as humans do except that some of them are fused or otherwise super weird looking.

Thanks evolution

The pose:
Before putting the legs together, you need to decide how the bird will be positioned. Perched on a branch? Walking on the ground? In flight? Knowing how bird anatomy works will help to create a natural looking pose, this is also a good time to look at pictures of your bird species and see what types of positions they often stand in.
The femur, fibula, and tibiotarsus: Attaching the legs can be a bit finicky and depending on the size of your bird, you may need to use the Dremel to create a hole at the end of each joint and attach them with wire and thick superglue. Depending on the pose you have chosen, you may want to attach the bird to its base with the keel support wire before attaching the legs. Whatever works for you there’s no rules.
The base:

- To get the bird standing (or perching) you will need a wooden base and a piece of thicker wire to act as a support from the bottom of the keel to the wooden base. This thicker wire is glued to the keel with epoxy.
- You will also want to use a thinner wire to attach the bottoms of the feet to the wooden base or perch by drilling a small hole into the bottoms of the feet and into the base.
- Then, thick superglue is put into the holes and a piece of thin wire is inserted. Your bird should now be standing on its own – way to go!
step 5: the wings

Just like the legs, bird wings have all the same bones as human arms, they just got super wonky on the journey to evolve flight.
• The three segments of the wing: the humerus, radius and ulna, and the carpometacarpus (the fused carpels and digits), can all be glued together with medium superglue and drying accelerator. For a large bird you may need to use the Dremel and wire method.

• It’s usually easiest to build both wings before attaching them to the body, that way they both match – you don’t want the left and right wings to be in different positions.

• Figuring out exactly where the shoulder joint should attach can be very confusing. Because of how mobile bird shoulders are, there isn’t a clear articulation point, just do your best and make sure that the left and right wings are even and symmetrical.
Step 6: the head

First, Attach the jaw with a little bit of medium superglue and drying accelerator
The neck:

- Next, you will want to insert a wire through the vertibre as far down into the spinal column as it will go.

- Wet the neck vertebrae with water until they are flexible. Using the wire, bend the neck into the position you want and let it dry.
  - Once completely dry, drip some thin superglue throughout the spinal column. This will hold the wire in place permanently.

- Bend the top of the wire into a small loop so that the skull can be placed on top.

- The wire should go through the foramen magnum (the hole at the base of the skull) and the loop of the wire should rest snugly against the inside of the braincase of the skull.
• Once you get the position right, remove the skull from the wire and hold it upside down.

• Drip epoxy onto the inside of the skull through the foramen magnum.

• Wait until the epoxy is tacky and replace the skull onto the wire, the epoxy should seal to the wire loop.

like this!
Step 7: the feet

Bird toes are weird.

There’s different numbers of bones on different digits and different types of birds with different toe orientations.

– for example, this chukar has an anisodactyl toe orientation.
Sort:

• You can lay out a piece of masking tape (sticky side up) and use it to line up all the toe bones without them rolling around.

• Make sure that you continue to keep them separated left from right.

○ Some tweezers will probably be useful for this endeavor.
The toes:

It may be helpful to look at some pictures of your chosen bird species for reference when building the feet. Like I said, bird toes are weird. Use medium super glue and drying accelerator to attach the toe bones to the foot - then to each other - one at a time.
Step 8: boop 'em on the nose!

Congrats! You did it!