

## **Intonation by Sumner Truax**

As saxophonists, and musicians in general, intonation, along with rhythm, is one of the most important technical aspects of music making. It is imperative that we spend a great deal of time practicing intonation. In this article, I will discuss everything in terms of Just Intonation. There are many systems of tuning (Equal tempered, Kelner, Pythagorean etc...) but I have found in my own teaching and practicing, that Just Intonation is an effective way to tune a saxophone. I will briefly describe what is meant by Just tuning, discuss the different tendencies of the ranges of the saxophone, and finally, provide strategies by which one can practice these techniques.

### **Just Intonation**

Just Intonation, or “beatless” tuning involves tuning each note so that they exist within the same harmonic series. This involves raising or lowering pitches depending on their location within the series. The classic example is that of a major third. Perhaps you’ve heard a teacher or band director say that “the major third has to be lower.” Specifically, the major third has to be 2.60 cents lower than the equal tempered major third. This is because the fifth partial (the major third) sits lower in the overtone series than what is necessary for equal temperament.

Just intonation is difficult to achieve by just using a needle tuner (although those are helpful too). In my opinion, the best resource is Richard A. Schwartz’s *Tuning CD*. It can be found on amazon or iTunes and is well worth the \$10 price tag. The Tuning CD allows you to play scales against a drone and adjust to eliminate the “waves” that exist when one is out of tune. This is infinitely helpful to develop the ear’s sensitivity to pitch.

### **Intonation on the Saxophone**

Intonation is a concept that I have found is best explained via demonstration. Some ways to demonstrate the concept of intonation are the following:

- Simply demonstrate playing in tune, sharp and flat. Mark features for each of these sounds. What does playing sharp sound like, what does flat sound like. Have the student identify some of the characteristics of each of these.
- Have student play against a drone pitch and identify whether they themselves are sharp or flat using the same characteristics that they applied to the teachers playing
- Pull the mouthpiece all the way out and slowly push in until the student identifies it as in tune. (can be done on a concert Bb)
- Push the mouthpiece all the way in and slowly pull out until the student identifies it as in tune. (can be done on a concert Bb)

Essentially all these techniques are doing is encouraging students to hear pitch in relation to another pitch and identify whether one is higher or lower than the other.

Once the student can hear that he/she is not in tune they will need to find ways to be in tune by moving pitch. The next step in the process is to provide them with *techniques* that they can use for changing pitch and manipulating their instrument so that it is more in tune. There are four ways to do this.

- Mouthpiece movement
- External (jaw) movement
- Internal (tongue) movement
- Mechanical adjustments

### **Mouthpiece movement**

This is the strategy that gets the student in the ballpark. The mouthpiece can be pushed in or pulled out along the cork in order to get the instrument calibrated correctly. The two notes that are most commonly tuned are concert A 440 and Bb (466.16). On the alto saxophone this is F#2 and G2. For the beginner, it is important to use the octave key for both of these notes as the lower register can have a tendency to be flat without proper embouchure support.

Typically what I will do with my students is have them pull out all the way, so that they are flat. I then ask them to play a concert Bb against a drone and slowly push in as they are playing until they hear the waves disappear. This technique accomplishes two things. First, it eliminates any guessing on the part of the student. There is absolutely no doubt that they are flat, and must push the mouthpiece in in order to get to the proper pitch level. Secondly, it allows them to hear the pitch change in real time and to react in real time. If the student is playing an F#, they have to take the right hand off the instrument in order to push in. With a G, they can just use the left hand to play and the right hand to move the mouthpiece.

This is step one as it gets the instrument into the optimum area for tuning. Students must also be playing with the correct embouchure in order to have this strategy work accurately. Check out my article on [tone production](#) for information on developing a stable embouchure.

Before moving on to external and internal adjustments, students should be able to accomplish this step relatively easily.

### **Jaw movement to manipulate pitch**

The first way of changing pitch as one is playing (without using the hands) is by moving the jaw. Most commonly, this technique is used to drop the pitch in the middle and lower register (up to around Bb3).

By having a tight “oo” (as in food) shaped embouchure, the lips can flex even more which will allow the jaw to drop slightly, thereby lowering the pitch.

A good note to use for this exercise is the saxophone middle D. Have the student use more of an “oo” shaped embouchure. If they can draw the lips into a tighter “oo,” the jaw will drop, thereby lowering the pitch. The goal of this exercise is to lower the D by about a half step just by moving the jaw. This exerts a tremendous amount of pressure on the student’s lip muscles and will be difficult for them to accomplish until they have built up embouchure strength.

In addition to being lowered, the pitch can also be raised by manipulating the jaw. By drawing the corners back and smiling slightly, the lower jaw will exert upward pressure to compensate for the lack of side pressure and the pitch will rise.

The following are some necessary things that must be in place in order for the student to bend pitch using the jaw.

- Tongue must be in “i” (as in tree) position—otherwise you will hear a “honking” sound and the pitch will tend to drop the octave
- Lips must be strong enough to sustain the pressure on the reed—otherwise you will end up getting toneless wind.
- Adequate air stream—think of a crescendo as the pitch is being lowered.

### *Kinesthetic Awareness of jaw motion*

It is important when teaching this to make students aware of the proper motion of their jaw.

- When the jaw drops down the movement is also somewhat inward
- Try bending over at 90 degrees so that tongue and jaw will be relaxed
- Lean back in a chair and open and close jaw
- Tongue on roof of mouth guides the jaw into its proper gliding motion—put hands on jaw bone to feel the correct motion

### **Internal Movement to manipulate pitch**

Internal pitch manipulation on the saxophone is particularly helpful and is the principle form of manipulation in the upper register.

These “internal pitch bends” can be done in two ways. The tongue can either produce an “i (as in tree) – aa (as in cat)” motion in which the tongue moves slightly back in the mouth, or an “i—eeee” motion in which the tongue moves farther forward.

Videos demonstrating these pitch bends in action are available here:

[http://www.lawrence.edu/fast/jordheis/Pitch\\_Bending\\_Player\\_1\\_Mouth.html](http://www.lawrence.edu/fast/jordheis/Pitch_Bending_Player_1_Mouth.html)

[http://www.lawrence.edu/fast/jordheis/Pitch\\_Bending\\_Player\\_2\\_Mouth.html](http://www.lawrence.edu/fast/jordheis/Pitch_Bending_Player_2_Mouth.html)

In order to produce these:

- Tongue must be arched in the mouth (‘i’ position as in tree).
- Soft palate must be high. Touch the soft palate to raise it, or you can also yawn. Look in the mirror to gain control over the soft palate.

A good goal to shoot for is to bend the pitch down a perfect fourth from palm D up to high F#. Once students possess this type of flexibility in the upper register, tuning ceases to become an impossible task. The student will be able to go far lower than they would ever need to on any given pitch. After these two forms of manipulation (external and internal) are mastered, the student need only to practice scales with Just Intonation and adjust pitches using these techniques.

*This internal pitch manipulation is also incredibly helpful for altissimo playing.*

### **Mechanical Adjustments**

Occasionally, mechanical adjustments need to be made in particularly fast passages, or passages with large leaps where external and internal movement do not suffice.

*Technique for finding alternate fingerings*

- Uncovering or covering a tone hole close to the last closed tone hole in the normal fingering will give you a substantial change in pitch. For example, adding side F# to a G will raise the pitch just as adding 4-5-6 to C natural will lower the pitch.

Tuning is mandatory and important in *any* style of music we play. Playing a note that is out of tune is, quite literally, playing an incorrect pitch. It’s important that our students understand the value of tuning both when playing unaccompanied, with piano or other fixed pitch instruments, and with an ensemble. On the saxophone, putting the fingers down in the right order does not guarantee that the right pitch will come out. In order to master intonation it is necessary for students to practice these techniques using scales, melodies and intervals. All of these must be practiced against a drone pitch in order to tune *relative to another pitch* (i.e. just intonation).

As always, please email me with questions or comments related to this article, especially if you have particular techniques you have found useful for you or your students. I would love to hear from you!

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