Make Your Own Musical Rib Bones

in 7 Easy Steps

By Scott Miller

Start With Good Bones

Ribs from large animals make the best musical bones.

The heyday of musical bone playing was 150 years ago during the Minstrel Era. The minstrel craze began in 1843 when a group of four musicians calling themselves the *Virginia Minstrels* put on a show for a bunch of rowdies at the Bowery Theatre in New York City. The band consisted of banjo, fiddle, tambourine—and rattlin' a set of foot-long horse ribs in each hand was the "father" of minstrel bones, Frank Brower.

Nowadays most folks play ox (cow) rib bones. Also popular are ribs from bison, goats, and sheep. Other large animal ribs which might be worth trying are elk, moose, mule, donkey, llama, and buffalo. Ribs from deer and pigs are usually too round and narrow to work well.

Which Ox Ribs Are Best?

You basically have a choice of two kinds of ox ribs:

1. Ribs from critters that died of old age.
2. Ribs from young slaughtered cattle.

In my view, rib bones from critters that died of old age sound no better than ribs from young animals at the butcher shop.

But old bones from animals that died naturally on the range do offer you some advantages. They ain't greasy and yucky for instance. There's other differences too. Old bones are bulkier and harder than young bones. And after a year or two bleaching under the sun, those old ribs are literally bone dry.

Bones from young slaughtered animals, by comparison, are softer and flexible. And unless you process them correctly, they seep oil and remain forever greasy.

Musical bones made from old naturally sun-bleached ribs are valued for the resonant sound they produce. They generate a full-bodied, vibrant, tone that other musical bones cannot match. But naturally sun-bleached bones from old critters are about as scarce as hen's teeth. You won't find them at your local butcher shop. So old ribs come at a premium.

Bone Tone

All rib bones resonate well because they are hollow inside. Young bones produce a relatively dull tone. Old bones produce a more clangy tone. To most listeners, though, the difference don't amount to a hill of beans. But for some players, the tone is as different as night and day.

The best reason to carry both old and new bones is because they do, in fact, enable you to play a wider range of tones. So although neither kind of bone is better, you still might say *viva la difference!*

I mix and match bones of all kinds. That's why my gig bag packs an assortment of bones made of wood, plastic, slate, metal, cow shins, and ribs from both old and young animals.

Making and playing different sounding musical bones is just plain fun. And isn't that what it's all about? So whether you make a set from old bones or young bones, crafting them yourself gives you a real sense of accomplishment.

Okay, that's enough talk. Let's get to work...

Recommended Tools:

Ruler

Pencil, or fine dry erase marker or other non-permanent marking instrument

Eye Protection (workshop goggles)

Face Mask, to avoid inhaling bone dust

Hacksaw, or metal cutting bandsaw, or wet saw

Half-round combination rasp, fine and coarse gratings

Sandpaper, wet/dry 150 grit. Also 220, 400, and 600 grit if desired

Basin, for wet sanding (dishwashing tub works well)

Optional Tools:

Wet Grinder

Bench Mounted Belt Sander

Bench Mounted Buffing Wheel, or buffing cloth

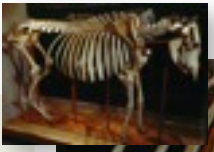
Tripoli Polishing Compound

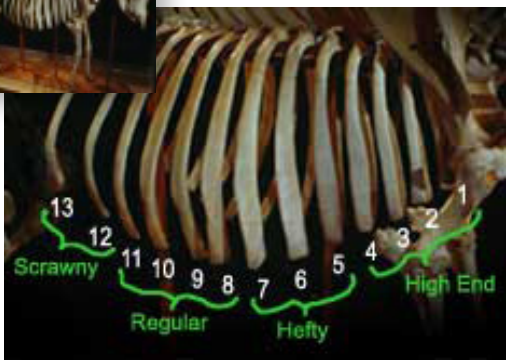
Sealant, such as woodworker's urethane glue, epoxy gel or paste, silicone sealant, or polyurethane

Step-by-step Instructions:

1. Select a Rib Bone

An ox has 13 rib bones on each side of the rib cage. Take a look at this ox skeleton. It shows the rib cage separated into four categories so you can better understand the raw material we are working with. Since every critter is different, the bones don't always fall neatly into each category. So take the numbering with a grain of salt.





Regular ribs make the best musical bones. High End ribs are easiest to sculpt and work.

High End
The easiest ribs to sculpt into musical bones are the upper back ribs. They are located next to the shoulder. These premium ribs are prized by experienced musical bone makers because the shape is nearly perfect and requires little sculpting. So High End ribs are the easiest to work with. They are 'prime ribs' for the workshop. But they sound no better than other rib bones.

You can make one musical bone from a single High End rib. You can't play just one bone, though. That's only half a pair. You need two High End ribs to make one functional pair of musical bones.

Hefty
Behind the High End ribs are Hefty bones. These ribs are too thick and massive for musical bones. I suppose a skilled craftsperson could shape these 'big bad boys' into decent instruments. But the task would certainly offer a challenge and is beyond the scope of this instruction guide.

Regular
Next in line are Regular ribs. These are kind of a cross between a High End and Hefty bone. They are long like Hefty bones, and just a tad thicker, wider, and heavier than High End bones. You will need to shape them here

and there with a saw and rasp. Regular bones produce excellent instruments—and give you the most for your money.

One Regular rib almost always yields two musical bones. That's a full pair. So you need just one Regular rib to make a full pair of bones for one hand.

Scrawny
The hindmost ribs are rather round and scrawny. You might get a musical bone out of one, but don't count on it. What good are Scrawny bones? Some craftspeople create marvelous jewelry from them. If nothing else, you can stick one in your bones bag and use it as a light-weight "cowboy" back scratcher.

2. Mark where to cut bone segment with template

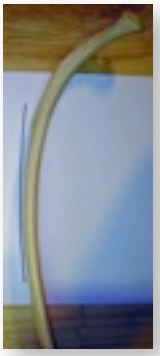
You only need a 6 to 7 inch segment for the finished product. Since natural ribs are big and bulky compared to wood, I recommend a length of only 6-1/2 inches. A High End rib usually produces just one musical bone. A Regular rib, like the one pictured below, almost always makes two.

Musical Rib Anatomy 101
The top area of the rib is too thick and round and it curves too much. So we discard it. The very top looks sort of like the head of a horse. By comparison, the bottom area of the rib is wide and flat.

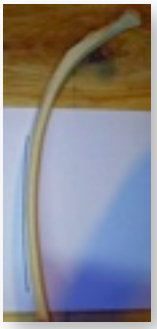
This Regular rib made the pair of bones pictured in this booklet.

The ideal camber (curve) of a musical bone follows a 28 degree arc. Use the template at right (or a bone from your own collection) as a guide to mark your rib segment.

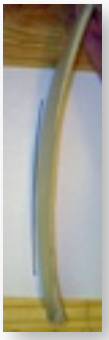
The top of this rib curves too much. (If your musical bones are too curvy, the ends won't click.) So slide rib until it aligns with template, as pictured below.



Here, the rib aligns perfectly with template. Mark where to cut segment with pencil.



If the bone is long enough, like this Regular rib, you can mark an additional segment.



Use This Handy 6-1/2" Template to Mark Your Rib Segments

3. Cut

Once you have marked the bone, use a hacksaw to cut the segments.

Bone dust is toxic. If you plan on making lots of musical bones, consider using a wet saw. If using a dry saw, then wear face mask and use a vacuum. Since this booklet was first published *I now dip the rib and saw blade in water to prevent dust,* then cut it.

Cutting with dry saw creates toxic bone dust.

A vacuum hose mounted below work draws away bone dust. Better yet, cut bone in water.

A safe bone making environment includes eye-protection, face mask, and vacuum.

You can use a metal-cutting bandsaw if you have one. If so, be careful not to overheat the bone.

If you marked the convex side of the rib bone, then it might be difficult to cut since the bone won't rest flat on a table. You can raise up the bone on some blocks of two-by-fours to cut it. Or just mark the concave side and flip the bone over. You could try putting the rib in a vise if you have one, but be extra careful you don't tighten the vice so much that it crushes the bone.

Raising curved rib on wood blocks makes it easier to cut. Or flip rib over and cut from other side.

After top segment is cut off, one block works fine to prop work.

A jeweler's wet-cutting bandsaw with a diamond coated blade works well if you have access to one.

Yes, you can cut bone on a bandsaw with a wood-cutting blade. But I do *not* recommend it. Instead, to avoid inhaling bone dust (not to mention the permeating odor of the stuff), just dip the rib in water, then use a hack saw and cut the bone in the shop sink. Since the initial publication of this guide, *I now brace the wet rib across the corner of my metal shop sink,* then hack away.

Regular ribs almost always yield two musical bones.

Musical Bones: The long and the short of it

Wooden musical bones are relatively light in weight and generally measure from 6-1/2" to 7-1/2" in length. My metal (aluminum) bones are heavy and short. They measure precisely 3/16" x 1" x 6". The two sets of musical horse ribs I have tried were both exceptionally long—and very light.

As a rule then, I think we can say that light-weight musical bones tend to be long while heavy ones tend to be short. Accordingly, it makes sense that the optimal size of a musical ox bone is around 6-1/2" in length.

The Perfect Musical Ox Bone

For our purposes, the *perfect* musical ox bone measures roughly 3/8" thick by 1-3/8" wide by 6-1/2" in length.

The keyword is 'roughly.' Your finished bone might be thicker at one end than the other. And one end might be wider than the other. This is perfectly okay. And a set does not have to match exactly to sound perfect. After all, these are natural products and no two bones are alike. The important thing is that your finished musical bones sound wonderful when you play them (I guarantee they will), and that's what counts.

4. Sculpt

You might need to sculpt a rib that is too wide, or file the edges if they are too sharp. But overall, it is best to keep filing and sculpting to a minimum.

A handy tool for sculpting rib edges is a half-round combination rasp. I use a small (1 inch by 6 inch) combination rasp that has both *fine* and *coarse* grating surfaces.

You can sculpt a pair of bones to match nearly identical, if you want. Areas along the sides of a bone that reveal marrow can be left open or filled with sealer, depending on your preference.

Half-round combination rasp sculpts bone edges in a jiffy. It's all you really need to shape a set of bones.

No, you don't need a bench mounted belt sander. And I rarely use mine. But if you have one, you can use it to quickly smooth lumpy bone edges.

Be careful not to over do it with any of these shaping tools. You can always take more off, but you can't put it back. And be sure to use shop vacuum to collect bone dust. Better yet, use a wet belt sander.

Belt sander is handy tool for smoothing edges. Wet sander is better.

You don't need a disk sander either, but it makes quick work out of rounding corners. Work gently though, as a disk sander eats away bone in an instant.

Disk sander makes quick work of rounding ends.

And you don't need a wet grinder. But it can be a handy bone-making tool. This grinder is intended for sharpening tools. I use mine to grind the ends and sides and bevel the edges of the bone—but *not* the face.

None of these sculpting tools is a finishing device. So do not use them on the face of your bone because they will create nasty gouges.

Wet grinder shapes edges with no bone dust or heat.

5. Sand

As you have read here several times, bone dust is a serious health hazard if inhaled. I care about my bone playing buddies. So if you choose to dry sand, then wear a mask to prevent respiratory injury. Sand the work outdoors if you need to, or at least use a room with good ventilation and a vacuum to collect the dust.

Wet Sanding Prevents Bone Dust

You can avoid bone dust altogether by wet sanding instead of dry sanding. Another good reason to wet sand is that it reaches the nooks and crannies of natural bone better than dry sanding does. In short, wet sanding is quicker, easier, safer—and it does a better job than dry sanding.

Any fine grit wet sanding sheet should work well. I prefer aluminum oxide wet/dry sanding sheets. Another kind of fine grit wet/dry sheet you might try is emory cloth.

Wet sanding with fine grit emory cloth. It's all you need to finish this High End rib bone.

I get excellent results using NicSand reusable wet/dry cushioned sanding sheets. These are sheets of cloth-backed aluminum oxide bonded to a thin 1/16" foam pad. The product is ideal for wet sanding the irregular surface of a natural bone. Unfortunately, however, the product is no longer in production, and I have yet to find a commercially available replacement.

But it's easy to make your own version of NicSand. Here's how: Just take a sheet of wet/dry sandpaper and 'sandwich' it to a sheet of thin foam (packing sheet foam works well).

This wet-sanding jig is perfect for curved bone surfaces, and it lets you use both hands to hold the work.

The fancy cylindrical wet-sanding jig pictured above is nothing more than a sheet of cushioned sandpaper wrapped around a plastic drinking mug. The contraption is clamped inside a pan of water.

Here's what you need to build this wet-sanding jig:

✓ **Large Plastic Thermal Mug,** with handle. (Outside diameter of mine is 4". Why thermal: Because of sturdy double wall construction. Handle keeps mug from rocking. My mug was an advertising freebie from a hospital, so the cost was zero.)

✓ **Cushioned Sandpaper** (Sheet of 150 grit wet/dry sandpaper, sandwiched to thin (approx. 1/16") layer of packing sheet foam.

✓ **Shallow baking pan**

✓ **2 Strong Rubber Bands,** like what the Post Office uses to bundle your mail.

✓ **2 Clamps, with wood blocks**

✓ **Water**

How to make your own wet-sanding jig in 5 easy steps:

1. Take a sheet of wet/dry 150 grit sandpaper (cloth backed works well) and sandwich it to sheet of thin foam.

2. Wrap your abrasive sandwich around mug. Secure it with rubber bands.

3. Place mug in shallow pan. Secure mug to pan and work surface with clamp and wood block.

4. Secure handle with clamp and wood blocks to keep mug from rocking.

5. Pour water over sandpaper. Sand ribs. Add more water as needed.

After your rib segments are sanded, you can consider your musical bones done—and ready to play!

But if you want a smoother finish, continue wet-sanding with finer grit sandpaper. From 150, you might progress to 220, then 400, and lastly 600 grit.

6. Buff and Polish

That nice dull finish on your musical bones is perfectly marvelous. But if you prefer a glossy finish (and sharper tone), then you need to buff and polish them.

Your local woodworking store can offer advice and supply the materials you need to buff them by hand or machine. You will get superior results using a fast spinning buffing wheel and tripoli polishing compound.

'Charging up' buffing wheel with tripoli polishing compound.

Hold bar of tripoli compound against spinning buffer to *charge up* the wheel with abrasive. The wheel only needs a quick touch of compound to buff an entire rib or two.

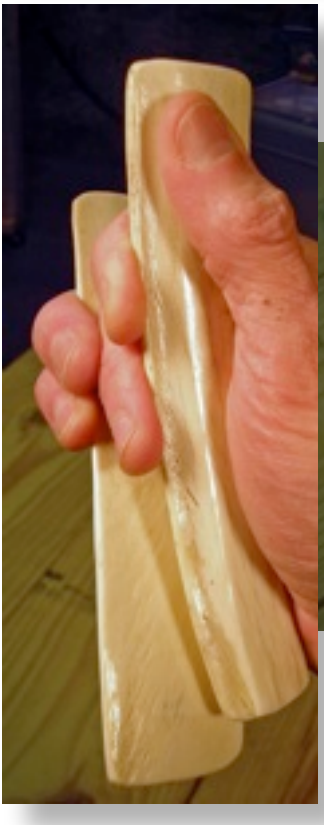
Buffing wheel creates professional glossy finish.

Buff all the surfaces of your musical bone. Don't forget to buff the ends and edges.

Be careful not to hold the piece in one spot or press it hard into the wheel. Doing so might burn the bone or cause *crazing*, which is tiny cracks that can develop weeks or even months later. (This warning about crazing applies more to ivory as sun-bleached rib bones are naturally inundated with tiny cracks.)

Congratulations! Enjoy your brand new gleaming musical bones.

High End rib yields one musical bone.



Regular rib yields two musical bones.

Your musical bones are finished and ready to play. You are done crafting them.

Unless you want to seal the ends...

7. Ends: To Seal or Not to Seal, That is the Question

You often see the ends of natural musical bones sealed with putty or filler.

Bone on left sealed with filler.

Musical bones from slaughtered animals are almost always sealed with a filler. This prevents oil from seeping out. But if you are working with sun-bleached rib bones from animals that died of natural causes or old age, then nature and the elements have dried them completely, so there is nothing to seep.

Top bone from last night's dinner seeps. Sun-bleached rib on bottom is bone dry.

You might want to fill areas along the sides of a bone that reveal open marrow. But you generally do not need to fill the ends of naturally sun-bleached rib bones.

Why? Because the finished bones seem slightly more resonant without sealing the ends. But if an end of a bone (or area of open marrow along the side) is too coarse or sharp, then go ahead and seal it as a safety precaution.

Bone Sealers

I have experimented with a number of sealers including polyurethane varnish, epoxies, putties, various glues and numerous wood fillers.

My current favorite is the "Do it Best" brand called "Woodworkers urethane glue." (Do it Best SKU: 386898) This is a strong, flexible expandable filler unlike any other I have encountered. Be sure to follow the manufacturer's directions which states "Difficult to remove from skin and clothing," and they mean it. The first time I tried the glue, some got on my fingers and did not come off for days. Now I wear rubber gloves.

Sealing Directions:

1. Fill open areas with glue. Use sparingly as Woodworkers urethane glue will expand and puff out. (You would be wise to experiment on a test bone first.)

2. Let dry overnight.

3. Sand edges (I use a power wet sanding belt) and finish as desired.

Enjoy Your New Musical Bones!

Made from High End rib.

Made from Regular rib.

Ox skeleton photo from U.S. National Park Service
All other photos by Zak Miller and Scott Miller

Zak Miller has demonstrated a natural eye for photography since he was a toddler. Zak shot the photos for this booklet in February of 2007 when he was 10 years old and a fifth grade student at Saint Louis Charter School.

Scott Miller is an award-winning player who rattles as many as eight bones at the same time. He has been a guest artist with numerous bands and virtuoso musicians. Scott is a featured performer at living history events, Irish fests and music festivals. He enjoys crafting musical bones in his basement workshop and holds a master's degree from Southern Illinois University at Carbondale where Scott specialized in Product Design. His online store, Bone Dry Musical Instrument Company, opened in 2007.

How To Clean Bone

The following bone cleaning instructions are compiled from several sources.

Two traditional ways for cleaning bone are sun-bleaching and bacterial maceration. Sun-bleaching is the preferred method, but takes a long time. Maceration requires much less time, but is smelly and messy. The Sun Soak method is a new process that seems to combine a little of both. Not covered is the Dermestes method which uses skin beetles to strip tissue off bone and is beyond the scope of this workshop.

None of the traditional methods employ the use of bleach or boiling water. Numerous bone preparators report that the application of excessive heat or boiling water causes fat to soak into the bone, resulting in a greasy, yellowish product. They also caution that chlorine bleach permanently damages the bone and causes it to become chalky, weak, and exceedingly porous. Some experts warn that bleached bones turn to powder with age.

Sun-bleaching

The easiest and absolute best cleaning method is to just let the bones sit outdoors where they can bleach naturally under the sun for a year or two. Then scrub with a brush and water and let dry.

Maceration

Maceration is a relatively quick method that cleans bone thoroughly and naturally via bacterial action. The simple (but smelly) technique essentially lets bones rot inside a closed container at a warm, near-constant temperature.

1. Remove tissue and skin from bone.
2. Place bones in bucket of water. Close lid.
3. Leave submerged in warm location where you won't mind the smell.
4. Empty fetid water every couple of days (plants love it). Replace with fresh water. Bacteria have run their course when water runs clear.
5. Sterilize in solution of 15% hydrogen peroxide and 85% hot water (or use full-strength store-bought hydrogen peroxide) until bone turns desired shade of white.
6. Rinse with fresh water.
7. Dry under sun or low heat.

Sun Soak

This seems to be the quickest bone cleaning method. Dan Cherney tells us on the rhythm bones forum that the process whitens bone, destroys residual soft tissue, and destroys softer portions of soft marrow that even boiling cannot reach.

1. Place bones in clear container.
2. Fill container with hydrogen peroxide solution.
3. Place in direct sunlight around 5 hours.
4. Bathe bones in solution of baking soda and water to draw out hydrogen peroxide.

Any comments you have about these bone cleaning methods, especially if you see inaccuracies or can add significant details, are appreciated.