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Saxophonist Steve Duke has a broad range of musical performance – from Ella Fitzgerald to computer/acoustic interactive music. Recently premiered solo works include compositions by Larry Austin, Dexter Morrill, Cort Lippe, William O. Smith, Rodney Waschka II, James Phelps, Zack Settel and Les Thimmig. The New York Times describes his performance of BluesAx as “gorgeous tone ... supple fluidity.”

A Presidential Research Professor at Northern Illinois University, Mr. Duke is highly regarded for the development and articulation of Jazz and Classical cross-over style techniques and for the application of the Feldenkrais Method® in learning music performance. Mr. Duke has solo recordings on Sony/Columbia, Centaur CDCM Series, and GMEB/UNESCO/CIME and is a Yamaha Performing Artist.

Mouthpiece Placement, Tuning & Tone

*By Stephen Duke
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One of the most common misunderstandings I find in teaching saxophone is how the mouthpiece position relates to intonation and tone production. We frequently overlook the significance of the position of the mouthpiece. Yet by its placement, the mouthpiece automatically dictates how the instrument is played. Some of the most fundamental problems related to the pitch and tone can be addressed only through mouthpiece placement.

Mouthpiece placement is a confusing issue even for experienced saxophonists. An individual's pitch center, musical style, mouthpiece type, the acoustic tendencies of the instrument, and even the condition of the instrument influence where we position the mouthpiece on the neck. Because of these conditions there is no single correct position. However, I have found that poor habits and false assumptions dictate where most students choose to position the mouthpiece.

Three Experiments

Try the following simple experiments to help determine if your mouthpiece placement is the optimum position for playing in-tune and with a resonant tone.

Using a tuner, tune your saxophone playing a low B. Make any necessary adjustments to the position of the mouthpiece so that the meter of the tuner points to “zero.” Then, turn away from the tuner so that you cannot see the meter and play the B notated on the first ledger line above the staff – two octaves higher than the low B. (All the pitches are in the saxophone key, not concert pitch.) While sustaining the high B, turn back to look at the tuner. The pitch of the high B should read within 10 cents of “zero” without the need to make major adjustments. Is your high B significantly sharper than your low B? Many will find that they have to lower the pitch of the high B down so that the tuner reads “zero.”

Try a second experiment. Set your mouthpiece where you normally position it. Play a middle B and bend the pitch down as far as you can. How far can you bend the pitch? The pitch of this note can be lowered at least a minor third on the alto (down to an Ab) and at least a major second on the tenor (down to an A). Some students are surprised to find that they can only bend the pitch down 20 or 30 cents.

Using the same mouthpiece position, a third experiment is to play your middle B and bend the pitch upward as far as you can. Although this pitch can be raised 20-50 cents, many students find that they cannot bend the pitch even 10 cents.

Frequently, these demonstrations produce some or all of the following results: (1) the low B was initially flat and in order to bring the pitch up you needed to push in the mouthpiece, (2) your high



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B was sharp compared to your low B, (3) you were not able to bend the middle B downward or upward very much. I find nearly all high school level and many college level students will produce some or all of these results when trying these simple experiments.

To understand how these experiments are relevant to pitch and tone we must consider a few basic principles of how pitch flexibility can affect our overall pitch center.

Pitch Flexibility and the Different Registers

The saxophone has a very flexible pitch. This is both a blessing and a curse. We can easily place a note either in-tune or very out-of-tune. To the bane of many band directors, the latter is more common.

What we frequently overlook is that when it comes to pitch flexibility, not all registers are created equal. The notes in the upper register have a more flexible pitch than the notes in the lower register. This means that you can play a note in the upper register sharper and flatter than you can when playing in the lower register.

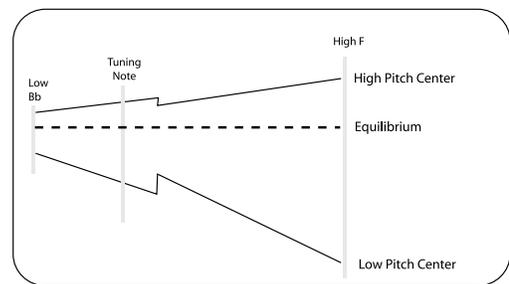
So, if your pitch is sharp overall (a high pitch center) then you will play more sharp in the upper register than in the lower register. When trying the first experiment, if you found that the high B was significantly higher than the low B, then you are most likely playing with too high of a pitch center. Frequently, when the pitch center is high, then bending the pitch upward or downward can become difficult. The pitch gets “locked up” in a high pitch center, losing its flexibility and making it even more difficult to adjust the pitch. When trying the second and third experiments, if you could not bend pitch very far up or down, then your overall pitch probably is stuck in a high pitch center.

Most students feel that while the upper register is sharp, the lower register is flat. In order to play in tune, they constantly adjust the upper register down and the lower register up. This view of pitch relation between the upper and lower registers of the saxophone is never questioned even though it contradicts the fact that the saxophone is designed to play relatively in-tune throughout the registers.

The reason that the lower register is viewed as flat is because of its relation to the tuning note we use in band, concert B \flat or A, which is in the middle register. We assume that the tuning note is the “in-tune” note on our instrument and that all the other notes, therefore, are sharp or flat. Consequently, if we play with a high pitch center then we conclude that the upper register is sharp and that the lower register is flat. If we change the tuning note to a note in the low register, for example, then the relative pitch of all other notes changes accordingly. Also, we will position the mouthpiece differently on the neck.

It does not occur to us that if we are playing sharp throughout the instrument, the lower register will sound flat because it cannot be played as sharp as the upper and middle registers. Likewise, the middle register cannot be played as sharp as the upper register. Consequently, only those notes near the tuning note are “in-tune.” Playing with a flat low register and a sharp upper register is due to a high pitch center and mouthpiece placement – not due to a design problem of the instrument. When considering the flexibility of the saxophone, the lower notes are our best reference point for pitch because they are the least flexible. Low B is a particularly good reference note.

The following graph illustrates the pitch flexibility between the lower and upper registers of the saxophone. The zigzag in the lines indicates the change in pitch flexibility that occurs over the break between middle C \sharp and middle D. Intonation tendencies of individual notes, such as the commonly sharp notes above the register break (middle D, E \flat and E), are not reflected in the lines on the graph.



Mouthpiece Placement – Lowering the Pitch Center

Since the pitch flexibility of the upper register is greater than the lower register, lowering the overall pitch center will affect the pitch of the upper notes more than the lower notes. As the overall pitch is lowered, at some point a pitch equilibrium is reached. This is when the pitches of upper register bend down far enough to play relatively in-tune with the lower register. The surprising and seemingly contradictory idea about mouthpiece placement is that if you play sharp in the upper register then PUSH IN and LOWER THE PITCH CENTER! This is the opposite of what everyone is taught – if you are sharp then pull out. If your pitch center is high and you pull out, then you only add to the problem by forcing your pitch center even higher.

Lowering the pitch center is easier said than done. The throat, embouchure and jaw habitually reinforce the pattern that creates a high pitch center. This is reinforced further if the mouthpiece is pulled out too far. Simply pushing in and playing lower on the pitch center usually makes the tone feel out of control and unstable. It feels “wrong” because it is unfamiliar.



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Another Experiment

Try another experiment. Play a middle B and make the most BEAUTIFUL TONE you can imagine. Then play a middle B again, but this time make the UGLIEST TONE you can imagine – REALLY UGLY! Make an ugly saxophone tone without vocal growls or extended technique sounds. For many students playing really ugly is very strange at first, so try several times, playing uglier each time. Do this experiment before you read any further. The results may surprise you!

What did you notice?

For the vast majority of people, what changes the most when producing an ugly tone is that the PITCH gets lower and the VOLUME gets louder. But the instruction was to change the TONE – not the pitch or the volume. Of course, there is no doubt that you were trying to change the TONE, and not the pitch or the volume. Yet, it did sound uglier. That is because flat and loud sounds ugly.

Interestingly, the students that I have tried this with frequently find that the tone of the instrument actually sounds more resonant and full, although less controlled. Try this experiment with another saxophone player listening to your tone and see what they notice. Another interesting result is that some students find that they can lower the pitch more when trying to make an ugly tone than when trying bend the pitch down as in the second and third experiments earlier in the article.

Of course, playing flat and loud in band is not acceptable. So, let's take the ugliness out of the sound. Push in the mouthpiece and play softer. It may still seem unattractive, but that is partially because it feels unfamiliar or "wrong." Remember, the familiar way of playing is what you are trying to change. Nobody wants to play ugly, but if you feel that your "attractive" tone is missing something then perhaps the qualities that you seek lie in the other "not attractive" parts of your tone.

You can modify the degree of ugliness, say 30-percent ugly or 10-percent ugly. After becoming familiar with this new pitch center, you will learn to produce a tone that feels comfortable. In fact, after you learn to play with the mouthpiece pushed in and to lower your pitch center, you may wonder how you ever played the saxophone with the mouthpiece pulled out so far. Ironically, playing with a high pitch center takes a lot of effort and sounds constricted.

In conclusion, it is important that we do not take the position of the mouthpiece for granted. It profoundly influences our pitch center. If it the

mouthpiece is pulled out too far then by necessity we must raise our pitch center. Consequently the tone becomes constricted, the pitch inflexible, the upper register is sharp and the lower register is flat.

By contrast, when the mouthpiece is pushed in and we play with a lower pitch center, our throat and jaw then become looser and freer. With time, the tone becomes more full and resonant, and all the registers play in-tune – the way the saxophone was designed to play.

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