

Spring 2015


# Understanding and Implementing Extended Saxophone Techniques

Tyler R. Bokman

University of Akron Main Campus, trb37@zips.uakron.edu

Please take a moment to share how this work helps you [through this survey](#). Your feedback will be important as we plan further development of our repository.

Follow this and additional works at: [http://ideaexchange.uakron.edu/honors\\_research\\_projects](http://ideaexchange.uakron.edu/honors_research_projects)

 Part of the [Music Pedagogy Commons](#), [Music Performance Commons](#), and the [Music Practice Commons](#)

---

## Recommended Citation

Bokman, Tyler R., "Understanding and Implementing Extended Saxophone Techniques" (2015). *Honors Research Projects*. 178.

[http://ideaexchange.uakron.edu/honors\\_research\\_projects/178](http://ideaexchange.uakron.edu/honors_research_projects/178)

This Honors Research Project is brought to you for free and open access by The Dr. Gary B. and Pamela S. Williams Honors College at IdeaExchange@UAkron, the institutional repository of The University of Akron in Akron, Ohio, USA. It has been accepted for inclusion in Honors Research Projects by an authorized administrator of IdeaExchange@UAkron. For more information, please contact [mjon@uakron.edu](mailto:mjon@uakron.edu), [uapress@uakron.edu](mailto:uapress@uakron.edu).

Understanding and Implementing Extended Saxophone Techniques

Tyler Bokman

Honors Research Project

## Table of Contents

Introduction.....	1
Altissimo.....	2
Altissimo Fingerings.....	5
Altissimo Exercises.....	6
Pitch Bending.....	8
Pitch Bending Exercises.....	10
The “F-Trick”.....	11
Double Tonguing.....	12
Double Tonguing Exercises.....	14
Flutter Tonguing.....	15
Flutter Tonguing Exercises.....	17
Slap Tonguing.....	18
Slap Tonguing Exercises.....	19
Growling.....	20
Growling Exercises.....	21
Multiphonics.....	22
Easy Multiphonics and Their Fingerings.....	23
Circular Breathing.....	24
Circular Breathing Exercises.....	25

## **Introduction**

Contemporary classical music often pushes the boundaries of how instruments should be played and what kinds of sounds they should produce. A great deal of contemporary music requires the player to utilize playing techniques that may seem very strange and difficult to those who are unfamiliar with them. These unusual practices, known as extended techniques, can include playing in extreme ranges, manipulating pitches in particular ways, and applying abnormal articulations. While once seen as a sort of novelty, these extended techniques are becoming increasingly essential to the contemporary musician. This is especially true of the saxophonist.

While nearly every other major instrument was developed gradually over extremely long periods of time, the saxophone was explicitly invented in 1841. As such, a relatively high percentage of saxophone literature was written in the twentieth century and beyond. It is this contemporary literature that frequently demands the use of the aforementioned extended techniques. It is crucial for the modern saxophonist to have at least a basic understanding of these techniques in order to approach much of this literature. This project discusses the implication of several extended techniques that commonly occur throughout the saxophone repertoire. The extended techniques covered include playing in the altissimo register, pitch bending, double tonguing, flutter tonguing, slap tonguing, growling, playing multiphonic pitches, and circular breathing.

## **Altissimo**

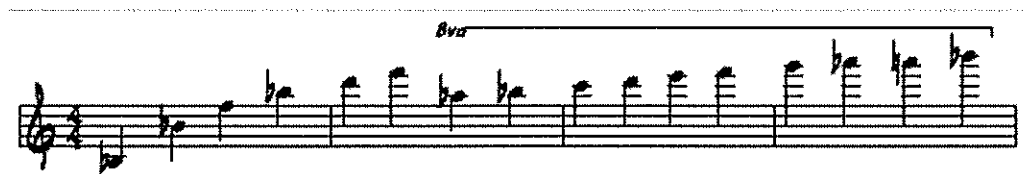
Out of the many different extended techniques for the saxophone, use of the altissimo register is arguably the most common technique occurring throughout the repertoire. The fundamental range of the saxophone extends from low Bb two spaces below the treble clef staff to high F four spaces above the treble clef staff. All pitches above this high F are considered part of the altissimo register. While this register has occasionally been viewed as little more than a novelty, renowned saxophonist and teacher Donald Sinta argues that being able to play in the altissimo register is an absolute necessity for the contemporary saxophonist (Sinta 1). There are countless pieces for saxophone that extend into the altissimo register. Some of the most widely performed include Paul Creston's *Sonata, Opus 19 for Eb Alto Saxophone*, Robert Muczynski's *Sonata for Alto Saxophone and Piano*, Alfred Desenclos's *Prelude, Cadence et Finale*, and Jacques Ibert's *Concertina da Camera*.

There are a variety of factors that contribute to the production of altissimo pitches. Many players place a great deal of importance on influences such as mouthpiece choice, reed strength, and fingering selection. While these aspects certainly have a significant influence when it comes to altissimo, they are not the primary components of success in this upper register (Sinta 1). The two most important areas in the mastery of the altissimo range are the studies of voicing and overtones (Sinta 2).

According to Sinta, "voicing refers to an awareness and control of the muscles and soft flexible tissue in the oral cavity and vocal tract." Alterations to these muscles and tissue, which include the position of the tongue, contribute directly to the player's control over range. Intonation, dynamics, and overall timbre are also affected (Sinta 2). Because many of the aforementioned muscles are rarely used outside of exercises that directly pertain to voicing, it

often takes players a long time to develop any significant awareness or consistency in manipulating them. A thorough study of overtones and harmonics will contribute greatly to the maximization of this muscle control and memory (Sinta 3).

Any audible pitch has a series of overtones that exist above it. While these tones are sometimes noticeable to the human ear, a majority of the time they are not. The overtone series is based on a predictable yield. The initial pitch is known as the fundamental, and each tone that occurs above it does so at a fixed interval. These tones are known as partials. The partial series for a fundamental of low Bb on the saxophone is pictured below (Thomas 1):



All of the above pitches can be produced on the saxophone by fingering low Bb. Identical intervals can and should be produced over other fundamentals as well (Thomas 1). The overtone pitches, or partials, are produced not by changes in fingerings, but by changes in voicing. To gain control over these voicing adjustments and eventually the altissimo register, the player must be able to hear the intervals in his or her inner ear and learn to anticipate the pitches. According to Sinta, “successful altissimo skill requires excellent pitch anticipation and placement” (Sinta 2). An acquaintance with the overtone series and the adjustments needed to produce the different partials will lead to enhanced muscle memory and aural anticipation (Sinta 2, 3).

Once the player has developed a good sense of voicing and aural anticipation, the next goal should be breaking through to the altissimo register. According to saxophonist and pedagogue Larry Teal, the only real way to initially approach the altissimo register is through trial and error (Teal 98). However, if the player has diligently worked on voicing and overtone

studies, the necessary oral adjustments for altissimo pitches should be found with relative ease (Sinta 4). Each altissimo note has numerous fingering possibilities. Each fingering will affect the response and intonation of the desired pitch in a different way. Exactly how these fingerings differ varies from saxophone to saxophone. Ideally, the voicing should have a greater effect on the altissimo pitch than the fingering (Sinta 59).

# Recommended Altissimo Fingerings

The first example shows a musical staff with a treble clef and a key signature of one sharp (F#). The notes are G4, A4, B4, and C5. To the right of the staff are two sets of fingering diagrams. The top set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded. The bottom set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded.

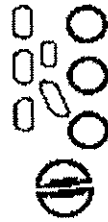
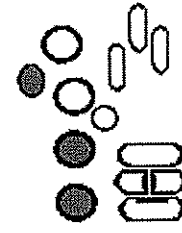
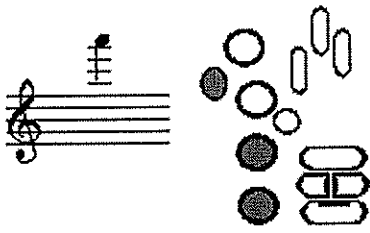
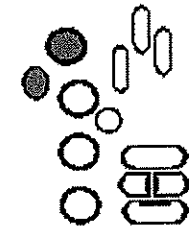
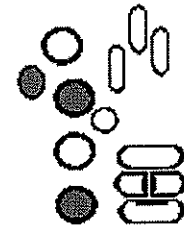
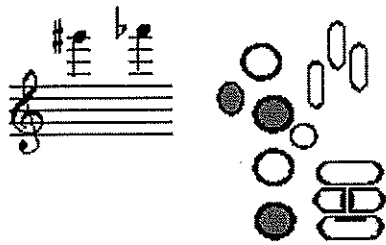
The second example shows two sets of fingering diagrams. The top set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded. The bottom set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded.

The third example shows a musical staff with a treble clef and a key signature of one sharp (F#). The notes are G4, A4, B4, and C5. To the right of the staff are two sets of fingering diagrams. The top set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded. The bottom set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded.

The fourth example shows two sets of fingering diagrams. The top set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded. The bottom set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded.

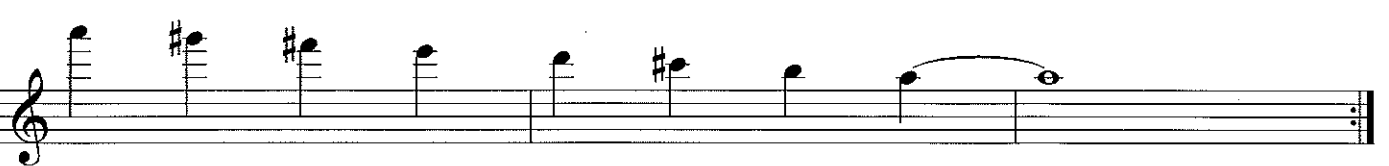
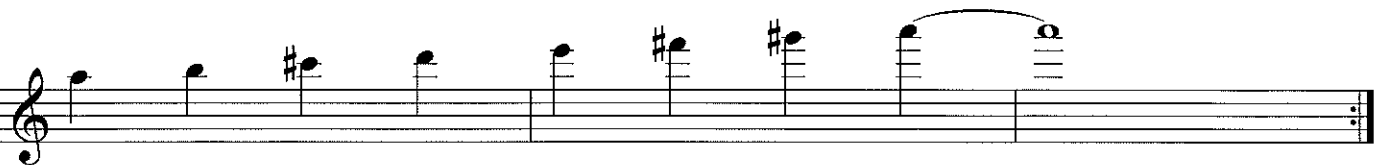
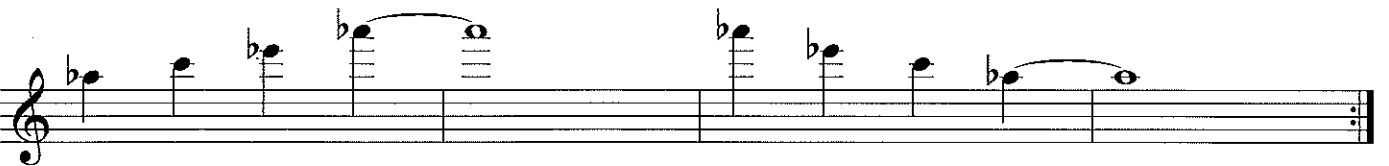
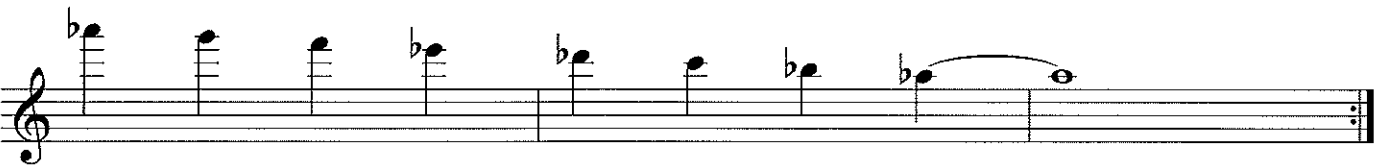
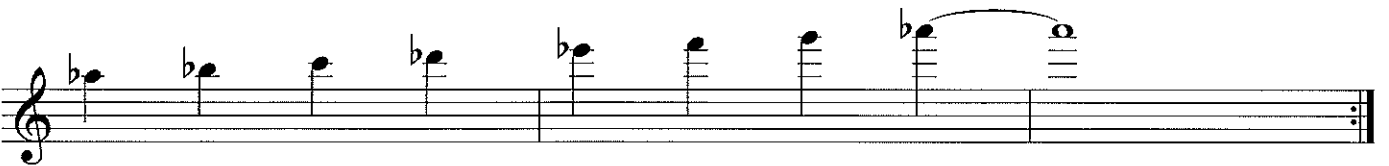
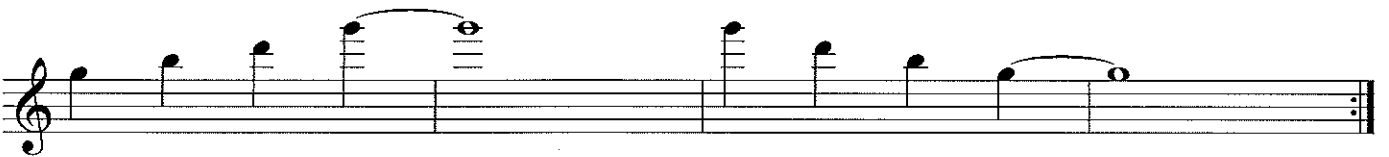
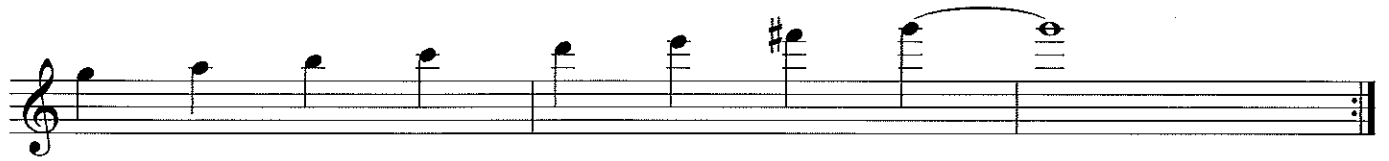
The fifth example shows two sets of fingering diagrams. The top set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded. The bottom set shows circles for fingers 1-4 and rectangles for fingers 1-2, with some circles shaded.



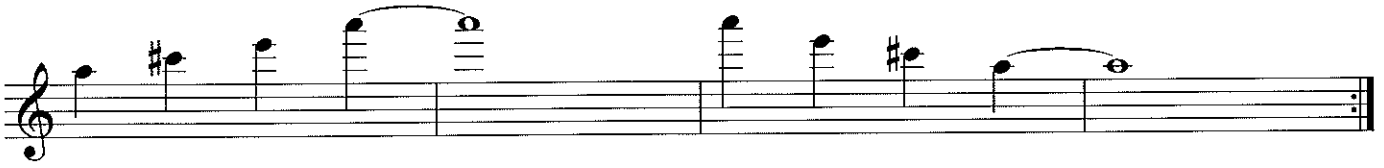


These fingerings are provided by saxopede.com.

# Basic Altissimo Exercises



[Title]



## **Pitch Bending**

Pitch bending is one of several extended techniques that was influenced directly by jazz music. It refers to a procedure used to seamlessly alter a pitch by “bending” or “scooping” into another pitch. Several major saxophone works that call for pitch bending include Erwin Shulhoff’s *Hot-Sonate*, Ryo Noda’s *Improvisation 1*, David Amram’s *Ode to Lord Buckley*, and Steven Gallante’s *Saxsounds III: Diminishing Returns*. There are several different ways that this can be achieved (Mauk<sup>3</sup> 14).

The easiest way to begin learning to bend pitches is through the jaw bend. To perform this, the player must sustain a note and with a very consistent airstream, gradually lower the jaw until the pitch is lowered a half step. If anything, the airstream should actually be a bit faster and more pressurized while the jaw is lowered. This is much easier to achieve in the middle and upper register than in the lower register (Mauk<sup>3</sup> 14).

Once the jaw bend is learned, the player can advance to the finger bend. This version will yield the same sounding effect as the jaw bend, only produced by the moving of the fingers. As a note is sustained, a finger is slowly lifted from the keys to produce a gradual bend to the next pitch. The airstream must increase a bit as the finger is being lifted to ensure that the sound does not drop out. However, it should return to normal once the next pitch has been reached (Mauk<sup>3</sup> 14-15).

Individually, the jaw and finger bends are typically learned with relative ease. Once the player is comfortable with both, these two bending techniques can be combined. This will allow the player to bend an interval wider than a half step. When bending from one pitch to another, the finger or fingers that need to be moved must be lifted slowly, as in the finger bend. Immediately after this motion begins and the necessary key or keys are slightly open, the jaw must be dropped to a lower position. The player then needs to coordinate the rising of the fingers

and the jaw so that the bend to the desired pitch is even and one component of the bend is not finished before the other (Mauk<sup>3</sup> 15).

There is another pitch bending method that is executed entirely through voicing and the manipulation of the oral cavity. This method is particularly effective for bending pitches in the upper and altissimo register. Donald Sinta recommends learning this technique with an exercise that he refers to as the “F-trick” (Sinta 8).

To perform the “F-trick,” the player must first play third octave F using the front fingering as pictured below. Players who are not familiar with this fingering will find it is more resistant and less forgiving than the more common side F fingering (Sinta 8). Once the pitch can be comfortably produced and maintained using this fingering, the player should attempt to lower it a half step using only voicing and oral muscle adjustments. The jaw and fingers should not move at all. Ideally, this should produce a full glissando and a true half step. Once the player is comfortable doing this, the bend should be increased by another half step. This process should be repeated until the player cannot bend the pitch any further without it dropping out. It may be a very long process, but with persistence and improved muscle control, the player should eventually be able to bend the pitch down about an octave. This same voicing technique can be used to bend other high pitches in addition to F (Sinta 9).



# Pitch Bending Exercises

Finger only the F while using the jaw bend to move down to the E and back.



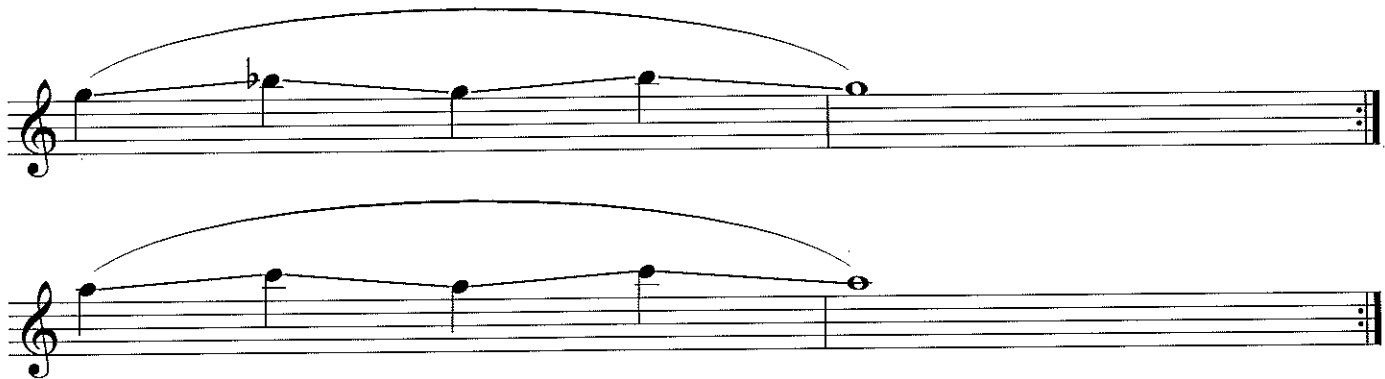
Now, still fingering F, begin with the jaw lowered so that the lower pitch is initially produced.



Lift and lower the fifth finger slowly to produce a finger bend between the two pitches.

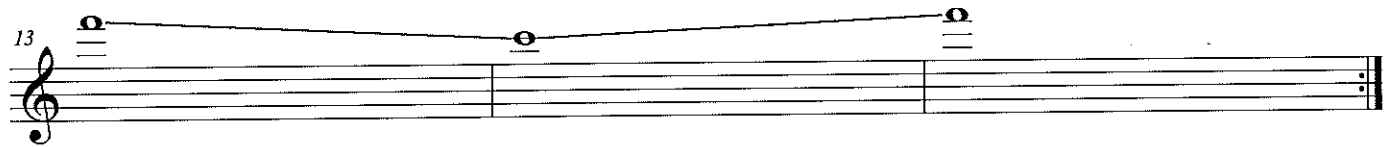


Finally, combine these two bending techniques to bend a wider interval.



# The "F-Trick"

Using the front F fingering and oral cavity adjustments, bend high F down to E. Once comfort and consistency are obtained, gradually increase the range of the bend. This will take time to achieve.



## Double Tonguing

Before a player is introduced to the double tonguing technique, it is essential that he or she develop a strong single tongue technique. Ideally, the player should be able to comfortably articulate sixteenth notes at a tempo of quarter note equals 100. However, the average player will likely have great difficulty consistently single tonguing sixteenth notes beyond quarter note equals 132. It is at this point that double tonguing often becomes a necessity (Teal 86). Pieces within the saxophone repertoire that require or facilitate double tonguing include Luciano Berio's *Sequenza VIIb*, Paul Creson's *Concerto for Alto Saxophone and Orchestra*, Jacques Ibert's *Concertina da Camera*, Vittorio Monti's *Czardas*, Ronald Nelson's *Danza Capriccio*, Heitor Villa-Lobos's *Fantasia*, Rudy Weidoeft's *Saxophobia*, and Takashi Yoshimatsu's *Fuzzy Bird Sonata*.

While a single tongue articulation is generally achieved using a "tah" or "too" attack, saxophonist and teacher Keith Young explains that double tonguing requires a softer attack, such as "dah" or "doo." Upon making one of these attacks, the player must immediately follow with "gah" or "goo" syllable from the roof of the mouth. These two syllables will be repeated in rapid succession, either "dah-gah-dah-gah" or "doo-goo-doo-goo." One of the greatest challenges in this process is making the two different syllables sound the same. This is a long process that will become easier over time (Young 55).

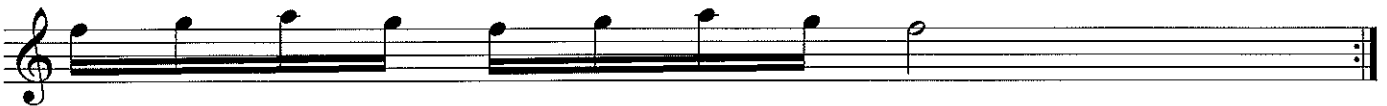
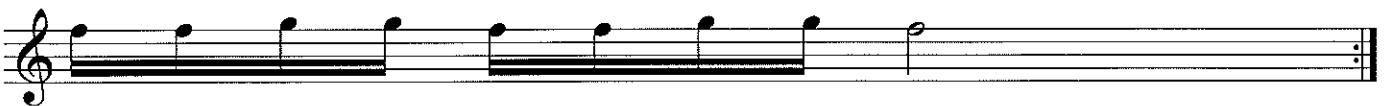
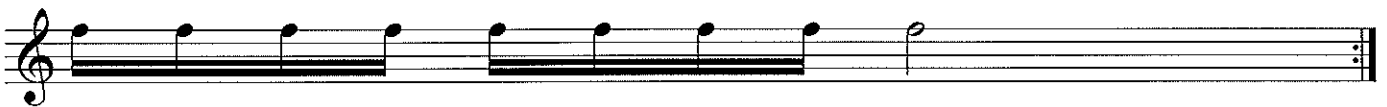
The player should begin by double tonguing legato, connected notes at a slow tempo, gradually increasing the tempo (Young 56). A fast, supported airstream needs to be maintained. This may be exhausting initially, and double tongue practicing may have to be limited to five to ten minutes a day in the early stages. Additionally, the player should not attempt to double



tongue outside of the middle range of the instrument at first, as there is much greater resistance in the extreme upper and lower registers (Young 55).

# Double Tonguing Exercises

Use a "doo-goo" or "dah-gah" articulation for all of the sixteenth notes. Start slowly.



## **Flutter Tonguing**

According to Jean-Marie Londeix, flutter tonguing is a tremolo-like effect that is produced by the rapid beating or rolling of the tip of the tongue (Londeix 45). This tongue rolling is nearly identical to the rolling that is often heard in the pronunciation of Spanish R's. It is also achieved in the same way as a person imitating the purring of a cat. If a player can roll his or her tongue in this manner, he or she is able to flutter tongue (Mauk<sup>2</sup> 18). Major saxophone pieces that contain flutter tonguing include William Bolcom's *Lilith*, Christian Lauba's *Arak*, and Ryo Noda's *Improvisation 1*.

Unfortunately, genetics prevents some players from being able to roll the tongue. These players can achieve a similar flutter effect by "gargling" from the back of the throat. This method, which Steven Mauk refers to as the uvula flutter, produces a lighter flutter effect, and can also be used within softer music (Mauk<sup>2</sup> 18).

The challenge in flutter tonguing comes from the need to sustain the air support and saxophone embouchure while simultaneously rolling the tongue or gargling from the throat (Mauk<sup>2</sup> 18). It is much easier to achieve this while taking very little of the mouthpiece inside the mouth, as any contact between the tongue and the mouthpiece itself will hinder the rolling. Another possibility is to try starting and maintaining the flutter and then inserting the mouthpiece into the mouth (Mauk<sup>2</sup> 19). Additionally, if rolling the tongue, the tongue roll should be kept as compact as possible for the most effective results (Clark 25).

It is absolutely imperative that the rolling of the tongue or gargling of the throat does not impede upon the proper saxophone embouchure, which must remain consistent throughout. It is generally easier to flutter tongue in the low to middle register of the horn and grows more difficult as the player approaches the higher register, as the tongue must remain more arched

there. It may take a long time for the player to reach a level of comfort or consistency in flutter tonguing, but patience and persistence will be rewarded (Mauk<sup>2</sup> 19).

# Flutter Tonguing Exercises

Flutter



## Slap Tonguing

Slap tonguing is a special kind of articulation that produces a distinct popping sound on the reed. The term “slap” is actually a bit misleading. While this term implies that the tongue forcefully strikes the reed to create the desired effect, this is not the case. In actuality, a large portion of the tongue is placed against the reed and suction is created between the tongue and the reed. The slap sound effect is produced when the tongue is quickly and forcefully removed from the reed and this suction is broken, not when the tongue strikes the reed. This is very similar to the popping sound effect that occurs when a suction cup is attached and subsequently removed from a window or other flat surface (Yoder 1). Notable saxophone works that feature slap tonguing include Barry Cockroft’s *Slap Me*, Christian Lauba’s *Jungle*, and Jacob ter Veldhuis’s *The Garden of Love*.

When learning to slap tongue, the player should begin by practicing creating the suction between the tongue and a reed away from the rest of the instrument. This will not create any significant sound, but the player should be able to feel the suction on his or her tongue. Next, this process should be repeated with the normal saxophone setup, but without forming an embouchure. These steps will ensure that the suction is actually created by the tongue, not the oral cavity or anything else. Following this, the player should repeat the process again, this time with a properly formed embouchure. When comfort has been gained here and the desired popping effect has been achieved, airstream and fingerings should be added. This will give the slaps a distinct pitch to be used in context (Yoder 1). In general, slap tonguing is much easier to implement on a saxophone with a larger reed, such as a baritone or tenor saxophone, than one with a smaller reed (Clark 26).

# Slap Tonguing Exercises

Musical staff 1: Treble clef, 4/4 time signature. The exercise consists of four measures. Each measure contains a quarter note followed by a quarter rest. The notes are on the following lines: G4, B4, D5, and F5. A circled phi symbol (φ) is placed below each note. The word "Slap" is written below the first measure. The staff ends with a double bar line and repeat dots.

Musical staff 2: Treble clef, 4/4 time signature. The exercise consists of eight measures, each containing a quarter note on the following lines: G4, A4, B4, C5, D5, E5, F5, and G5. A circled phi symbol (φ) is placed below each note. The staff ends with a double bar line and repeat dots.

Musical staff 3: Treble clef, 4/4 time signature. The exercise consists of four measures. Each measure contains a quarter note followed by a quarter rest. The notes are on the following lines: G4, B4, D5, and F5. A circled phi symbol (φ) is placed below each note. The staff ends with a double bar line and repeat dots.

Musical staff 4: Treble clef, 4/4 time signature. The exercise consists of eight measures, each containing a quarter note on the following lines: G4, A4, B4, C5, D5, E5, F5, and G5. A circled phi symbol (φ) is placed below each note. The staff ends with a double bar line and repeat dots.

Musical staff 5: Treble clef, 4/4 time signature. The exercise consists of four measures. Each measure contains two eighth notes followed by a quarter rest. The notes are on the following lines: G4-A4, B4-C5, D5-E5, and F5-G5. A circled phi symbol (φ) is placed below each pair of notes. The staff ends with a double bar line and repeat dots.

Musical staff 6: Treble clef, 4/4 time signature. The exercise consists of four measures. Each measure contains four eighth notes followed by a quarter rest. The notes are on the following lines: G4-A4-B4-C5, D5-E5-F5-G5, G5-F5-E5-D5, and C5-B4-A4-G4. A circled phi symbol (φ) is placed below each group of four notes. The staff ends with a double bar line and repeat dots.

## **Growling**

As the name of the technique implies, growling produces a rough, growl-like tone. Growling is another extended saxophone technique that is most often heard in jazz music, as well as in other genres such as rock and roll and popular music (Clark 26). However, it has also found a home in contemporary classical music. This is evidenced by its presence in pieces such as William Bolcom's *Lilith*, Frederick Fox's *Annexus*, and Yoshihisa Taira's *Penombres 6*.

Growling is executed in a fairly basic manner. To growl on the saxophone, the player simply needs to hum or sing through the instrument while playing. The pitch produced by the player's voice will clash with the pitch produced by the saxophone, creating the growl effect. While this may sound easy to achieve, it will likely take time and practice to implement properly. Maintaining a correct saxophone embouchure and a consistent airstream will likely prove to be quite difficult, especially early in the learning process (Clark 26).

When learning to growl, saxophonist Andrew Clark recommends beginning without the saxophone. The player should blow a steady stream of air while humming. Once this has been accomplished, the same concept is to be applied with the mouthpiece added. The player will likely be unsuccessful initially and will struggle to hum and play the saxophone simultaneously, allowing either the embouchure or airstream to be compromised while humming. There is no special trick or solution to solving this outside of diligence and persistence (Clark 26).

Once the player can comfortably produce an adequate growl, the next step is learning to control the growl by turning it on and off at will. A good way to practice this is through playing a slow scale and growling on every other pitch. As the player grows more comfortable with growling, he or she may want to experiment with humming different pitches to create different intervals against the pitches being played on the saxophone. This will have an effect on the roughness and overall quality of the resulting growl (Clark 26).





## **Multiphonics**

Multiphonics, which literally means “many sounds,” refers to the production of multiple pitches simultaneously. This effect can be achieved through a combination of specialized fingerings and the manipulation of the oral cavity, very similarly to that of the voicing used for altissimo. The resulting sound is described by Steven Mauk as “a fluttering or warbling chord-like sound, created by the beats present between two or more out-of-tune pitches” (Mauk<sup>1</sup> 34). Major pieces within the saxophone repertoire that contain multiphonics include Ronald Caravan’s *Sketches*, Edison Denisov’s *Sonata*, David Maslanka’s *Sonata for Alto Saxophone and Piano*, and Ryo Noda’s *Mai*.

The first aspect that should be considered when approaching multiphonics is the choice of fingering. The saxophone contains twenty-four different holes that can be covered, leaving a massive number of possible fingerings. Through extensive experimentation and trial and error, numerous multiphonic fingerings have been discovered (Mauk<sup>1</sup> 34). Some of these multiphonics are very easy to produce, while others require significant voicing adjustments and may only be attainable by more advanced players. Additionally, certain fingerings may work differently on different saxophones (Mauk<sup>1</sup> 35).

According to Mauk, the embouchure, airspeed, and mouthpiece position should remain unchanged while playing multiphonics. It is the oral cavity position and voicing that will determine whether a multiphonic will sound properly or not. It is essential for the player to have a great deal of awareness and flexibility in this area (Mauk<sup>1</sup> 35). As such, the previously discussed overtone and pitch bending exercises should be used to develop this and bring greater ease to the playing of multiphonics.

# Easy Multiphonics and Their Fingerings

1 1 1 1 1  
 2 2 2 2 2  
 3 3 B 3 Bb 3 Bb  
 4 4 4 4 4  
 5 5 5 5 5  
 6 6 6 6 6  
 C C C Eb

2 1 1 1 T 1  
 3 Bb 3 3 3 Bb 2  
 4 4 4 4 4 3  
 5 5 5 5 5 4  
 6 6 6 6 6 5  
 Eb C Eb C

1 1 T 1  
 2 2 2  
 3 Bb 3 Bb 3 Bb  
 4 4 4  
 5 5 5  
 6 6 6  
 Eb Eb C

## Circular Breathing

Circular breathing refers to continued playing without pausing to breathe. As saxophonist Peter Corser explains, “to play using circular breathing one needs to create an unbroken cycle of air, including a short moment where you breathe air out of your cheeks while quickly breathing in through the nose.” This technique is incredibly useful in playing very long passages that contain no rests or acceptable places to breathe. However, it can also be highly difficult to learn and execute seamlessly (Corser 44). Saxophone pieces that facilitate circular breathing include Barry Cockcroft’s *Gorge*, Christian Lauba’s *Balafon*, and John Fitz Rogers’s *Breaking*.

The best way to begin learning to circular breathe is by practicing extensively without the saxophone. Corser provides six steps to help learn to create an unbroken flow of air:

- Step 1: Keeping the mouth closed, fill the cheeks with air like a balloon. Blow this air out without using the lungs.
- Step 2: Repeat step 1, but breathe in through the nose while exhaling out of the cheeks. The lungs should be empty to begin with.
- Step 3: Using only the air from the cheeks, blow bubbles into a glass a third full of water through a drinking straw. This step may be made easier by pinching the straw slightly closed so that less air travels through it at once.
- Step 4: Repeat step 3, but breathe in through the nose while exhaling through the cheeks, just like in step 2. Again, the lungs should be empty at the start.
- Step 5: Blow bubbles into the glass using air from the lungs but keeping the cheeks puffed out. When running low on air, use the air from the cheeks to continue blowing the bubbles while breathing in through the nose.

- Step 6: Repeat step 5, but continue to breathe out normally through the lungs again after breathing in through the nose. Keep the diaphragm firm and engaged and push air up from the lungs. While the airstream should ideally be seamless, there will likely be at least a small break in the air after breathing out from the cheeks in the early learning stages. This will be diminished with practice (Corser 45).

After the player becomes comfortable with this process, it can be applied to the saxophone. It is easiest to begin with a soft reed and a mouthpiece with a fairly small opening. It is also easier to circular breathe on a smaller horn, such as a soprano or alto saxophone, than it would be on a larger one. Before attempting to circular breathe while playing moving notes, start with long tones in the upper register and gradually work down to the lower register. Once again, it may be difficult to avoid a gap in the airstream at the beginning of each cycle, but continued practice will help to eliminate this. After growing comfortable with long tones, the process should be repeated over slow, repetitive trills. The player should progressively begin experimenting with different pairings of notes and intervals (Corser 45).



## Works Cited

- Clark, Andrew. "Rock 'N Roll Saxophone: Bending, Circular Breathing, False Fingerings, Flutter Tonguing, Ghosting, Growling, Multiphonics, Slap Tonguing." *Saxophone Journal* 22.1 (1997): 25-26. Print.
- Corser, Peter. "Circular Breathing Masterclass and Play-Along CD." *Saxophone Journal* 30.1 (2005): 44-55. Print.
- Londiex, Jean-Marie. *Hello! Mr. Sax*. Paris: Leduc, 1989. 5, 31, 45. Print.
- Mauk, Steven. Creative teaching techniques –Multiphonics: Meaning many sounds. *Saxophone Journal* 33.3 (2009): 34-35. Print.
- Mauk, Steven. "Creative Teaching Techniques – Teaching Flutter Tongue." *Saxophone Journal* 29.1 (2004): 18-19. Print.
- Mauk, Steven. "Creative Teaching Techniques – Teaching Pitch Bends." *Saxophone Journal* 30.3 (2006): 14-15. Print.
- Saxopedia. "Fingering Chart – Altissimo Register" *Saxopedia*. 27 June 2011.  
<<http://www.saxopedia.com/chart-altissimo-register/>>
- Sinta, Donald. *Voicing: An Approach to the Saxophone's Third Register*. Radford: Sintafest Music Company, 1992. 1-4, 8-9, 59. Print.
- Teal, Larry. *The Art of Saxophone Playing*. Miami: Summy-Birchard, 1963. 98-101. Print.
- Thomas, Pete. "Saxophone Harmonics (Overtones)." *Taming the Saxophone*. 2014.  
<<http://tamingthesaxophone.com/saxophone-harmonics-overtones>>
- Yoder, Rachel. "How to Slap Tongue." *Rachel Yoder Clarinet*. 25 March 2012.  
<<http://www.rachelyoderclarinet.com/2012/03/how-to-slap-tongue/>>
- Young, Keith. "Saxophone Double Tonguing: Saxophone Journal Masterclass CD." *Saxophone Journal* 24.2 (1999): 54-57. Print.