Bending Notes on the Harmonica

By David Barrett for Stanford CCRMA Music 318 Class

How the Harmonica Produces Sound

There are 20 reeds on the harmonica—10 on the blow (exhale) reed plate and 10 on the draw (inhale) reed plate. Both reed plates are attached (commonly via screws) to a comb (commonly made of wood) where air is channeled through one reed at a time. Blowing through Hole #1 vibrates and sounds the blow #1 reed (C on a C Harmonica) and drawing through the same hole vibrates and sounds the draw reed (D on the C Harmonica). Cover plates give the harmonica player a surface to hold the instrument without disturbing the vibration of the reeds.

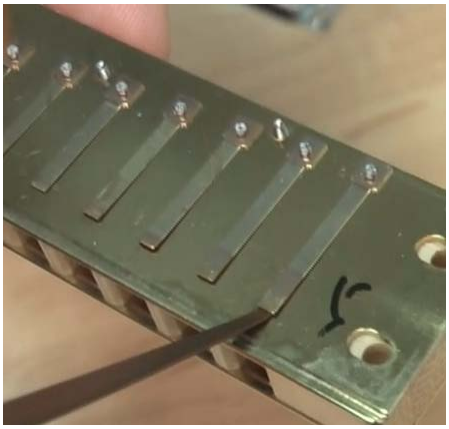


Figure 1 – Reed Plates

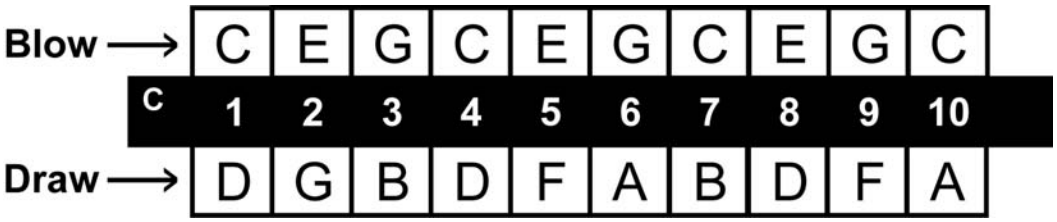
Figure 2 – Comb

Figure 3 – Coverplates

The “pad” side of the reed as it is known in the harmonica community, is attached to the reedplate (commonly with a rivet). The “tip,” or free-end of the reed, exits the reed slot (upward swing) and releases a “puff” of air. The reed then re-enters the slot (downward swing) and then starts the upward swing again to release another puff of air. Each puff creates a pressure wave, of which there are approximately 262 for the number #1 Blow reed on the C Harmonica to produce the pitch C4. The closer the tolerances between the reed and its slot (both draw and blow reeds), the more of the player’s air goes towards tone production.

In order to understand how bending works on the harmonica, the pitches of both blow and draw reeds need to be mapped—both reeds are involved in the bending process. Detailed in Figure 4 are the notes of the C Major Diatonic Harmonica.

Figure 4 – C Major Diatonic Harmonica



What Pitches Can Be Produced in the Bending Process on the Harmonica

Not every hole (note) on the harmonica can be bent, and not every hole that you can bend allows the same degree of bend. The amount of bend you can achieve is dictated by the distance (interval) between the draw and blow reed in holes #1 through #6 and blow and draw reed in holes #7 through

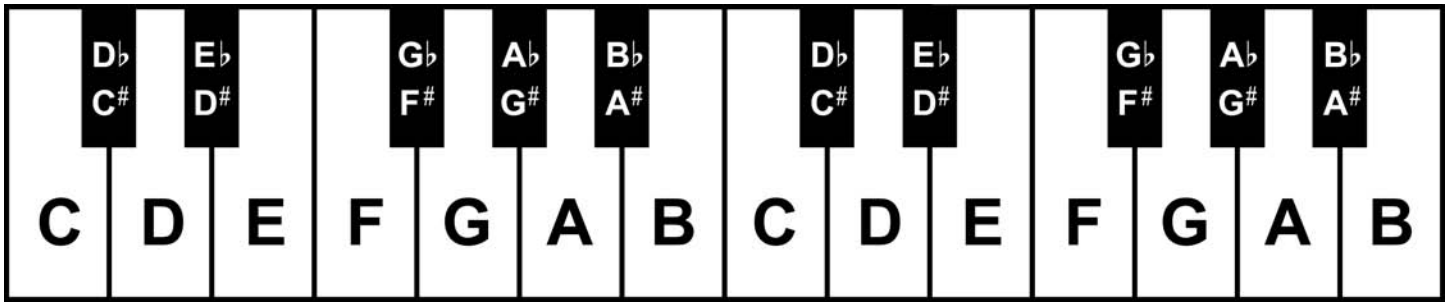
#10. Figure 5 shows the chromatic scale. The chromatic scale lists every note available in our western European diatonic music system.

Figure 5 – Chromatic Scale

C C♯ D D♯ E F F♯ G G♯ A A♯ B C
D♭ E♭ G♭ A♭ B♭

Musicians tend to like to use the visual reference of the piano for this same information.

Figure 6 – Piano Keyboard



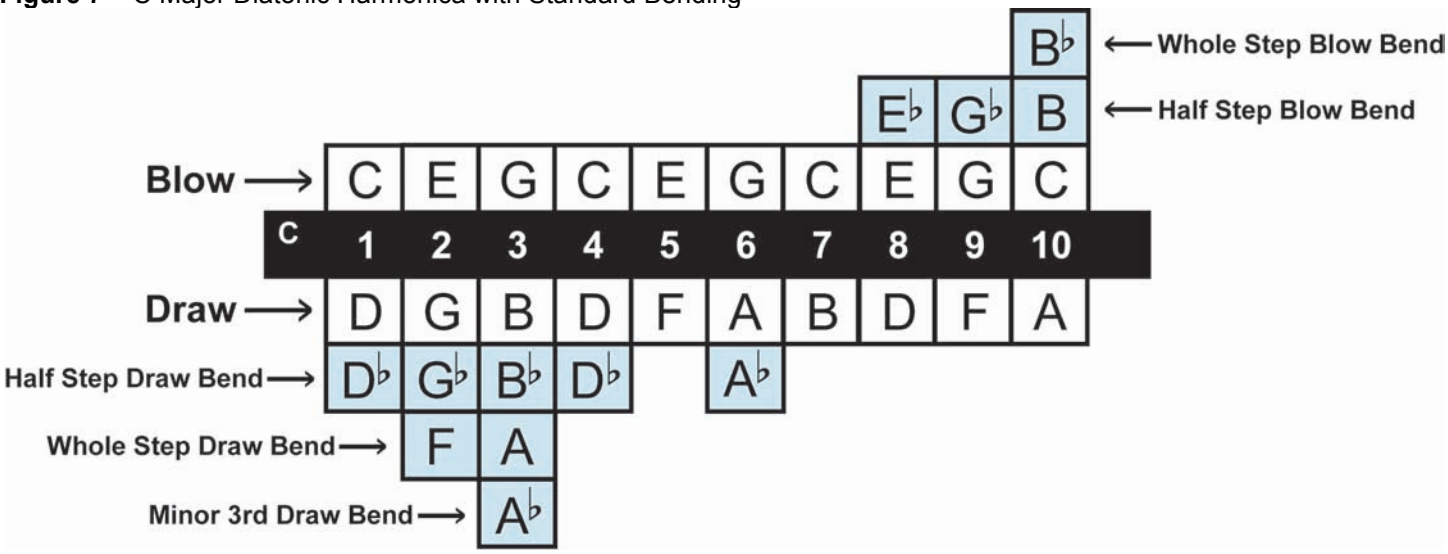
1 draw is the note D and the 1 blow is the note C on the harmonica. When performing a 1 draw bend, the player can lower the pitch of the draw reed (D) very close to, but not equal to, the blow reed (about an eighth of a tone away from C). Players learn to control their bending process to stop at notes within our chromatic system. Referencing the chromatic scale above, this gives us the note D♭ as our target for this 1 draw bend. When using these bends for "bluesy" affect, it's commonly okay to bend further than the notated pitch if it's used as an outside tone (not of the chord, nor the scale of the chord—a tone outside of the key that builds bluesy tension—a note that will resolve to a scale or chord tone, and ultimately to the root note of the home chord).

Continuing this process with the 2 draw, the player can bend down to whatever is between the G of the 2 draw and E of the 2 blow. This gives produces the notes G♭ and F. This process is used up to the 6 draw.

At the seventh hole of the harmonica the blows are higher than the draws. This means that a player now bends the blow notes. The same rule applies here… whatever pitches are between the higher pitched reed (blow in this case) and lower pitched reed (draw reed in this case) are what can be bent.

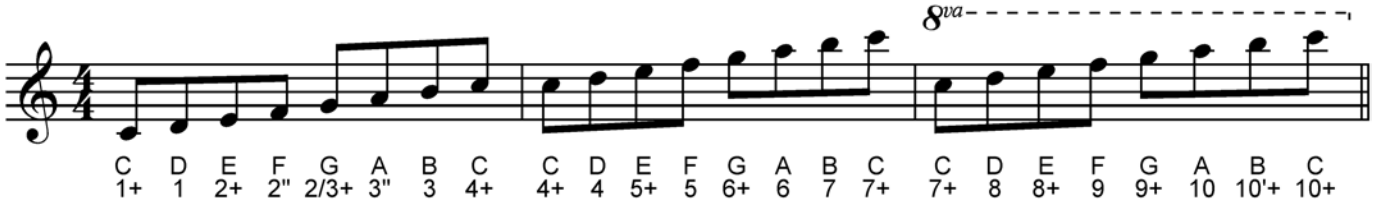
Figure 7 below shows all the bends available on the C Major Diatonic Harmonica with the bending process stated so far. Each slash (') represents a half step bend: 3 = 3 draw (B), 3' = 3 draw half step bend (B♭), 3" = 3 draw whole step bend (A) and 3"' = 3 draw minor third bend (A♭).

Figure 7 – C Major Diatonic Harmonica with Standard Bending



Detailed in Figure 8 are the notes of the C Major Diatonic Harmonica using Standard Bending to produce the C Major Scale on the Music Staff.

Figure 8 – C Major Diatonic Scale with Standard Bending



Bending Process using MRI

Figure 9A and 9B shows the harmonica in the mouth, with a normal tongue block embouchure used for the production of good tone.

Figure 9A

Figure 9B

To produce a bend, the first step is for the harmonica player is to hump their tongue to the roof of the mouth. This is demonstrated in Figure 10.

Figure 10

The placement of the tongue is very similar to the spoken E, as demonstrated in Figure 11, but with the tongue a bit higher in the mouth. I commonly uses “KEE” to help students achieve the proper location in the mouth.

Figure 11

Just humping the tongue is not enough for the bend to occur, the tongue must be humped in a place where the volume in front of the hump of the tongue to the face of the harmonica is tuned to the pitch of the draw reed (in our case, the note B on the C Harmonica). The player then moves the constriction point further back in the mouth to enlarge the chamber and sound the lower pitch. Figures 12A and 12B demonstrates in light blue this volume. I commonly uses “SH” as an approximation of the location for a slight bend.

Figure 12A

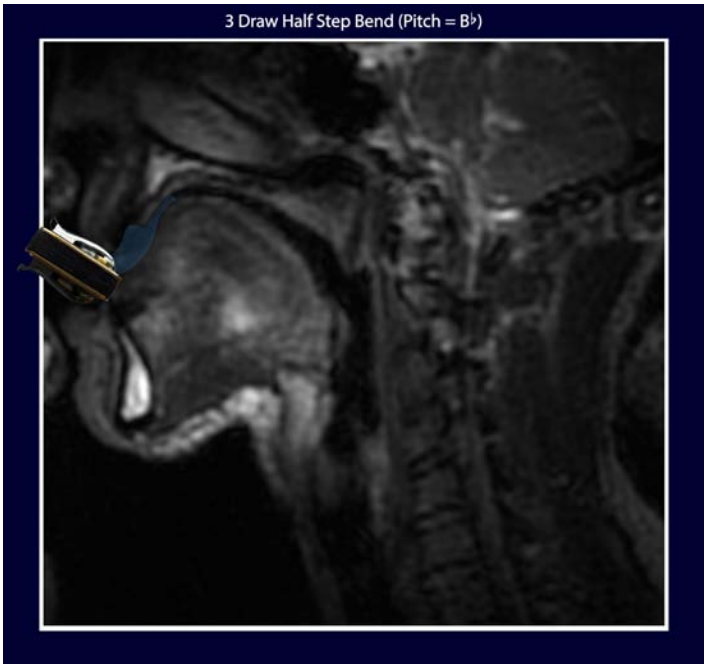


Figure 12B

To deepen the bend, the player again moves the constriction point further back in the mouth and can also drop the jaw if they wish to make volume larger (though dropping the jaw is generally discouraged unless the player is bending on a very low-tuned harmonica). Figures 13A and 13B demonstrates this lowered pitch—note the larger chamber in light blue. I commonly use “KEE” as an approximation of this bend location.

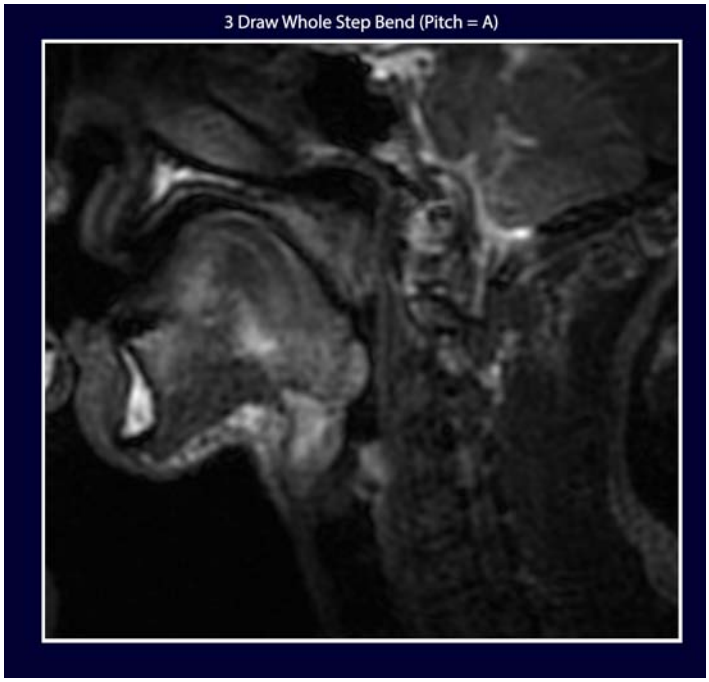


Figure 13A

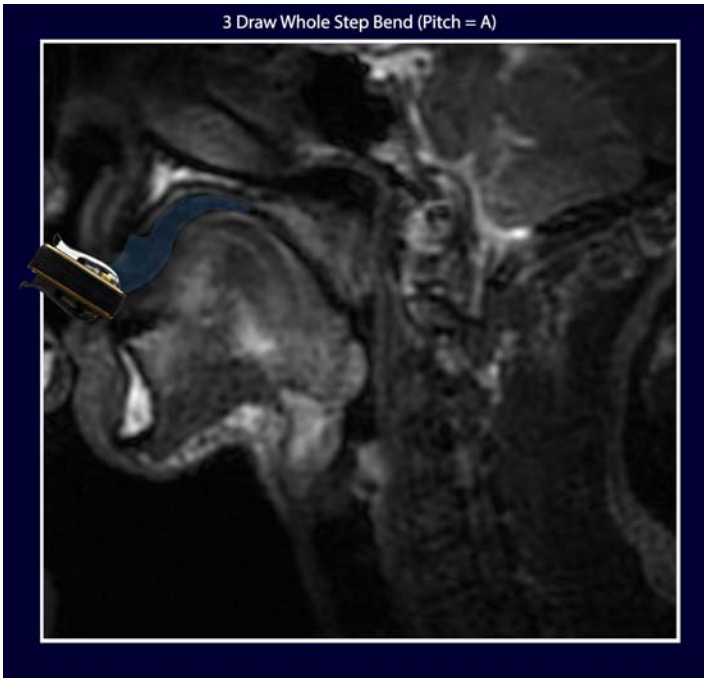


Figure 13B

Hole 3 draw on the harmonica can bend even further. Figures 14A and 14B demonstrate this. I commonly use “KOO” as an approximation of this bend location.

Figure 14A

Figure 14B

Bending for Bluesy Affect

Figure 8 detailed how bending can be used to fill in the missing notes of the "natural" scale of the harmonica—the C Major Scale for the C Major Harmonica for example. The notes F and A were recovered in the lower octave a B for the upper octave. This is helpful for both recovering notes of the scale and chord.

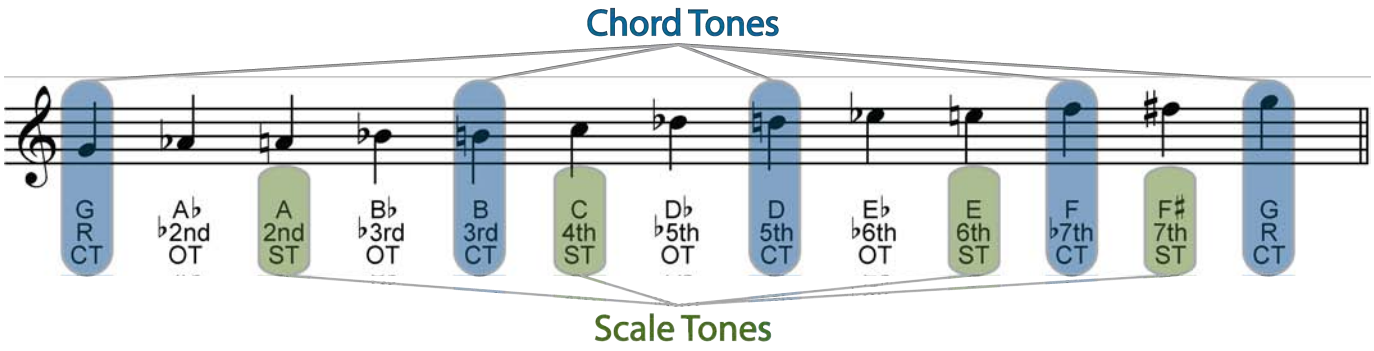
Bending is also used to create bluesy sounds, such as the half steps between the scale, slurring and emphasizing notes found between those half steps (commonly known as quartertones). Let's first talk about the ordering of note choice for song writing and improvising, from most consonant to most dissonant.

Chord Tones are the notes of the chord and match the most and should be played most often. These are called ***Non-Active Tones*** due to the fact that they match—thus they don't grab much attention.

We also have Scale Tones, which are not of the chord, but of the scale of the chord, and add interested by introducing new notes without straying too far from the chord structure and tonal center of the song. These notes are called ***Active Tones*** because they actively seek to resolve to a Chord Tone and ultimately to the root note of the song (G in our case). **Chord Tones (Non-Active Tones) and Scale Tones (Active Tones) comprise the most common notes used in melodic development (soloing).**

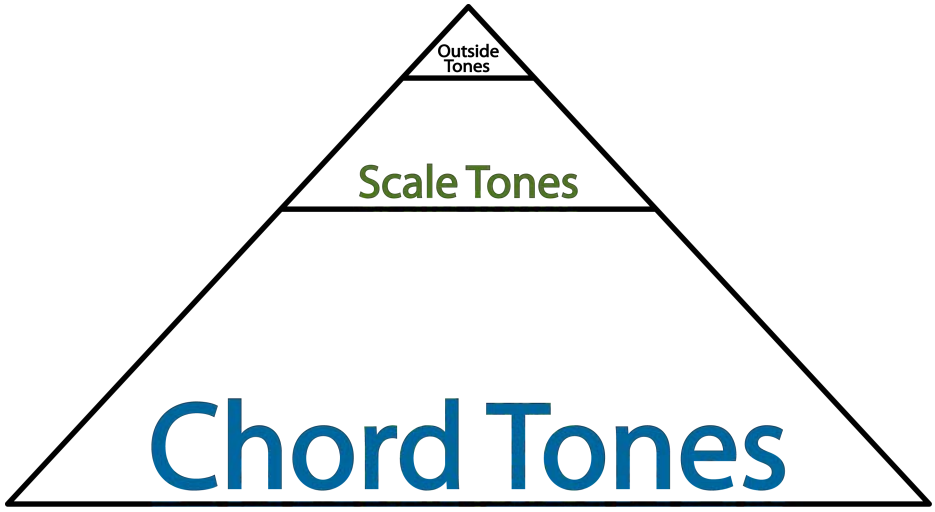
Our last type of tone is the Outside Tone. The ***Outside Tone (OT)*** is not of the chord and not of the scale of the chord—it's essentially outside of the key. These notes are very dissonant, which means they're very bluesy. These Outside Tones add the spice that makes the music exciting—but too much of it can make the music overly dissonant—so moderation is important.

Figure 15 – Illustrated below are all of the tones (a full chromatic scale) available from root note of a G^7 Chord.



Simply stated, Chord Tones should be played the most, since they match the notes that the rest of the band are playing. Scale Tones, since they are within the key you're playing in, also sound good, but are used to support the Chord Tones, in the form of Passing Tones, Neighbor Tones and other devices. Outside Tones are outside of the key, and are very exciting, but should be used sparingly due to them being very dissonant.

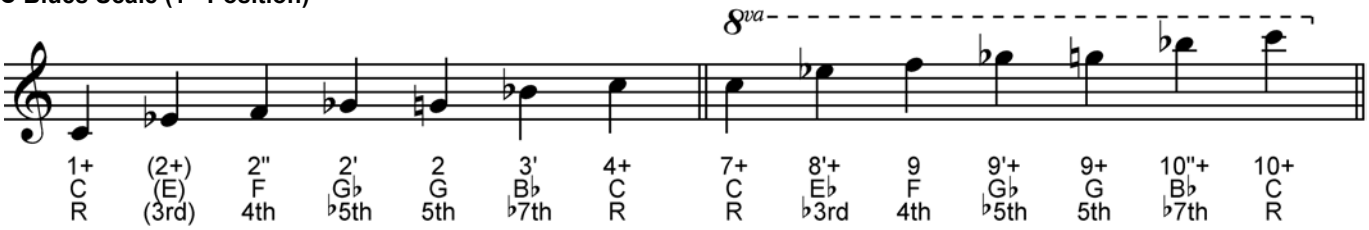
Figure 16



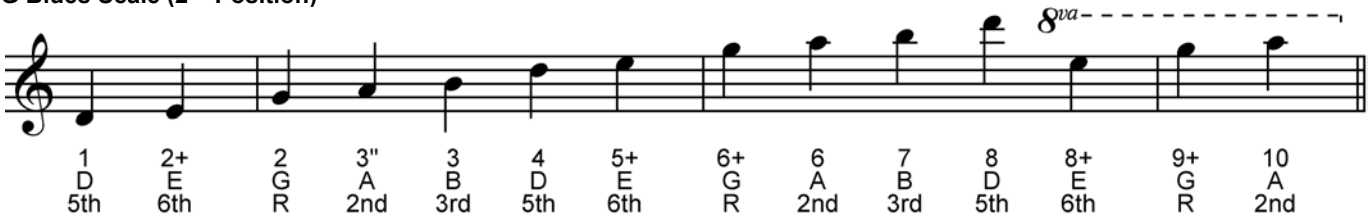
With the technique of bending, a very bluesy-sounding scale, called the ***Blues Scale***, is possible. Here are the three most common "positions," or keys, played on the C Harmonica with their corresponding blues scales.

Figure 17 – Blues Scales

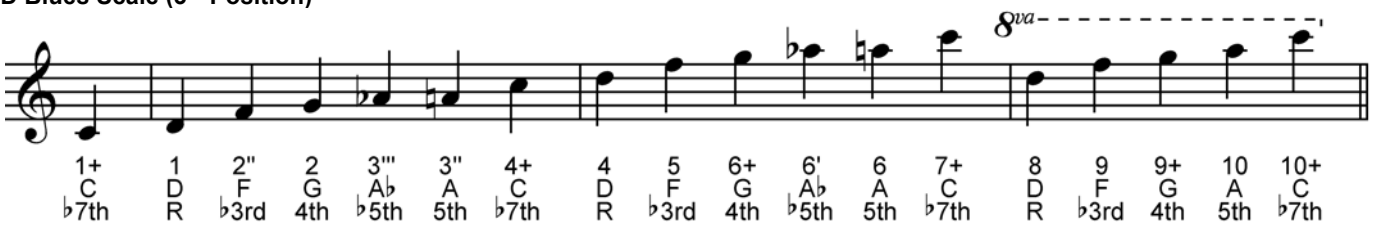
C Blues Scale (1st Position)



G Blues Scale (2nd Position)



D Blues Scale (3rd Position)



Bending Combinations

Players employ cool approached to bending, including moving beyond single-note bending to explore textural options. I'll perform the following examples for you in class:

1) Dip = Quick bend note to release
2) Cut = Quick natural note to bend
3) Two-Note Texture Bending = Adjacent holes
4) Split Bending = Holes played on both the left and right side of the mouth, separated by the use of the tongue in the center
5) More…

Let's Do It

Grab your C Harmonicas and let's give it a try!

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